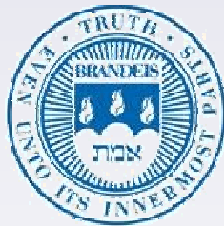


Mechanisms of Age-Related Cognitive Change/Targets for Intervention: **Social Interactions/Stress**



Margie E. Lachman
Brandeis University

No Conflicts

Discussion

Cognitive Aging Summit II
FNIH/NIA/McKnight Foundation

Washington DC, October 4-5, 2010

Support from NIA: RO1 AG032271, RO1 AG17920, PO1 AG20166

Current (Lack of) Knowledge

- Many reliable associations with level of cognitive functioning, but not with change
- Unclear directionality of social relations, stress and cognitive functioning
- *“Firm conclusions cannot be drawn about the association of any modifiable risk factor with cognitive decline or Alzheimer’s Disease”*

NIH State-of-the-Science Conference, April 2010

Pieces of the Puzzle

- Early Life Factors
 - *Education*
- Physical Factors
 - *Health*
- Psychological Factors
 - *Personality, Self-Efficacy, Control Beliefs, Coping*
 - *Stress- Chronic, Acute, Daily, Cumulative, Reactivity*
- Social Factors
 - *Social Ties, Network, Integration, Support, Conflict*
- Behavioral Factors
 - *Exercise, Cognitive Activity*



But...

How do these psychosocial and behavioral factors get *under the skull*?

- What are the pathways?
- If we modify these factors, does this affect cognitive aging?



Some Possible Mechanisms

- Health and Disease
- Hormonal Factors (e.g., Cortisol, Oxytocin)
- Allostatic Load (e.g., Inflammation, Metabolic Parameters)
- Neural Plasticity
- Motivation, Effort, Strategy Use
- Rumination, Intrusive Thinking, Distraction
- Emotional Factors, Depression, Anxiety



