Religious Involvement and U.S. Adult Mortality Risk

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GUIDING RESEARCH QUESTIONS

1) What is the relationship between religious involvement and adult mortality risk among middle-aged adults in the United States?
2) How is this relationship influenced by controls for demographic, health, socioeconomic, and behavioral factors?
3) Does the religious involvement-mortality relationship among this cohort vary by gender, race/ethnicity, region, education level, or marital status?

Why Focus on This Age Group?

1) Previous evidence (Musick et al.) suggests that the religion-mortality relationship may be stronger among middle-aged adults (at least in a relative sense) than among older adults
2) Much literature in this area focuses on the elderly...especially the community-level studies
3) Deaths in this age range are clearly premature in the context of current U.S. life expectancy
4) Cohort is quite religious, & entered adulthood prior to profound social change in the 1960s
5) Cohort is more homogeneous–by race-ethnicity and denomination–than later cohorts
6) Cleaner methodological approach

PREVIOUS LITERATURE, I

- Handbook of Religion and Health (Koenig et al., 2001) is monumental summary and assessment of the literature.
  - 1200 studies over the last century; 400 of which are theoretical/review
  - Many of the studies are cross-sectional, have poor religion measures, and lack appropriate controls; others, methodologically very weak
  - Many are at the ecological level (e.g., county) level
  - Many are of limited geographic areas or specific denominational groups
- Still to date, only 4 published empirical studies that I am aware of specifically focusing on the relationship between religious involvement and mortality risk at the national level in the U.S.
- Few data sets that will allow such investigation!!!

Previous Literature, II

- Hummer et al. (1999) in Demography

  * NHIS data from 1987 (N>20,000), mortality links through 1995

  * Graded association between lower reported levels of religious attendance and higher adult mortality risk in U.S.

  * No statistically significant difference in the association by age or gender

  * Showed life expectancy differences by attendance; also showed cause of death differences

  * Ages 18-99 at baseline

HAZARD RATIOS OF ADULT MORTALITY BY RELIGIOUS ATTENDANCE AND OTHER VARIABLES: U.S., 1987-1995

Variable	Model 1	Model 2	Model 3
Religious Attendance			
Never	1.87**	1.72**	1.50**
< Once per week	1.31**	1.34**	1.24*
Weekly	1.15	1.23*	1.21*
> Once per week (ref.)	—	—	—
	Demographic controls only	Demographic, Socioeconomic, and Health Controls	Demographic, Socioeconomic, Health, Social Support, Social Activity, and Behavioral Controls

Source: 1987 National Health Interview Survey—Multiple Cause of Death Linked File (NCHIS 1989, 1997).

*$p < .05$; **$p < .01$ (one-tailed test)

Cause of Death Differences^

- Non-attendance (compared to frequent attendance) most strongly related to higher mortality for:
  * infectious diseases (HR=3.56)
  * respiratory diseases (HR=3.36)
  * diabetes (HR=2.91)
  * residual causes (HR=2.90)
  * external causes (HR=2.11)...but ns (small # of deaths)
  * circulatory diseases (HR=1.58)

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  * cancer (HR=1.16)...ns

^ These diff's control for demog, health, & SES factors.

Previous Literature, III

- Ellison et al. (2000) in Research on Aging
  - Among African Americans, strong and pervasive association between non-attendance and higher mortality among different demographic subgroups
  - Associations stronger and graded among younger (<55 at baseline) adults; association somewhat weaker and only among non-attenders among older (55+ at baseline) adults
  - Also used NHIS data from 1987 linked to mortality risk through 1995
  - Ages 18-99 at baseline

  - Also see Bryant and Rakowski (1992)

HAZARD RATIOS OF ADULT MORTALITY BY RELIGIOUS ATTENDANCE AMONG AFRICAN AMERICANS, 1987-1995

	Model 1	**Model 2**	**Model 3**
Religious attendance			
Never	2.23*	2.35*	2.22*
<1/week	1.35	1.44*	1.47*
≥1/week	Ref	Ref	Ref
	Demographic controls (age, gender, and region)	Demographic, Health, and SES controls	Demographic, Health, SES, Social Support, Activity, and Behavioral controls

Source: National Health Interview Survey Multiple Cause of Death Public Use Data File (NCHS, 1989, 1997).
*$p \leq .05$ (one-tailed)

Previous Literature, IV

- Musick et al. (2004), Journal of Health and Social Behavior

  * Strong association between non-attendance and higher adult mortality risk—but not strongly graded (only slight difference between infrequent and frequent attendance).

