HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH | CENTER FOR WORK, HEALTH, & WELL-BEING

Safety Incentives, Safety Climate, and Total Worker Health® in the Dynamic Environment of Commercial Construction

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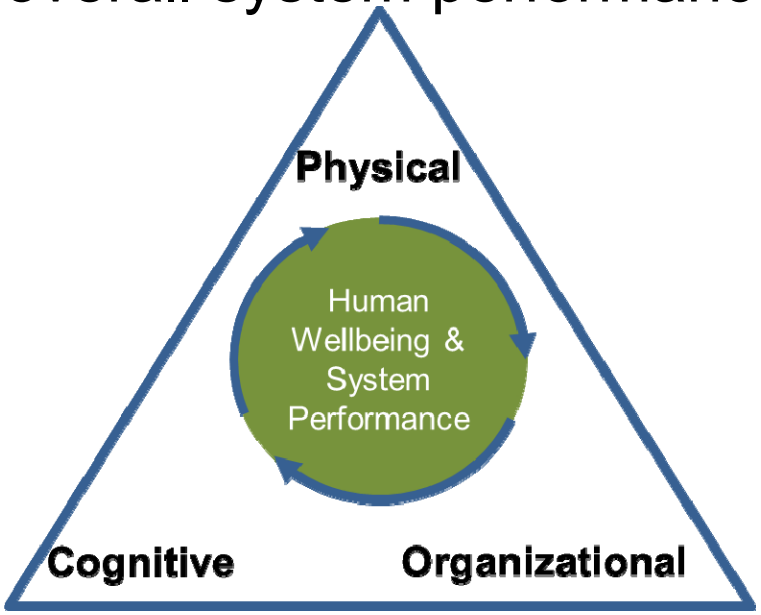
Integrating Design and Systems

Ergonomics (or human factors) is the scientific discipline concerned with the understanding of *interactions among humans and other elements of a system*, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance



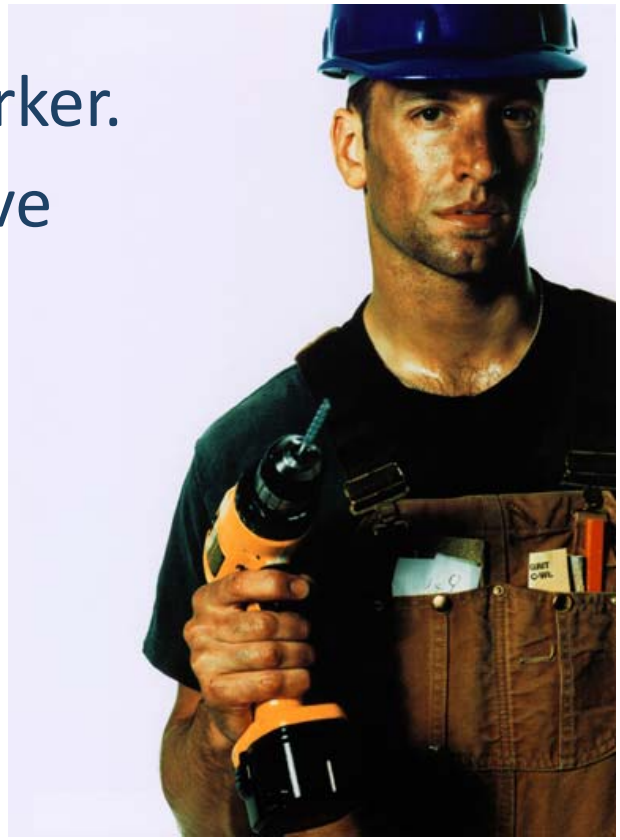
Three domains of modern ergonomics

- Systems
- Design
- Two outcomes
  - Human Well-Being
  - System Performance

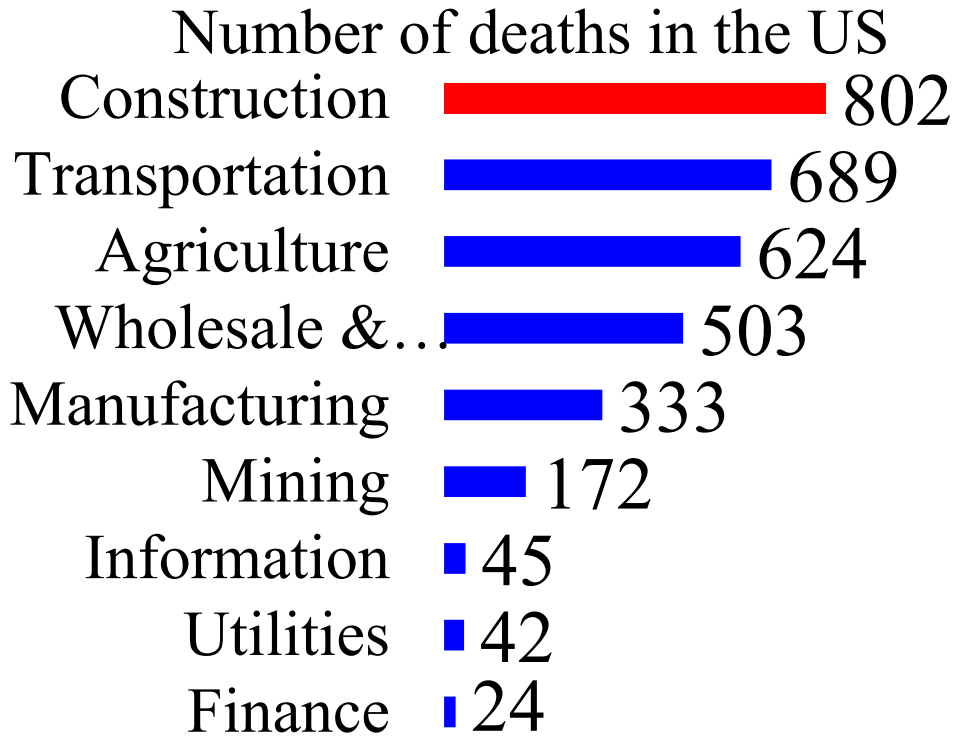
Dul et al, Ergonomics, 2012; 55(4): 377-395
International Ergonomics Association, 2000

Take home message(s)

- It's tough being a construction worker.
- Emphasis in the industry to improve safety culture
- Challenges exist to improve safety culture and to measure it.
- Innovation (and adaptation) can overcome these challenges.



Construction Safety and Health



In 2010, 34% of non-fatal injuries with days away from work were associated with strains and sprains, three-quarters of which were related to overexertion

CPWR (2013) Chartbook

Most workers work in pain

Caban-Martinez et al. Construction workers working in musculoskeletal pain and engaging in leisure-time physical activity: Findings from a mixed-methods pilot study. *Am J Ind Med*. 2014 Jul;57(7):819-25

- 70% of workers reported musculoskeletal pain in the 3 months prior to their interview,
  - 54% pain 2 or more anatomical sites
  - 65% pain interfered with their work from "a little bit" to "quite a lot."
- "have no choice but to work through pain and discomfort [as the worker] needs to do anything to get the job done."
- "the job beats you up and there's not much you can do to avoid it."

Direct measures of physical activity of 53 Construction workers for seven days

	N	(%)
Plumber	3	5
Carpenter	10	18
Demolition	3	5
Electrician	5	9
Operator	2	4
Foreman	4	4
Pipe Fitter	2	4
Iron Worker	2	4
Laborer	19	42
Pile Driver	2	4
Welder	1	2
Male	55	100
	Mean	SD
Age	40	11
BMI (kg/m2)	29	4

- "it's not heavy cardio, but at least [I am] moving around."
- "moving all the time and not sitting behind a desk."

Caban-Martinez Am J Ind Med. 2014 Jul;57(7):819-25
Freedson *Med Sci Sports Exerc.* 1998;30:777–781.

LTPA and OPA

in construction workers

Minutes	Self Report		Measured	
LTPA	Mean	SD	Mean	SD
Moderate	489	612	128	121
Vigorous	244	455	5	13
OPA				
Moderate	1032	935	247*	128
Vigorous	536	752	2	6

- * Moderate OPA was negatively correlated with Fatigue

- LTPA, Self-report of moderate minutes is 3.8 times larger
- OPA, Self-report of moderate minutes is 4.2 times larger

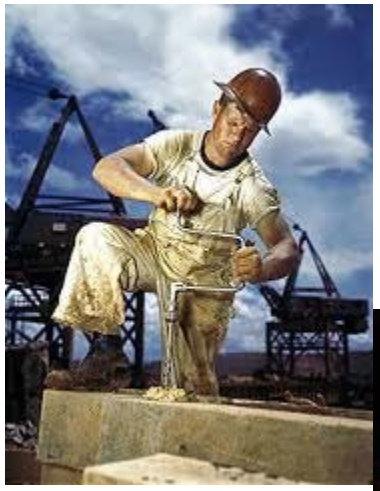
40 hours = 2400 minutes

Arias et al J Occup Environ Med. 2015 Jan;57(1):73-8. PMID: 25563543

Construction Worker Safety and Health

Commercial Construction workers have high prevalence

- smoking (39%)
- heavy alcohol use (17%)
- mental distress (16%)



Lee et al JOEM 2007;49(1):75-81
Bush & Lipari Substance Use and Substance Use Disorder by Industry. The CBHSQ Report: Short Report. April 16, 2015
Borsting Jacobsen et al JOEM 2013 Oct;55(10):1197-2004.

Mental Health in Construction workers

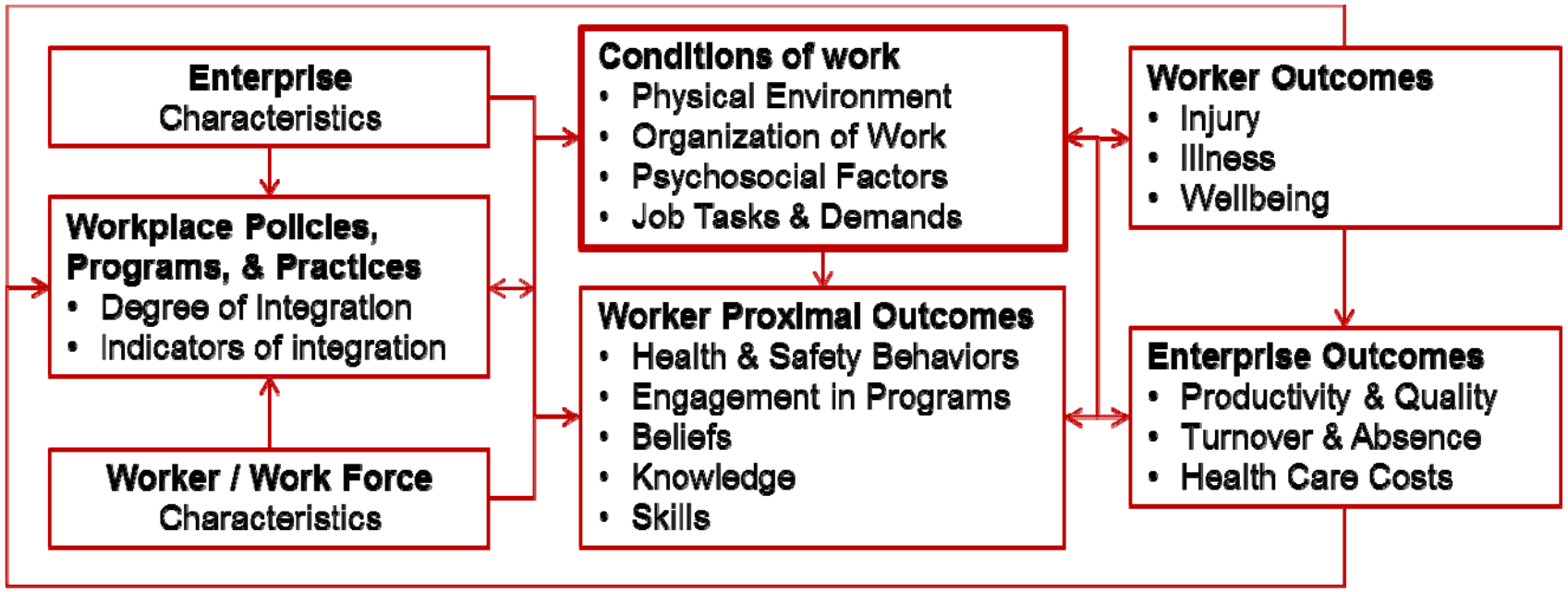
- Surveyed 172 construction workers on 4 work sites
- 16% had mental distress
  - 2x the prevalence in general male population
- Associated with injury & Pain

Substantial Mental Distress Models	OR [95% CI]
4 or more injuries	4.8 [1.4-17.2]
Any Low Back Pain	2.6 [1.0 – 6.6]
Pain 2 or more body parts	3.1 [1.2 – 7.9]

Borsting Jacobsen et al JOEM 2013 Oct;55(10):1197-2004

Our Center's Total Worker Health® conceptual framework

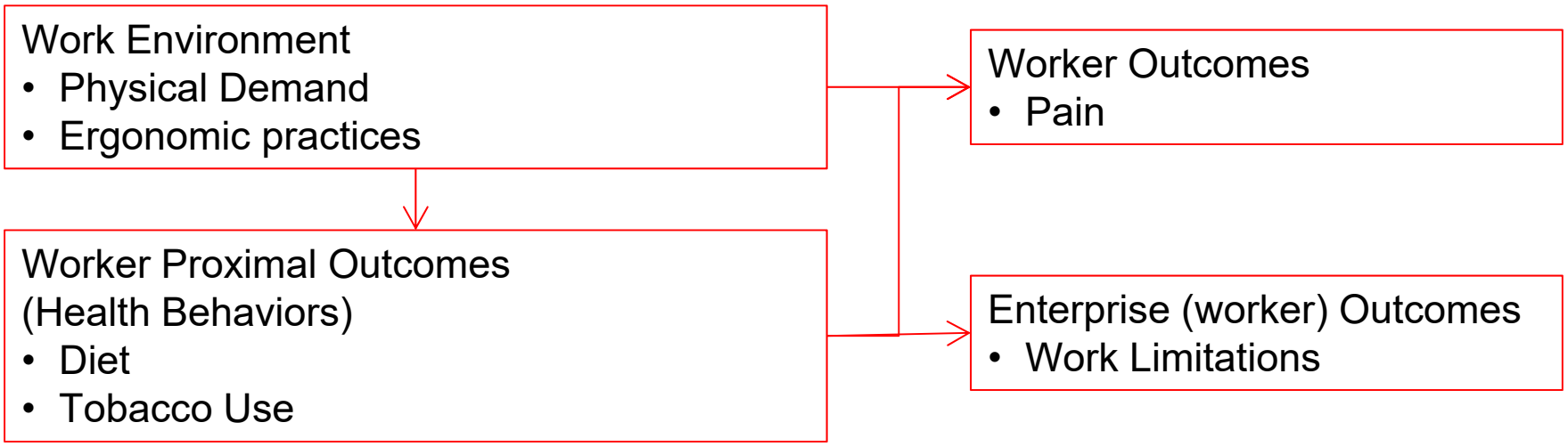
"Workers respond to the work environment"



Sorensen et al Under review

How do construction workers respond?