Putting the Pieces Together

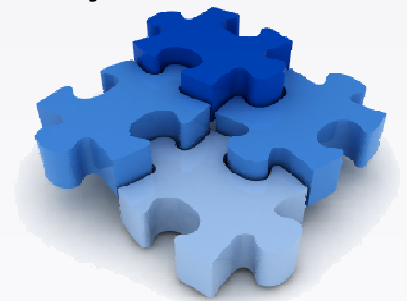
Identify Mechanisms

Suggest Targets for Interventions

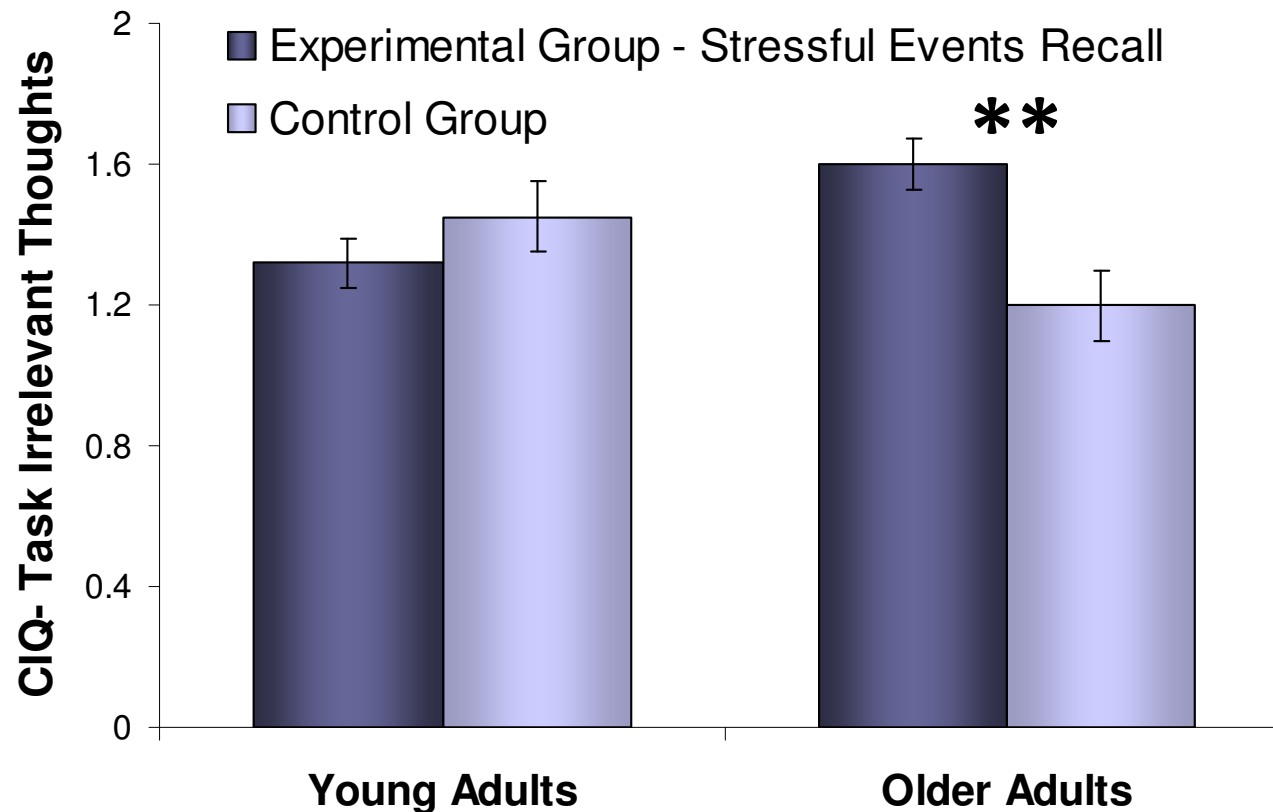
- Mediation
 - *Multiple Mediators*

- Moderation- Interactions
 - *Age, Stress, Intrusive Thoughts and Memory*
 - *Education, Cognitive Activity and Memory*

- Composites- Combined Effects
 - *Protective Effects for Reasoning*

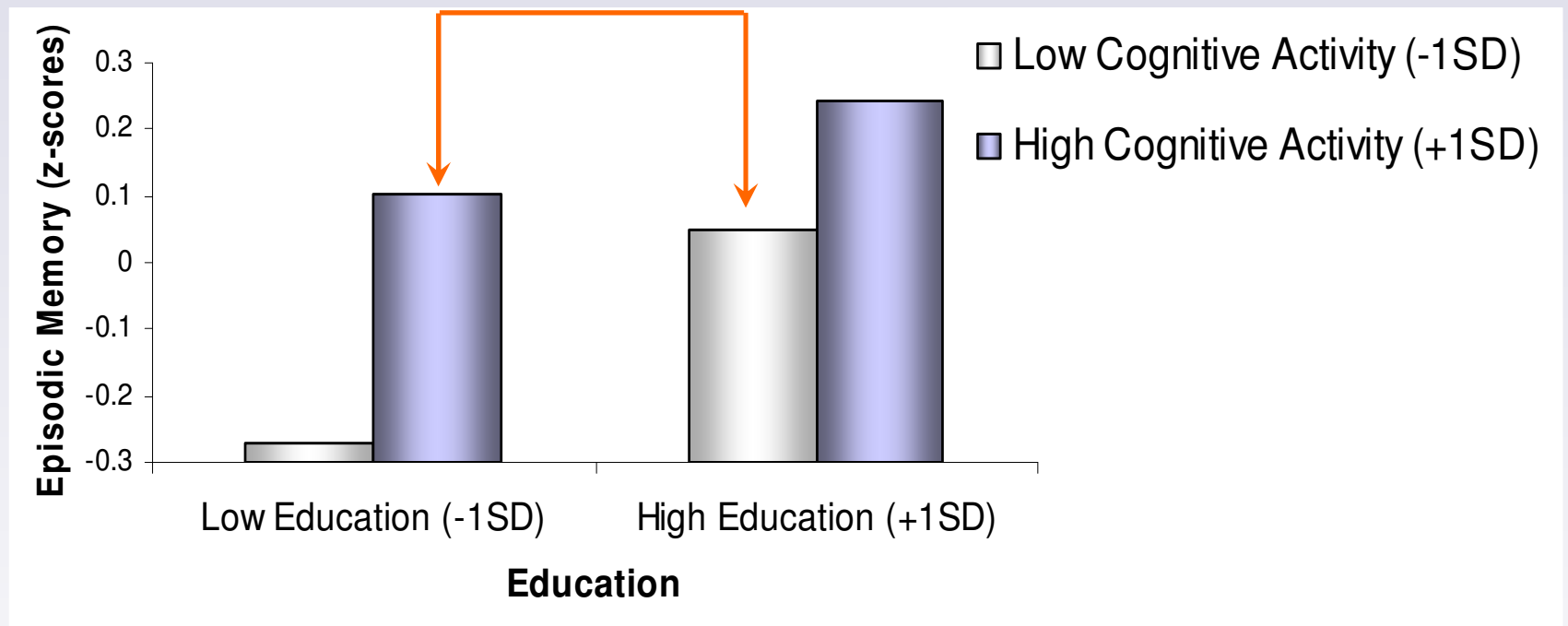


Effects of Stress Condition on Task Irrelevant Thoughts Vary by Age



(Rosnick & Lachman, 2009)

Frequent Cognitive Activity Moderates Education Differences in Episodic Memory



Midlife in the U.S. (MIDUS)

(Lachman, Agrigoroaei, Murphy & Tun, 2010)