  * Other religion measures (volunteering, private activity, comfort, negative justice, fatalism) not related to mortality risk…and acted as suppressors of the attendance-mortality relationship.

  * Much stronger relationship between attendance and mortality risk among younger (<60 at baseline) adults than among older (60+ at baseline) adults.

  * No differences in relationship by gender or race

  * Americans' Changing Lives dataset from 1986; mortality follow-up thru 1994

Previous Literature, V

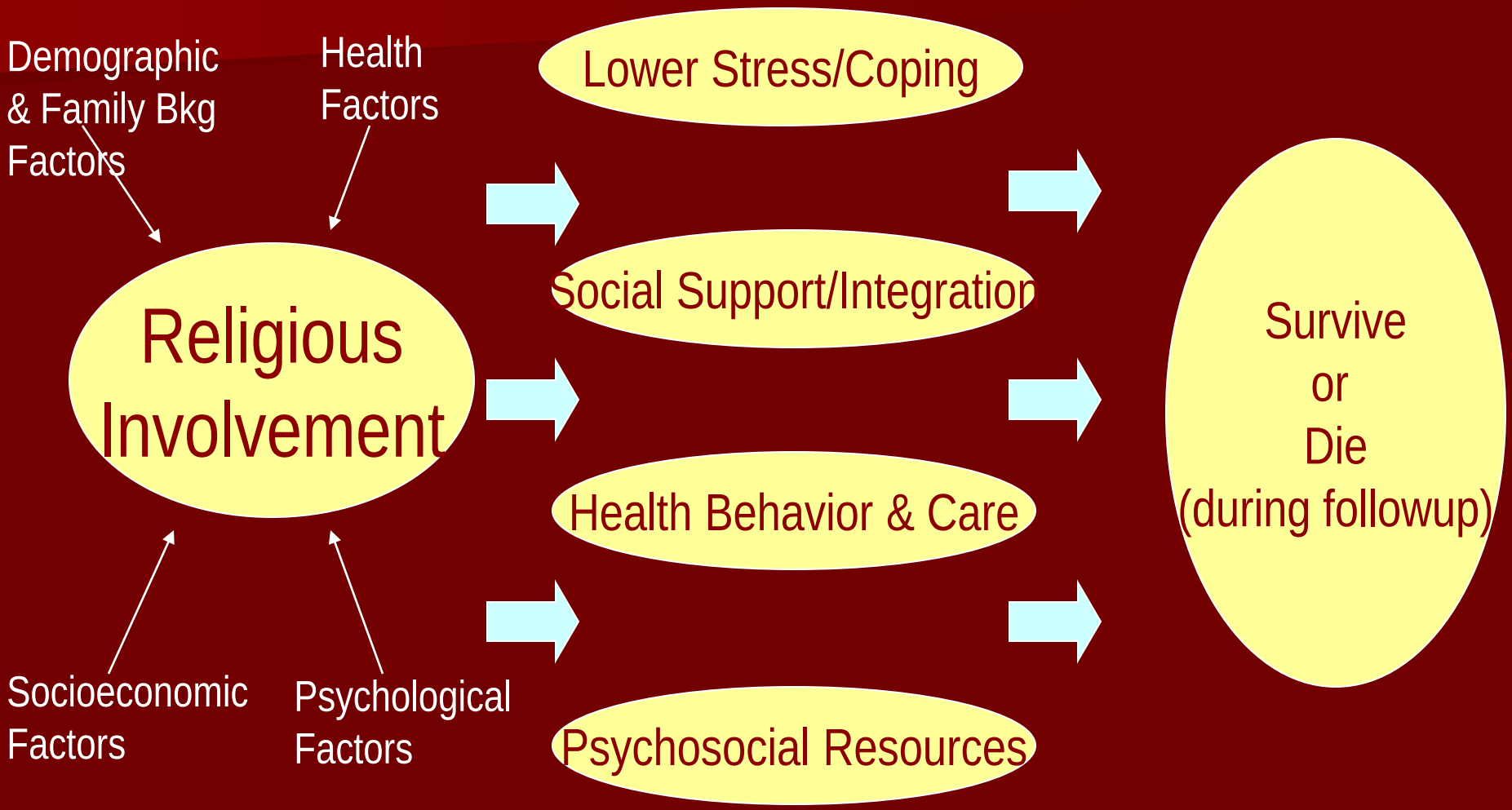
- Gillum et al. (2008) in Annals of Epidemiology
- NHANES III data from 1988-94, with mortality follow-up through 2000
- Lower mortality among weekly and more-than-weekly attenders compared to non-attenders, net of confounders
- Differences muted with controls for mediating factors

