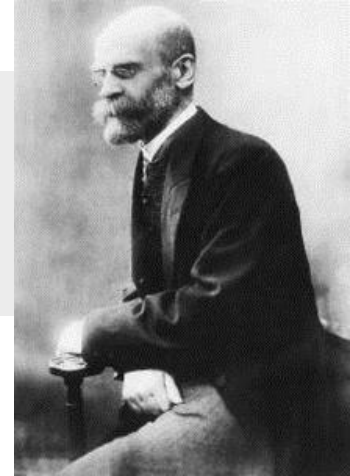# Offspring's Schooling and Inflammation of Older Adults

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Family Resources and Health

Social relationships and wellbeing (Durkheim, 1897)

Family—the most significant institution that affects individuals' wellbeing by providing psychosocial resources or strains (Carr et al., 2014)

- Social support and control are the most common means whereby family members affect an individual's wellbeing (House et al., 1985; Umberson, 1992)

- Quality or efficacy of support from family members may vary by family member's resources (e.g., education)

Changes in Family Influence over the Life Course

From childhood to young adulthood, parents have a strong effect on their children's wellbeing (e.g., Conger et al., 1994)

In adulthood, marriage results in a decline of parents' influence on health because marital partners tend to monitor one another's health (Umberson, 1992)

In old age, the intergenerational influences from parents to children may flow in the opposite direction (Silverstein et al., 2002)

Children's Education and Health of Older Adults

Having well *vs.* poorly educated children

- Lower functional limitations in Taiwan (Zimmer et al., 2002)

- Lower risk of mortality in Taiwan, the U.S., and Sweden
  (Zimmer et al., 2007; Friedman and Mare, 2014; Torssander, 2013)

- More exercise and less smoking in the U.S. (Friedman and Mare, 2014)

- Lower depressive symptoms in Taiwan (Lee et al., under review)

✓ **No prior work on offspring's schooling and biological risk**

- **Inflammation**— a important biological mechanism linking education to functional limitations, morbidity, and mortality

Potential Mechanisms

Behavioral (lifestyle)
Smoking
Exercise
Diet
Alcohol use

Psychological
Stress exposure
Psychological distress
Social class identity

Health care
Access to care
Insurance coverage
Medication adherence

Well educated
children

Network resources
Social control
Social support

Lower levels of
inflammation

Health and
wellbeing in old age

Gender Differences

Resource substitution

- Individuals who are otherwise disadvantaged are more likely to benefit from alternative resources to their own (Ross and Mirowsky, 2006)

  - ✓ Given gender differences in SES, women may rely on well educated children more strongly than men

Child and mother *vs*. father relationship

- Child–parent ties may be especially deep for women (Bowlby, 1988)

  - ✓ Mothers generally derive greater health benefits from increases in children's schooling

Network stress

- Older women are more vulnerable than older men to network events that happen to family members (Lee et al., 2014)

Hypotheses

1. Children's education is negatively associated with inflammation of their parents even after accounting for a respondent's own and other measures of SES

2. Psychosocial and behavioral factors partially explain the association

3. Women are more likely than men to benefit from children's education

Data and Methods

Data: Taiwanese Longitudinal Study of Aging (TLSA) in 1996, 1999
Social Environment and Biomarkers of Aging Study (SEBAS) in 2000

Sample: 943 Taiwanese (aged 50+; 42% women) who, as of 1996, had a child

Measures:
Education of family members

- Years of education (measured in 1996), ranging from 0 to 17, for each family member—respondent, spouse, children

- For meaningful comparisons across generations, the measure of education for each family member was z-scored

- Children's education: the mean education of all living children

Data and Methods

Inflammation index (range: 0-5) in 2000
CRP, IL-6, sIL-6 R, sE-selectin, and sICAM-1
- High risk-cutoffs: CRP (> 3.0) , otherwise above the 80th percentile

Psychosocial factors in 1999
- <u>Exposure to stressors</u> (range: 0-6)
  - Marital disruption, moving, children's and spouse's health, economic condition, changes in financial situation
- <u>Perceived stress</u> (range: 0-12)
  - Whether R's work, family or daily life bring stress and worries

Behavioral factors in 1999
- Healthy diet: eating vegetables and fruits daily (yes/no)
- Exercise (0=none - 4=vigorous); Normal BMI (=18.5 - 22.9)
- Current smoking (yes/no); Daily drinking (yes/no)

Data and Methods

Controls in 1996:
- Age, ethnicity, marital status,
- Num of children, co-residence with children
- Occupational prestige (respondent, spouse)
- Health status (e.g., depression, num of chronic diseases)

Analytic strategy

- Step 1: children's education → parental inflammation

- Step 2: children's education → psychosocial and behavioral factors

- Step 3: children's education → parental inflammation (after including psychosocial and behavioral factors)

