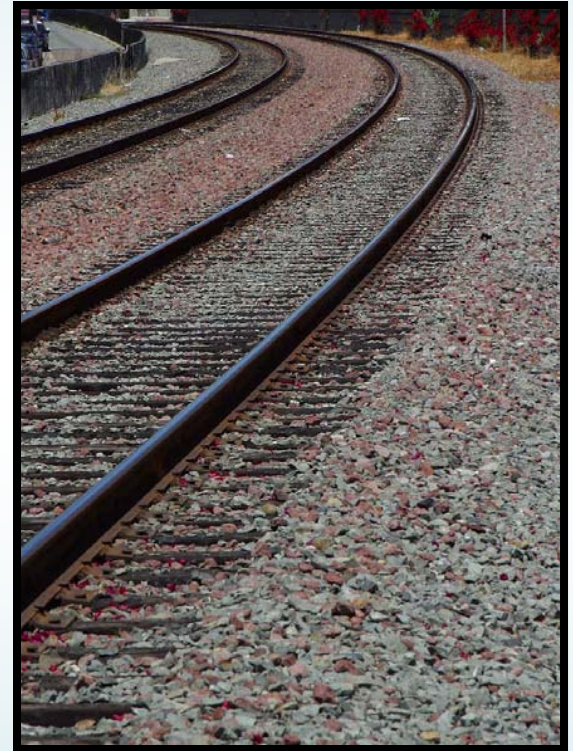


Unpacking the Relationship Between Safety Climate and Safety Behavior

Lessons from a Sample of Rail Maintenance Workers



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Background

- Transportation Sector Council of National Occupational Research Agenda (NORA) calls for...
 - Improved techniques for measuring safety climate & culture
 - New partnerships between industry, government, and research community
- Larger project with Canadian Pacific Railroad

What is Safety Climate?

- Psychological
- Specific type of climate
- Informed by...
 - Organization's formal policies and procedures
 - Actual practices of supervisors and coworkers

Perception of the value of safety in the workplace

(Griffin & Neal, 2000)

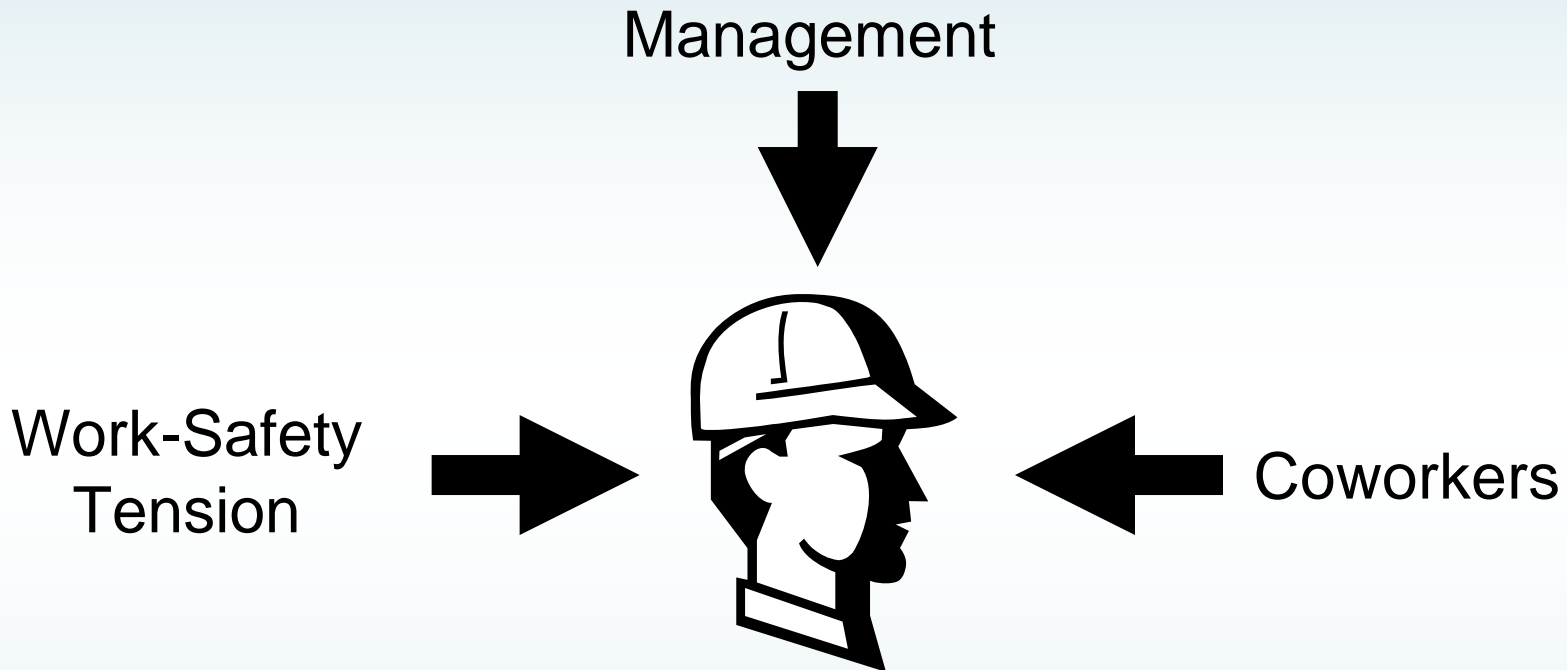
Why is Safety Climate Important?

