The Association of Neighborhood Characteristics and Social Interactions with Exercise and Obesity Among Employed Adults

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Background and Objective

- Among US adults:
  - Recommended levels of physical activity are typically not achieved.
  - Diets have excess fat and inadequate fruit and vegetable (F/V) and fiber intake.

- Most existing studies of the associations of neighborhood characteristics and psychosocial circumstances with health behaviors have examined the impact of only one of several possible factors contributing to physical activity or obesity:
  - Neighborhood characteristics: Presence/absence of sidewalks
  - Networks of family and friends: Social support / strain
  - Patient activation

Background and Objective

- These factors, however, may have simultaneous, independent associations with physical activity or obesity.

- We studied the independent contributions of neighborhood characteristics, social support / strain, and patient activation on physical activity levels, dietary intake, and obesity among working age adults of a MCO.

Study Population

- Random samples of Kaiser Permanente Georgia (KPGA) members, aged 25-59, employed by large public agencies or private corporations in the Atlanta area.

- Three condition cohorts were sampled:
  - Low risk adults (no identifiable major morbidities)
  - Adults with elevated lipids (without CAD history)
  - Adults with type 2 diabetes

Data

- Mixed mode survey (mail or Internet responses) conducted by a professional survey firm from 10/1/05 thru 12/31/05.
- 2,224 respondents (42% response rate)
- Survey measures included:
  - Neighborhood characteristics
  - Social climate (MIDUS survey scales)
  - Patient activation (PAM-13)
  - Physical activity (BRFSS)
  - Height and weight (for computing BMI)
  - Dietary intake (Block fat, F/V screeners)

Measures

- Dependent variables
  - Recommended exercise level: moderate or vigorous exercise
  - Physical inactivity
  - Dietary intake: computed from fat and F/V screeners and equations in Block et al. (2000)
    - Percent fat in diet
    - Daily fruit and vegetable (F/V) servings
    - Daily fiber intake (grams)
  - Obese: BMI $\geq$ 30 kg / m^2
- Independent variables
  - Neighborhood characteristics: sidewalks, crime, nearby walking / cycling paths, household exercise equipment
  - Social support / strain: scored 0-100; average of 2 4-item subscales (support, alpha=0.91; strain, alpha=0.87)
  - Patient activation: scored 0-100, 13-item scale (alpha=0.95)