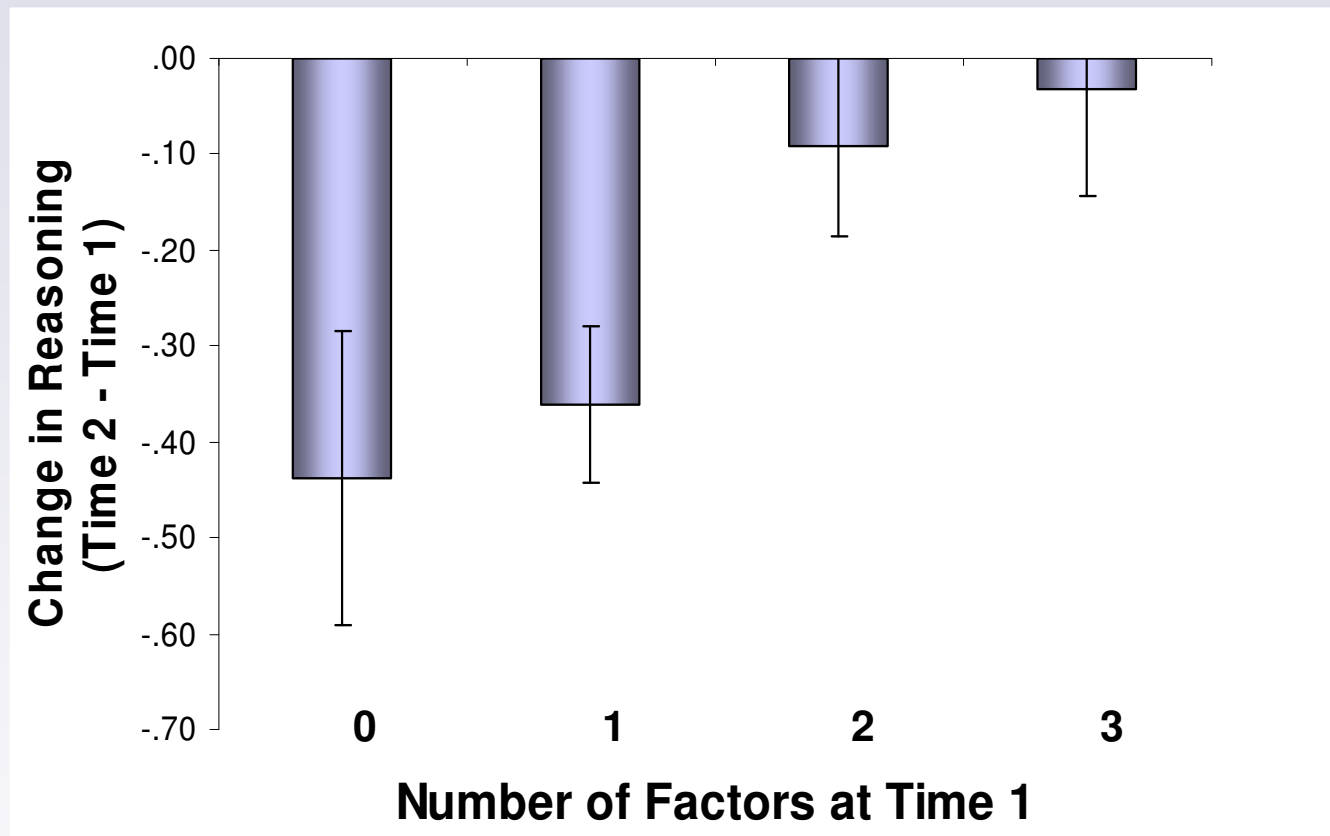
Controlling for age, sex, self-rated health, physical activity, and income

Composites- Combined Effects

Factors

- **Social**
 - Good quality social relations- High support, low strain = 1
- **Psychological**
 - High sense of control- High mastery, low constraints = 1
- **Physical/Behavioral**
 - Frequent vigorous physical exercise = 1
- Composite Scoring 0 to 3 (low or high on each factor)

Protective Effects of Composite for 10-year Changes in Reasoning



Boston Subsample of MIDUS (Agrigoroaei & Lachman, 2010)

Controlling for age, sex, education, race, waist circumference, smoking, alcohol problems, functional health

Intervention Approaches

- Multimodal, Multifaceted
- Integrated into Everyday Life
- Preventive
- Target Vulnerable High Risk Groups

- Experience Corps (*Fried et al.*)
- Healthy Lifestyle Program (*Small et al.*)
- Computer-Mediated Support Groups (*Rains & Young*)

Improve Existing Social Relations or Cultivate New Ones

Next Steps

- Conduct Multidisciplinary Studies
- Integrate Findings from Epidemiological (Survey) and Experimental (Lab) Studies
- Examine Antecedents of Intraindividual Change and Variability with Longitudinal, Prospective Data
- Test Mechanisms and Treatment Benefits with Interventions/RCT's
- Consider Social Policies to Facilitate Social Interactions, Reduce Stress and Promote Cognitive Health

Summary and Conclusions

Explanation and Modification of Age-Related Cognitive Change

■ Mechanisms

- Multiple Pathways/
Mediators/Moderators
- Multifaceted/Composites

- *All Roads Lead to Rome*
- *There is More than One Way to Skin a Cat*
- *Moderation in All Things*
- *The More the Merrier*
- *The Whole Is Greater Than the Sum of Its Parts*

■ Interventions

- Multimodal
- Prevention

- *Kill Two Birds with One Stone*
- *The Early Bird Catches the Worm*
- *An Ounce of Prevention is Worth a Pound of Cure*

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