

# Social Networks and Health

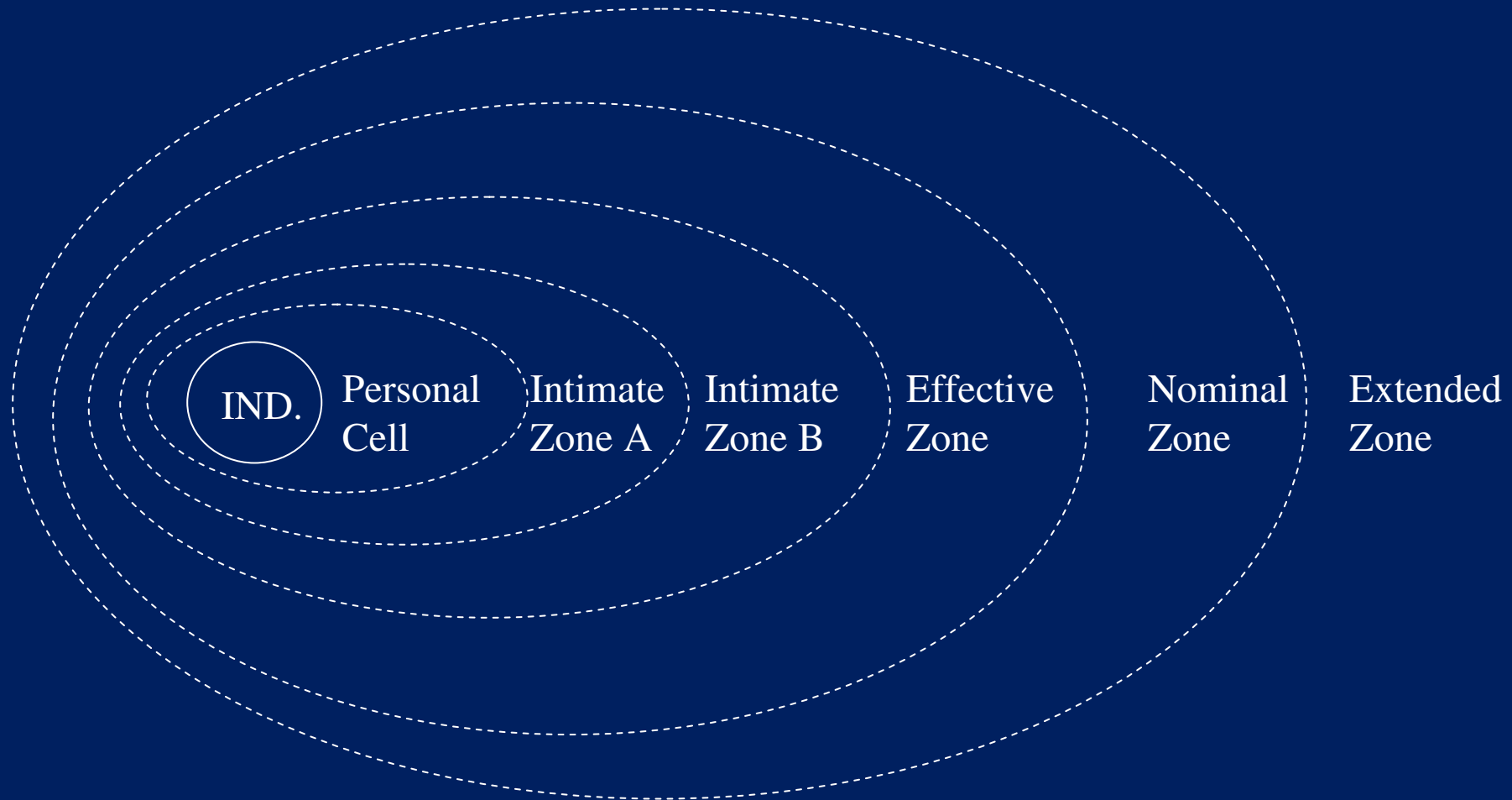
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Director, Harvard Center for Population and  
Development Studies

WHO

Geneva, June 2-4, 2010

# Social Network Model



Source: Bolssevain, Jeremy: Friends of Friends, 1974

# Conceptual Model of How Social Networks Impact Health

← **Upstream Factors**

**Downstream Factors** →

Condition: the extent, shape, and nature of...

Which provides opportunities for...

Which impacts health through the following...

## Social-Structural Conditions (Macro)

### Culture

- Language
- Norms and values
- Competition/cooperation

### Socioeconomic Factors

- Inequality
- Discrimination
- Conflict
- Labor Market structures

### Sociogeographic Factors

- Urban/rural
- Neighborhood characteristics
- Residential and occupational segregation

### Social Change

- Urbanization
- War/civil unrest
- Economic depression

## Social Networks (Mezzo)

### Network Structure

- Size
- Density
- Reciprocity
- Reachability
- Proximity
- Organizational structure
- Social ranking

### Network Activation

- Frequency of face-to-face interaction
- Frequency of nonvisual contact
- Frequency of organizational participation (attendance)
- Duration and intensity o

## Behavioral Mechanisms (Micro)

### Social Support/conflict

- Instrumental and financial
- Informational. Appraisal
- Emotional
- Conflict/negative

### Access to Resources and Material Goods

- Jobs/economic opportunity
- Access to health care
- Housing
- Human capital
- Referrals/institutional contacts

### Social Engagement

- Physical/cognitive exercise
- Reinforcement of meaningful social roles
- Interpersonal attachment

### Social Influence

- Constraining/enabling influences on health behaviors
- Attitudes and norms toward help-seeking
- Attitudes and norms toward treatment adherence

## Pathways

### Psychobiological Pathways

- Stress-response/allostatic lode
- Immune system function
- DHEA levels
- Glucocorticoid levels
- Blood pressure
- Cardiovascular reactivity
- inflammattion

### Health Behavioral Pathways

- Smoking/alcohol consumption
- Diet
- Exercise
- Adherence to medical treatments
- Help-seeking behavior

### Psychosocial Pathways

- Self-efficacy
- Coping effectiveness
- Relaxation/stress management
- Depression/distress
- Sense of well-being/QOL