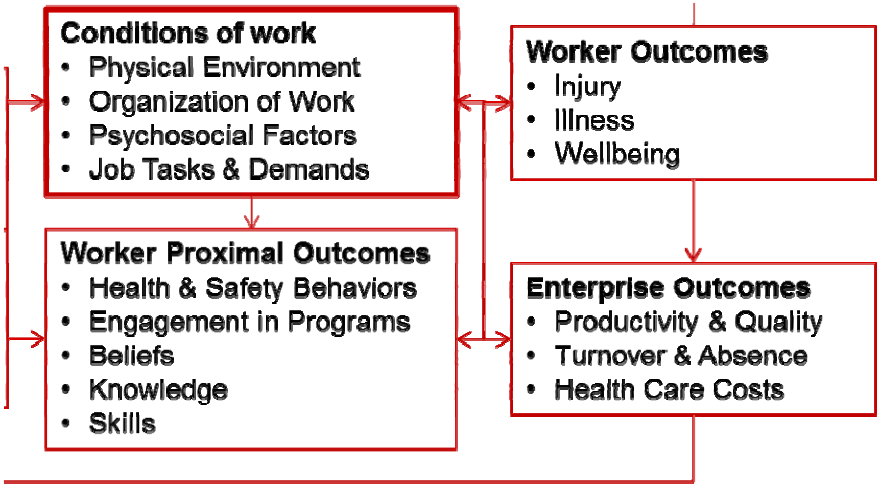
- Evaluate the response of construction workers to the work environment.
  - Independent variables:
    Physical demand and ergonomics practices
  - Dependent variables: MSK Pain, Smoking, and Diet

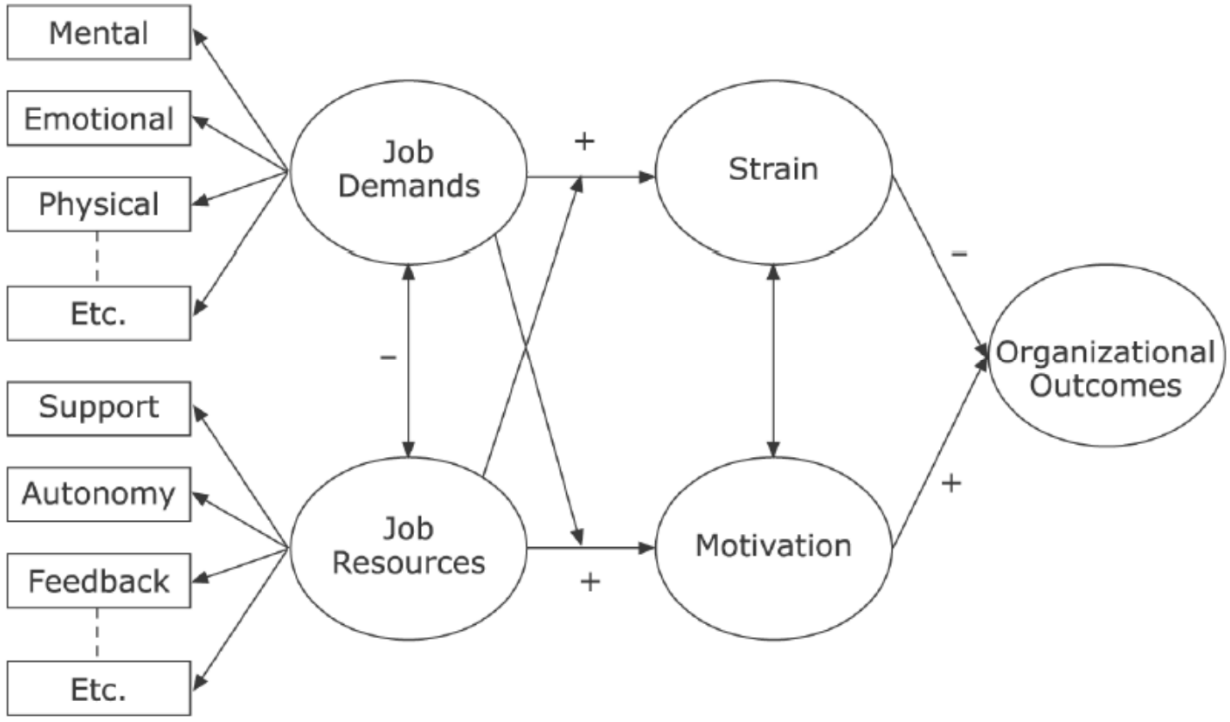


Dennerlein, PREMUS 2016 Toronto, Canada

The Job Demands-Resources model: state of the art

Arnold B. Bakker
Erasmus University Rotterdam, Institute of Psychology, Department of Work and Organizational Psychology, Rotterdam, The Netherlands, and
Evangelia Demerouti
Utrecht University, Department of Social and Organizational Psychology, Utrecht, The Netherlands





Bakker and Demerouti J. Managerial Psychology 2007: 22(3): 309-328

Pearson Correlations Coefficients

658 baseline surveys from 10 construction sites	Pain interferes with work	WLQ
Pain interferes with work	1	**0.41**
Weekly Severe Pain	**0.40**	**0.34**
Current Smoker	**0.08**	0.04
Unhealthy Diet	**0.12**	**0.08**
Leisure Time Physical Activity	**0.10**	0.04
Ergonomics	**0.09**	0.07
Physical Demands	**0.09**	**0.17**

WLQ = Short version of the Work Limitations Questionnaire

Dennerlein, PREMUS 2016 Toronto, Canada

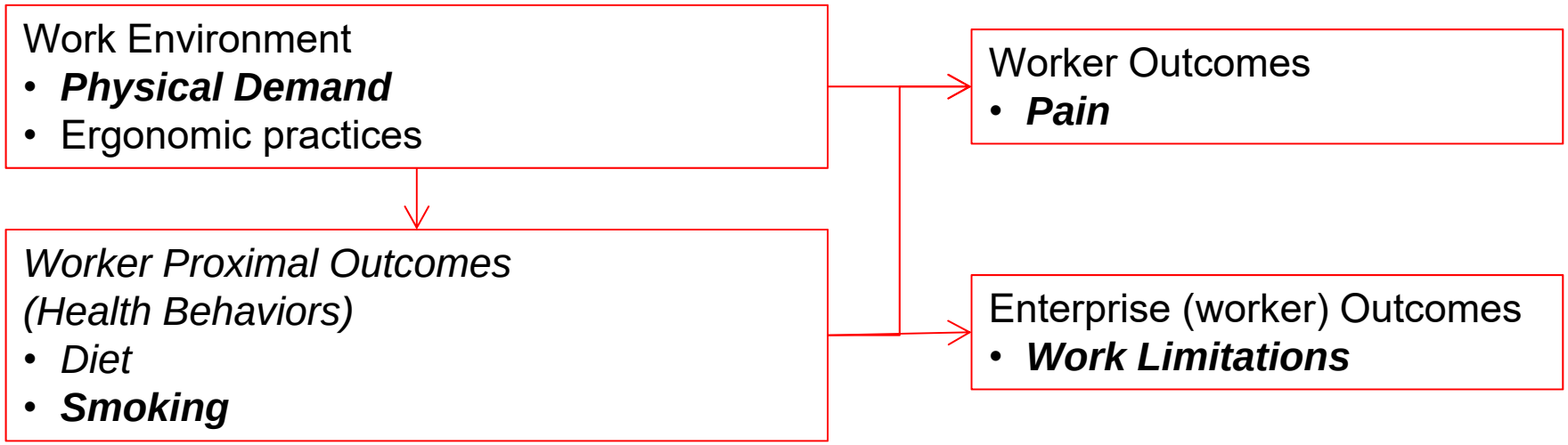
Associations with physical demands

658 baseline surveys from 10 construction sites	Physically Demanding Work (binary)		Ergonomic Environment (continuous)	
Binary Outcomes:	OR (95%CI)	P-value	OR (95%CI)	P-value
12 Month Pain	***1.74***	***0.0018***	0.82 (0.62, 1.07)	0.1476
3 Month Pain	1.32	0.1668	0.74 (0.54, 1.01)	0.0574
3 Month Multiple Pain	***2.03***	***<0.001***	0.89 (0.69, 1.14)	0.3467
3 Month Pain Interference	1.40	0.0891	0.77 (0.58, 1.04)	0.0855
Weekly Severe Pain	***1.74***	***0.0015***	0.80 (0.62, 1.03)	0.0846
Current Smoker	***1.46***	***0.0416***	1.50 (1.15, 1.98)	0.7229
Continuous Outcomes:	β (95%CI)	P-value	β (95%CI)	P-value
Work Limitations	***0.25***	***<0.001***	-0.07 (-0.16, 0.01)	0.0923
Daily Physical Activity	***12.66***	***0.0017***	4.36 (-1.64, 10.37)	0.1543
Unhealthy Diet	-0.06	0.5968	-0.03 (-0.20, 0.14)	0.7534

Adjusted for possible confounding variables include: age, gender, race, title, and trade

Dennerlein, PREMUS 2016 Toronto, Canada

Tough being a construction worker



- Within the context of work, there are many interactions between work and health outcomes.
- Only beginning to understand how the conditions of work effect these workers within this framework

Take home message(s)

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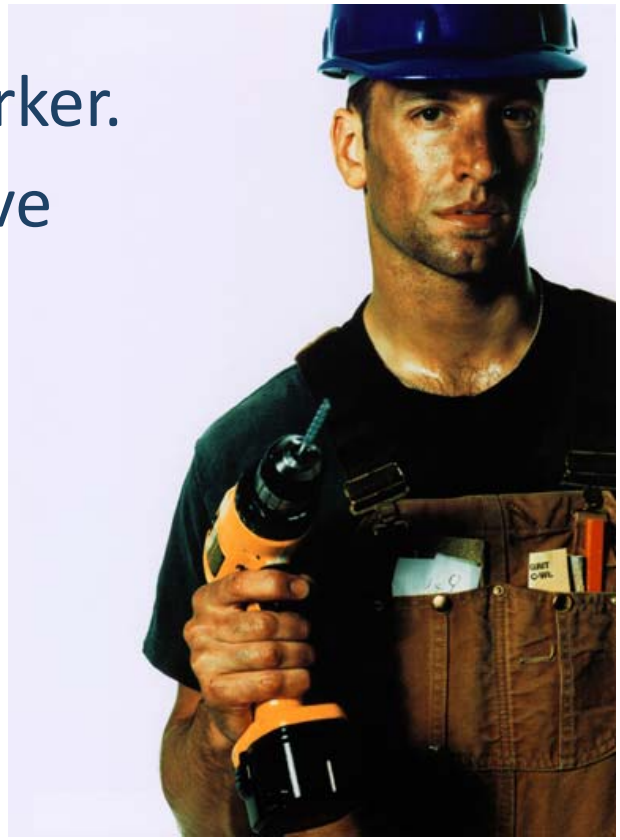


Jim McDonald, Meijer
Title : Creating a Safety of Culture

Meijer Core Values

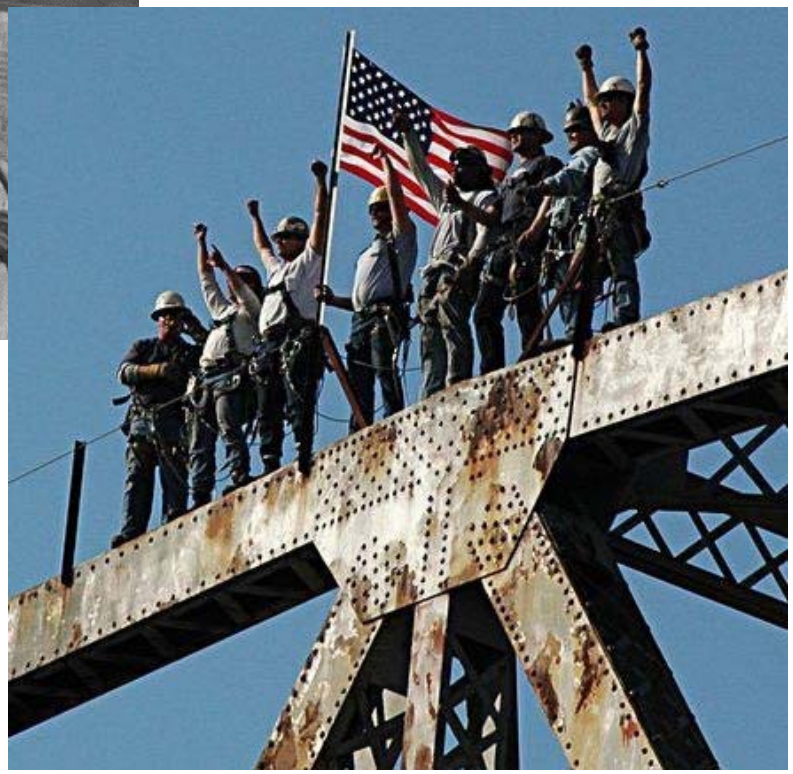
As the world around us evolves and changes, one thing remains constant at Meijer – our core values. They inform everything we do, from how we've developed our culture to how we approach everyday challenges.

1. **Customers:** Fred Meijer always said, "Customers don't need us, we need them." At Meijer, we focus on our customers and thrive by meeting their needs and exceeding their expectations.
2. **Competition:** Retail is a fast-paced business that demands continuous improvement. Meijer is committed to keeping our competitive spirit strong and staying nimble and flexible to win in the marketplace.
3. **Family:** Meijer is a family business. We believe in treating each other with dignity and respect. We are committed to strengthening the communities we serve.
4. **Freshness:** Meijer is known for freshness. A focus on fresh food, fresh thinking and innovation makes us better at serving our customers.

5. **Safety & health: Meijer provides a safe and healthy environment for our team members. We create a safe shopping experience for our customers and offer products and services to help our customers lead healthier lives.**

Safety Culture in Construction

Men at lunch, RCA Building NYC 29 September 1932



Safety Culture and Climate in Construction:

Bridging the Gap Between Research and Practice

June 11-12, 2013
Omni Shoreham Hotel – Washington DC

WORKSHOP REPORT

- 2013 – The Center for Construction Research and Training (CPWR) held a work shop to define safety culture and climate within the industry
- Huge push in the industry for improving safety culture – needed to define it.

(Organizational) Safety Culture: Deeply held but often unspoken safety-related beliefs, attitudes, and values that interact with an organization's systems, practices, people, and leadership to establish norms about how things are done in the organization. Safety culture is a subset of, and clearly influenced by, organizational culture. Organizations often have multiple cultures or subcultures, and this may be particularly true in construction.