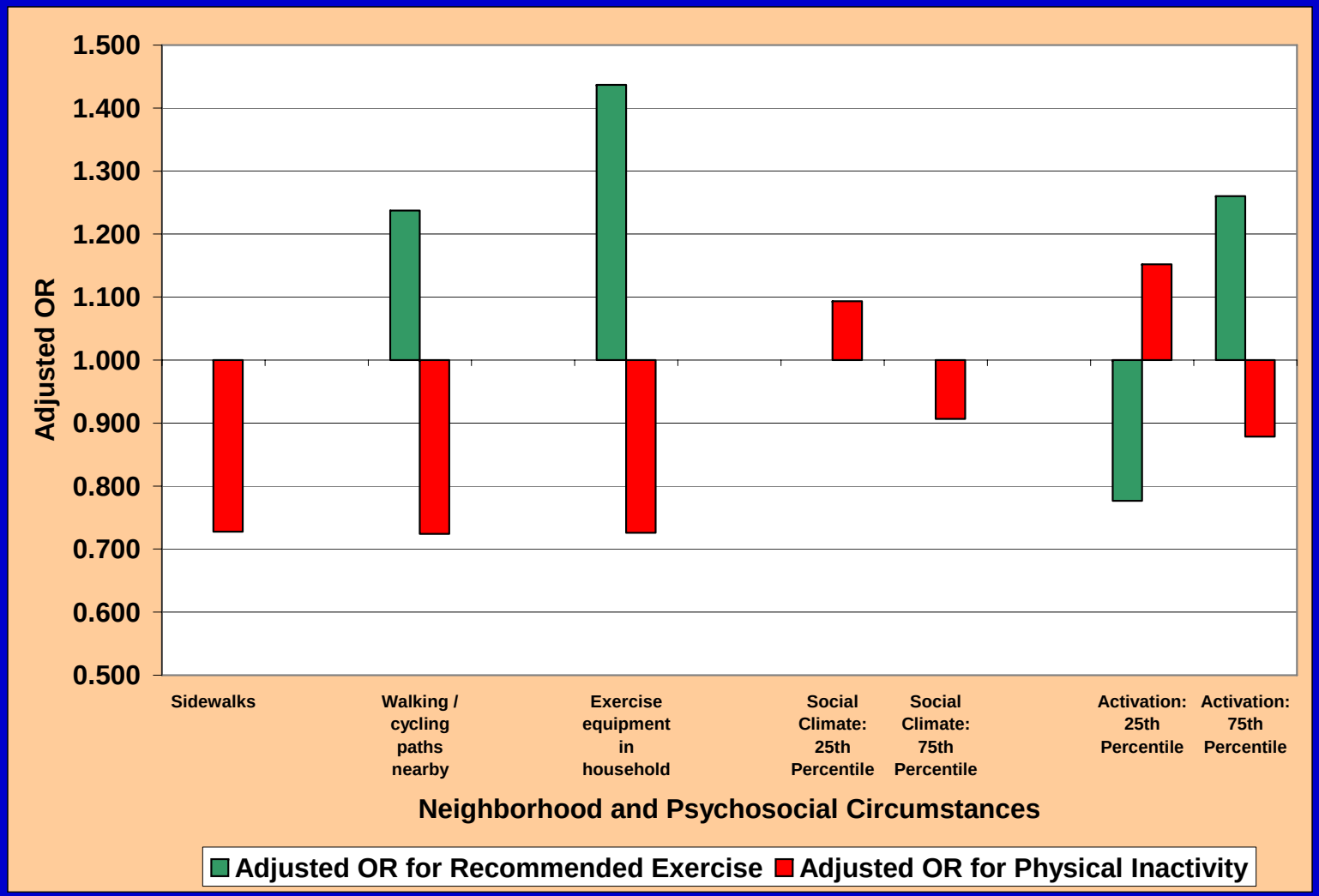
Methods

- Ordinary logistic regression:
  - Dependent variables: Recommended exercise level, Inactivity, Obesity
  - Independent variables: Neighborhood characteristics, “social climate” (friend / family support or strain), activation
  - Covariates: age, gender, condition cohort, race, education, marital status
- Ordinary linear regression:
  - Dependent variables: Percent fat in diet, daily F/V servings, daily fiber intake (grams)
  - Independent variables: Social climate, activation
  - Covariates: age, gender, condition cohort, race, education, marital status

Results

- Exercise
  - Recommended exercise level (at least moderate or vigorous exercise) was significantly ***more likely*** with:
    - Walking or cycling paths nearby (adjusted OR = 1.237)
    - Exercise equipment in household (adjusted OR = 1.437)
    - Higher activation (adjusted OR = 1.022 per PAM-13 point)
  - Physical inactivity was significantly ***less likely*** with:
    - Sidewalks in neighborhood (adjusted OR = 0.992)
    - Walking or cycling paths nearby (adjusted OR = 0.724)
    - Exercise equipment in household (adjusted OR = 0.726)
    - More friend / family support, less friend / family strain (adjusted OR = 0.992 per scale point)
    - Higher activation (adjusted OR = 0.988 per PAM-13 point)