The upside of social integration,  
social support:  
experimentally induced support  
or disease exposure

# Pittsburgh Common Cold Study N=276:

Cohen et al JAMA, 1997

**VIRUS**



6 Day Quarantine

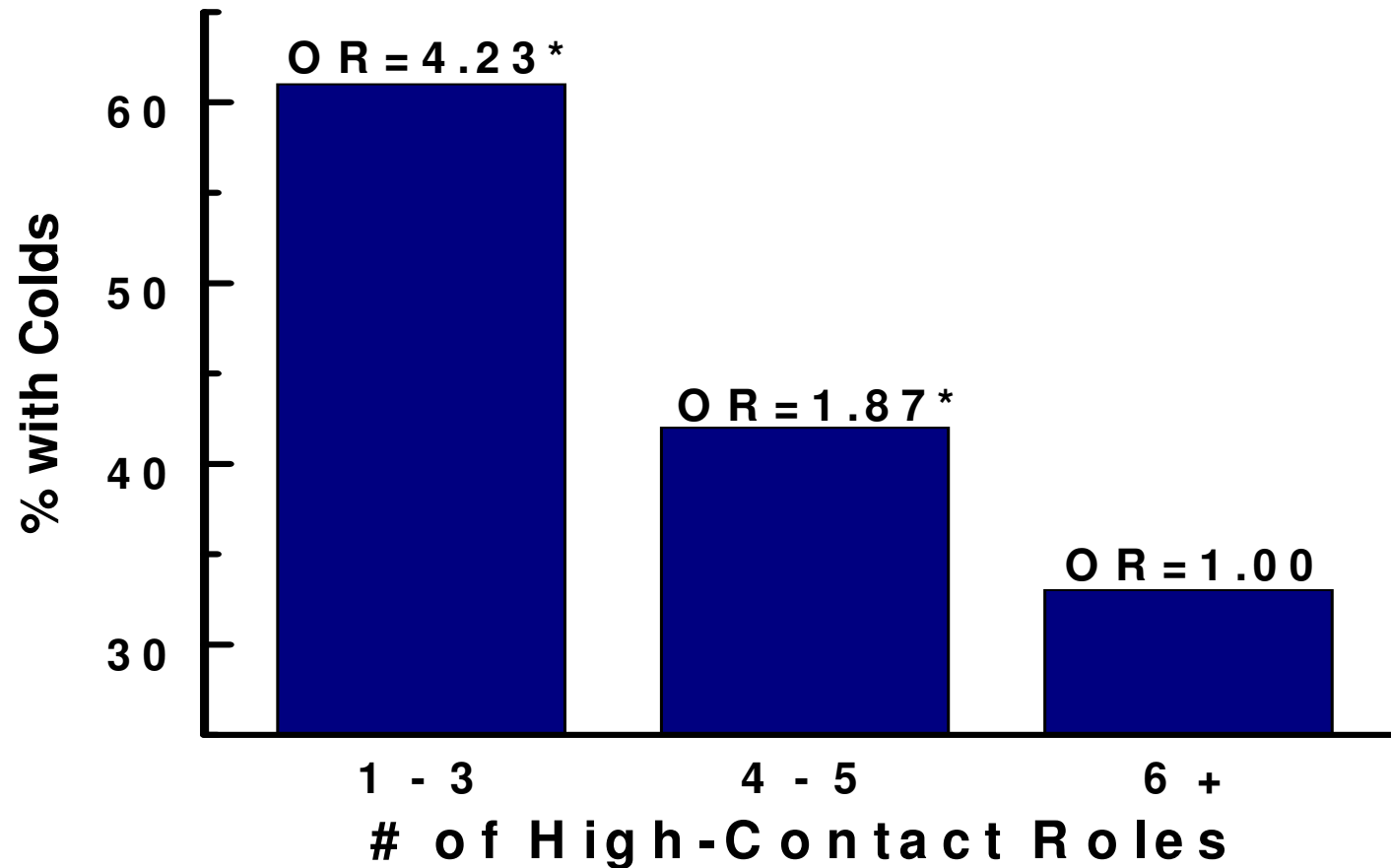