(Organizational) Safety Climate: The shared perceptions of safety policies and procedures by members of an organization at a given point in time, particularly regarding the adequacy of safety and consistency between actual conditions compared to espoused safety policies and procedures. Homogeneous subgroups tend to develop shared perceptions while between-group differences are not uncommon within an organization.

Project Safety Climate: Perceptions of occupational safety and health on a particular construction project at a given point in time. It is a product of the multiple safety climates from the different organizations involved in the project including the project owner, construction manager/general contractor, and subcontractors. Project safety climate may be heavily influenced by local conditions such as project delivery method, schedule and planning, and incentives.

Strengthening Jobsite Safety Climate

Eight Worksheets to Help You Use and Improve Leading Indicators

Uninformed → Reactive → Compliant → Proactive → Exemplary

Indicators

1. Management commitment
2. Aligning and integrating safety as a value
3. Ensuring accountability at all levels
4. Improving safety leadership
5. Empowering and involving workers
6. Improving Communication
7. Training at all levels
8. Encouraging Owner/Client Involvement

Sound Familiar?

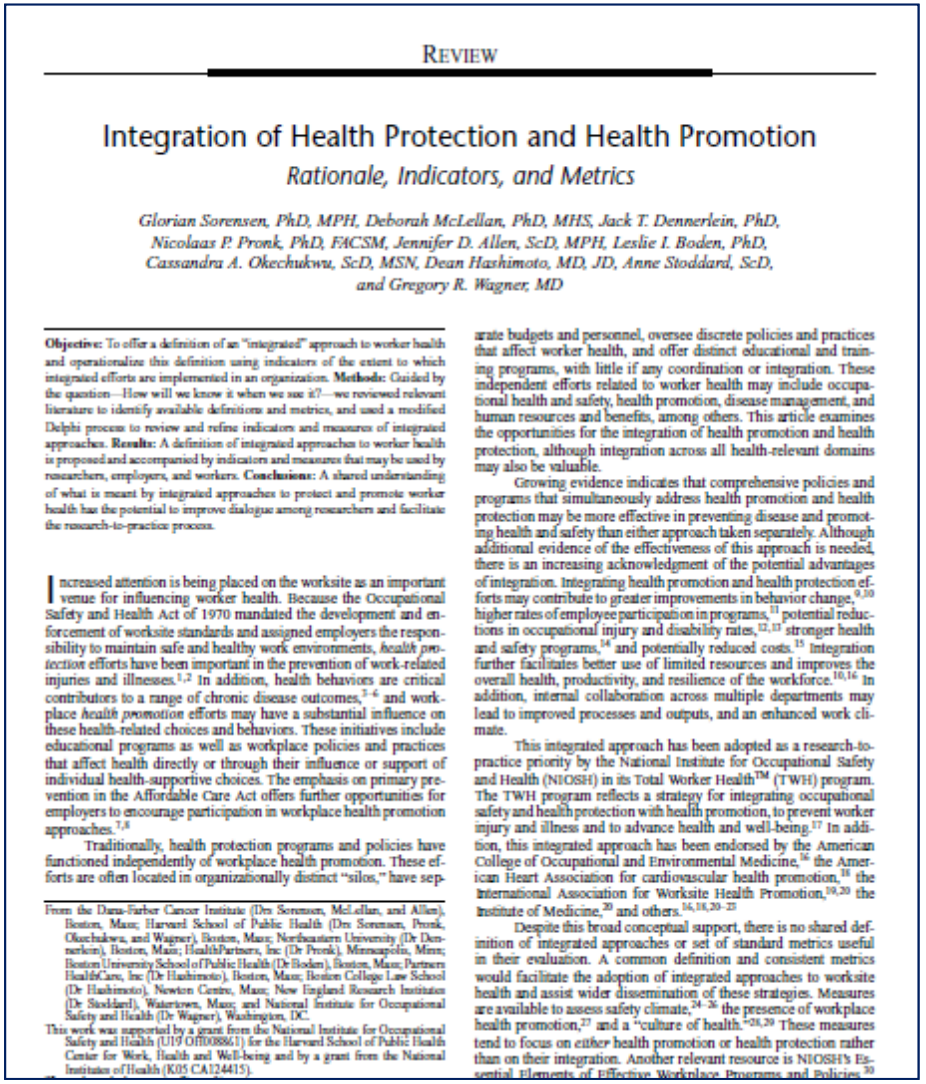
Themes

- Safety Culture has parallels with Integrated Approaches and Total Worker Health®
- Builds upon fundamental safety systems.
- Recognition and control of job hazards is implicit at best
- Theory?

Defining integrated approaches to worker health

"A **strategic** and operational **coordination** of policies, programs & practices designed to **simultaneously prevent** work-related injuries & illnesses & **enhance** overall workforce health & well-being"

- Coordination and linkage of separate policies, practices & programs
- Continuum of approaches exists



REVIEW

Integration of Health Protection and Health Promotion

Rationale, Indicators, and Metrics

Glorian Sorensen, PhD, MPH, Deborah McLellan, PhD, MHS, Jack T. Dennerlein, PhD, Nicolaas P. Pronk, PhD, FACSM, Jennifer D. Allen, ScD, MPH, Leslie I. Boden, PhD, Cassandra A. Okechukwu, ScD, MSN, Dean Hashimoto, MD, JD, Anne Stoddard, ScD, and Gregory R. Wagner, MD

Objective: To offer a definition of an "integrated" approach to worker health and operationalize this definition using indicators of the extent to which integrated efforts are implemented in an organization. **Methods:** Guided by the question—How will we know it when we see it?—we reviewed relevant literature to identify available definitions and metrics, and used a modified Delphi process to review and refine indicators and measures of integrated approaches. **Results:** A definition of integrated approaches to worker health is proposed and accompanied by indicators and measures that may be used by researchers, employers, and workers. **Conclusions:** A shared understanding of what is meant by integrated approaches to protect and promote worker health has the potential to improve dialogue among researchers and facilitate the research-to-practice process.

Increased attention is being placed on the worksite as an important venue for influencing worker health. Because the Occupational Safety and Health Act of 1970 mandated the development and enforcement of worksite standards and assigned employers the responsibility to maintain safe and healthy work environments, *health protection* efforts have been important in the prevention of work-related injuries and illnesses.[1,2] In addition, health behaviors are critical contributors to a range of chronic disease outcomes,[3–6] and workplace *health promotion* efforts may have a substantial influence on these health-related choices and behaviors. These initiatives include educational programs as well as workplace policies and practices that affect health directly or through their influence or support of individual health-supportive choices. The emphasis on primary prevention in the Affordable Care Act offers further opportunities for employers to encourage participation in workplace health promotion approaches.[7,8]

Traditionally, health protection programs and policies have functioned independently of workplace health promotion. These efforts are often located in organizationally distinct "silos," have separate budgets and personnel, oversee discrete policies and practices that affect worker health, and offer distinct educational and training programs, with little if any coordination or integration. These independent efforts related to worker health may include occupational health and safety, health promotion, disease management, and human resources and benefits, among others. This article examines the opportunities for the integration of health promotion and health protection, although integration across all health-relevant domains may also be valuable.

Growing evidence indicates that comprehensive policies and programs that simultaneously address health promotion and health protection may be more effective in preventing disease and promoting health and safety than either approach taken separately. Although additional evidence of the effectiveness of this approach is needed, there is an increasing acknowledgment of the potential advantages of integration. Integrating health promotion and health protection efforts may contribute to greater improvements in behavior change,[9,10] higher rates of employee participation in programs,[11] potential reductions in occupational injury and disability rates,[12,13] stronger health and safety programs,[14] and potentially reduced costs.[15] Integration further facilitates better use of limited resources and improves the overall health, productivity, and resilience of the workforce.[10,16] In addition, internal collaboration across multiple departments may lead to improved processes and outputs, and an enhanced work climate.

This integrated approach has been adopted as a research-to-practice priority by the National Institute for Occupational Safety and Health (NIOSH) in its Total Worker Health™ (TWH) program. The TWH program reflects a strategy for integrating occupational safety and health protection with health promotion, to prevent worker injury and illness and to advance health and well-being.[17] In addition, this integrated approach has been endorsed by the American College of Occupational and Environmental Medicine,[18] the American Heart Association for cardiovascular health promotion,[19] the International Association for Worksite Health Promotion,[19,20] the Institute of Medicine,[20] and others.[16,18,20–23]

Despite this broad conceptual support, there is no shared definition of integrated approaches or set of standard metrics useful in their evaluation. A common definition and consistent metrics would facilitate the adoption of integrated approaches to worksite health and assist wider dissemination of these strategies. Measures are available to assess safety climate,[24–26] the presence of workplace health promotion,[27] and a "culture of health."[28,29] These measures tend to focus on *either* health promotion or health protection rather than on their integration. Another relevant resource is NIOSH's Essential Elements of Effective Workplace Programs and Policies.[30]

From the Dana-Farber Cancer Institute (Drs Sorensen, McLellan, and Allen), Boston, Mass; Harvard School of Public Health (Drs Sorensen, Pronk, Okechukwu, and Wagner), Boston, Mass; Northeastern University (Dr Dennerlein), Boston, Mass; HealthPartners, Inc (Dr Pronk), Minneapolis, Minn; Boston University School of Public Health (Dr Boden), Boston, Mass; Partners HealthCare, Inc (Dr Hashimoto), Boston, Mass; Boston College Law School (Dr Hashimoto), Newton Centre, Mass; New England Research Institutes (Dr Stoddard), Watertown, Mass; and National Institute for Occupational Safety and Health (Dr Wagner), Washington, DC.

This work was supported by a grant from the National Institute for Occupational Safety and Health (U19 OH008861) for the Harvard School of Public Health Center for Work, Health and Well-being and by a grant from the National Institutes of Health (K05 CA124415).

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Sorensen, et al, *JOEM* 2013: Dec;55(12 Suppl):S12-8

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Indicators of integration

- Organizational leadership and commitment
- Collaboration between health protection and worksite health promotion and others, (HR, EH, etc..)
- Supportive Organizational Polices and Practices
  - Accountability and Training
  - Management and Employee Engagement
  - Benefits and Incentives to Support Workplace Health Promotion and protection
  - Integrated Evaluation and Surveillance
- Comprehensive program content

Sorensen et al J Occup Environ Med. 2013: 55(12):S12-18

REVIEW

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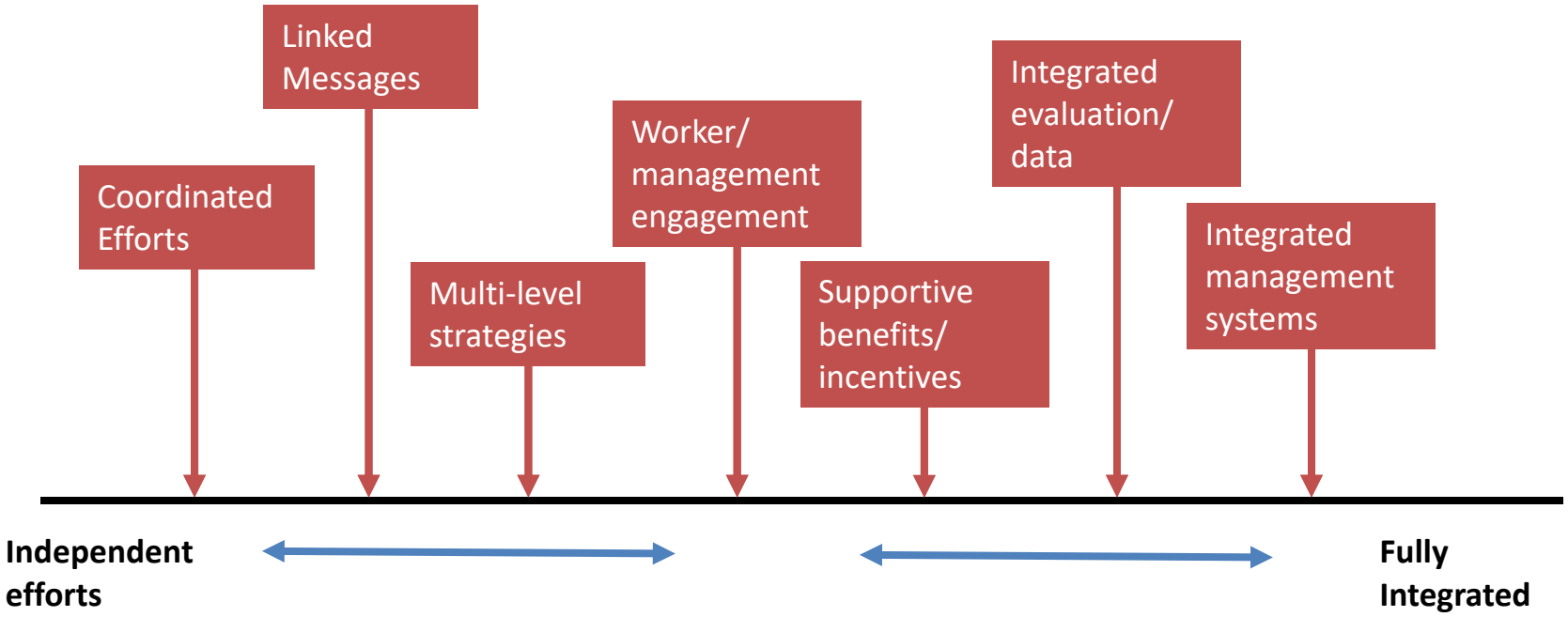


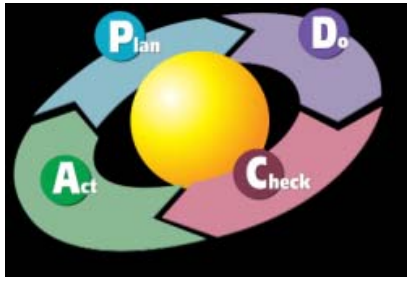
Successful health and safety management programs

Management leadership and employee involvement

Sets up culture and communications channels

Hazard Identification and Assessment

Recognizing energy sources



Hazard Prevention and Control

Eliminating and/or controlling sources

Information and Training

Supervisor, recognition of active & passive controls)

Evaluation of the Program Effectiveness

Injury surveillance, process evaluations

OSHA Draft Proposed Safety And Health Program Rule: 29 CFR http://www.osha.gov/dsg/topics/safetyhealth/nshp.html