- Research in similar industries links safety climate to...
 - Increased safety compliance
 - Increased safety participation
 - Lower accident rates
 - Lower injury rates
- Meta-analysis suggests safety climate accounts for roughly **21%** of variability in safety performance
- Proactive approach to prevent/reduce safety incidents in the workplace

Facets of Safety Climate

- **Management Safety:** Perception that **supervisors** value and are committed to safety
- **Coworker Safety:** Perception that **peers** value safety
- **Work-Safety Tension:** Perception that working safely is at odds with effectively performing **job duties** and meeting organizational standards for performance

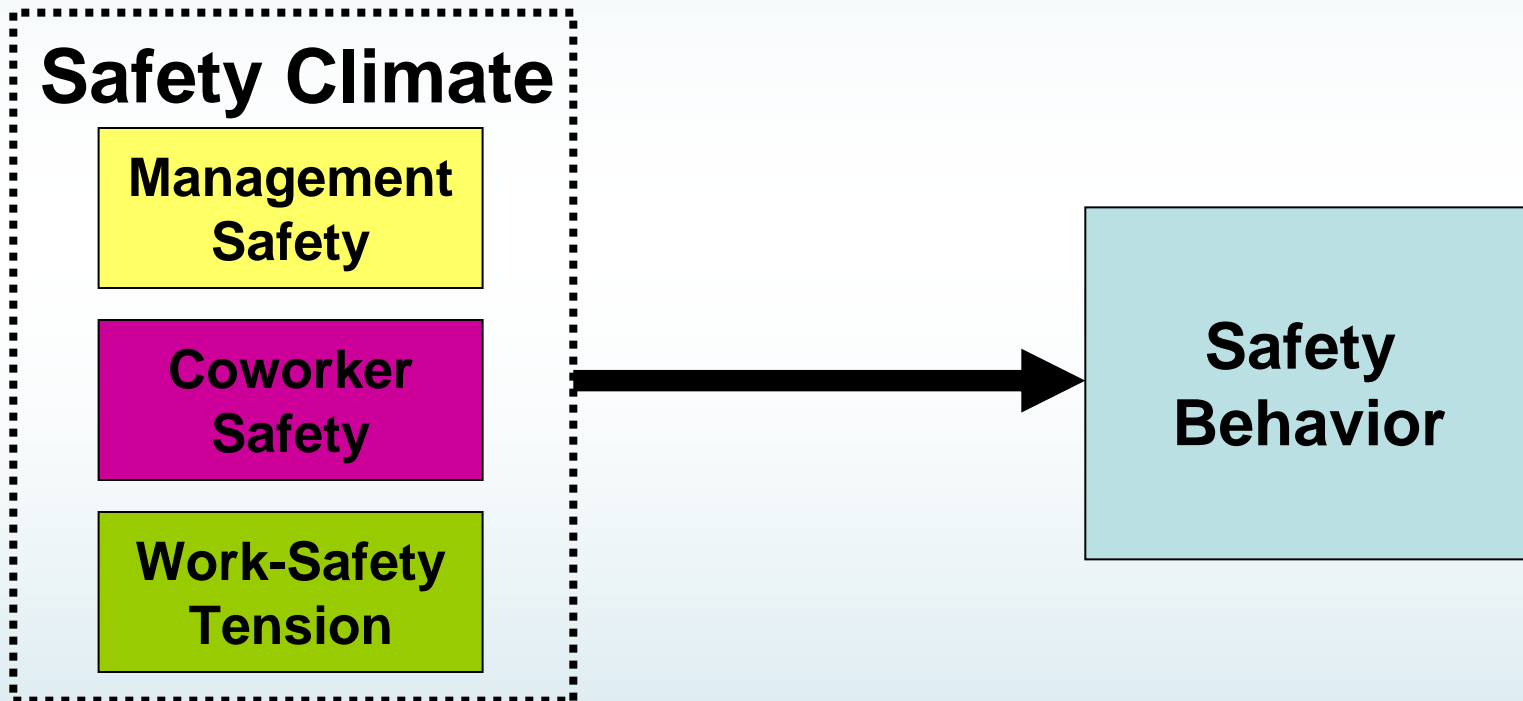
Facets of Safety Climate



What is the relative importance of each of these facets in relation to safety behavior?

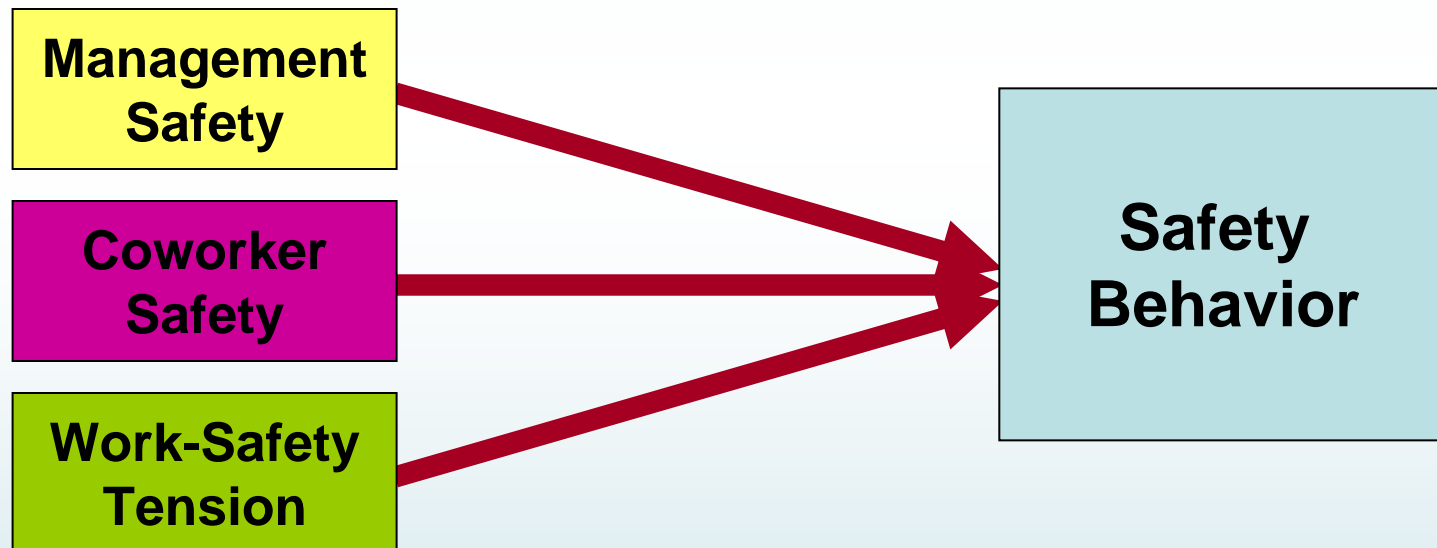
Study Goals

1. Confirm relationship between Safety Climate and Safety Behavior



Study Goals

1. Confirm relationship between Safety Climate and Safety Behavior
2. Evaluate *relative importance* of 3 key facets of Safety Climate



Research Methodology & Sample

- Paper & pencil survey
- Mechanical shops at multiple locations
- Non-dispersed work setting

