Physical workload and low back disorders: *Does fairness matter?*

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Acknowledgements

- Catherine A. Heaney
- Sue A. Ferguson
- W. Gary Allread
- Sato Ashida
- William S. Marras

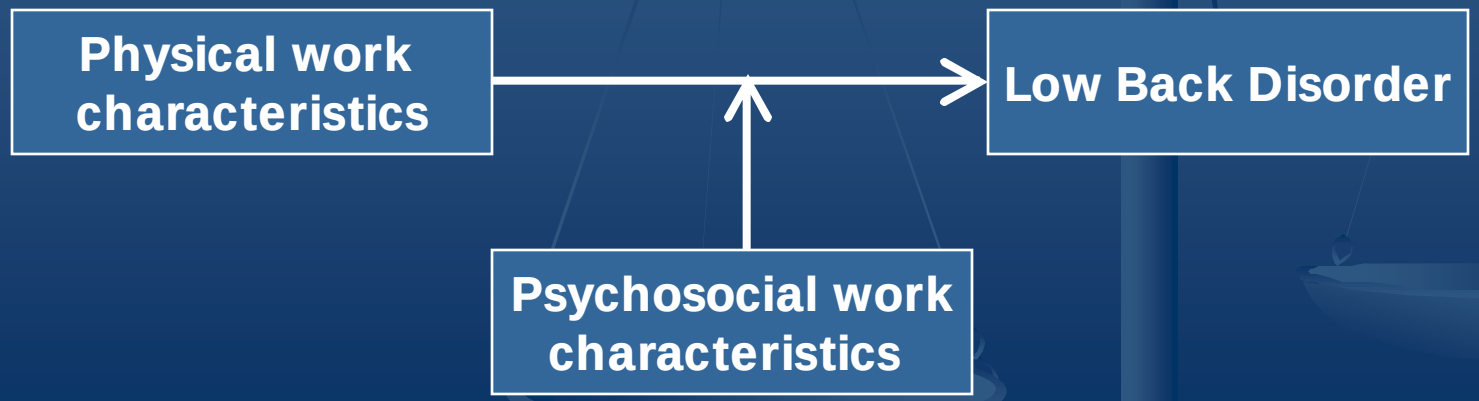
This study was supported by NIOSH 5 R01 OH003914-03.

Risk Factors for Low Back Disorders

- Biomechanical characteristics of the job
  - Heavy lifting, pushing, pulling
  - Awkward posture
  - Whole body vibration
- "Psychosocial factors"
  - Psychosocial characteristics of the job (e.g., job demands, job control) Hartvigsen et al, 2004
  - Personality traits (e.g., introvert, extrovert) Marras et al., 2000
  - Mental health (e.g., depression) Rubin, 2007

Main Effect Model

Interaction (Moderation) Model



Fairness/Justice in the Workplace

- Associated with
  - Self-rated health (Kivimäki et al., 2004)
  - Coronary heart disease (Elovainio et al., 2006; Kivimäki et al., 2003)
  - Mental health (Ferrie et al., 2006; Kivimäki et al., 2003)
  - Absence because of sickness (Väänänen et al., 2004)

Research Question

Does fairness have a main effect?

Or an interaction effect?