Previous Literature VI

- A number of community-level studies, most among the elderly, showing higher mortality among non-attenders in follow-up studies. Just a few:
  - Strawbridge and colleagues in CA*
  - Oman and colleagues in CA
  - Koenig and colleagues in NC; also Dupre et al.
  - Hill and colleagues (U.S. southwest)
  - And... Bagiella et al. pooling 4 U.S. communities

* This study also showed religious attendance predicting healthy behavioral change and increased social integration/support over the 28-year follow-up period.

CONCEPTUAL FRAMEWORK (and Implied Hypotheses)



Possible Moderators (Interactions) Based on Some Previous Literature

- Gender: attendance stronger among women
- Race/Ethnicity: attendance stronger among African Americans
- Region: attendance stronger among southerners
- Education: attendance stronger among less educated
- Marital Status: attendance stronger among unmarried

Data: NHIS-LMF (Rogers, Krueger, Hummer; Chapter 15 in recent RUP Volume)

- NHIS Cancer Risk Factor Supplement from 1987, with mortality follow-up through end of 2002
- Ages 45-64 at baseline
- N = 4,906 individuals, 1,041 of whom were identified as dying during follow-up
- Follow-up exclusively through linkages to the National Death Index

SUPPLEMENTAL DATA

- Another large, nationally-representative health survey of U.S. adults
  - Health and Retirement Study original cohort (1992), individuals born 1931-1941 (ages 51-61 at baseline)
  - N = 9,491, with 1,594 identified as dying during follow-up through end of 2006 (ages 65-75 at end of 2006)
  - Largest national level U.S. study of a single birth cohort that I am aware of
- Data include information on religious involvement (attendance, denomination) & correlates
- Statistically linked to death information from the National Death Index (NDI) and through follow-up interviews with spouses or other family member contacts
- HRS individuals “statistically followed” for mortality risk for 14 years

Key Variables, I

- Religious Attendance:

  * Frequent (usually once per week or more; 35.7% of sample)... 12.3% died during follow-up

  * Less frequent (usually less than once per week; 36.7% of sample)... 16.7% died during follow-up

  * Very infrequent or never (27.5% of sample) ... 22.9% died during follow-up

Key Variables, II

- Demographic Controls: Age, Gender, Race/Ethnicity, Region, Religious Denomination, Marital Status
- Socioeconomic Controls: Education, HH Income
- Health Controls: Self-Rated Health, Activity Limitations
- Behavioral Factors: Smoking, Drinking, Exercise

Hazard Ratios of Mortality, NHIS-LMF (Ages 45-64 at Baseline)

	Model 1	Model 2	Model 3
Attendance (>1 week)			
* Never	1.73***	1.43***	1.35***
* Less than once/week	1.27***	1.29***	1.21*
* Once per week	0.97	1.02	1.00
Controls:	Demog	Demog, SES, Soc, Behavior	Demog, SES, Soc, Behavior, Health

HAZARD RATIOS ESTIMATING RELATIONSHIP BETWEEN RELIGIOUS VARIABLES, COVARIATES, AND SUBSEQUENT MORTALITY RISK, U.S. ADULTS, AGED 51-61, 1992-2006