**Social Roles**



**Clinical Colds**

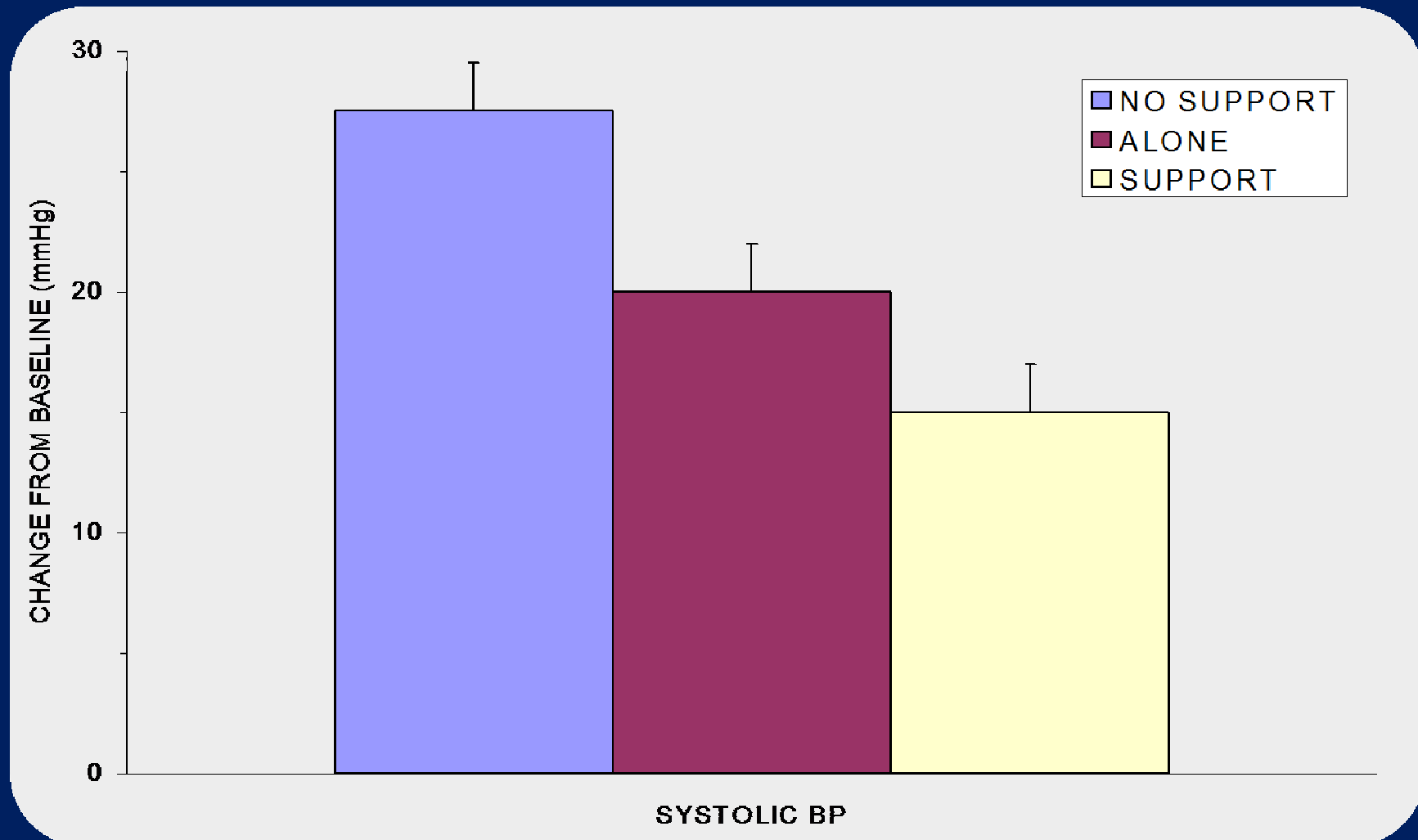
# Social Roles and Colds

Cohen et al JAMA, 1997



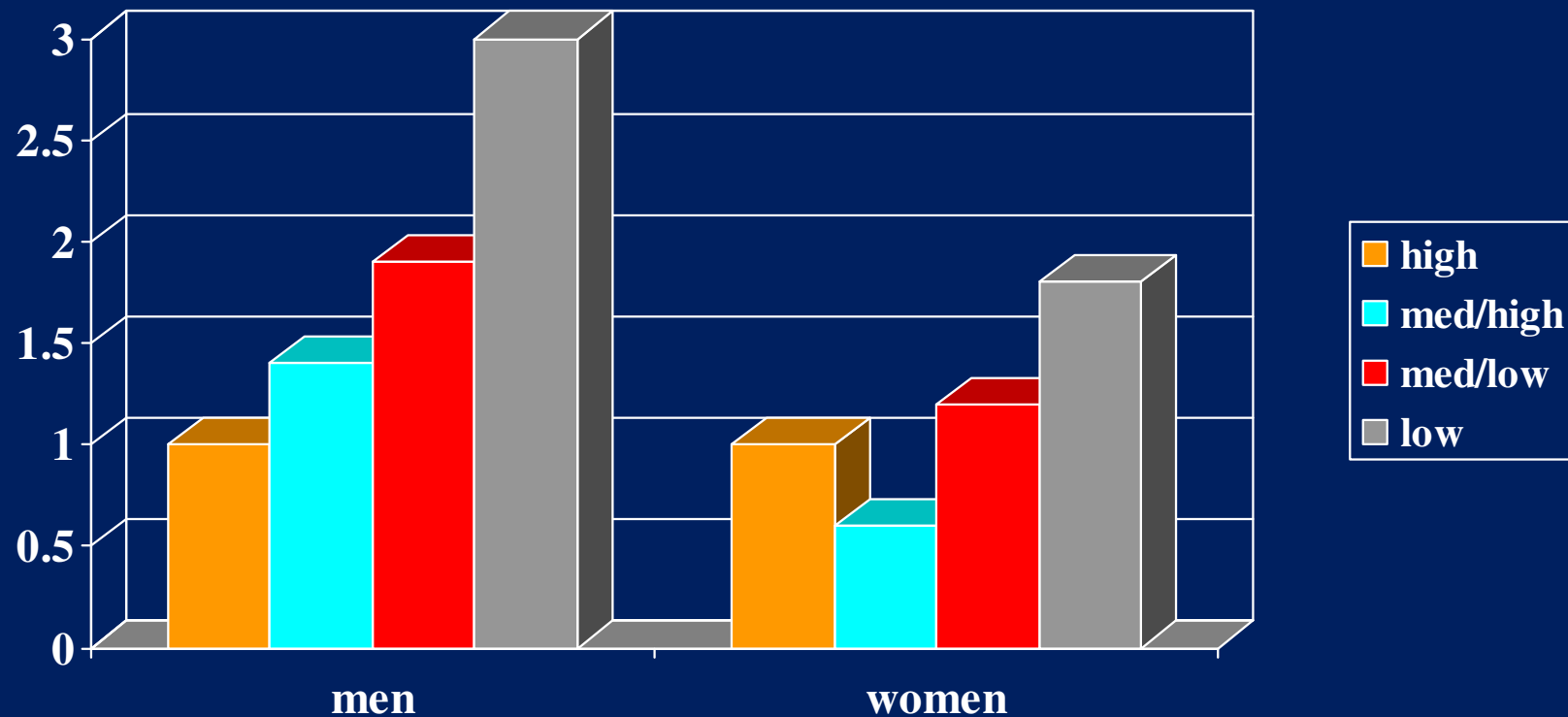
(Odds ratios are adjusted for control variables.)

