How to Build a Better Brain
Center for Successful Aging
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Barbara Cherry, PhD
Department of Psychology
California State University
Fullerton
Road Map

• Cognition
• Cognitive Reserve
• Telomeres
• Epigenetics
• Building a better brain
  – Engage in meaningful activities
  – Get moving
  – Learn something new
Cognition
Cognitive and Neural Reserve

cognitive

biological
Telomeres

What We Lose With Age

Chromosome

Telomere, a protective covering

As cells divide over time...

telomeres shorten, and eventually cell division stops.

Source: WSI researcher
Epigenetics
Building Cognitive Reserve

- Engage in meaningful activities
- Get moving
- Learn something new
Robot & Frank

http://www.youtube.com/watch?v=9jZlSfsE730
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 Studies I and II
Lifestyle Redesign® Intervention

• Lifestyle focused (activity based)
  – group and individual sessions

• Lifestyle Redesign® is the process of infusing healthy and meaningful activities into day-to-day routines

• Intervention Goal: Assist each participant to develop
  – A personally feasible, healthy lifestyle
  – Sustainable within the individual’s everyday routines
Well Elderly 1 Design

Month

1

Occupational Therapy Intervention

Social Group Control

No Treatment Control

15

Follow

Follow

Health Care Utilization Data Collection
Well Elderly 1 Outcomes

- Vitality
- General Health
- Absence of Health-Based Role Limitations
- Social Functioning
- General Mental Health
- Absence of Bodily Pain
- Physical Functioning
- Absence of Emotion-Based Role Limitations

Comparing Occupational Therapy (blue) and Control (brown) outcomes.
Well Elderly Study 1

Lifestyle Redesign Intervention

Improved Psychosocial and Physical Health

Gains Sustained Six Months Later

Cost Effective
Well Elderly Study II
Pre-Post Intervention
All Participants Receiving Intervention

Month | 1 | 6 | 12 | 18 | 24
--- | --- | --- | --- | --- | ---
Group A Intervention
Group B Control
Group B Intervention
Well Elderly Study II: Pre-Post Intervention
All Participants Receiving Intervention (n = 326)

<table>
<thead>
<tr>
<th>Health-Related Quality of Life - SF36V2</th>
<th>Life Satisfaction - LSI-Z **</th>
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</thead>
<tbody>
<tr>
<td>Mental Health</td>
<td>***</td>
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<tr>
<td>Social Function</td>
<td>*</td>
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<tr>
<td>Vitality</td>
<td>**</td>
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<tr>
<td>Bodily Pain</td>
<td>***</td>
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<tr>
<td>Composite: Mental</td>
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<tr>
<td>Composite: Physical</td>
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<tr>
<td>General Health</td>
<td>*</td>
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<td>Physical Function</td>
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<td>Role Emotional</td>
<td>*</td>
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<tr>
<td>Role Physical</td>
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Depression - CES-D **

Cognition

<table>
<thead>
<tr>
<th>Memory - CERAD</th>
<th></th>
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<tbody>
<tr>
<td>Immediate Recall</td>
<td>**</td>
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<tr>
<td>Delayed Recall</td>
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<tr>
<td>Recognition</td>
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<tr>
<td>Visual Search</td>
<td>***</td>
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<tr>
<td>Psychomotor Speed</td>
<td>*</td>
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Well Elderly Study II Conclusions

• No significant direct effects of the intervention

• Effects on physical and cognitive health were indirect
  – Activity-related measures
    • Activity frequency
    • Activity purpose
Path Analysis

Activity Frequency

Activity Purpose

Perceived Control

Active Coping

Social Support

Covariates
- Age
- Education
- Gender
- Ethnicity

Significant Relationships

Non-significant Relationships

Program

LSI-Z

CES-D

SF-36v2 Physical

SF-36v2 Mental

Path Analysis

Activity

Purpose

Perceived

Active Coping

Social Support

Control

Covariates

Age

Education

Gender

Ethnicity

0.099

0.132

0.090

0.202

-0.175

0.102

0.196

0.151

-0.153

0.162

-0.192

0.197

0.110

Significant Relationships

Non-significant Relationships
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.
Building Cognitive Reserve

- Engage in meaningful activities
- Get moving
- Learn something new
Exercise your body

- Oxygen to the brain
- Running in rats
  - Improves learning
  - Stimulates synaptic plasticity
- AD mice and exercise
  - Improves learning
  - Less beta-amyloid
Exercise your body

• Better physical performance is related to higher cognitive function
Adults 50 years and older

- 2007 study
  - 51 participants with fibromyalgia
  - Physical performance predicted cognitive function

- 2008 study
  - Physical & cognitive status of participants (50+ yrs.) with and without fibromyalgia
  - Physical performance predicted cognitive function

- 2010 and 2012......
Keep moving!

• Take the stairs

• Park farther from the door

• Walk a dog
  – borrow a dog
Building Cognitive Reserve

- Engage in meaningful activities
- Get moving
- Learn something new
Exercise your brain

• Play games

• Play NEW games!

• Memorize something

• Learn something new
Brain Games

- Nifty after Fifty
- Memory Bootcamp (UCLA)
- Posit Brain Fitness Program
- Wii
- Or....... visit your computer
Brain Fitness


Cognitive Reserve

- Intelligence
- Education
- Eat right
- Hang with friends
- Be happy
- Meaningful activities
- Get moving
- Learn something new

Happiness and Aging

The U-bend
Self-reported well-being, on a scale of 1-10