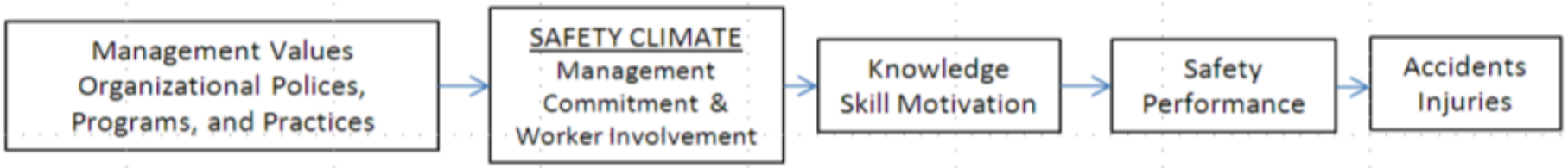
OSHA Injury and Ilness Prevention Programs White Paper 2012 http://www.osha.gov/dsg/topics/safetyhealth/OSHAwhite-paper-january2012sm.pdf

Essential Elements of Effective Workplace Programs and Policies for Improving Worker Health and Wellbeing

20 Elements in four groups

- ***Organizational Culture and Leadership***
  - Human centered culture, demonstrate leadership, engage mid-level management
- ***Program Design***
  - Recognize and control known hazards, clear and consistent principles, employee involvement, adjust and sustain the program,
- ***Program Implementation and Resources***
  - Start small and build, adequate resources, communication systems and accountability
- ***Program Evaluation***
  - (Measure and Adjust)

Theory? Sociotechnical systems and Safety Climate

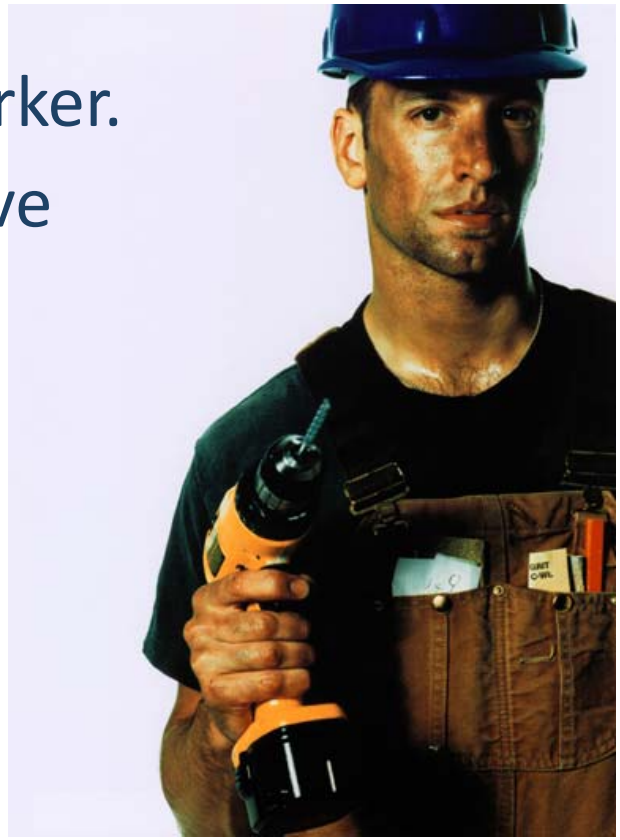


- Safety Climate is based on the functional construct of organizational climate where workers understand what is being rewarded (and penalized) within complex and ambivalent organization.
- Organizations are complex and ambivalent
- Climate perceptions require detection from multiple cues in the presence of competing demand and inconsistent policies

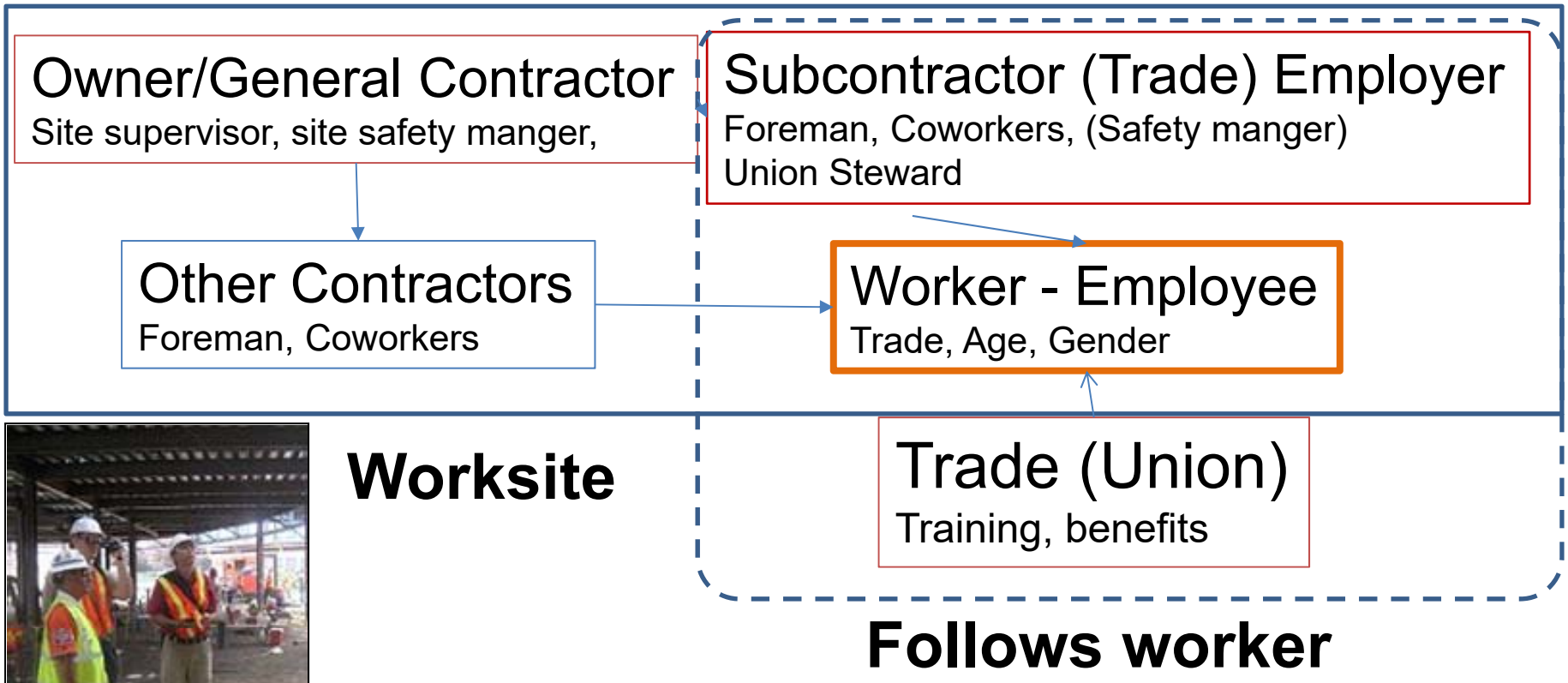
Griffin MA, Neal A. *J Occupational Health Psychology.* 2000;5(3):347-358.
Schneider *Annual review of psychology*. 2013;64:361-88.
Zohar D. *Accid Anal Prev*. 2010;42(5):1517-22.

Take home message(s)

- It's tough being a construction worker.
- Emphasis in the industry to improve safety culture
- Challenges exist to improve safety culture/climate and to measure it.
- Innovation (and adaptation) can overcome these challenges.



Many system components!



Sparer et al, *Amer. J. Ind. Medicine*, 2015 58:964–973.
Zohar and Polachek 2014 (J. Appl Psychol)
Sparer et al., *Scand J Work Environ Health* 2016 42(4):329-37

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AMERICAN JOURNAL OF INDUSTRIAL MEDICINE 56:1463–1472 (2013)

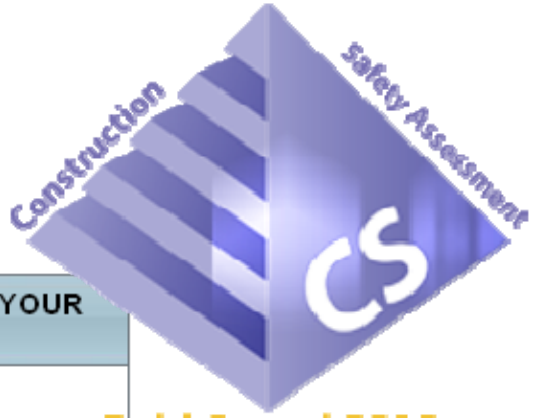
Correlation Between Safety Climate and Contractor Safety Assessment Programs in Construction

Emily H. Sparer, MS,[1] Lauren A. Murphy, PhD,[1,2] Kathryn M. Taylor, MS,[1] and Jack T. Dennerlein, PhD[1,3*]

Background *Contractor safety assessment programs (CSAPs) measure safety performance by integrating multiple data sources together; however, the relationship between these measures of safety performance and safety climate within the construction industry is unknown.*

Methods *Four hundred and one construction workers employed by 68 companies on 26 sites and 11 safety managers employed by 11 companies completed brief surveys containing a nine-item safety climate scale developed for the construction industry. CSAP scores from ConstructSecure, Inc., an online CSAP database, classified these 68 companies as high or low scorers, with the median score of the sample population as the threshold. Spearman rank correlations evaluated the association between the CSAP score and the safety climate score at the individual level, as well as with various grouping methodologies.*

ConstructSecure, Inc.



Gold Award 2010

ABC Company Profile Page

PROFILE COMPLETE: Download Certificate, Download Logo

Select Trade Category: Fireproofing

TRADE CATEGORY	SCORE
FIREPROOFING	74.77 / 100
Injury/Illness/Insurance	39/45
EMR	10/10
FATALITIES	0: 5 points awarded
RECORDABLE CASES	14/15 Details
DART	10/15 Details
OSHA Experience	10/10
Safety Management Systems	24.71/30
Safety Program Elements	9.06/10
Special Elements	5/5
Safety Manual Document	-13 points deducted
OSHA 300 Summary Form	Uploaded
Insurance EMR Rating	Uploaded
General Liability Cases	5 / $1504000
MITIGATION	COMPLETE

COMPANIES ABLE TO VIEW YOUR PROFILE

Harvard University
Intel Corporation
The Graham Company
Suffolk Construction
Turner
Gilbane
Kenny Construction
Hoffman Construction

Add More

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State: MA
Zip Code: 02138
Main Telephone #: 617-495-3055
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Primary Contact: Garrett Burke
Email: skirilenko@live.com
Date of Enrollment: 9/10/2009
Date of Last Update: 6/2/2011
Renewal date: 9/10/2011