- Sex-stratified models
  - OLS, Poisson, Ordered logit, or Logit regression
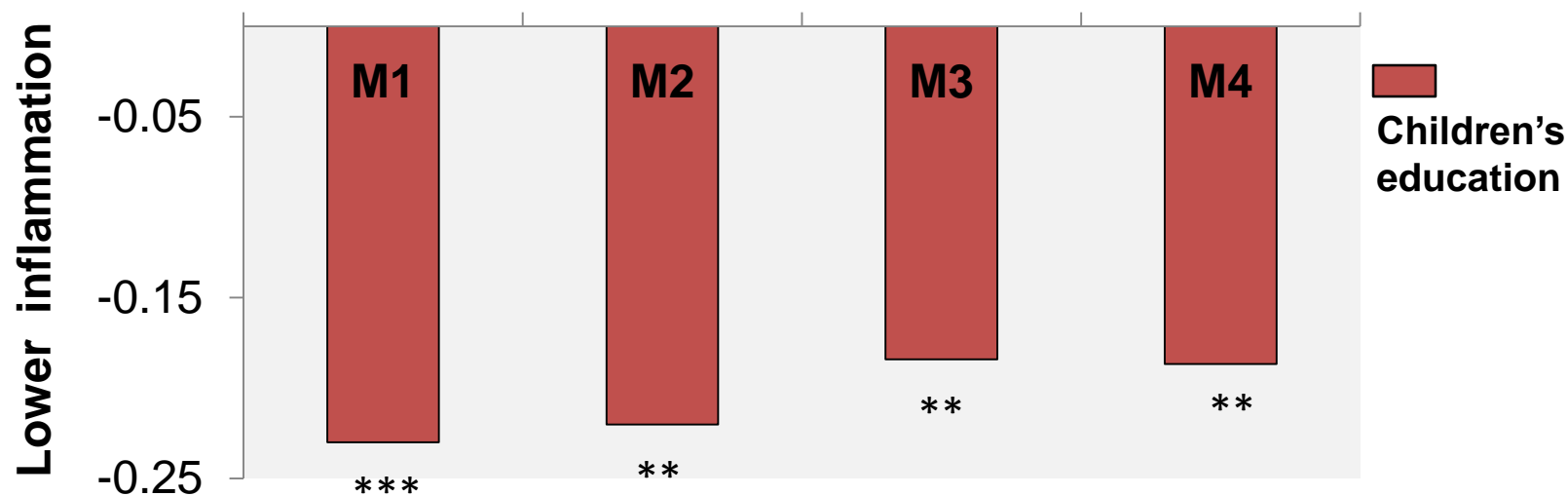
Children's Education and Inflammation
Women

Poisson regression:

Model (M) 1: Children's education

M 2: M 1 + R's education

M 3: M 2 + Spouse's education

M 4: M 3 + Occupational prestige (respondent and spouse)

Note: adjusted for sociodemographic, familial characteristics, and health status at baseline
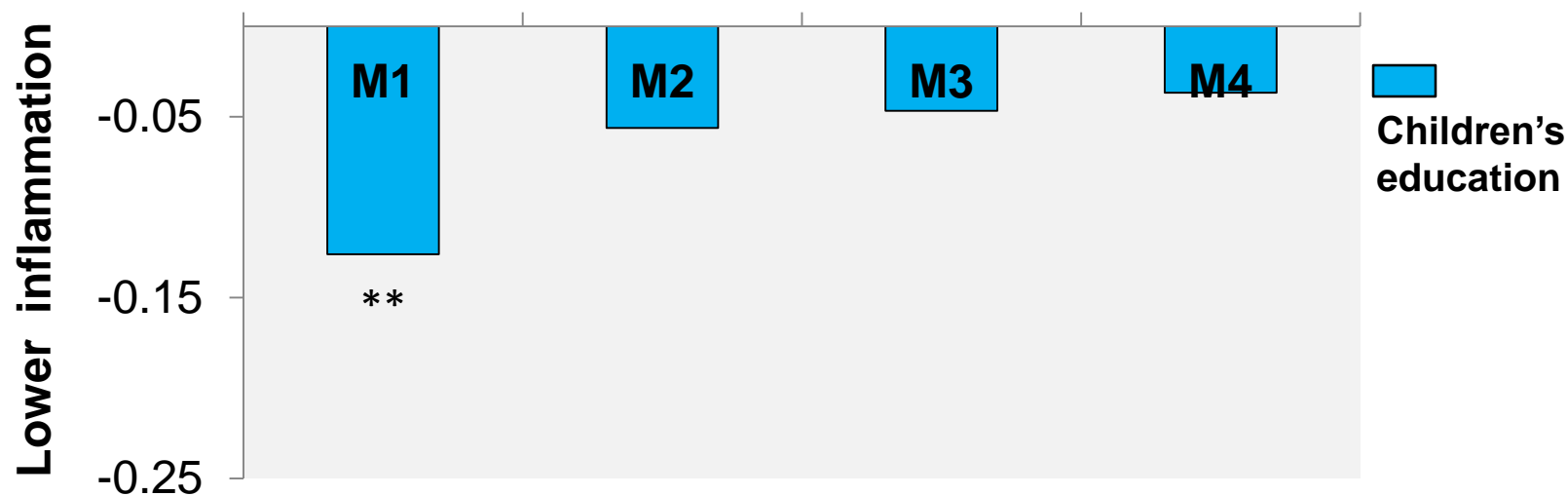** p <.01, *** p <.001

