



# The Effect of Community Social Capital on Physical Activity and Healthy Eating

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*Oct. 11, 2008*

2008 Workshop on Social Capital and Health, Paris



# Objectives

1. Whether community social capital (CSC) promotes health behaviors
  - Physical activity
  - Healthy eating
2. Whether schooling levels moderate the effect of CSC on health behaviors



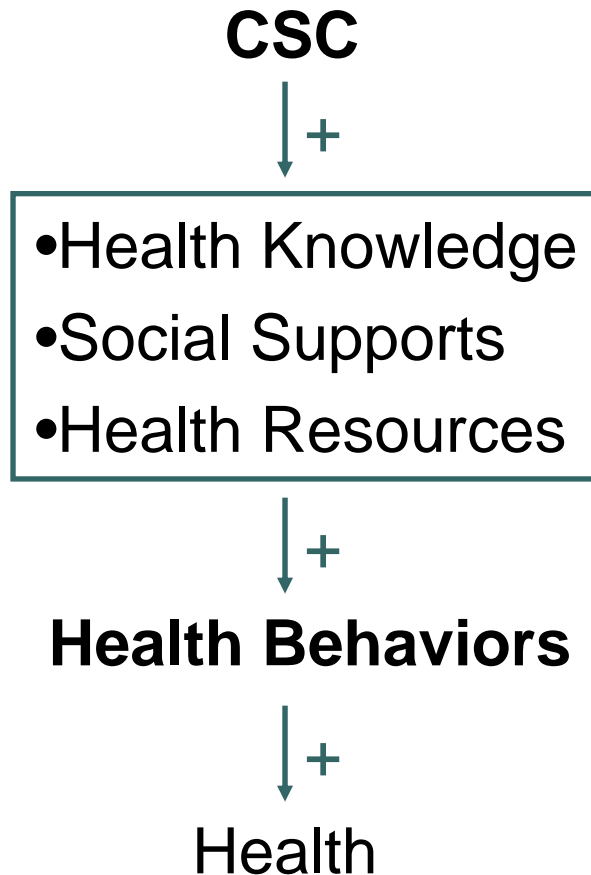
# CSC and Health

- Community social capital (CSC)
  - “Density of networks, trust, & cooperation in a given community”
  - Promotes physical and mental health
    - better health status<sup>1</sup>;  
cardiovascular disease<sup>2</sup>;  
obesity<sup>3</sup>
    - psychological distress<sup>4</sup>;  
poor mental health days<sup>5</sup>;  
suicide<sup>6</sup>.

<sup>1</sup>Miller et al., 2006. <sup>2</sup>Scheffler et al. 2008. <sup>3</sup>Kim et al., 2006. <sup>4</sup>Araya et al., 2006; Miller et al., 2006; Scheffler et al. 2007. <sup>5</sup>Kim and Kawachi, 2007. <sup>6</sup>Desai et al., 2005.



# Pathways





# Health Behaviors

- Physical activity & healthy eating reduce
  - Chronic diseases
    - Cardiovascular disease, stroke, obesity, diabetes, hypertension, cancer, poor physical health days
  - Mental illness
    - Anxiety, depression, poor mental health days

*Brown et al., 2003; O'Neil and Nicklas, 2007; Haskell et al., 2007; Bize, 2007.*



# CSC & Health Behaviors

- ❑ Kim *et al.* (2006)
  - CSC reduces physical “inactivity”
  - Limitations:
    - Levels of physical activity
      - Meet national recommendations?
    - Unobserved area-level factors (Scheffler *et al.*, 2007)
    - Compositional fallacy of CSC measures
- ❑ No study on CSC and diet choice
- ❑ No uniform effect of CSC
  - May vary by individual characteristics (e.g., schooling)