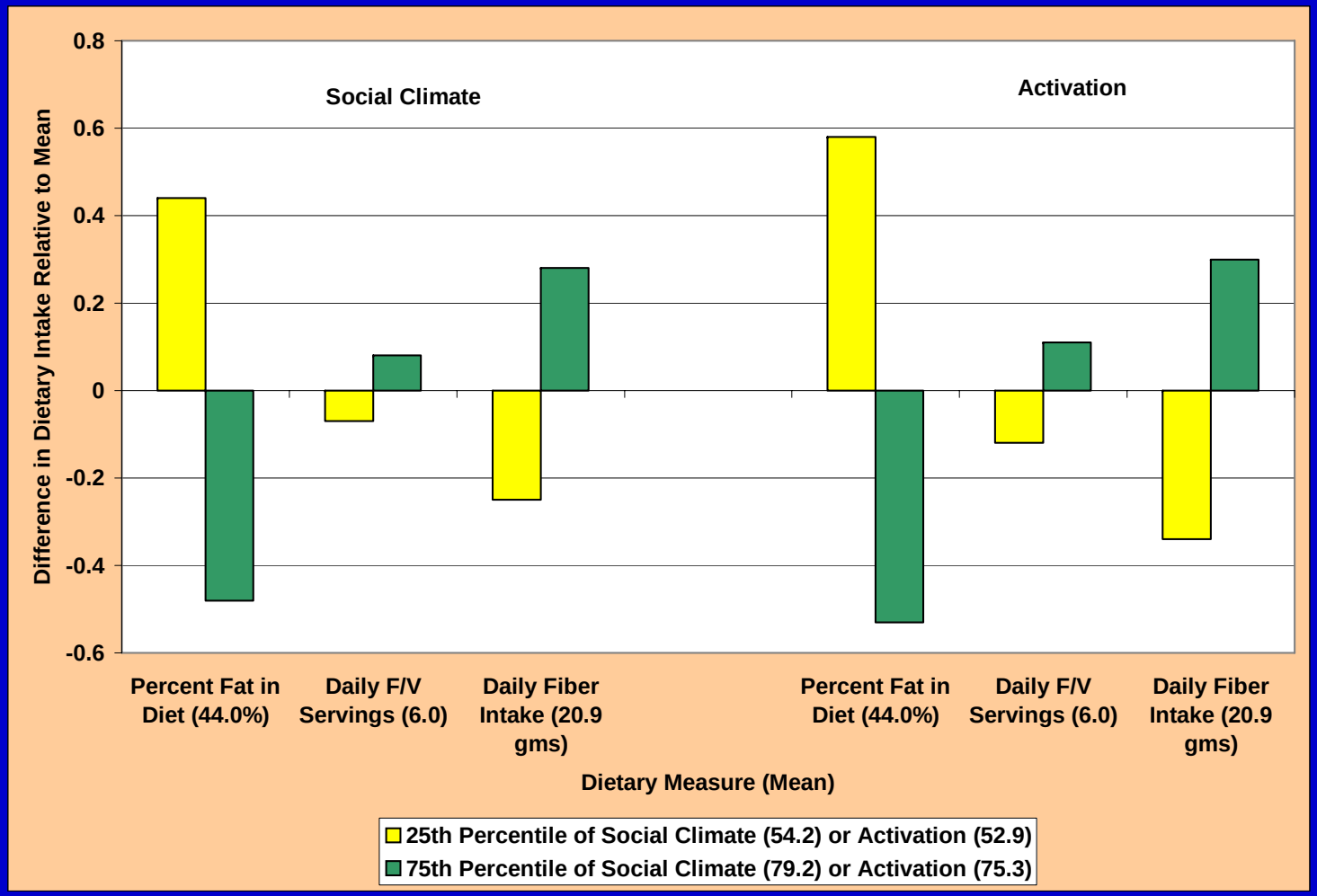
Results


1.500
1.400
1.300
1.200
1.100
1.000
0.900
0.800
0.700
0.600
0.500
Adjusted OR
Sidewalks
Walking / cycling paths nearby
Exercise equipment in household
Social Climate: 25th Percentile
Social Climate: 75th Percentile
Activation: 25th Percentile
Activation: 75th Percentile
Neighborhood and Psychosocial Circumstances
Adjusted OR for Recommended Exercise
Adjusted OR for Physical Inactivity

Results

- Diet
  - Percent fat in diet was significantly ***lower*** with:
    - More friend / family support, less friend / family strain (β = -0.037 per scale point)
    - Higher activation (β = -0.049 per PAM-13 point)
  - Daily F/V servings were significantly ***higher*** with:
    - More friend / family support, less friend / family strain (β = 0.0051 per scale point)
    - Higher activation (β = 0.0094 per PAM-13 point)
  - Daily fiber intake was significantly ***higher*** with:
    - More friend / family support, less friend / family strain (β = 0.021 per scale point)
    - Higher activation (β = 0.027 per PAM-13 point)

