



SD07 A CLIMATE FOR CHANGE
Sustainable Development Conference



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Understanding the links between
Organisational Culture and Safety



www.minerals.org.au/sd07



Towers Perrin-ISR Safety Culture Research: Why and What...

- > Focus on reducing unintentional occupational injuries due in part to their frequency and cost:
 - There were approximately 690,000 work-related illnesses or injuries in Australia in 2005-06
 - An average of 5% of the global work force is absent every day due to work-related injuries
 - In the Australia alone, work-related illnesses, injuries and death cost businesses approximately \$82.8 billion in annual losses

- > Antecedents of safe working behaviour include:
 - Safety climate: perceptions of the policies, procedures, and practices that impact safety in the workplace (Neal & Griffin, 2004)
 - Process safety: perceptions of the design and engineering of facilities, maintenance of equipment, effective alarms, effective control points, procedures and training

Towers Perrin-ISR Safety Culture Surveys: Focus on Understanding and Improving Safety Culture

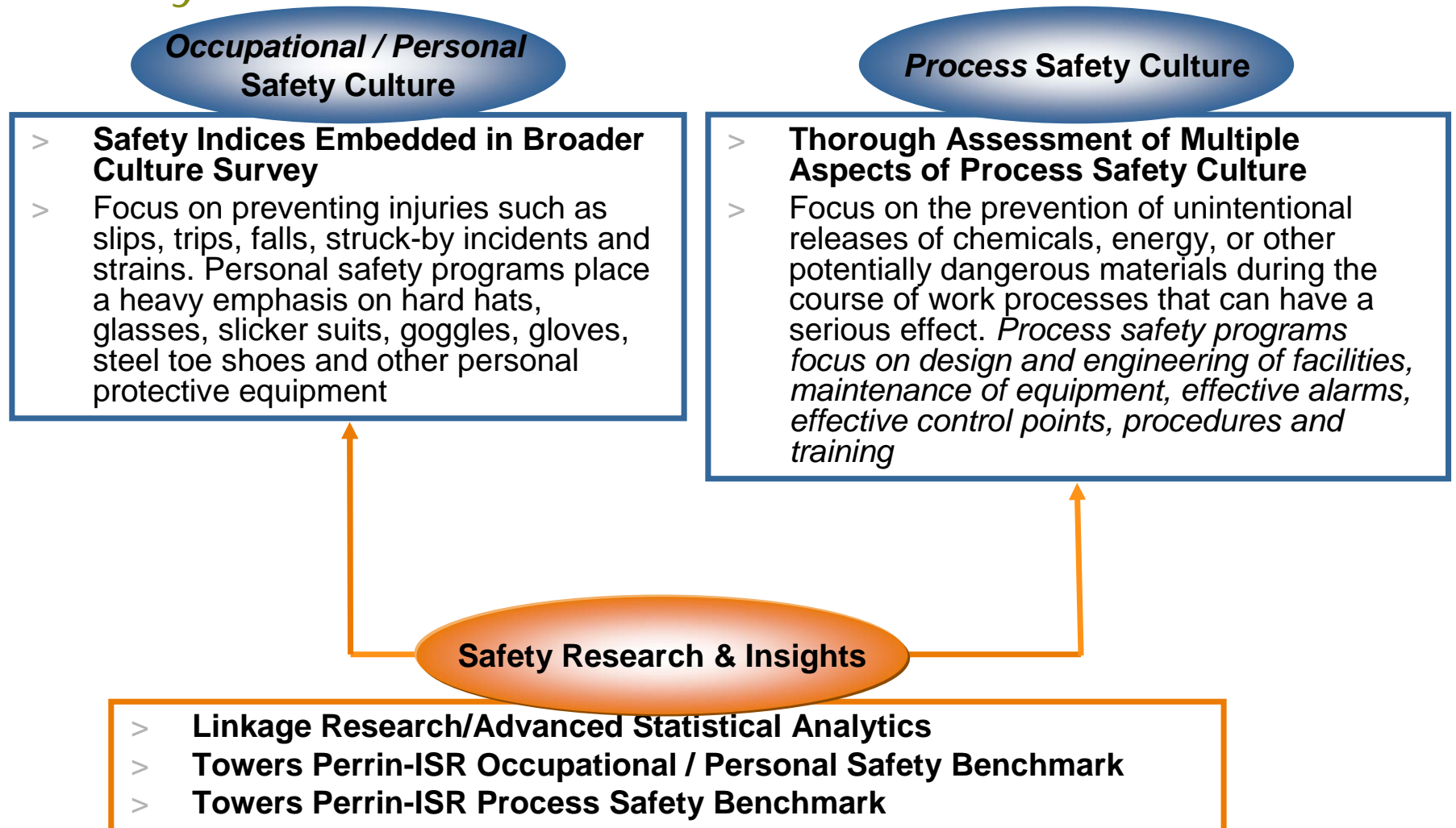
- > Firms today rightfully recognise culture as a leading indicator of safety performance
- > Towers Perrin-ISR partners with many firms to help them understand and improve safety culture and performance
- > Starting from a foundation of thorough company culture understanding, we work with our clients to protect worker lives and company assets by improving safe working behaviours and minimising operational event risk
- > Safety Culture Benchmarking capabilities lead the way

Types of firms we partner with...