	Mortality Risk		
	Model 1	**Model 2**	**Model 3**
Religious Attendance (Frequent) [a]			
Infrequent	1.48***	1.34***	1.19**
Never attends	2.27***	1.82***	1.52***
Religious Denomination (Mainline Protestant)			
Evangelical Protestant	1.27**	1.04	1.05
Catholic	1.24**	1.18**	1.14*
No Denomination	0.88	0.83	0.87
Other	1.12	1.10	1.16
	Demographic controls (age, gender, race/ethnicity, and region)	Demographic, Health, and SES controls	Demographic, Health, SES, and Behavioral controls

Notes: [a] Reference categories in parentheses

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

Summary of Main Effect Findings

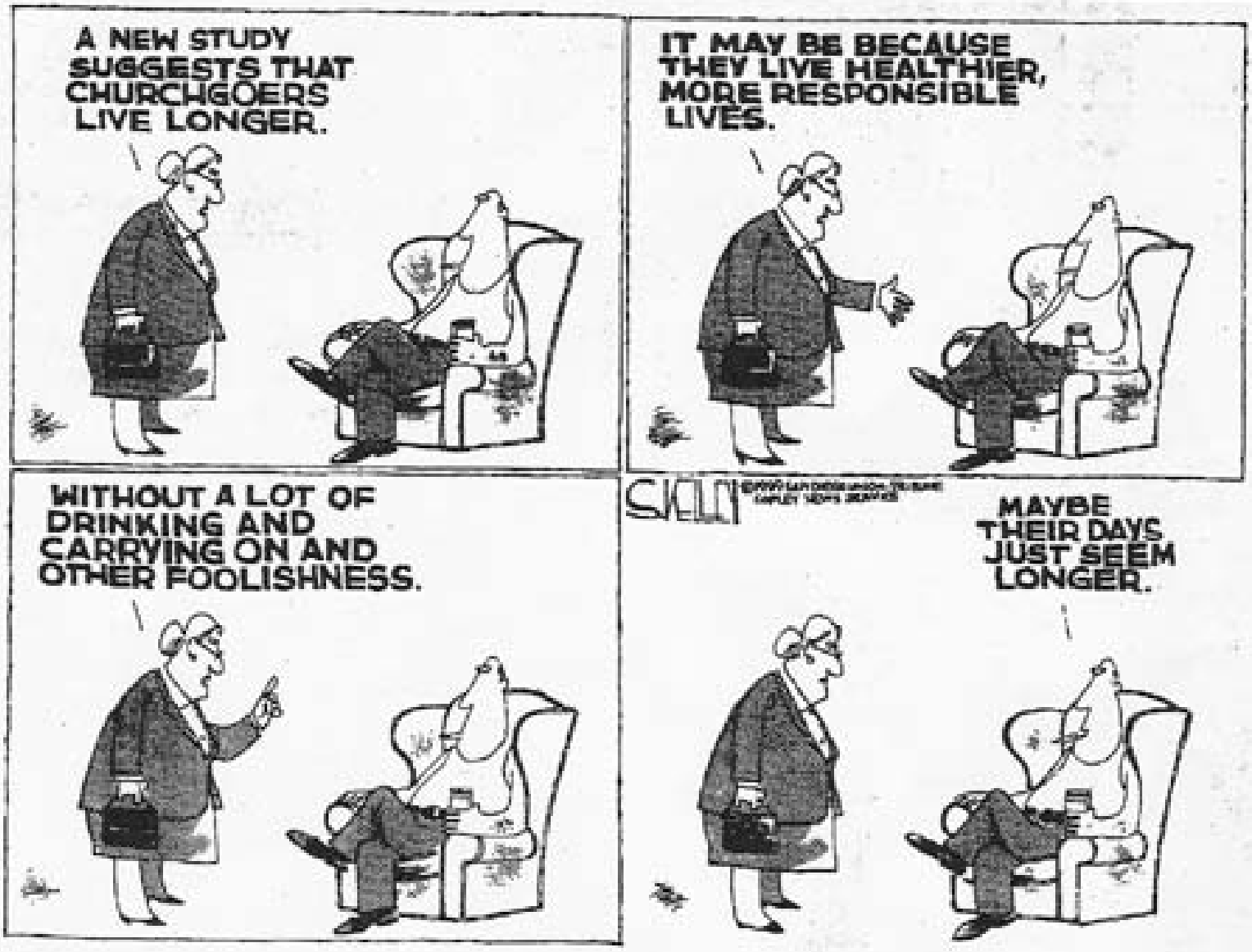
- Strong association between religious attendance and mortality risk among middle-age U.S. adults
- Non-attenders particularly stand out (52% higher mortality risk than frequent attenders, in most completely specified model); upwards of 80% higher risk in less completely specified models
- Moderate-to-modestly higher mortality (depending on model specification) among less frequent attenders, compared with frequent attenders
- 3 behavioral factors account for ~ 40% of the mortality differences between attendance groups
- 4th very high quality national data set to support this relationship net of stringent controls; this one in a single cohort