# Social Support and Blood Pressure Reactivity to Challenge: experimentally induced blood pressure reactivity



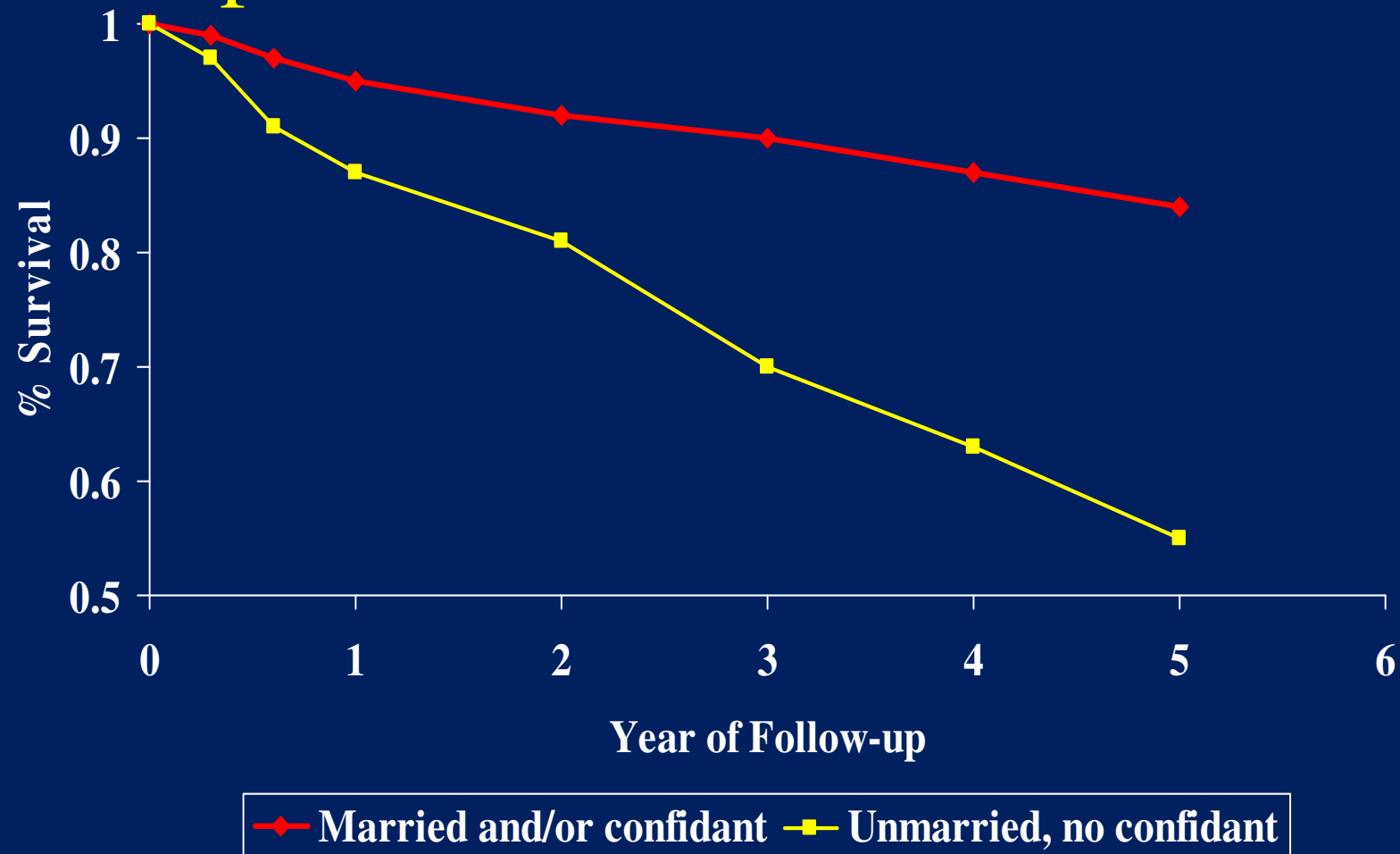
# Social Networks and Health: results from observational studies