STRENGTHS	WEAKNESSES

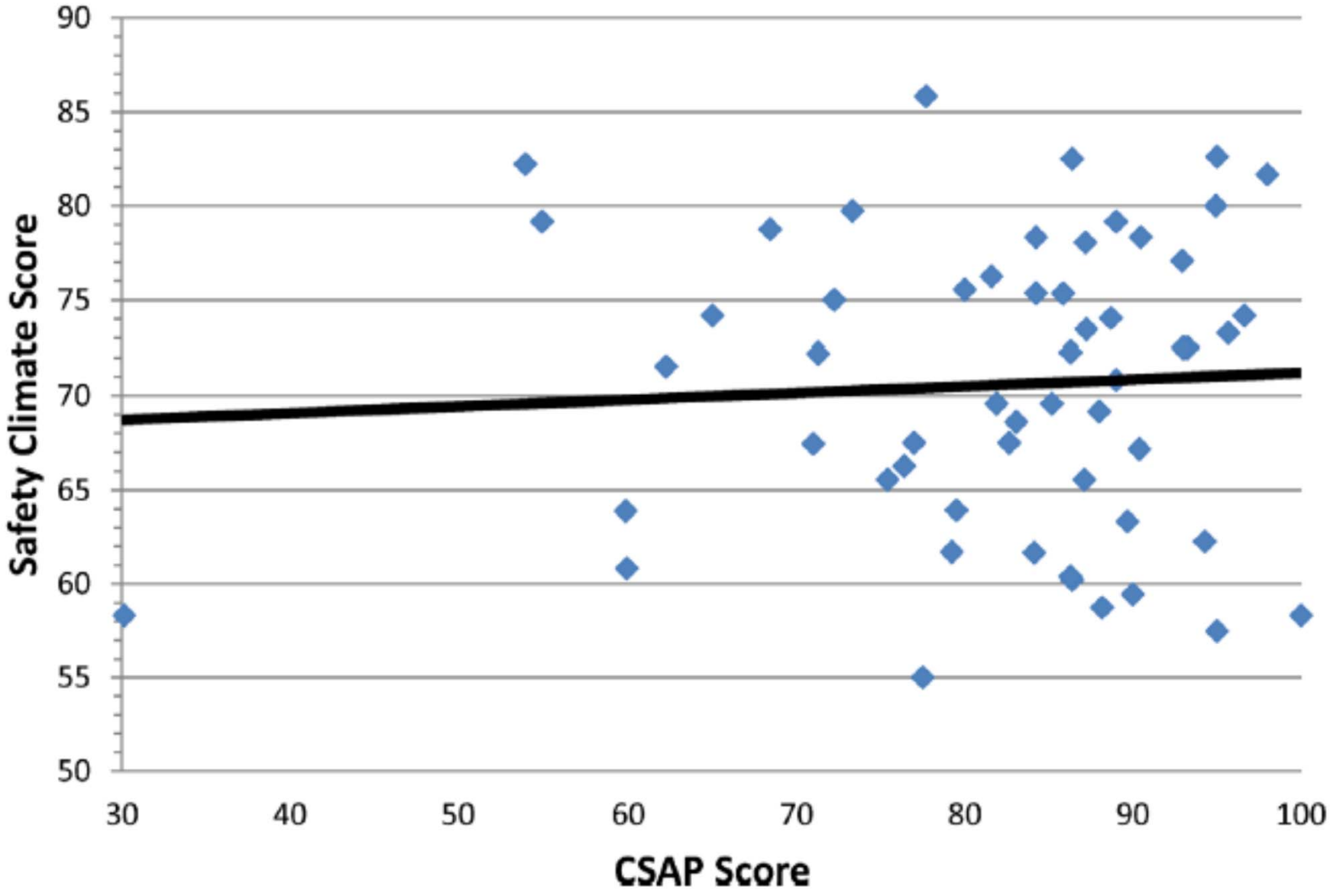


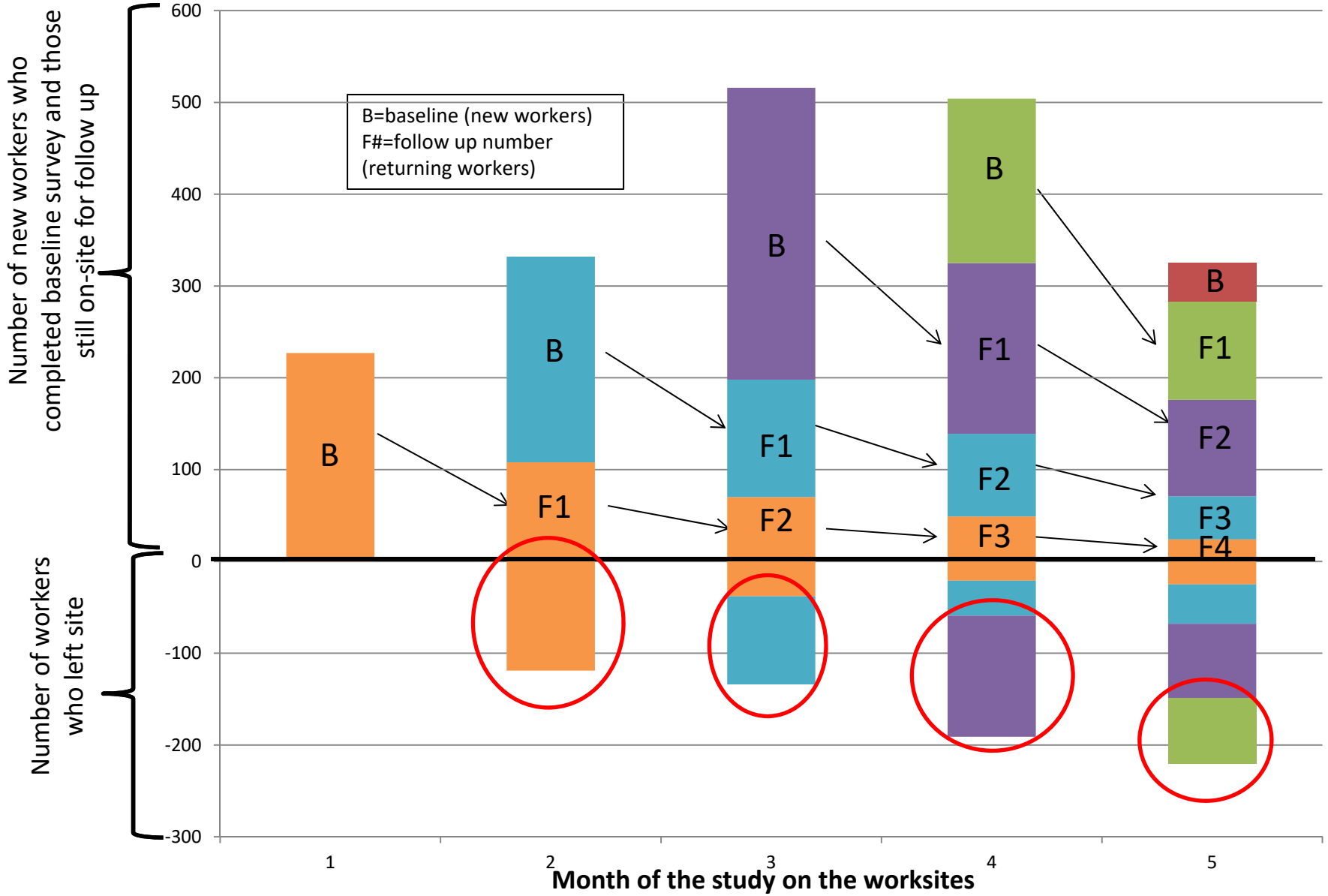
FIGURE 4. Scatter plot analyzing the linear relationship between safety climate and CSAP scores, at the company level.

AMERICAN JOURNAL OF INDUSTRIAL MEDICINE 58:964–973 (2015)

Length of Time Spent Working on a Commercial Construction Site and the Associations With Worker Characteristics

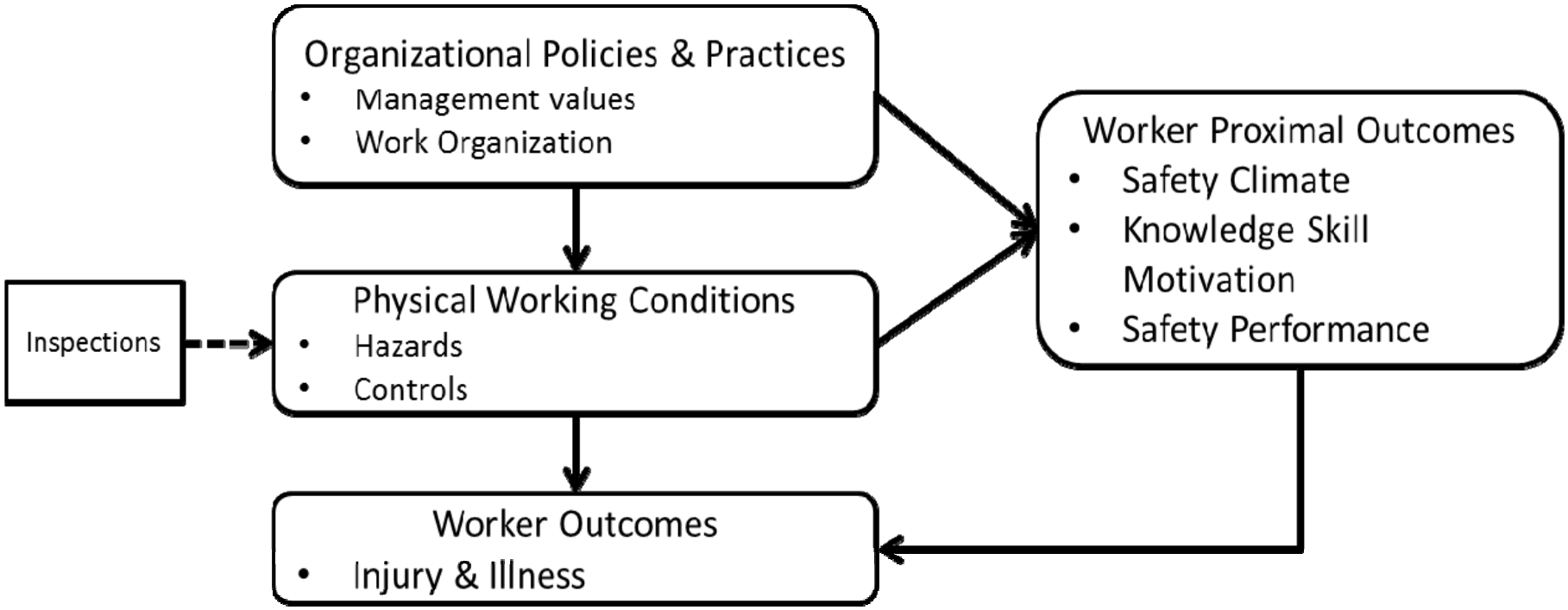
Emily H. Sparer, ScD,[1] Cassandra A. Okechukwu, ScD,[2] Justin Manjourides, PhD,[3] Robert F. Herrick, ScD,[1] Jeffrey N. Katz, MD,[1,4,5] and Jack T. Dennerlein, PhD[1,3*]

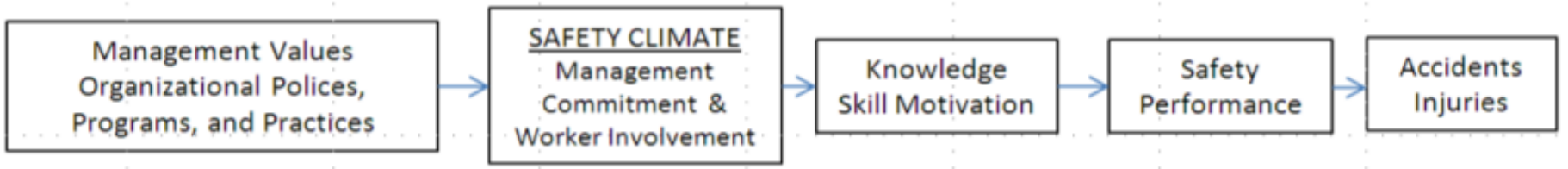
6. *Temporary Workers on construction sites*



Sparer et al, *Amer. J. Ind. Medicine*, 2015. 58(9):964-73.

Safety Climate and Conditions of Work





Grant et al *Harvard Chan School Doctoral Thesis,* 2016

Safety Climate and Conditions of Work

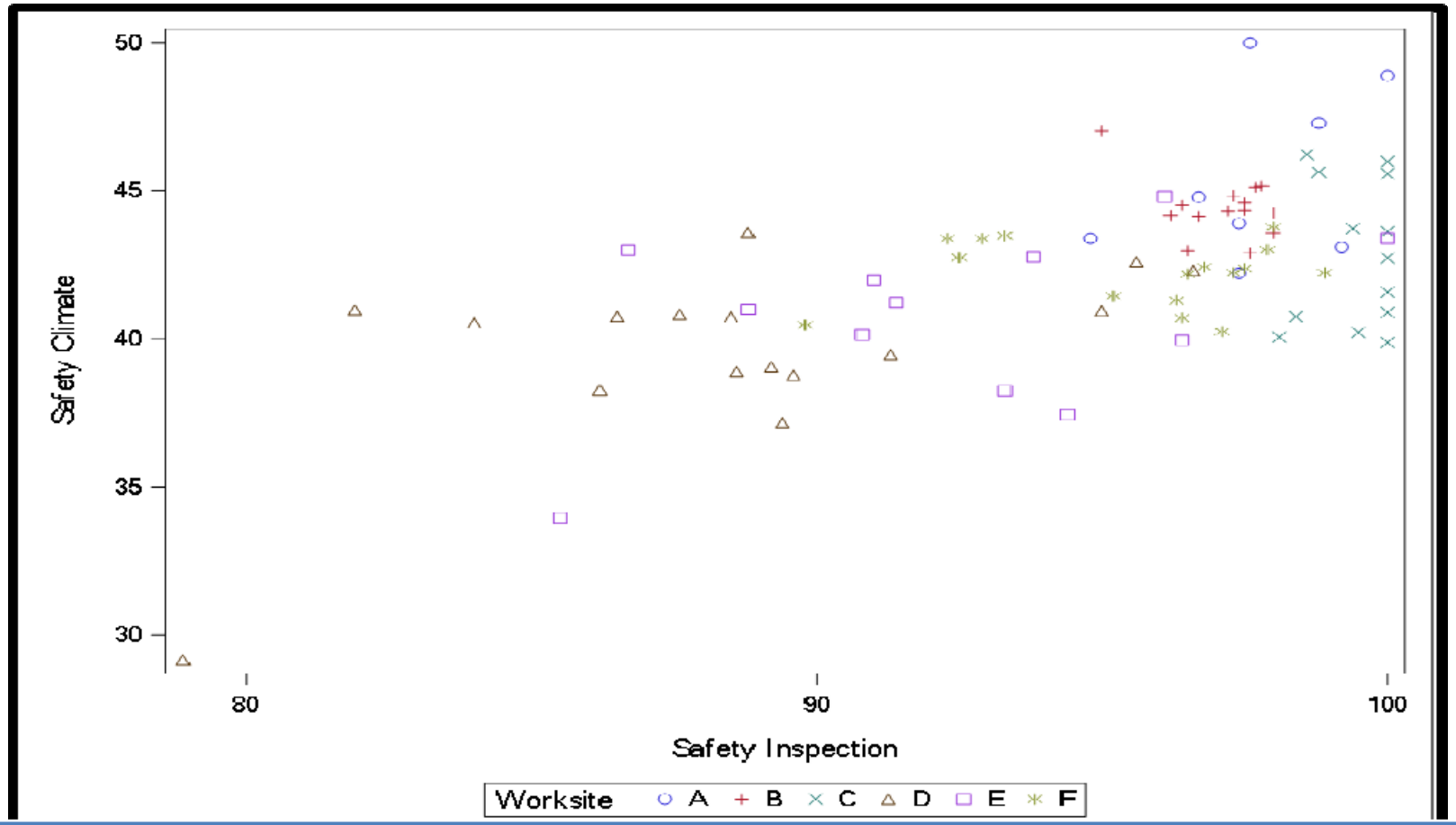


Table 2.2. Results of repeated measures analysis.

	Effect Estimate	N	Standard Error	p-value
Climate/Safety Inspection	0.3689	79	0.0704	< 0.0001*
Lagged one week	0.0311	73	0.0925	0.7376

Ann. Occup. Hyg., 2016, Vol. 60, No. 5, 537–550
doi:10.1093/annhyg/mew020
Advance Access publication 19 April 2016

BOHS
The Chartered Society for Worker Health Protection

REVIEW

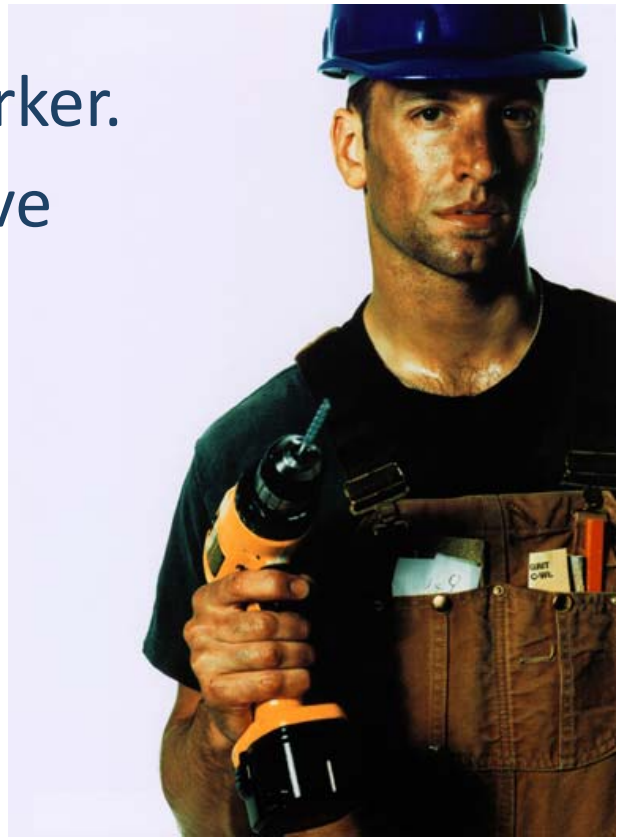
Defining and Measuring Safety Climate: A Review of the Construction Industry Literature

Natalie V. Schwatka[1*], Steven Hecker[2] and Linda M. Goldenhar[3]

- Transience of the industry
- Subcontracting
- Work organization (‘cultural unit’?)
- Induction / acculturation process (training through the trades)

Take home message(s)

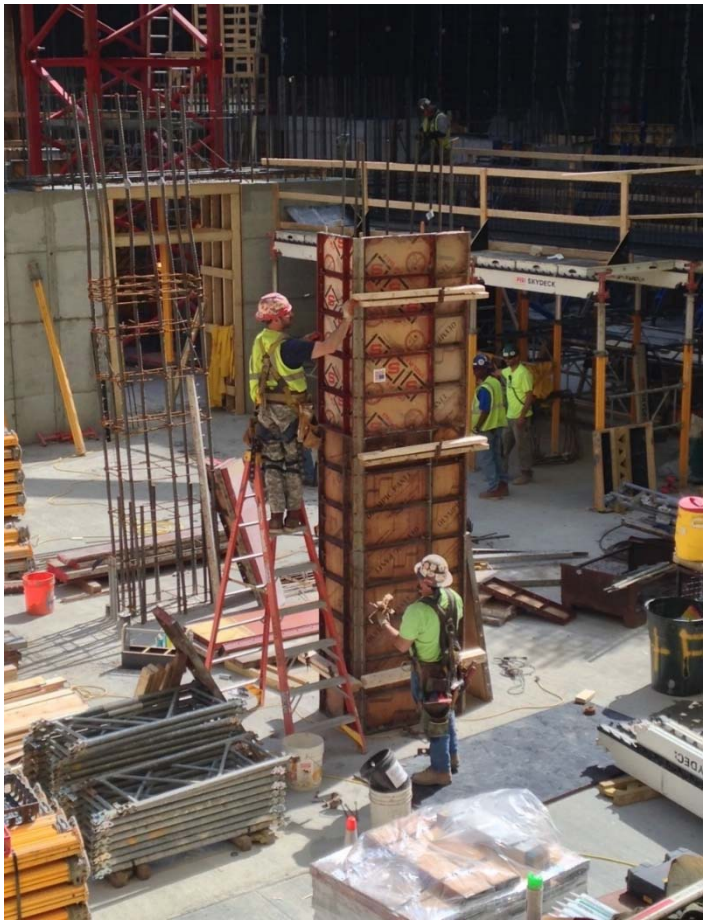
- It's tough being a construction worker.
- Emphasis in the industry to improve safety culture
- Challenges exist to improve safety culture and to measure it.
- Innovation (and adaptation) can overcome these challenges.