Variations Across Socio-demographic Groups (Gender, Race/Ethnicity, Region, Marital Status, Education)?

- Not much... Religious Attendance and Mortality Association Nearly the Same for All Groups Within This Age Range
- One minor difference: slightly stronger effect of non-attendance for the unmarried than for the married...that is, compared to frequently attending married people, unmarried people who do not attend have especially high mortality.
- Again, tests not ideal...relatively few deaths in some subgroups

Austin American-Statesman

STEVE KELLEY



Accounting for the Association Between Religious Involvement & U.S. Adult Mortality Risk:

- Selection/Confounding: 25ish %
- Health Behavior: 35ish %
- Social Support/Integ: 10ish %
- Unmeasured: 30ish %
- Other Religion Measures: 0 (so far)

Critiques

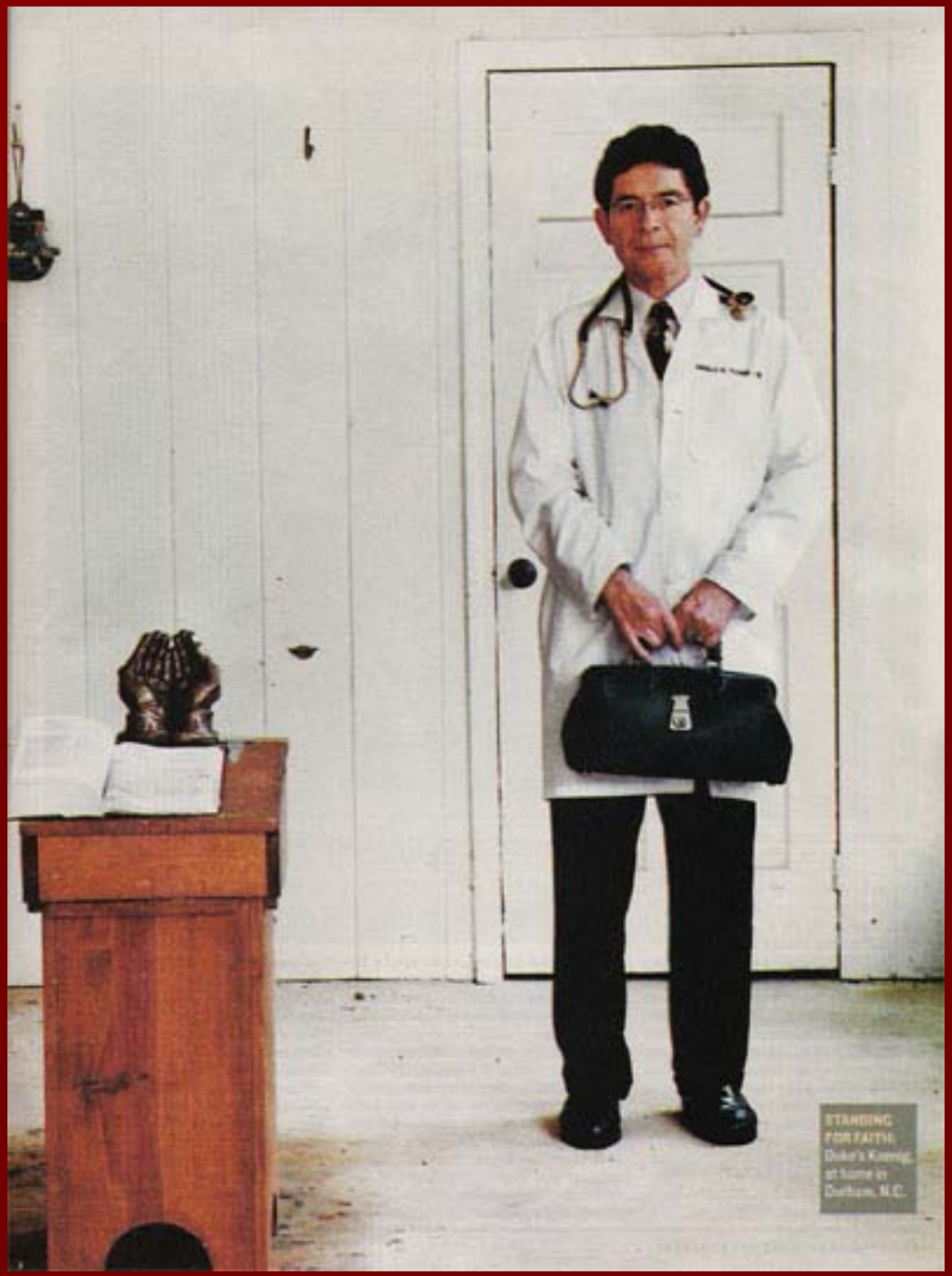
- Sloan and colleagues have criticized the empirical work in the religion-health and religion-mortality area, focusing on:
  - The lack of appropriate controls for confounders…selection into religious attendance/involvement still a very important concern…but baseline health controls make for pretty conservative tests!
  - Perception of inconsistent findings…quite a bit of replication with the mortality studies now…both the national level and in various U.S. communities
  - Failure to make multiple comparisons…not an issue with mortality (die versus survive)