# Social integration and mortality in a French occupational cohort: EDF-GDF employees

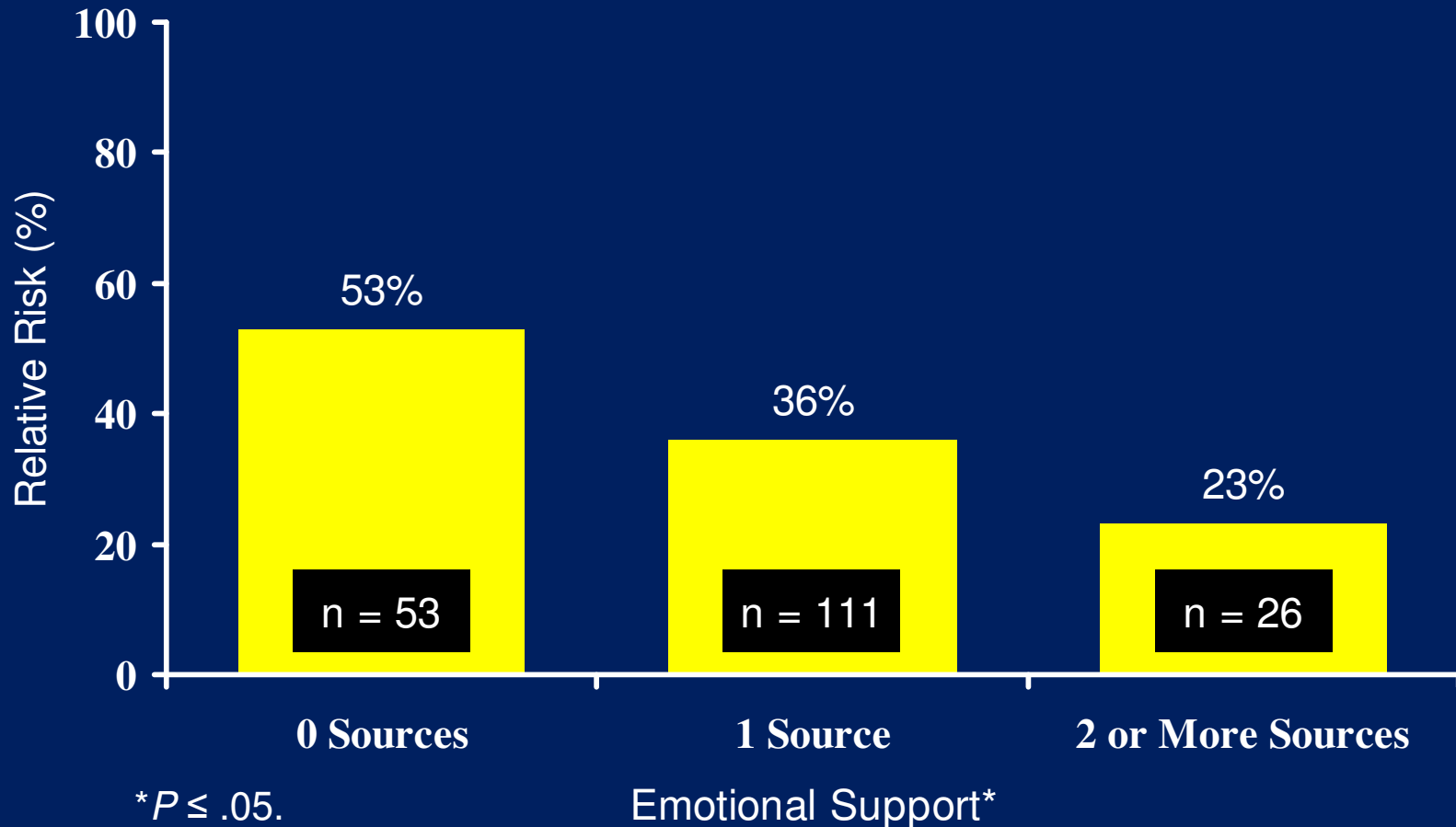


Adjusted for age, occupational grade, cigarette smoking, alcohol consumption, BMI, depressive symptoms, self-rated health, and geographical region.

# Survival curves by marital status and presence of close confidant



# 6-Month Mortality post MI by Emotional Support: EPESE



Source: Berkman, Leo-Summer, Horwitz: Emotional Support and Survival Following Myocardial Infarction. Ann Intern Med, 1992

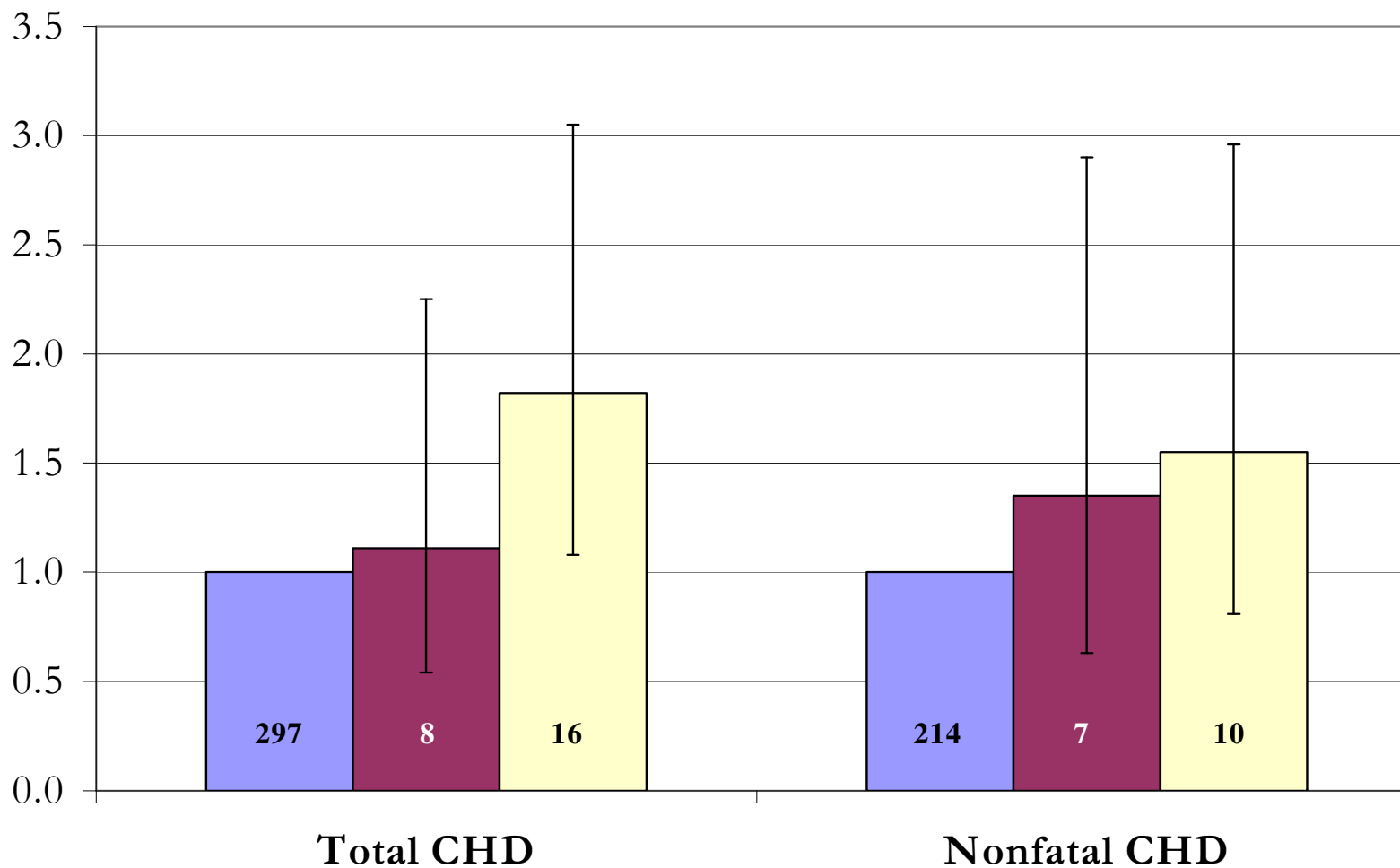
# Caregiving: the upside and downside

# Caregiving in the Nurses Health Study.

Lee, Colditz, Berkman, Kawachi, AM J Prev Med  
2003;24(2):113-119

- 54,412 women in the Nurses Health Study, ages 46-71 (no documented CHD)
- Information on caregiving in 1992
- CHD follow up 1992-1996
- 321 incident cases, 231 nonfatal, 90 fatal

# CHD Risk: Caregivers of Disabled/Ill Spouse



Hours of Caregiving Per Week: 0 1-8 >=9

# Mounting evidence that caregiving takes a toll

- Schulz and Beach. Caregiving strain increases mortality risk ( RR=1.63)
- Caregivers have poorer immune function, slower at wound healing( Kiecolt-Glaser et al)
- Caring for disabled child , telomere length and telomerase ( Epel, Blackburn et al)
- Caring for cognitively ill is especially stressful(EPESE)