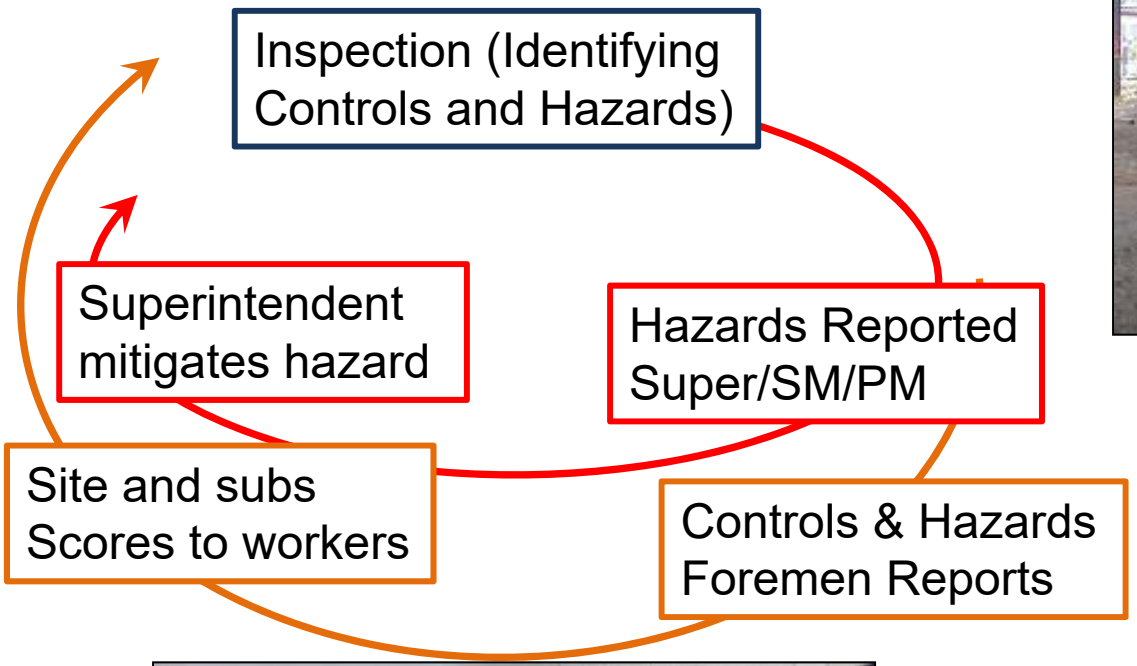
Innovation can overcome challenges

Components that improve culture include:

- *Communications*
- *Incentives*
- Leadership
- Integrating
- Adapting



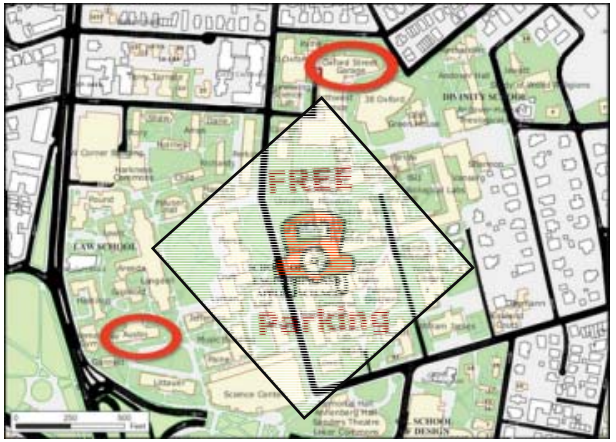
Communication: Safety Performance Feedback



Contractor	Safety Score (as of 7/29/13)
Century Drywall Inc	99.5% ↑
E.M. Duggan, Inc.	98.7% ↑
Gilbane Building Company	99% ↑
McCusker-Gill HVAC	97.5% ↑ !!!
John A Penney Co. Inc.	96.1% ↑
TOTAL	98.2%

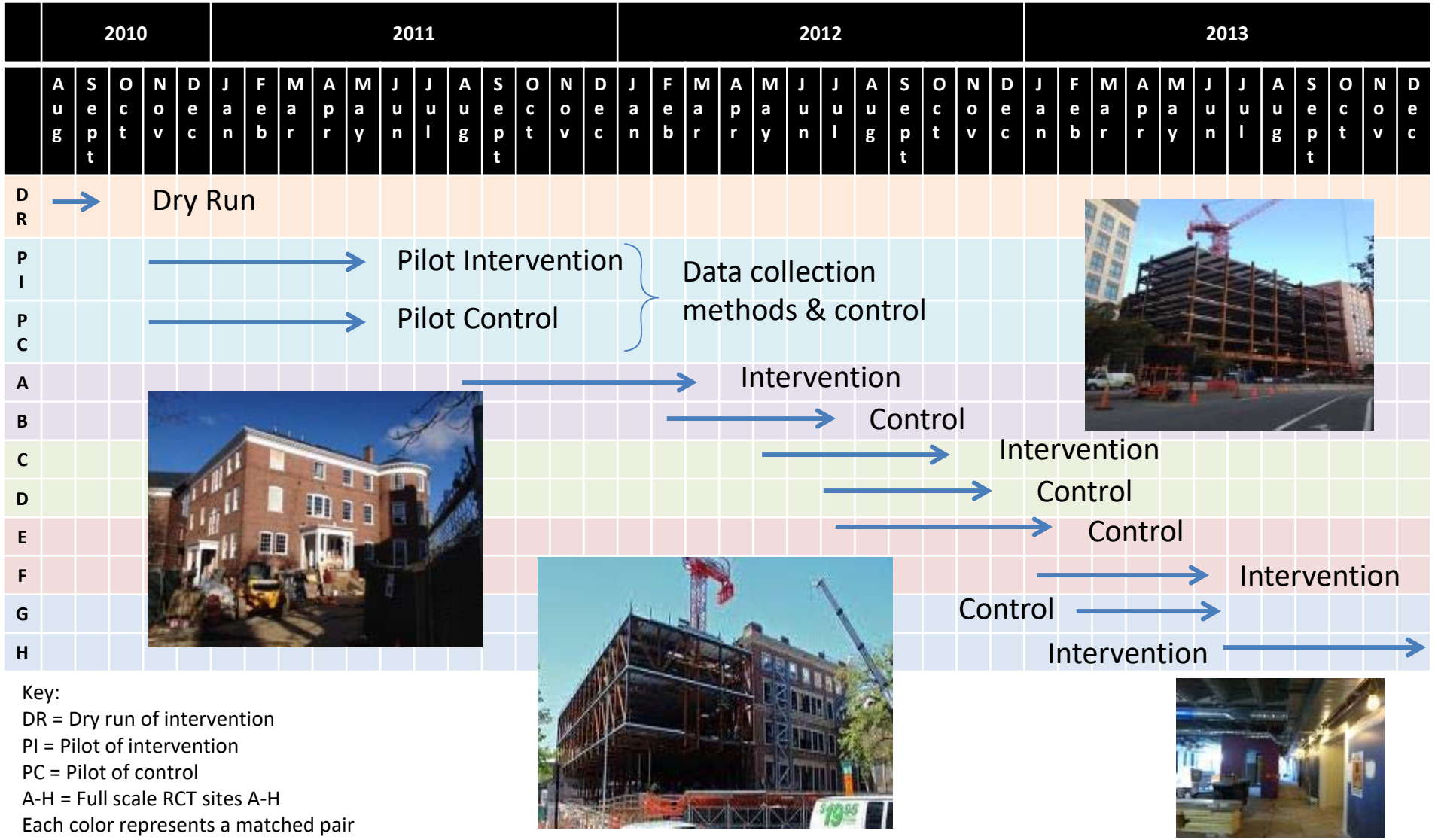
Sparer et al, *New Solutions*, 2015 May;25(1):42-58

Incentive:
Lunch and Raffle



Sparer et al., 2013, *Safety Science* 51: 77–84
Sparer et al., 2015, *New Solutions* 25(1):42-58.

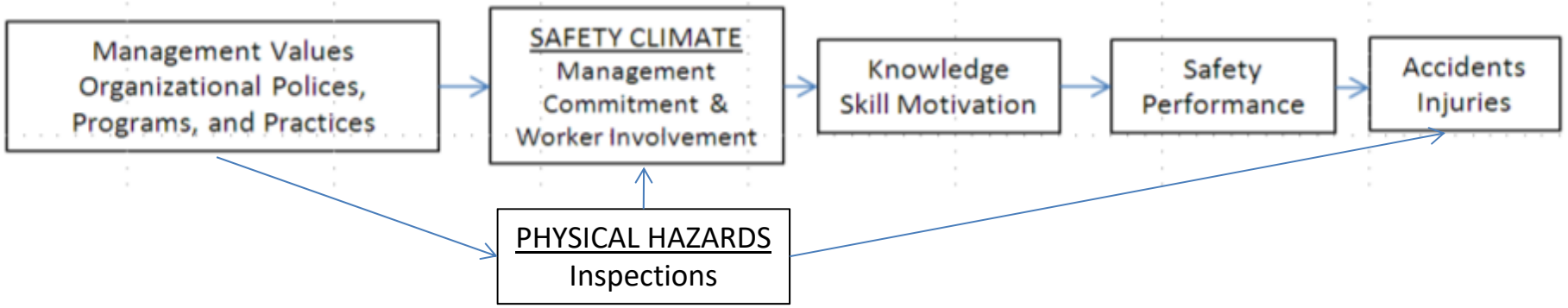
Evaluated
Cluster Randomized Trial on 8 (4 pairs) sites



Key:
DR = Dry run of intervention
PI = Pilot of intervention
PC = Pilot of control
A-H = Full scale RCT sites A-H
Each color represents a matched pair

Sparer et al, *Scand J Work Environ Health*, Accepted!

Sociotechnical concept of Safety Climate for construction (Incentive)



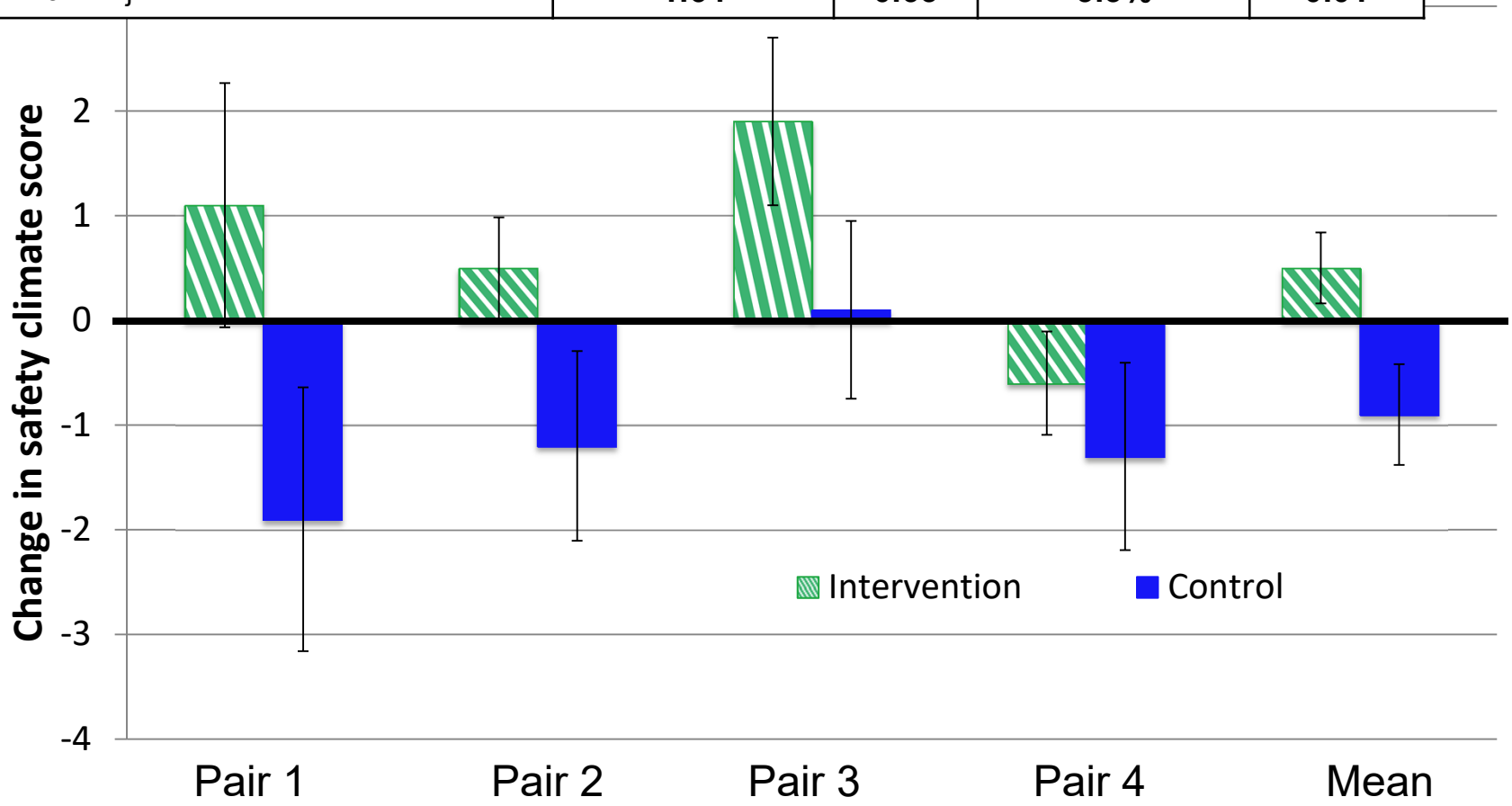
- Safety Climate is based on the functional construct of organizational climate where workers understand what is being rewarded (and penalized) within complex and ambivalent organization.