# CSC & Health Behaviors

- Schooling facilitates
  - Civic and social engagement
    - Helliwell and Putnam, 1999
  - Efficient production of health
    - Grossman, 1972; Kenkel, 1991
  - Future-orientedness
    - Becker and Mulligan, 1997
  - Implications:
    - Schooling promotes physical activity (Haskell *et al.*, 2007) and healthier diet
    - Schooling increases returns to CSC



# Hypotheses

- ❑ *H1:*  
CSC increases physical activity and healthy eating
- ❑ *H2:*  
Schooling increases physical activity and healthy eating
- ❑ *H3:*  
The effect of CSC is larger for persons with higher levels of completed schooling





# Data

- ❑ Behavioral Risk Factor Surveillance System (BRFSS), 2001, 2003, & 2005
  - Statewide telephone survey of civilian, non-institutionalized adults in the US
  - All 50 states and D.C.
  - Complex multi-stage cluster sample
- ❑ Included adults 18 and older
- ❑ Excluded counties with < 200,000 residents
- ❑ 337,314 individuals clustered in 288 counties



# Data

## □ Dependent variables

- **Activity:** = 1 if physical activity meets the AHA/ACSM guideline; 0 if not
  - Moderate:  $\geq 30$  min on 5 days/week, or
  - Vigorous:  $\geq 20$  min on 3 days/week
- **Eating:** Daily # of fruit/vegetable servings
  - = 0 if daily serving  $< 1$
  - = 1 if  $1 \leq$  daily serving  $< 3$
  - = 2 if  $3 \leq$  daily serving  $< 5$
  - = 3 if  $\leq 5$  daily serving



# Data

## □ Petris Social Capital Index (PSCI)

- Validated, geographically-based proxy for CSC
- Used in research on smoking, mental health, and cardiovascular disease
- County PSCI =

Total FT employees in voluntary organizations

Total population

- Calculated using the County Business Patterns (NAICS 813) and population data from U.S. Census Bureau



# Data

## □ Petris Social Capital Index (PSCI)

### ■ Strengths

- Community-level resources that promote and maintain CSC
- “What social capital does”
- Immune from fallacy of composition
- Amenable to policy interventions



# Specification

## □ Overall effect of CSC

$$D_{ijt} = f(\alpha \cdot CSC_{jt} + \beta \cdot S_{ijt} + \gamma \cdot X_{ijt} + Y_t + C_j + \varepsilon_{ijt})$$

- $i$  - Individual;  $j$  - County;  $t$  - Year
- $D$  - **Activity** or **Eating**
- CSC - Community social capital (PSCI)
- $S$  - Levels of schooling
  - high school diploma
  - some college (2-year or some 4-year college)
  - $\geq$  4-year college
  - $\leq$  high school (base group)



# Specification

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$$D_{ijt} = f(\alpha \cdot CSC_{jt} + \beta \cdot S_{ijt} + \gamma \cdot X_{ijt} + Y_t + C_j + \varepsilon_{ijt})$$

- $i$  - Individual;  $j$  - County;  $t$  - Year
- $D$  - **Activity** or **Eating**
- $CSC$  - Community social capital (PSCI)
- $S$  - Levels of schooling
- $X$  - Socio-demographics
  - age, sex, race/ethnicity, marital status, income, unemployment, and pregnancy



# Specification

## □ Overall effect of CSC

$$D_{ijt} = f(\alpha \cdot CSC_{jt} + \beta \cdot S_{ijt} + \gamma \cdot X_{ijt} + Y_t + C_j + \varepsilon_{ijt})$$

- $i$  - Individual;  $j$  - County;  $t$  - Year
- $D$  - **Activity** or **Eating**
- $CSC$  - Community social capital (PSCI)
- $S$  - Levels of schooling
- $X$  - Socio-demographics
- $Y$  - Year dummies
- $C$  - County fixed effects



# Specification

- Moderating effect of schooling

$$D_{ijt} = f(\alpha \cdot CSC_{jt} + \beta \cdot S_{ijt} + \delta \cdot CSC_{jt} \cdot S_{ijt} + \gamma \cdot X_{ijt} + Y_t + C_j + \varepsilon_{ijt})$$