Social integration predicts  
the preservation of memory in  
US elderly:  
Findings from the Health and  
Retirement Study

Karen A. Ertel

M. Maria Glymour

Lisa F. Berkman

# Methods: Study Sample

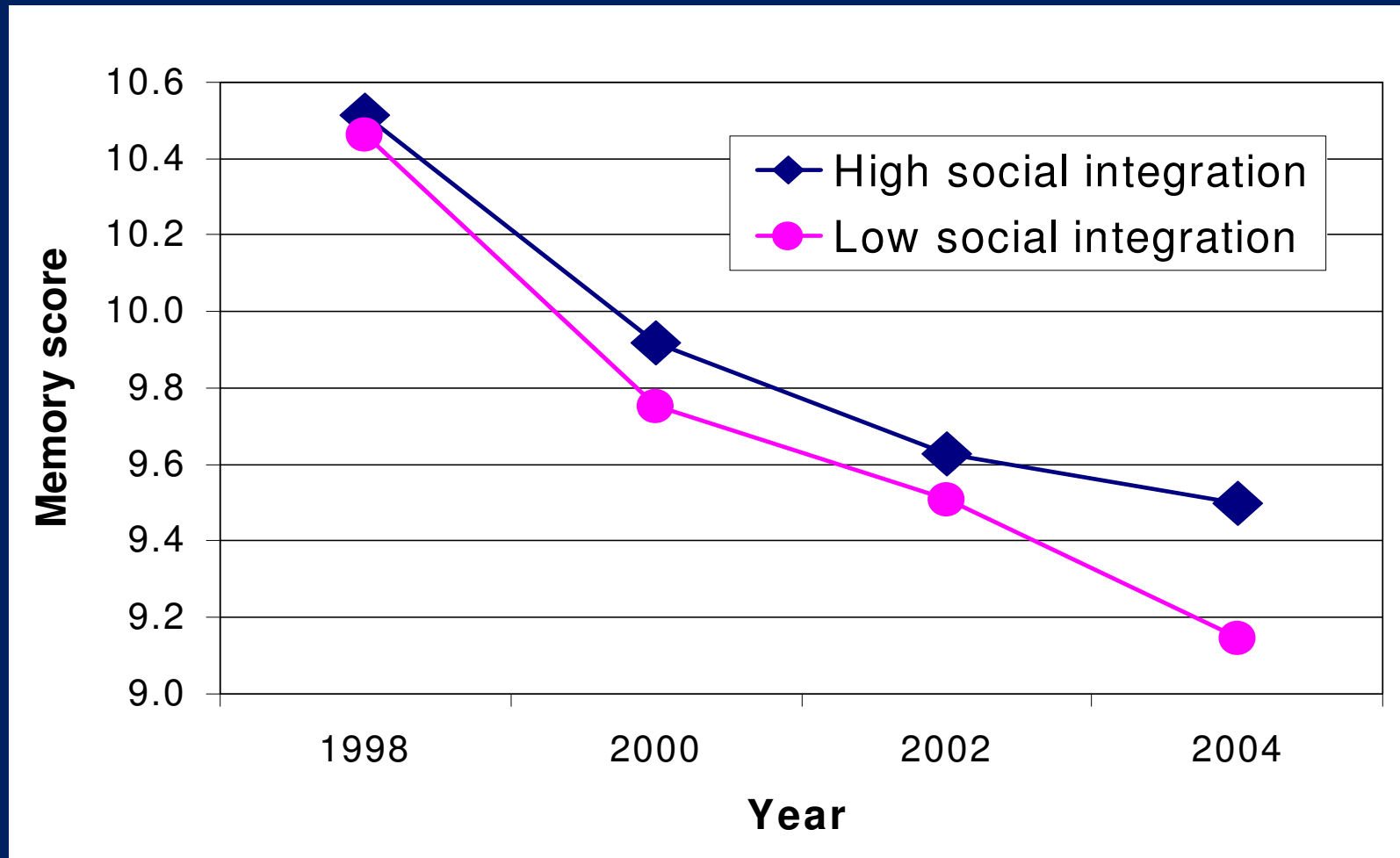
- Health and Retirement Study (HRS)
- Nationally-representative sample of US residents born before 1948
- 4 waves of data collection:
  - 1998, 2000, 2002, 2004
- N=16,638

# Methods: Exposure Measure

- Social integration at baseline (1998)
  1. Marital status
  2. Volunteer activities
  3. Contact with parents
  4. Contact with children
  5. Contact with neighbors

Possible scores: 0, 1, 2, 3, 4, 5

# Results: Trajectory of memory scores comparing subjects with high versus low social integration



Predictions are for white males with mean age, income, wealth, and education, and healthiest baseline scores for all health measures.