Study Participants & Design

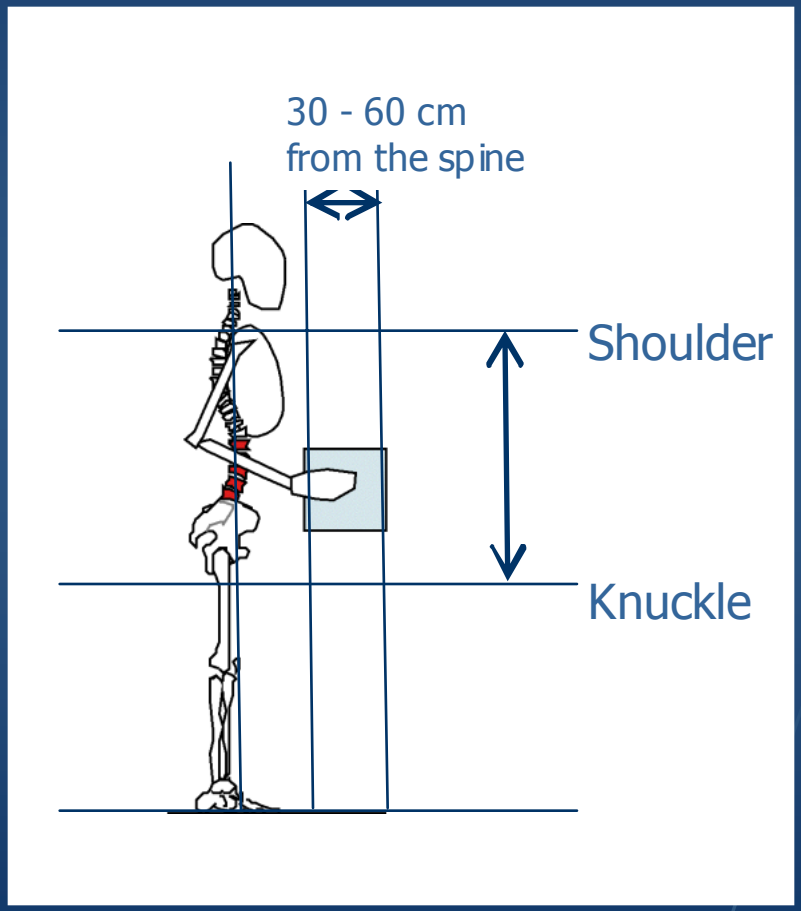
- Prospective cohort study of warehouse workers
  - Physical workload (baseline)
  - Management fairness (baseline, 6-month follow-up)
  - Low back functioning (baseline, 6-month follow-up)
  - Response rate at baseline=88%, at follow-up = 72%
- 301 employees provided data at both time points
  - 92% men, median age = 35 years old (18 – 77 y.o.)
  - 60% White, 22% African American, 12% Latino
  - 43% High school diploma, 13% less than high school
  - Median wage=$10.00/hour

Physical Workload

- Assessment was conducted by a Certified Professional Ergonomist (CPE)
  - Identified major job categories
  - Obtained the following information for each job category:
    - Work rates, durations
    - Work postures
    - Weight of objects handled
    - Forces exerted during pushing or pulling tasks
- Number of Exertions above TLV (Threshold Limit Value for safe manual material handling)

Determined by American Conference of Governmental Industrial Hygienists; ACGIH)

Exertions above TLV



- **LOW** workload jobs
  ≤ 8 exertions per hour (n=160)
- **MEDIUM** workload jobs
  10 – 53 exertions per hour (n = 81)
- **HIGH** workload jobs
  ≥ 63 exertions per hour (n=60)

Management Fairness

- Developed for this study based on a previous qualitative study (Heaney & Joarder, 1999)
  - 23 items: e.g., "To what extent does management treat employees with respect?"
  - Five-point response scale, "Not at all (1)" to "A very great deal (5)" Cronbach alpha = .96 for BL, .95 for F/U
- Change score = Fairness (F/U) – Fairness (BL)

  Positive values indicate increased fairness

  Negative values indicate decreased fairness

Low Back Functioning

- Lumber Motion Monitor
  - Participants performed a standard set of exertions (i.e., flexing and extending the trunk, twisting, and bending side by side)
- Probability of normal (pn)

(Marras, Ferguson et al., 1999)