Griffin MA, Neal A. *J Occupational Health Psychology.* 2000;5(3):347-358.
Schneider *Annual review of psychology*. 2013;64:361-88.
Zohar D. *Accid Anal Prev*. 2010;42(5):1517-22.

Safety Climate Improved!

Amount of improvement varied across pairs

	Effect estimate	SE	Effect Size	P-value
Model 1 – Simple	1.54	0.80	3.1%	0.06
Model 2 – Adjusted for pair/block	**1.58**	**0.59**	**3.2%**	**0.01**
Model 3 – Adjusted for baseline differences	**1.64**	**0.63**	**3.3%**	**0.01**



Sparer et al, *Scand J Work Environ Health*, 2016 42(4):329-37

Qualitative Results

Safety communication:

"It helped safety wise definitely, to be cautious of other people and what's around you, and that's huge. "

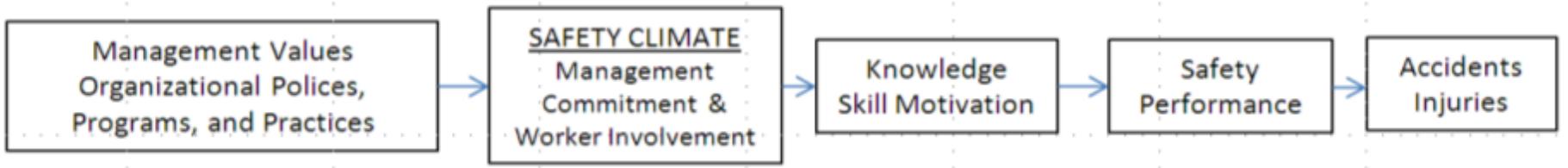
"Communication is key between the trades.."

Teambuilding:

"The trades were working together with the program, and other trades were watching out for everyone else. Normally they would never do that, but now I see talking amongst the trades—this came from the program."

Positive reinforcement of safe work practices:(intervention)

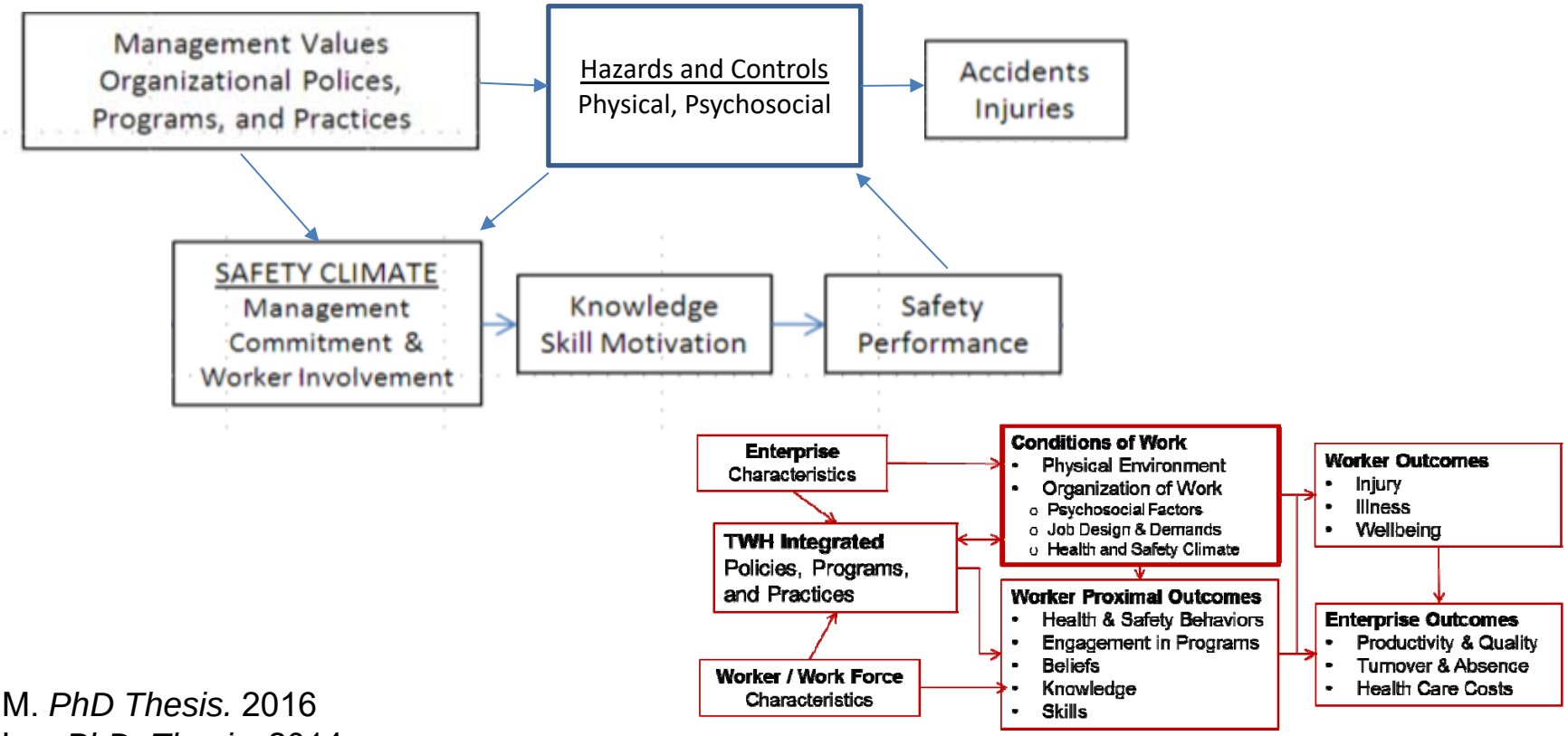
"It felt good to finally get a report in a meeting to say I did something right"



Sparer et al, *Scand J Work Environ Health*, 2016 42(4):329-37

Incorporating hazards into the Sociotechnical systems

- Climate perceptions require detection from multiple cues in the presence of competing demand and inconsistent policies

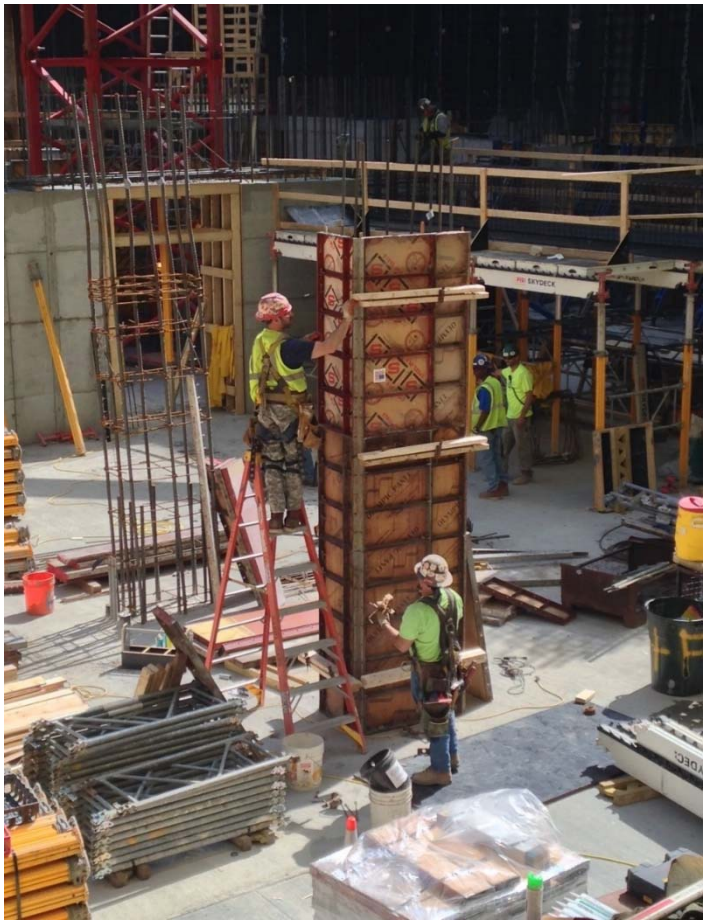


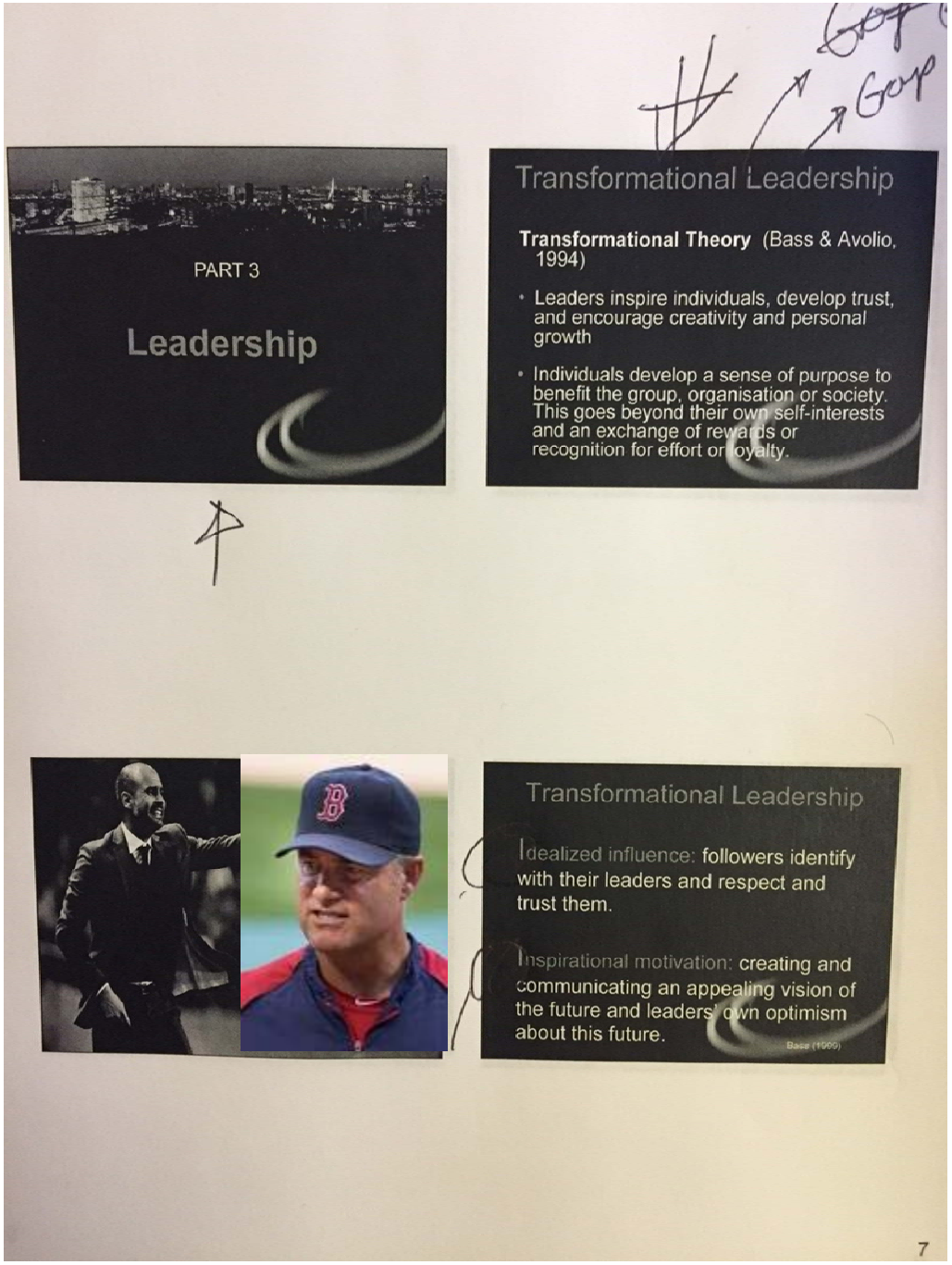
Grant, M. *PhD Thesis.* 2016
Marin, Luz *PhD. Thesis*. 2014.
Sparer et al*Scand J Work Environ Health*, 2016 42(4):329-37
Sorensen et al, Revision under revision

Innovation can overcome challenges

Components that improve culture include:

- Communications
- Incentives
- *Leadership*
- Integrating
- Adapting





Arnold Bakker, PhD
Erasmus University Rotterdam,
The Netherlands
Day 1, 12 July

Foundations for Safety Leadership

The Center for Construction Research and Training (CPWR) Project

- PI: Linda Goldenhar
  - CPWR
- Co-PI: Stephanie Johnson
  - University of Colorado
- Natalie Schwatka
  - University of Denver
- John Rosecrance
  - Colorado State
- Jack Dennerlein
  - Northeastern University

- National evaluation
  - Colorado
  - Georgia
  - Ohio
  - Kentucky
  - West Virginia
  - Massachusetts

5 *LEADER*ship Skills

- Foreman are required to take 30 OSHA Safety Training
- Developed and adding a Safety Leadership Module/elective
- OSHA Has approved adding the developed curriculum

Leads by example

Engages and empowers team members

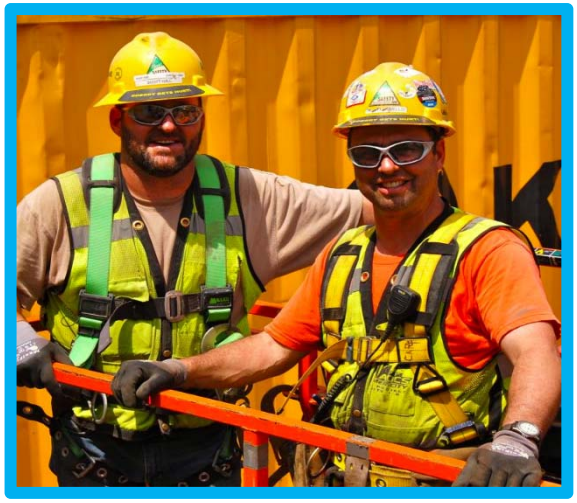
Actively listens and practices three-way communication

DEvelops team members through teaching, coaching, & feedback

Recognizes team members for a job well done

Who are Safety Leaders?