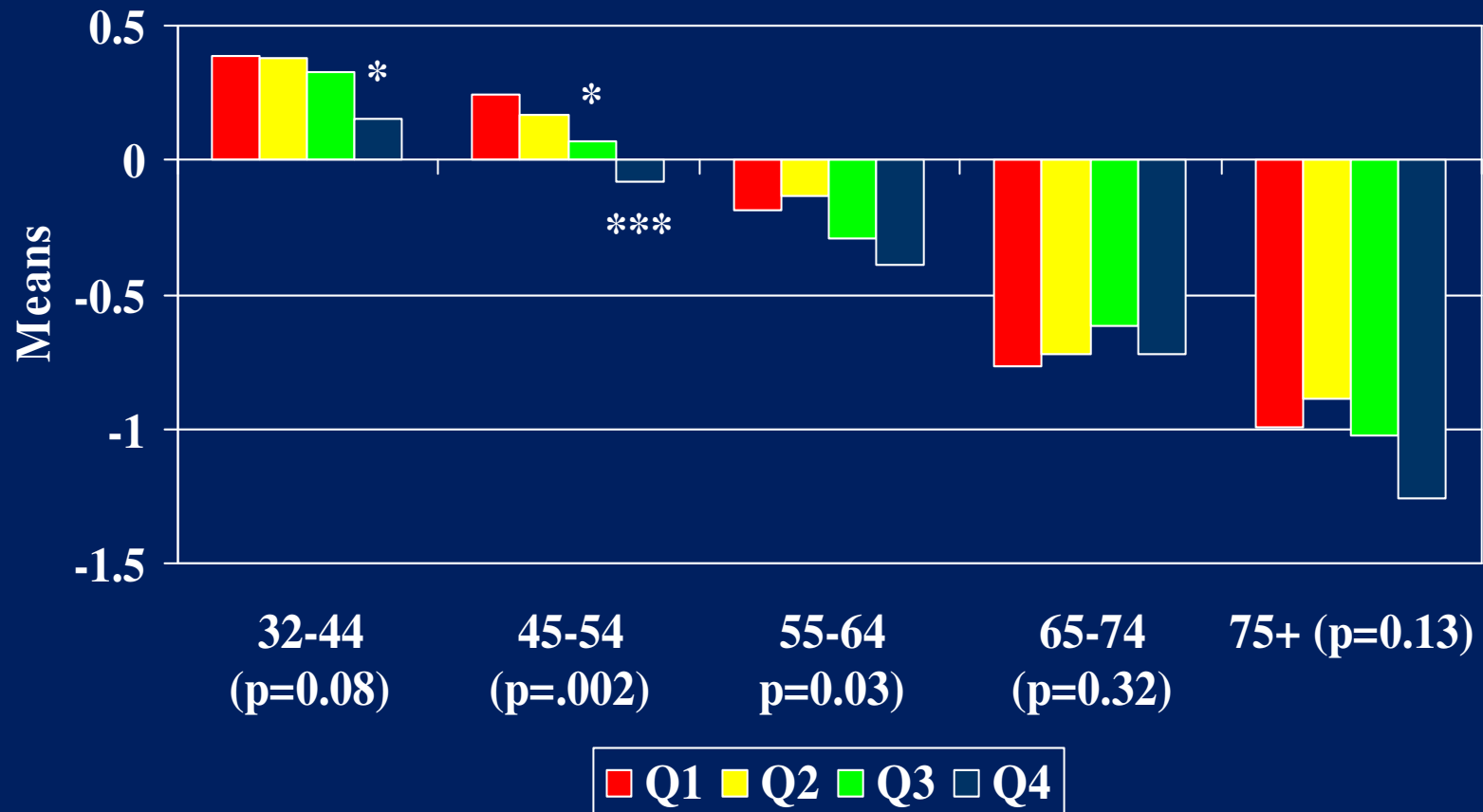
# MIDUS Brief Test of Adult Cognition by Telephone (BTACTION)

(Lachman & Tun, 2008)

TASK	THEORETICAL CONSTRUCT(S)	SAMPLE ITEMS
Word List Recall (immediate and delayed)	Episodic verbal memory	15 words (e.g., flower, truck, school)
Backward Digit Span	Working memory	Spans from 2 to 8 (e.g., 7, 2, 5, 3 = 3, 5, 2, 7)
Category Verbal Fluency	Executive function, semantic memory	List as many animals as possible in 60 seconds
Number Series	Inductive reasoning	5 series of 5 numbers (e.g., 35, 30, 25, 20, 15... correct answer = 10)
Backwards Counting	Processing speed	Counting backward quickly from 100
Attention-Switching, Stop and Go Task Switch	Reaction time, attention, task switching	<p><i>Normal condition:</i> Green = Go; Red = Stop</p> <p><i>Reverse condition:</i> Green = Stop; Red = Go</p> <p>With mixed and switched trials</p>

# Executive Function & Social Conflict [avg. M1&M2]

## Age stratified



Can we intervene to promote  
health by improving social  
networks and social support?

# ENRICHD-Enhancing Recovery in coronary heart disease: Objective

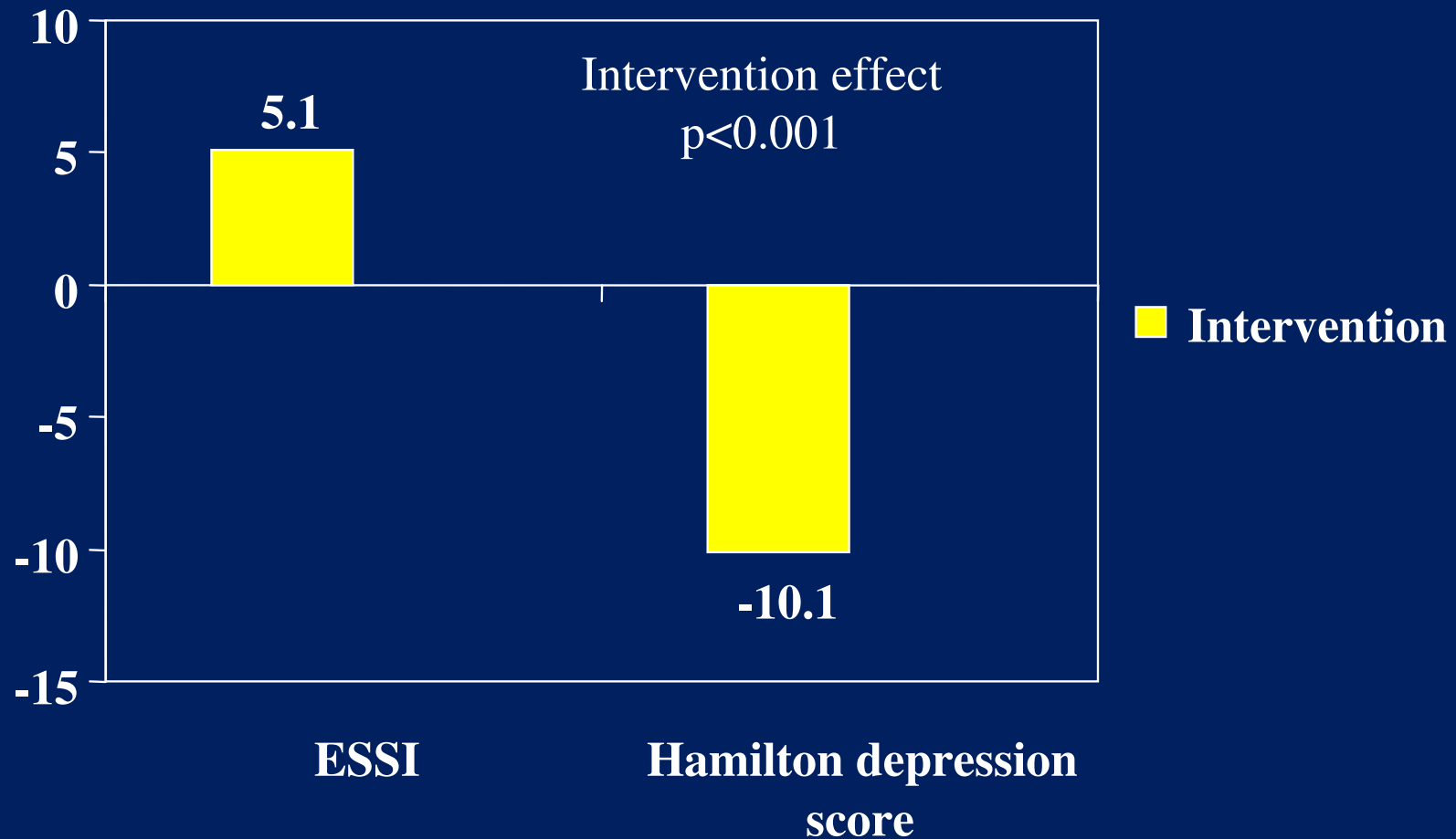
Berkman et al: *Effects of Treating Depression and Low Perceived Social Support on Clinical Events After Myocardial Infarction: ENRICHD Randomized Trial*. JAMA, 2003. **289**(23)