    ….mortality data far from perfect, but consistent and strong evidence is mounting.

IMPLICATIONS....

- What might this set of religious involvement and mortality risk findings mean???
  - to the media and public?
  - for health care practice?
  - for theory?
  - for continued research?

IRAQ'S NEW TERRORISTS • RAGE OVER 'THE REAGANS'
Newsweek
God & Health
Is Religion Good Medicine?
Why Science Is Starting to Believe


STANDING
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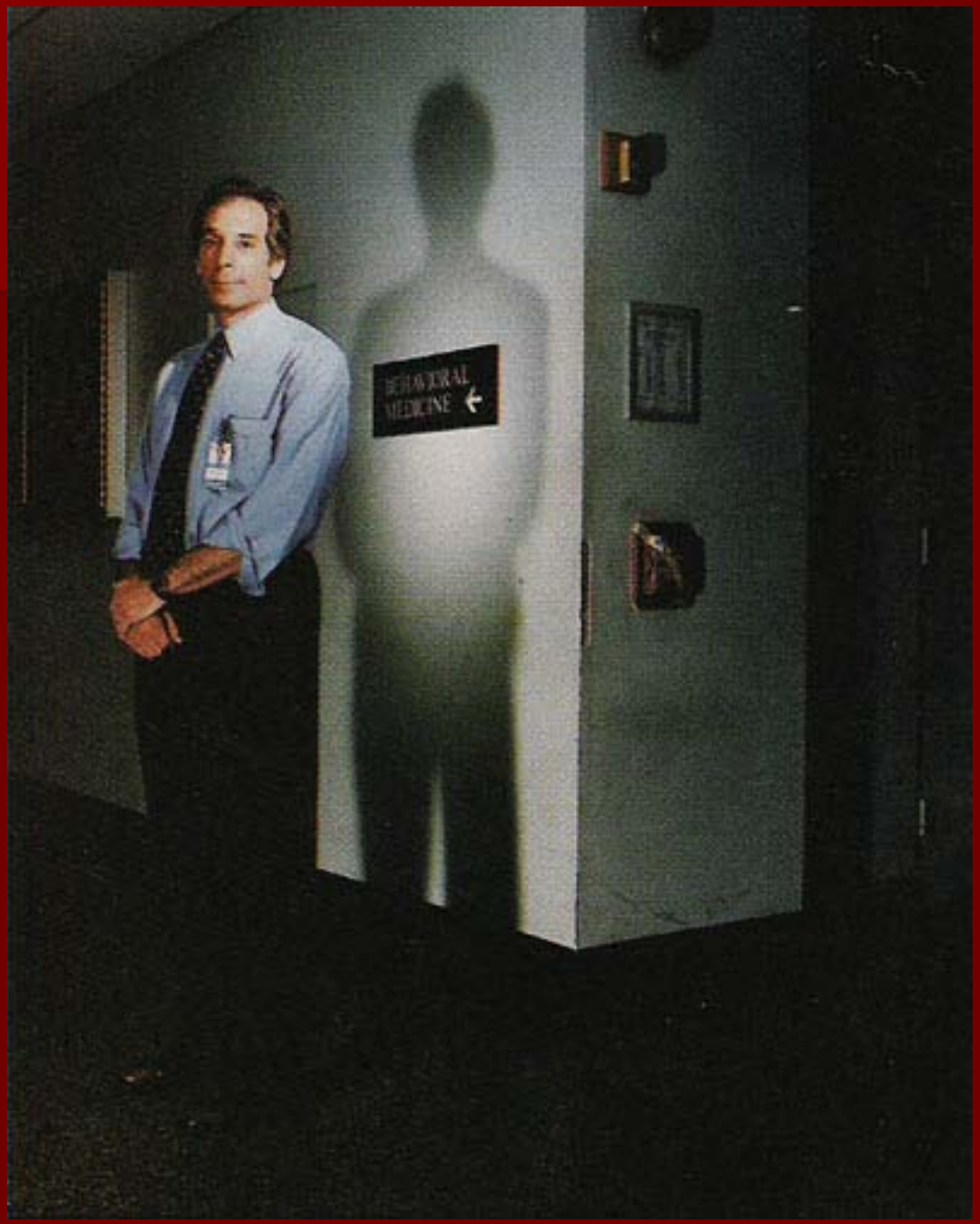
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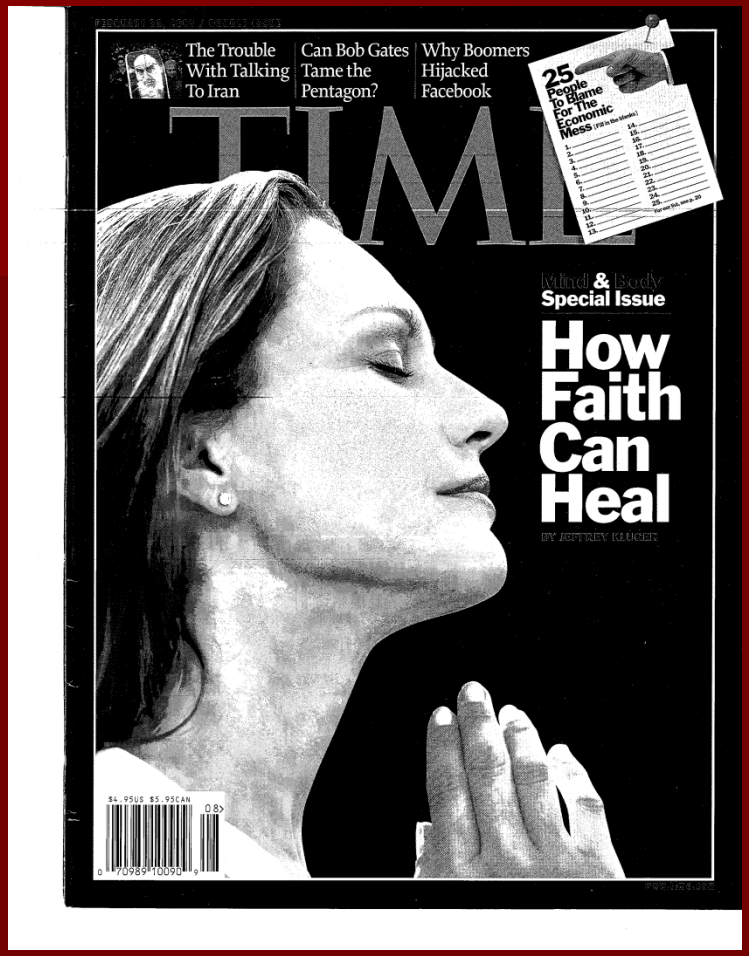
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MEDIA/PUBLIC IMPLICATIONS

Is religion “good medicine?” Does “faith heal?” Is religious involvement a “wonder drug?” Is there a “dose-response” relationship between religious involvement and mortality risk? Do the religious involvement and mortality risk findings suggest that “faith-based medicine IS evidence-based medicine”? (And more…). NO. I, for one, was not at all prepared to deal with various interpretations of my findings and some fairly “out there” questions regarding them. And I would/should have more clearly written about them differently – especially 10-12 or so years ago – knowing what some of the interpretations/questions might be.

