Is There an Association between Worksite Social Support, Diet, and Body Mass Index?

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Background

- 30% of Americans are obese (BMI ≥ 30 kg/m^2).
- Only 10% of Americans eat 5 or more daily servings of fruits and vegetables.
- Worksites are important venues to influence health behaviors:
  - Over 60% of the U.S. adult population is employed.
  - Working people spend one third of their waking hours at the workplace.
  - Worksites may be considered small communities where individuals interact.
  - Employees consume at least one meal and several snacks at work.
  - Social support can be provided through co-workers to positively influence the thoughts and behaviors of the receiver.
- Therefore, worksites may provide social support and influence dietary behaviors, specifically fruit and vegetable intake.

Aim

- To evaluate the association between worksite social support, dietary behaviors, and Body Mass Index (BMI).

Context

- The Physical Activity and Changes in Eating (PACE) worksite study is a group randomized trial.
- Thirty-four worksites from the Seattle Metropolitan area were recruited and randomized.
- Baseline surveys were collected from 2,878 employees.

Descriptive Statistics

Table 1: Demographics (n = 2573)

	Percent
Gender	
Male	49
Female	51
Age, mean (s.d.)	42.3 (11.8)
Housemate	
Alone	16
With Other Adult(s) and Children	40
With Children Only	3
With Other Adult(s) Only	41
Education	
Less than high school	4
High school graduate or GED	42
Technical College	8
College	32
Postgraduate or professional degree	14
Household Income	
<$25,000	6
$25,000 to $49,999	25
$50,000 to $74,999	23
$75,000 to $100,000	20
>$100,000	26
Race/Ethnicity	
White	80
Asian	12
Other	8

Table 2: Questions related to Social Support (n = 2573)

	Strongly Agree (%)	Agree (%)	Disagree (%)	Strongly Disagree (%)
1. I look forward to being with those on my shift or in my work group.	32	59	8	1
2. I feel it would make a difference in my work shift or work group's performance if I wasn't there.	29	44	15	12
3. People take a personal interest in each other on my shift or in my work group.	28	59	11	2
4. There are set ways of doing things on my shift or in my work group.	16	61	21	2
5. Members of my shift or work group really help and support one another.	28	61	9	2

Table 3: Baseline BMI and Diet (n = 2573)

	Mean	s.d.
Body Mass Index (kg/m^2)	27.4	6.1
Dietary Behaviors		
Fruits and vegetables per day (single question)	3.0	1.7
Fruits and vegetables per day (summary FFQ)	3.1	2.2
Fast food restaurant meals (per month)	2.3	3.1
Soft drink consumption (per day)	0.5	0.7
	Percent	
Eating while doing other activities		
Never	5	
Seldom	17	
Sometimes	46	
Most times	28	
Always	4	

Materials and Methods

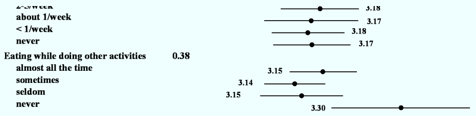
- Participating worksites have 40-350 employees, and include:
  - White collar personal services
  - Other personal services
  - Manufacturing
  - Transportation
  - Wholesale/trade
- Baseline surveys administered to:
  - 100% employees for worksites with 40-125 employees,
  - a random sample of 100 employees for worksites with 126-350 employees.
- Worksite social support constructs assessed via 5 questions (table 2).
- Body Mass Index (BMI) was computed using self-reported weight (kg) and height ($meters^2$).
- Dietary behaviors associated with high energy intake assessed via 5 questions (table 3).