Children's Education and Inflammation for **Men**

Poisson regression:

Model (M) 1: Children's education

M 2: M 1 + R's education

M 3: M 2 + Spouse's education

M 4: M 3 + Occupational prestige (respondent and spouse)

Note: adjusted for sociodemographic, familial characteristics, and health status at baseline
** p <.01, *** p <.001

Children's Education and Psychosocial and Behavioral Factors for **Women**

	Exposure to stress (O)	Perceived stress (OLS)	Healthy diet (L)	Exercise (OL)
Children's Education	-.413**	-.282*	.396*	.283*

	Current smoking (L)	Daily drinking (L)	Normal BMI (L)
Children's Education	-1.03*	NA	.376

Note: O=ordered logit regression; OLS= OLS regresssion; L= logit regression adjusted for sociodemographic, familial, health characteristics, occupational prestige, respondent's and spouse's education

* p <.05, ** p <.01, *** p <.001

Children's Education and Psychosocial and Behavioral Factors for **Men**

|	Exposure to stress (O)	Perceived stress (OLS)	Healthy diet (L)	Exercise (O)
Children's Education	-.187	.059	.201	-.038

	Current smoking (L)	Daily drinking (L)	Normal BMI (L)	
Children's Education	-.326**	-.023	-.129	

Note: O=ordered logit regression; OLS= OLS regresssion; L= logit regression adjusted for sociodemographic, familial, health characteristics, occupational prestige, respondent's and spouse's education

* p <.05, ** p <.01, *** p <.001

Reduced Effects of Children's Education by Psychosocial and Behavioral Factors for **Women**

Lower inflammation

-0.1

-0.3

-0.5

-.187*

-.167*

11% decline
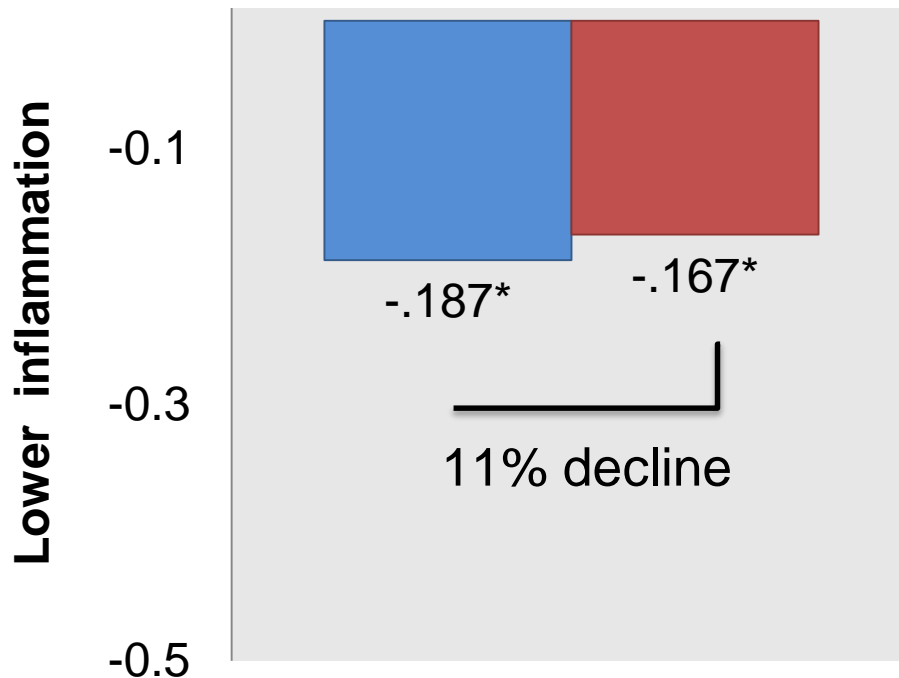
Poisson regression:
Model 1: R's and spouse's education, occupation, and other covariates

Model 2: Mode1 + psychosocial and behavioral factors

* p <.05

Summary

1. Having well educated children is associated with lower inflammation risk for mothers, but not for fathers

2. Mothers with well educated children are less likely to be exposed to stressors, report lower perceived stress, and tend to report a healthy diet, vigorous exercise, and non-smoking

3. Fathers who have well educated children are less likely to smoke

4. Psychosocial and behavioral factors moderately attenuate the association, the main effect remains significant for mothers

Discussion

- Parents, particularly mothers, who devote resources to their offspring's schooling may have better biological profiles in old age

- Well-educated children may promote their parents' wellbeing by encouraging a healthy life style and buffering the negative impact of later life adversities

- The benefits from well-educated children may be more prominent in societies where adult children are obliged to support their elderly parents

- Future studies should aim to replicate this study in societies with different family norms and educational opportunities

Acknowledgements