- To test the hypothesis that treatment of depression and low social support early after an acute myocardial infarction will reduce death and nonfatal recurrent infarctions.

# Study Design ENRICHD JAMA 2003;289:3106

- Randomized, parallel-group clinical trial to compare the efficacy of a psychosocial intervention vs. usual care
- 2,481 post-MI patients with depression or low social support
- Average 3.4 years of follow-up
- Blinded ascertainment of primary endpoint
- Intention to treat analysis

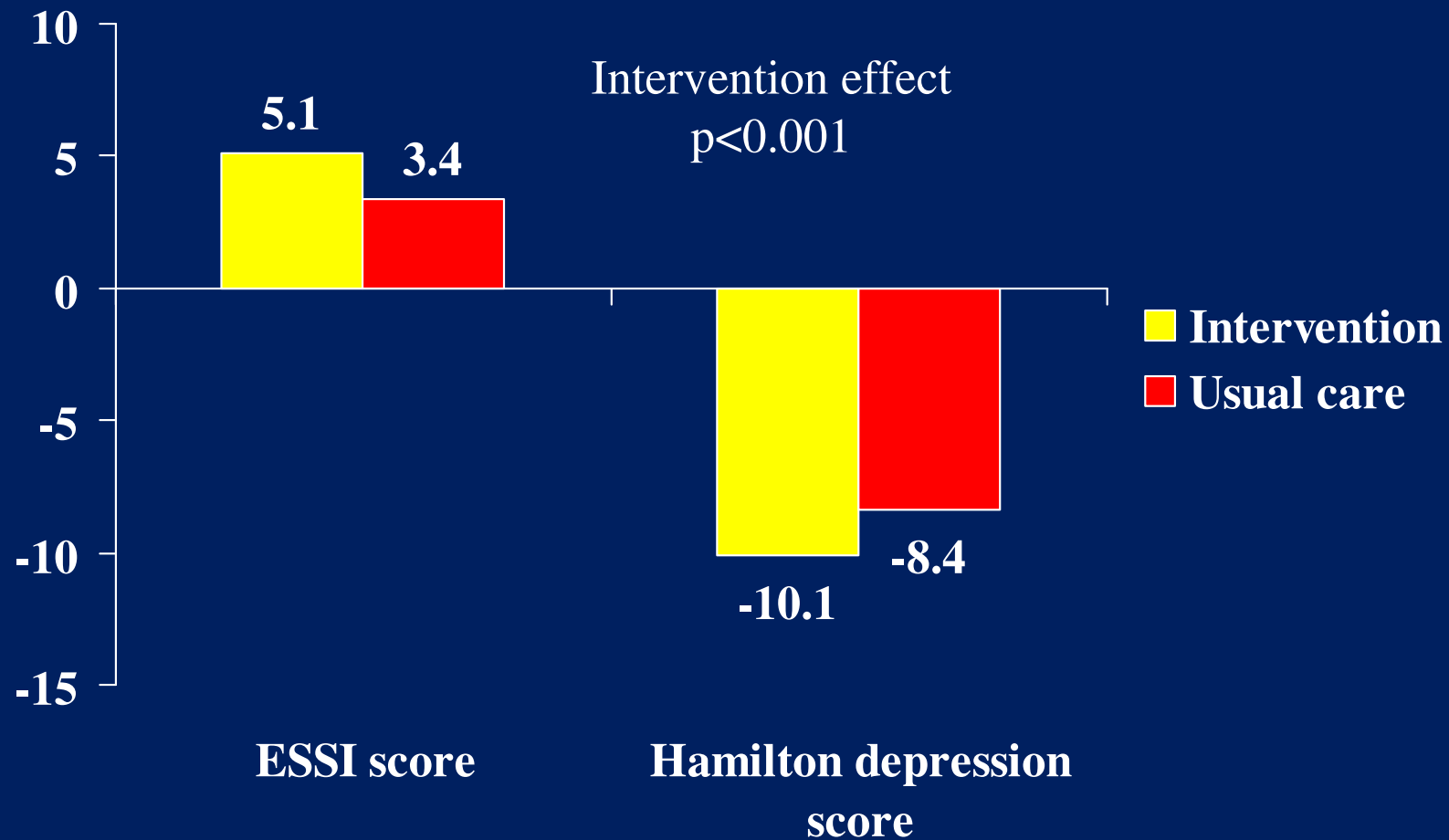
# Baseline to 6-month Changes in Social Support and Depression



ESSI reported for patients with low social support only

Hamilton depression score reported for depressed patients only

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# Kaplan-Meier Survival Curves

