

Spousal Education and Mortality in the United States

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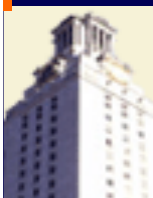
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Background

- Education and mortality share an inverse association at the individual-level.
- The married have a lower risk of death than the never-married, widowed, and divorced.
- Relatively few studies examine the link between a spouse's education and one's own risk of death, particularly in the U.S.
- The family is the most immediate and salient context in which social factors mediate a person's exposure to health risks.
- The characteristics of other family members likely have ramifications for the health of others in the household.

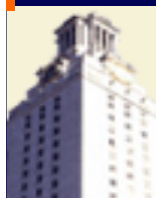


Theoretical Perspectives

Two broad theoretical perspectives linking spousal education and health and/or mortality emerge from prior studies:

- Household Resource: Material and non-material resources at the individual-level are pooled within a marriage to become resources at the *household* or *family-level*
- Status Inconsistency: Status discrepancies between spouses that are inconsistent with broader social norms initiate the following general process:

Role Conflict → Stress → Poor Health → Death



Previous Research

- The household resource perspective generally is supported in recent studies from Europe and Israel.
- Results of studies from the U.S. are mixed:
 - The status inconsistency perspective is supported by several older, non-representative U.S. studies.
 - No link between spousal education and mortality is found in a few more recent, nationally-representative U.S. studies



Research Questions

- Is a spouse's education linked to his/her partner's risk of death net of his/her own education?
- How are discrepant levels of education between spouses associated with each partner's risk of death?
- Are there gender differences in the association between spousal education and the risk of death?



Data

- National Health Interview Survey Linked Mortality Files (NHIS-LMF)
 - NHIS is a nationally representative cross-sectional survey of the U.S. non-institutionalized civilian population ages 18+
 - NHIS is linked to death records in the U.S. National Death Index (NDI) to create NHIS-LMF
- Sample:
 - NHIS survey years 1986-1996 linked to NDI from 1986-2002
 - Ages 50-84 at interview
 - Non-Hispanic white
 - Currently married at interview
 - Household reference person of primary family or his/her spouse



Measures

- Dependent variable: All-cause mortality
- Independent variables:
 - Own and Spouse's Education
 - Years of completed formal schooling
 - Categorized: 0-11 years, 12 years, 13-15 years, 16+ years
 - Household income at interview
 - Age at interview (range: 50 – 84 years)
 - Gender (Female = 1, Male = 0)



Methods

- Shared Frailty Models
 - Weibull proportional hazard models
 - Inverse-Gaussian distributed frailties shared between spouses
- The conditional individual hazard is as follows:

$$h_{ij}(t|\alpha_i) = \alpha_i h_{ij}(t) = \alpha_i \exp(\mathbf{x}_{ij}\beta) \rho t^{\rho-1}$$

where

α_i is a couple-level shared frailty,
 \mathbf{x}_{ij} is a vector of observed covariates, and
 ρ is the Weibull scale parameter .



Methods

- We estimated eight nested models with the following independent variables:
 - Model 1: $h(t) = \text{Own Education} + \text{Female} + \text{Age}$
 - Model 2: $h(t) = \text{Own Education} + \text{Spouse's Education} + \text{Female} + \text{Age}$
 - Model 3: $h(t) = \text{Own Education} + \text{Spouse's Education} + \text{Household Income} + \text{Female} + \text{Age}$
 - Model 4: $h(t) = \text{Own Education} + \text{Spouse's Education} + \text{Own Education} * \text{Spouse's Education} + \text{Household Income} + \text{Female} + \text{Age}$
 - Models 5-8: Models 1-4 with all two & three-way interactions with gender



Results

Table 1: Distribution of own X spouse's education for the sample (N=118,718)

		<u>Spouse's Education</u>			
		Less Than High School	High School	Some College	College
Own Education	Less Than High School	19,448	10,363	1,755	589
		(16.1)	(8.6)	(1.5)	(0.5)
	High School	10,363	26,922	6,623	4,634
		(8.5)	(22.7)	(5.6)	(4.0)
	Some College	1,755	6,623	4,874	4,436
		(1.5)	(5.6)	(4.2)	(3.8)
	College	589	4,634	4,436	10,674
		(0.5)	(4.0)	(3.8)	(9.3)



Results

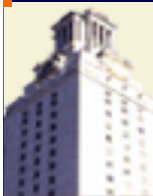
Table 3: Weibull shared frailty models for all-cause mortality, NHIS-LMF, 1986-2002 (N = 118,718)

	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>	<u>Model 4</u>
<u>Own Education</u>				
Less than high school	1.706***	1.528***	1.327***	1.349***
High school	1.381***	1.292***	1.172***	1.233***
Some college	1.244***	1.198***	1.131***	1.167***
<u>Spouse's Education</u>				
Less than high school		1.262***	1.107***	1.141
High school		1.142***	1.049*	1.087*
Some college		1.122***	1.068**	1.107*
<u>Own X Spouse's Education</u>				
< High school X < High school				0.960
< High school X High school				1.007
< High school X Some college				0.925
High school X < High school				0.981
High school X High school				0.915
High school X Some college				0.942
Some college X < High school				0.947
Some college X High school				0.951
Some college X Some college				0.958
ρ (Weibull scale parameter)	1.547***	1.547***	1.542***	1.542***
θ (Inverse-Gaussian shared frailty)	0.146***	0.153***	0.144***	0.143***
Log-Likelihood	-82,159.3	-82,101.9	-81,863.0	-81,854.2
BIC	164,412.0	164,332.4	163,901.2	163,988.8

Notes: † $p \leq 0.10$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$; Models 1 and 2 control for gender and age (in years); Models 3 and 4 control for gender, age (in years), and household income.

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Results

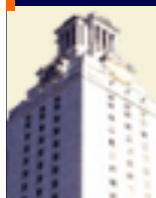
Table 4: Matrix of relative risk of death by own & spouse's education

		<u>Spouse's Education</u>			
		Less Than High School	High School	Some College	College
Own Education	Less Than High School	1.469	1.392	1.418	1.327
	High School	1.298	1.229	1.252	1.172
	Some College	1.252	1.186	1.208	1.131
	College	1.107	1.049	1.068	1.000



Summary of Key Results

- A spouse's education is linked to his/her partner's risk of death net of a persons' own education and household income.
- The additive association between own and spousal education suggests that education is a household resource.
- The absence of a significant interaction between own and spousal education suggests no effect of status inconsistency on mortality.
- The association between spousal education and mortality does not differ according to gender (models not shown).



Conclusion

- Models omitting information on spousal education among the married may overestimate the importance of an individual's own education on his/her risk of death.
- Researchers should seriously contemplate including spousal education in analyses of educational differences in mortality among the married.
- Future research should carefully examine the mechanisms linking spousal education and mortality.