- Foremen – frontline managers
- Experienced workers
- Trainees/apprentices
- Superintendents
- Owners
- ***Anyone….Everyone***



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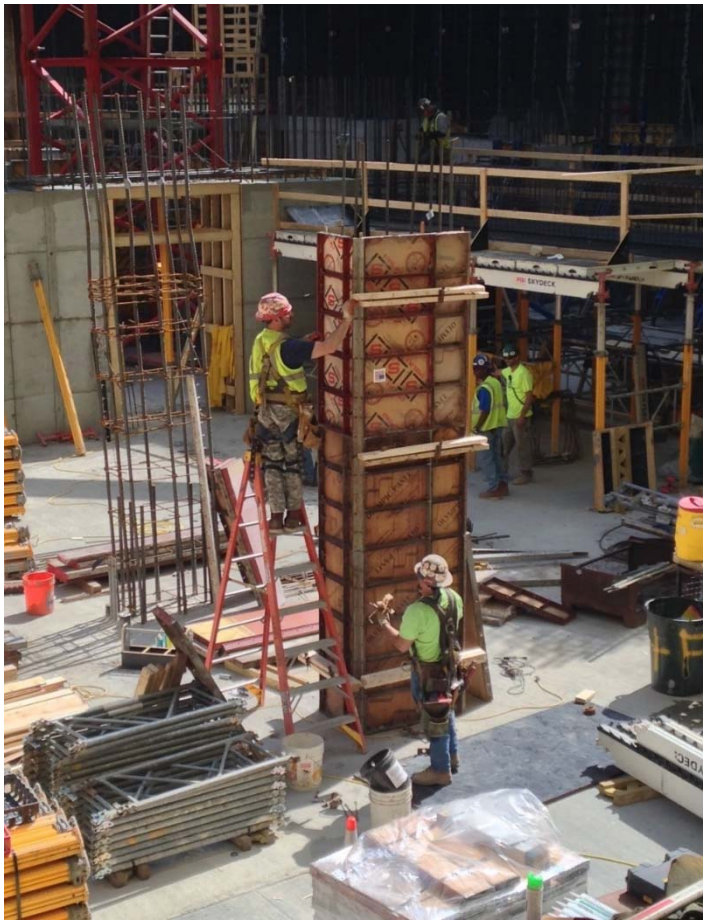
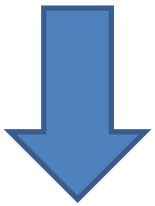


Lessons learned: What works?

Collaborative engagement in planning and vetting of ideas/components of integrated programs



Customization to setting, population and needs

Augmentation of existing program should occur as much as possible

Okechukwu 2014 Total Worker Health Symposium

All the Right Moves

Aim 1: **Develop a worksite-based, multi-component, and integrated musculoskeletal disorders prevention and health promotion intervention** for workers in commercial construction

Aim 2: **Complete a feasibility study of the developed worksite based intervention** on six sites, randomly assigned to either intervention (five sites) or controls (five sites) with 420 workers total (70 per site) measured at baseline and at six-month follow up

PROPOSED PROGRAM OVERVIEW

Proposed Trainings:

Integrated program for worker health and productivity

Supervisor training: Integrated program management
Worker training: Toolbox talk ・Safety orientations

Musculoskeletal health

Cardiovascular Health

Proposed Activities:

Ergonomics

Task pre-planning:
- Checklist for the *Ergo 4*
- *Ergo 4* Simple Solutions
- Database of solutions
- Posted *Ergo 4* solutions
- Employee feedback

Inspections:
- Including *Ergo 4*

Supervisor training:
- *Ergo 4* risk (1 hr)
- *Ergo 4* solutions (1 hr)

Worker training:
- Toolbox talk on *Ergo 4*

Physical Activity

Physical activity:
- Daily 10 min warm up (stretch & flex/ walk) integrated with daily task pre-planning activities
- Local walking routes posted
- Simple facilities, eg hoops
- Challenges (competitions)

Inspections:
- Posted routes / activities

Worker training:
- Toolbox talk on *PA*

Tobacco Cessation

Safety orientations:
- CO measurements with Toolbox talk

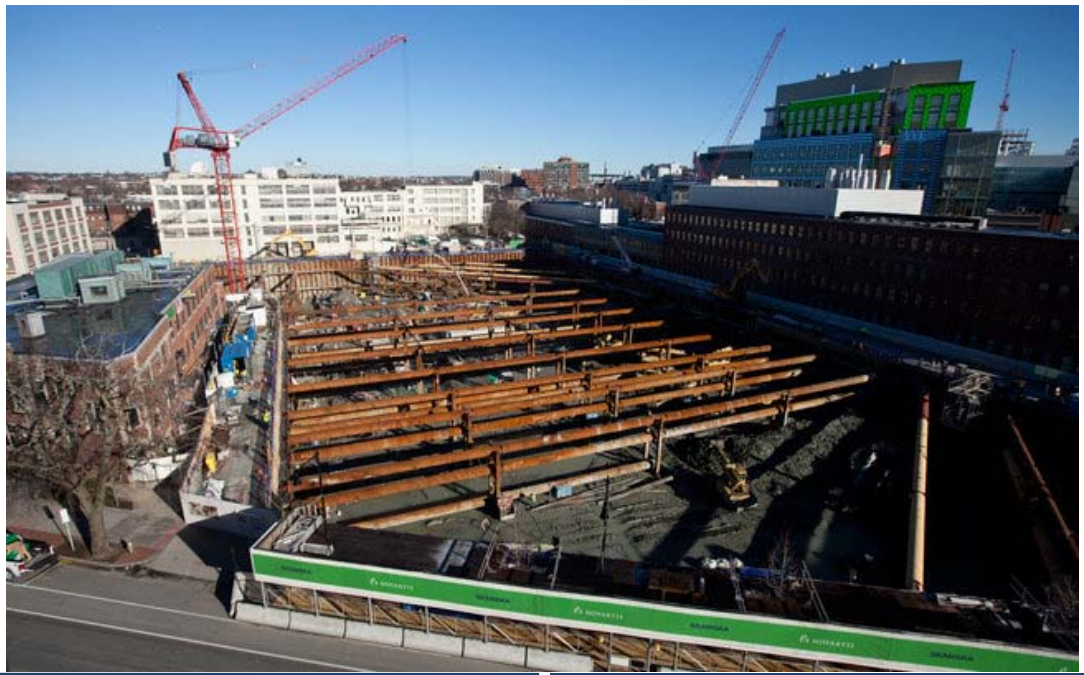
Tobacco cessation referral:
- 1-800 QUIT NOW
- NRT
- DIY kits

Inspections:
- Posted policies and cessation activities

Worker training:
- Toolbox talk on CO
- Toolbox talk on TC

Reality hit

- Key informant, focus groups, and pilot testing.
  - Can't do many Physical Activity activities on site
  - Physical Activity of construction work is already high
  - Best intervention for construction workers is health coaching



All the Right Moves

Musculoskeletal health

Cardiovascular Health

StIPP
Soft Tissue Injury Prevention Program

Health Week
(get workers signed up for Health Coaching)

Activities:

Task pre-planning:
- Checklist for the *Ergo 4*
- *Ergo* Simple Solutions
- Database of solutions
- Posted *Ergo 4* solutions
- Employee feedback

Inspections:
- Including *Ergo 4*
- Reports to Foremen and workers

Supervisor *training*:
- *StIPP* (1/2 hr)
- *Adding Ergo to pre-task planning workshop* (1/2 hr)

Worker *training*:
- Toolbox talk on *Ergo and Health*

Monday:
- What is health coaching

Tuesday:
- StIPP Program – the components

Wednesday:
- Tobacco cessation
- CO measurements

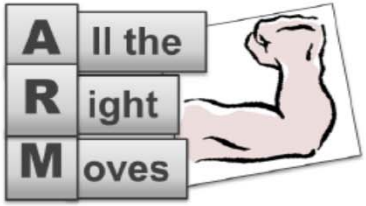
Thursday:
- Food and Activity

Friday:
- Questions and Health Coaching sign up

Health Coaching:
- 4 sessions
- No cost to worker
- PA/Diet, Tobacco Cessation

Tobacco cessation referral:
- NRT

Augmentation: Pre-task planning



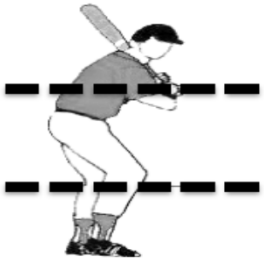
Consider overexertion hazards and ergonomic solutions in your pre-task planning

Identify Overexertion Hazards:

- ❑ **Overhead work**
  Duration: # of Workers:
- ❑ **Ground work**
  Duration: # of Workers:
- ❑ **Manual materials handling**
  Duration: # of Workers:
- ❑ **Repetitive work**
- ❑ **Awkward/ uncomfortable postures**

Identify Ergonomic Solutions:

- ❑ **Work in the "Strike Zone":** _____
- ❑ **Store materials at waist height:** _____
- ❑ **Use of material handling equipment:** _____
- ❑ **Job rotation/ break up work**
- ❑ **Other:** _____



Keep work in the "Strike Zone"

Bring work off the floor

Use tool extensions

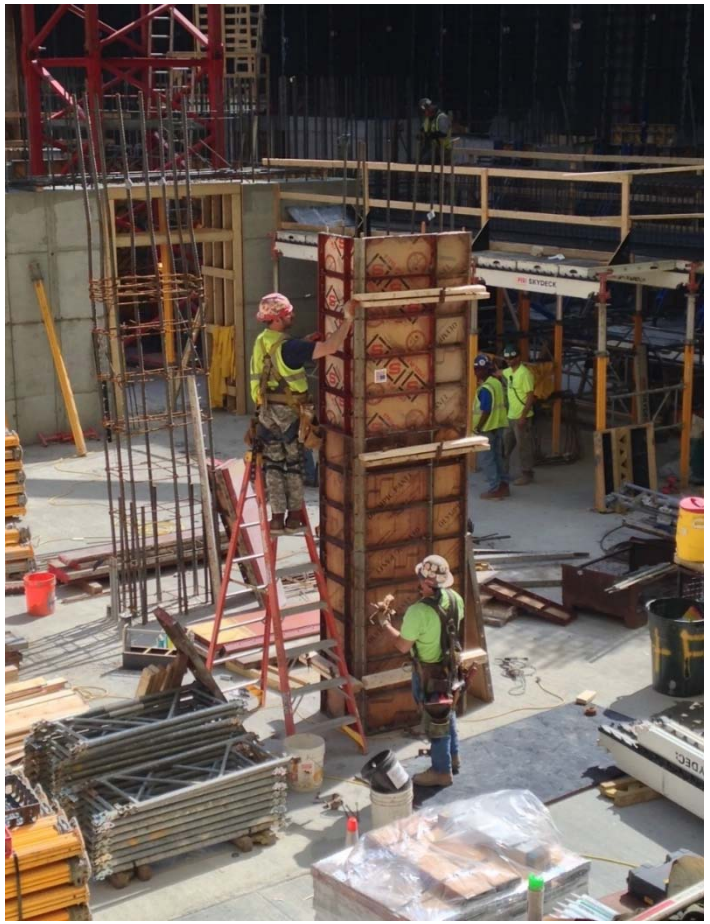
Health week (education & engagement)

Innovation can overcome challenges

Components that improve culture include:

- Communications
- Incentives
- Leadership
- Integrating
- Adapting

- Still a lot to do!
- Model for other industries



Take home message(s)

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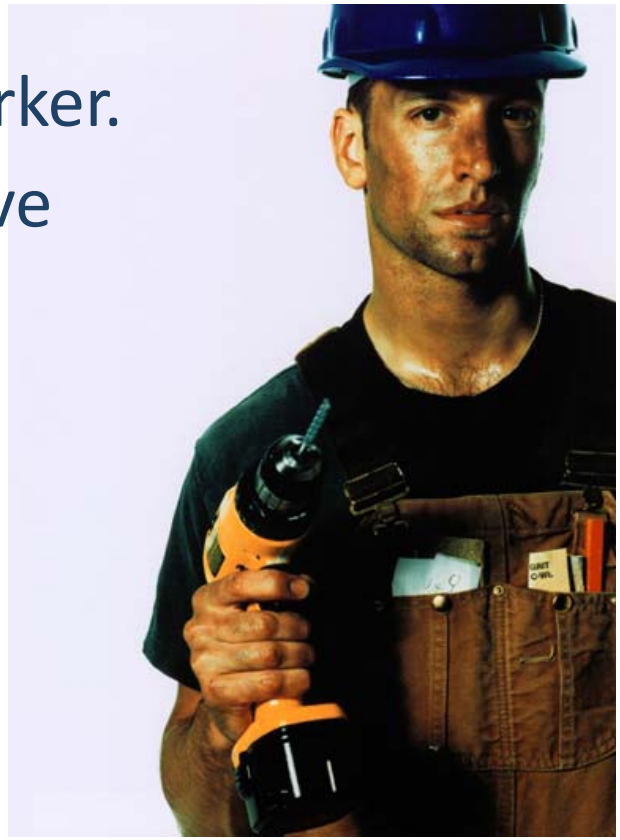
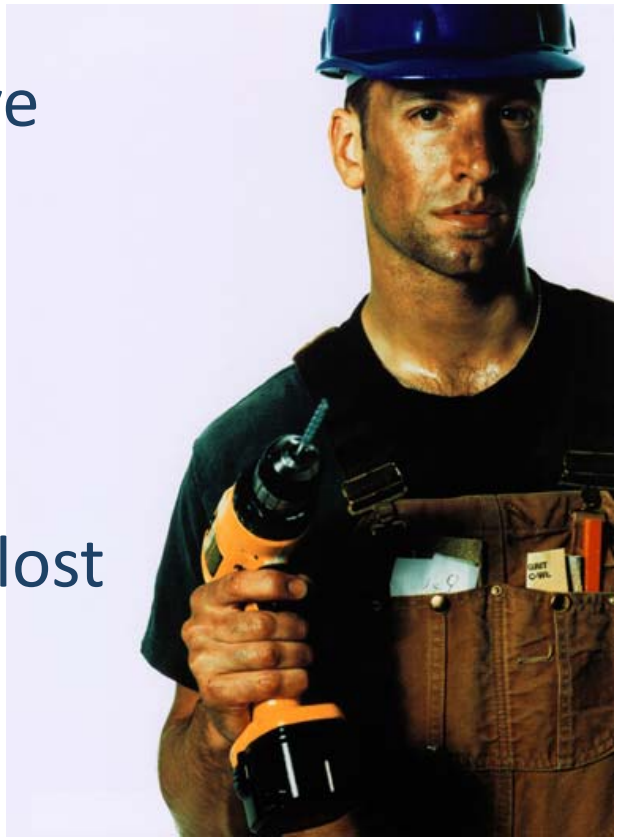
- Challenges exist to improve safety culture and to measure it.
- Innovation (and adaptation) can overcome these challenges.



Total Worker Health® Theme

- Safety Culture and climate can have similar systems frameworks and components as Indicators of Total Worker Health and Integrated approaches.
- Conditions of Work should not be lost within the culture and climate framework



Thank you!

Funding sources include but are not limited to grants from the National Institute for Occupational Safety and Health (R01 OH003997, R01 OH008373, R01 OH008781, R01 OH01009, T42 OH008416, U19 OH008861, U60 OH009762).