*** Researchers in this area should be particularly clear about what their questions are, what their findings are, use of causal language, what the limitations of the study are, what the findings may or may not mean, and what if any biases they bring to the table. ***

HEALTH CARE IMPLICATIONS of MORTALITY WORK?

- There may be important religious-based resources that individuals rely on for health and health care that providers might benefit from knowing about….similar to spouses, neighbors, and adult children. Taking stock of any religious resources, without judgment, would seem to be a possible avenue by which health providers could both respect the beliefs of, and potentially tap into the resources of, individuals under their care.
- But that implication is hardly based on the religious involvement and mortality work...
- Send or encourage folks to attend services? No. Similar to the marriage-mortality literature and its implications.

Theoretical Implications

Parallels to the marriage-mortality literature here as well (i.e., drawing on Waite/Lehrer, Sloan, and others):

- Protection, selection, or both? Evidence suggests both at this point
- Marriage literature becoming more sophisticated (e.g., transitions)
- Evidence to me also suggests a fundamentally social relationship between religious involvement and mortality risk…public attendance the key predictor and best evidence for mediators to date are health behavior and social support/connections
- Much weaker evidence for relationship between private religious activity and mortality risk

CONTINUED NEED FOR RESEARCH

Literature has relied very heavily on self-reported public attendance at one point in time as the key measure. Substantial data needs:

- Religious life histories, including transitions!
- Ethnographic evidence: what is it that individuals are drawing from religious service attendance in various contexts? And what is it about non-attending individuals that is related to higher mortality?

Much more comparative/contextual work needed:

- Younger cohorts in a changing religious context
- Other population subgroups
- Religious involvement working in different contexts (congregations, families/households, neighborhoods, cities/counties/states)
- Cross-national comparisons

Much more work needed on confounders and mediators:

- Most large demographic/health data sets just do not collect the level of detailed information needed to most clearly understand this relationship.

CONTINUED RESEARCH, con'd.

- Room/Need for further work? Definitely yes. Religious involvement and mortality work in its early stages at this point. Findings are intriguing at this point and building consistency across data sets, but not close to definitive.
- What's the most aggressive angle to pursue?
  - Rich, large, in-person, focused longitudinal survey that includes biomarkers.
  - Team of investigators from different disciplines that includes those who are critical.
  - Shift focus away from religion as medicine to religious involvement as social influence that works across the life course

IMPLICATIONS FOR DATA LINKAGE

- Data linkage (NDI) to health surveys have arguably been THE most important innovation for mortality studies over the last 20 years
- NHIS-LMF and NHANES-LMF
- National Longitudinal Mortality Study (NLMS)
- HRS, ACL, PSID, many others

Why So Innovative???

- They allow us to learn things about patterns and trends in mortality that we simply did not, and could not, know before
- E.g., religion-mortality, income dynamics and mortality, social integration and mortality, obesity-mortality, SES and mortality, etc...
- We can do so for all-cause mortality and cause-specific mortality

But there are threats and challenges...

- Worsening reports of ID information for linkage purposes (SSN's)
- Restrictions on public use versions of data
- Out-migration of U.S. residents
- Limitations of cross-sectional data (e.g., NHIS, NHANES, etc...)
- Limitations of measures collected on the surveys linked to mortality follow-up

Acknowledgements

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Final Notes

- Portions of this work were funded by grants from the National Science Foundation (Hummer, PI) and National Institute on Aging (Ellison, PI)
- Robert Hummer does not claim a religious affiliation and would answer “never” on questions regarding frequency of religious attendance and frequency of other religious-based activities.