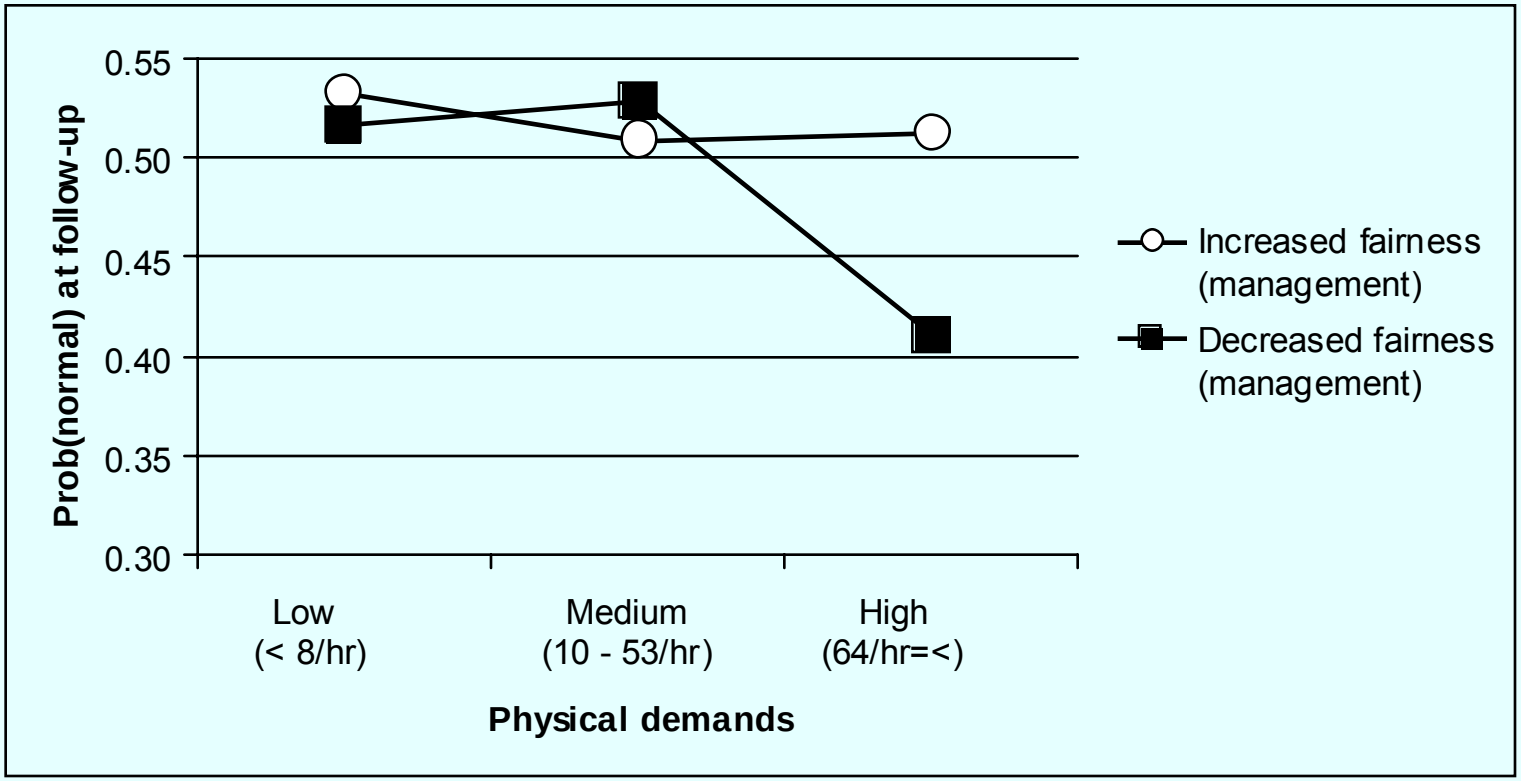
Descriptive statistics by level of physical workload

	Physical Workload					
	Low		Medium		High	
Variable	Mean	SD	Mean	SD	Mean	SD
Age	39.75	12.32	35.44	10.92	**31.65**	8.96
BMI	28.30	6.03	26.55	4.71	28.62	5.21
pn at BL	0.53	0.27	0.58	0.27	0.58	0.27
pn at F/u	0.50	0.27	0.54	0.29	0.49	0.26
Management Fairness at BL	**3.53**	0.72	3.16	0.84	3.22	0.77
Management Fairness at F/u	**3.48**	0.78	3.10	0.77	3.10	0.81
Δ Management Fairness (F/u-BL)	-0.04	0.50	-0.06	0.70	-0.12	0.48

Regression results: pn at Time 2 as the outcome variable

	Model 1			Model 2			Model 3		
	B	SE	p	B	SE	p	B	SE	p
Physical workload									
Medium	-0.007	0.031	0.826	-0.007	0.031	0.812	-0.009	0.031	0.757
High	**-0.072**	**0.035**	**0.041**	**-0.072**	**0.035**	**0.042**	-0.056	0.035	0.114
Management Fairness				0.023	0.023	0.321	0.026	0.035	0.452
Interaction									
Medium * Fairness							-0.057	0.049	0.250
High * Fairness							**0.136**	**0.069**	**0.049**
R^2 change			0.009			0.002			0.016
Adjusted R^2			0.401			0.401			0.414

Notes. All models are adjusted for pn at time 1, age, gender, language, worksite, and BMI.



Yes, Fairness Does Matter.

- High physical workload was associated with a decline in low back functioning only for employees who experienced a decline in management fairness.
- Fairness moderated the relationship between physical workload and low back functioning.

  This supports an interaction model.

Implications

- Future research
  - Examine interaction effects of psychosocial work characteristics
  - Investigate fairness as a moderator for other health outcomes
- Intervention
  - Assess employees' perceptions of fairness in the workplace, and address causes of unfairness
  - Consider whether a fair workplace might also enhance the effectiveness of other intervention efforts