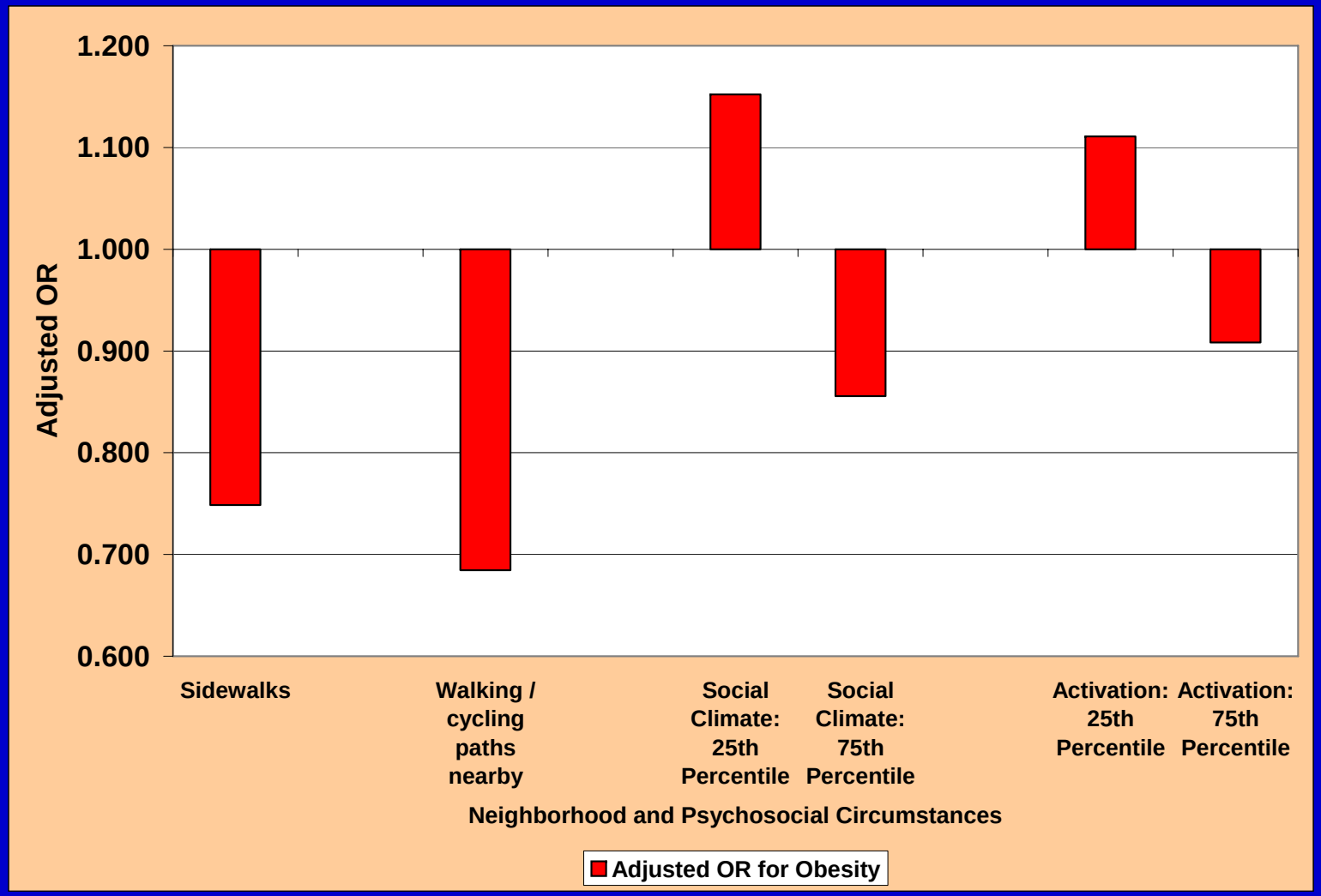
Results


Social Climate
Activation
Difference in Dietary Intake Relative to Mean
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
Percent Fat in Diet (44.0%)
Daily F/V Servings (6.0)
Daily Fiber Intake (20.9 gms)
Percent Fat in Diet (44.0%)
Daily F/V Servings (6.0)
Daily Fiber Intake (20.9 gms)
Dietary Measure (Mean)
25th Percentile of Social Climate (54.2) or Activation (52.9)
75th Percentile of Social Climate (79.2) or Activation (75.3)

Results

- Obesity
  - Obesity was significantly ***less likely*** with:
    - Sidewalks in neighborhood (adjusted OR = 0.744)
    - Walking or cycling paths nearby (adjusted OR = 0.686)
    - More friend / family support, less friend / family strain (adjusted OR = 0.992 per scale point)
    - Higher activation (adjusted OR = 0.990 per PAM-13 point)

Results


1.200
1.100
1.000
0.900
0.800
0.700
0.600
Adjusted OR
Sidewalks
Walking / cycling paths nearby
Social Climate: 25th Percentile
Social Climate: 75th Percentile
Activation: 25th Percentile
Activation: 75th Percentile
Neighborhood and Psychosocial Circumstances
Adjusted OR for Obesity

Conclusions

- Neighborhood characteristics, interactions among friends and family, and activation independently contribute to physical activity.
  - Sidewalks in neighborhoods, nearby walking and cycling paths, household exercise equipment, supportive networks of friends and family, and personal motivation increase likelihood of recommended physical activity and decrease likelihood of physical inactivity.

- Interactions among friends and family and activation independently contribute to dietary intake.
  - Supportive networks of friends and family and personal motivation decrease fat intake and increase F/V and fiber intake.

Conclusions

- Likelihood of obesity is related to essentially these same neighborhood characteristics and psychosocial circumstances.
  - Etiology of obesity has both social and clinical components.

Neighborhood sidewalks **Nearby walking / cycling paths**	→	**Less Physical Inactivity**	↘	
Supportive social networks	→	**Less Physical Inactivity** **Better Dietary Intake**	→	**Lower BMI**
Patient activation	→	**Less Physical Inactivity** **Better Dietary Intake**	↗	

Implications for Policy and Practice

- Community health might benefit from partnerships of MCOs with neighborhood and community organizations to:
  - Increase availability of neighborhood features and facilities that promote physical activity, and
  - Increase availability of neighborhood and community programs that promote social interaction and support for physical activity and healthy food selection and meal preparation.