- 421 non-management workers
- 92% work 30-50 hours/week
- 65% tenure > 20 years
- 68% age > 46

Measuring Safety Climate & Safety Behavior

- **Safety Climate**

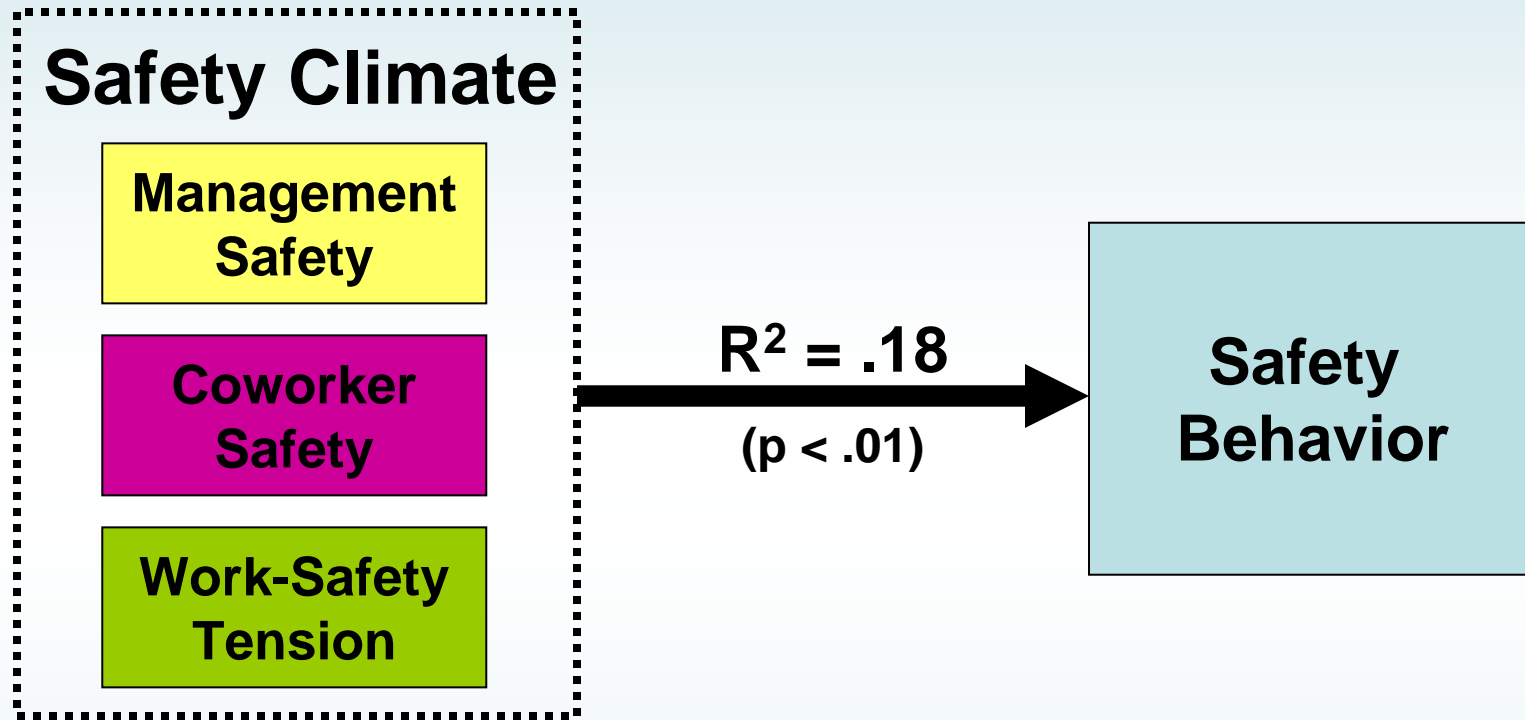
- 21 items, 3 sub-scales (Mueller et al., 1999)
 - Management Safety
 - Coworker Safety
 - Work-Safety Tension
- Agree/Disagree response format

- **Safety Behavior**

- 6 items (Hofmann & Stetzer, 1996)
- Self-report of unsafe activities
- Frequency response format

* All measures demonstrated acceptable reliabilities ($\alpha > .70$)