Analytic Methods

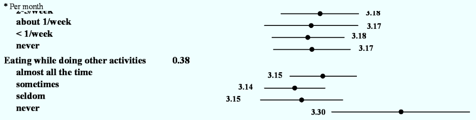
- 305 persons excluded due to missing values for BMI or worksite social support (n = 2573).
- Principal components analysis applied to worksite social support questions, using eigenvalue cut point of 0.95.
- Variables created by averaging high loading questions on each factor/component.
- Linear mixed models were executed using STATA v. 10:
  - *Random effect*: worksites
  - *Fixed effects*: gender, age, education, race/ethnicity, dietary behaviors, BMI

Results

- First principal component characterized the three worksite social support questions:
  - (high loading questions 1, 3, 5 in table 2),
  - explaining 45% of the total variation.
- Second principal component characterized the two worksite social norms questions:
  - (high loading questions 2, 4 in table 2),
  - explaining 19% of the total variation.
- Higher worksite social support was associated with higher fruit and vegetable intake-single question (figure 1) (p-v = 0.03).
- Higher worksite social norms was associated with lower BMI (figure 2) (p-v = 0.02).
- No significant relationships between worksite social support, BMI, fruit and vegetable intake (summary FFQ), fast food restaurant meals, soft drink consumption, and eating while doing other activities were observed.
- No significant relationships between worksite social norms, fruit and vegetable intake, fast food restaurant meals, soft drink consumption, and eating while doing other activities were observed.



[1] Linear mixed models were used, adjusted for gender, age, education, and race/ethnicity. Categories of race were collapsed into three categories
[2] Trend tested with Wald Test
† Single question
‡ Summary Food Frequency Questionnaire
* Per month



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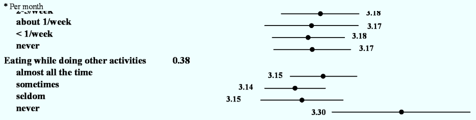

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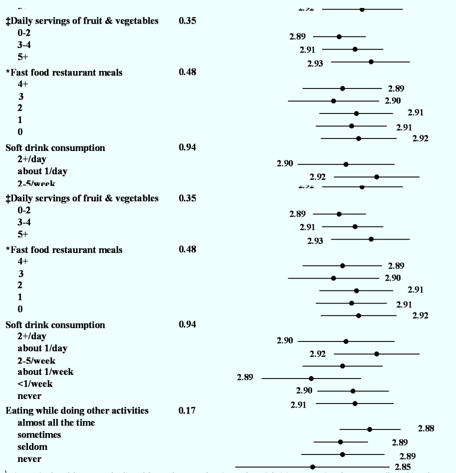

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Discussion

- Previous research has shown an association between worksite social support and healthy diets.
- Preliminary results suggest that only fruit and vegetable intake is associated with worksite social support, while BMI is associated with worksite social norms.

Future Directions

- Continued studies should further examine worksite social support, dietary behaviors, especially fruit and vegetable intake, and BMI to determine whether these associations can be demonstrated longitudinally.
- If so, given the association of low fruit and vegetable intake and obesity risk, more emphasis on the role of social support among co-workers could help improve effectiveness of obesity prevention interventions at the worksite.

Selected Readings

- Beresford S A.A., Locke E, Bishop S, West B, McGregor B, Bruemmer B, Duncan G, Thompson B. Worksite Study Promoting Activity and Changes in Eating (PACE): Design and Baseline Results. *Obesity*. 2007 Nov, Vol. 15.
- Berkman L, Kawachi I. (Eds.). (2000). *Social Epidemiology*. New York: Oxford University Press.
- Kimmons J, Gillespie C, Seymour J, Serdula M, Blanck H. Fruit and Vegetable Intake Among Adolescents and Adults in the United States: Percentage Meeting Individualized Recommendations. *The Medscape Journal of Medicine.* 2009;11(1):26.
- National Center for Chronic Disease Prevention and Health Promotion. Overweight and Obesity, Centers for Disease Control and Prevention, 2007.
- Nies MA, Kershaw TC. Psychosocial and environmental influences on physical activity and health outcomes in sedentary women. *J Nurs Scholarsh*. 2002;34(3):243-9

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