- $CSC \cdot S$  – Interaction between CSC and schooling levels





# Estimation

- Effect on *Activity*
  - OLS
  - Logit: the same interpretation
- Effect on *Eating*
  - Ordered logit
- Adjusted for the complex survey design



# Results

## □ Overall effect of *CSC* on *Activity* and *Eating*

	<i>Activity</i> †		<i>Eating</i> ‡	
CSC (PSCI)	5.51*	(2.56)	2.44	(6.31)
High school	0.0543***	(.0062)	0.0090	(.0056)
Some college	0.0853***	(.0058)	0.0448***	(.0063)
≥ College	0.1203***	(.0067)	0.0993***	(.0063)

Notes:

•†Estimated by OLS; ‡Estimated ordered logit models.

•Standard errors are in parentheses.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .



# Results

## □ Effect of *CSC* on *Activity* by schooling: coefficients

	<i>Activity</i>	
CSC	2.83***	(2.93)
CSC * High school	2.23	(1.26)
CSC * Some college	3.17**	(1.15)
CSC * $\geq$ College	3.23*	(1.55)
High school	0.0154***	(.0029)
Some college	0.0254***	(.0029)
$\geq$ College	0.0290***	(.0029)

Notes:

- Estimated ordered logit models. Standard errors are in parentheses.
- CSC (PSCI) and the interaction terms are jointly significant ( $p < .01$ ).
- \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .



# Results

## □ Marginal effect of *CSC* on *Activity* by schooling

Subgroups	<i>Activity</i>	
< High school (base group)	2.82	(2.93)
High school	5.06*	(2.56)
Some college	6.00*	(2.58)
≥ College	6.05*	(2.57)

Notes:

• Estimated by OLS. Standard errors are in parentheses.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .



# Results

## □ Effect of *CSC* on *Eating* by schooling: coefficients

	<i>Eating</i>	
CSC	19.8	(21.7)
CSC * High school	8.79*	(4.43)
CSC * Some college	12.03*	(5.13)
CSC * $\geq$ College	10.32	(6.21)
High school	-0.005	(.061)
Some college	0.203**	(.067)
$\geq$ College	0.519***	(.074)

### Notes:

- Estimated ordered logit models. Standard errors are in parentheses.
- CSC (PSCI) and the interaction terms are jointly significant ( $p < .05$ ).
- \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

# Results

## □ Marginal effect of *CSC* on *Eating*

Subgroups	<i>Servings / day</i>			
	<i>&lt; 1</i>	<i>1 -3</i>	<i>3 -5</i>	<i>5 or more</i>
<i>&lt; High school</i>	-0.0133	-0.0362	0.0233	0.0262
<i>High school</i>	-0.0170	-0.0544	0.0298	0.0416
<i>Some college</i>	-0.0150	-0.0623	0.0231	0.0543
<i>≥ College</i>	-0.0109	-0.0575	0.0089	0.0595

Notes:

- Marginal effects were calculated as changes in the predicted probability for 1 S.D. increase in CSC (0.0015 → 0.2158), for a persons of mean age, female, white, married, non-pregnant with income of \$35K-50K in 2005.

- Estimated ordered logit models.

\*  $p < .05$ .



# Conclusion

- ❑ CSC promotes physical activity
- ❑ Schooling facilitate physical activity and healthy eating
- ❑ The effect of CSC is heterogeneous
  - Greater benefit to persons with higher education
  - No beneficial effect on persons with < high school education



# Discussion

- ❑ Social capital policy paying attention to those with lower levels of schooling
  
- ❑ Should explore
  - Long-term impact of CSC on educational attainment, health knowledge and behavior, and health
  - Interrelationship between CSC, education, and social engagement





# Acknowledgement

Richard M. Scheffler, PhD

Director, Nicholas C. Petris Center  
Distinguished Professor of Health Economics and Public Policy  
University of California, Berkeley