Results of Regression Analysis



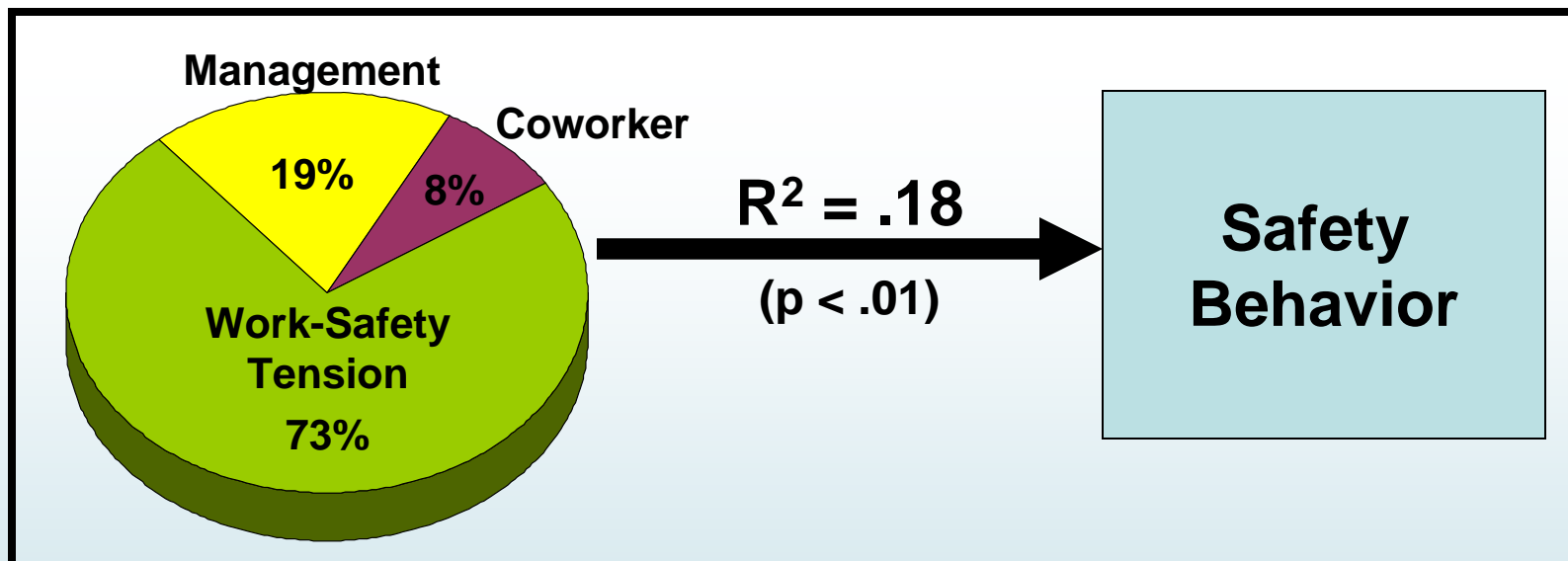
Employees who perceive a more positive safety climate are less likely to act in unsafe ways on the job

Dominance Analysis Strategy

- Regression-based procedure
- Calculates R^2 from series of regression equations
- Averages effect sizes for each predictor using all possible combinations of predictor variables
- Assesses relative importance of each predictor

Safety Climate Dominance Analysis

	Management Safety	Coworker Safety	Work-Safety Tension
Direct Effect	.06	.04	.16
Partial Effect	.03	.01	.12
Total Effect	.02	.00	.11
Overall Average	.03	.02	.13
% of Total Variance	19%	8%	73%



Findings & Recommendations

- Safety climate is significantly related to safety behavior
- Work-safety tension is dominant predictor of safety behavior

- Increase focus on bottom-up communication
- Introduce participatory approaches to safety
- Reexamine whether performance expectations align with safety operating practices

For More Information...

Morrow, S.L., McGonagle, A.K., Dove-Steinkamp, M.L., Walker, C.T. Jr., Marmet, M., & Barnes-Farrell, J.L. (In Press). Relationships between psychological safety climate facets and safety behavior in the rail industry: A dominance analysis. *Accident Analysis & Prevention*, doi:10.1016/j.aap.2009.08.011.

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