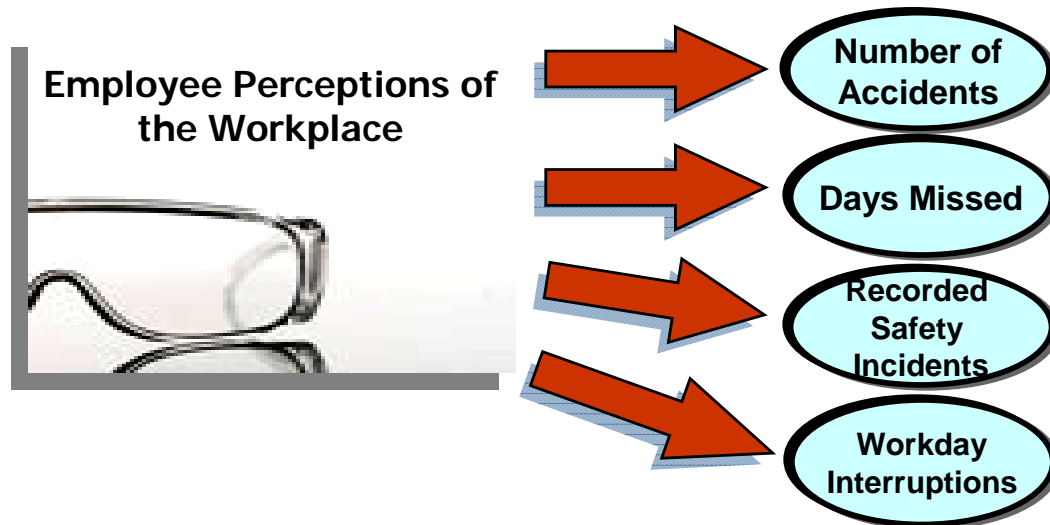
- Manufacturing
- Petrochemical/Refineries
- Chemical
- Utilities
- Government Agencies
- Transportation/Logistics
- Technology/Hardware
- Airlines
- Healthcare
- FMCG
- Retail
- Pharmaceutical



Towers Perrin-ISR Safety Culture Surveys: Measuring Occupational / Personal and Process Safety



Culture (Employee Opinions) as a Leading Indicator: Predicting and Reducing Safety Incidents



Research has consistently linked employee opinion data to actual safety incidents in the workplace

- Absenteeism, accidents at work, days away from work, and others

Three important case studies converge around some common cultural contributors to safety performance:

- Supervision, Empowerment, Teamwork, and Workload commonly influence safety outcomes



Conceptualizing Safety Climate

- > Our research explores links between rates of occupational injury and elements of safety climate, reflecting many dimensions of Neal & Griffin (2004) model:
 - Organisational policies and procedures: management practices, human resource practices
 - Local work conditions and practices: supervisor support, internal group processes, work pressure

- > Safety climate measured through general employee attitude surveys
 - Organisation-wide surveys with a broad focus on employee attitudes, not limited to safety topic exclusively
 - Three case studies from 1 global manufacturer and 2 global petrochemical companies



Research Insights

- **Case Studies Leading to Theoretical Model**
- **Further Evidence with Global Energy Provider**
- **Expanding the Research: Tapping Our Normative Database**



Culture (Employee Opinions) as a Leading Indicator: Predicting and Reducing Safety Incidents

Case study 1:

Glass producer; 1,200 + employees surveyed across 53 work sites.

Found significant relationships between **outcomes** (*Workplace Injury Rates* and *Complaints for Unsafe Driving*) and **cultural elements** (employee opinions on *Supervision, Empowerment, and Teamwork*).

Case study 2:

U.S. operations of a Global Energy producer; 5,800 + employees surveyed across 37 work sites. Found significant relationships between **outcomes** (*Accident-Related Workday Interruptions* and *Time Lost for Injury Treatment*) and **cultural elements** (employee opinions on *Working Relationships* and *Workload*).

Case study 3:

Global Energy producer operating in 180 countries, 30,000+ employees surveyed and safety data at 163 sites. A structural equation model found significant relationships between **outcomes** (*Days Away From Work due to Injury* and *Total Recordable Incident Rates*) and cultural elements (employee opinion of *Working Relationships, Empowerment* and *Supervision*).



Case Example 1: Global Glass Manufacturer

- > Data from U.S. sites of a global provider of glass products with operations in 24 countries
- > Employee opinion from 1,204 employees analyzed across 53 sites
- > Safety statistics available at the overall site level (53 sites)
 - Rates of workplace injury by site (standardized by headcount)
 - Rates of complaints for unsafe driving by site (standardized by headcount)
- > Time-lag design; separate data sources aggregated to the site level
- > Employee attitude dimensions correlated with rates of safety incidents

Findings:

- > Leadership, Working Relationships, Supervision and Empowerment were all significantly correlated to **lower rates** of Workplace Injury
- > Supervision and Empowerment were significantly related to **less complaints** of unsafe driving

Case Example 2: Global Petrochemical

- > Data from a U.S. subsidiary of global petrochemical with operations in over 100 countries
- > Employee attitude survey data from 5,886 employees analyzed across 37 sites, many oil drilling facilities
- > Safety statistics available at the overall site level (37 sites)
 - Rates of accident-related workday interruptions: time lost for treatment less than 1 day (standardized by headcount)
- > Time-lag design; separate data sources aggregated to the site level
- > Employee attitude dimensions correlated with rates of safety incidents

Findings:

- > Sites in which employees are **more favorable regarding workload** have **lower rates** of accident-related workday interruptions ($r = -.50, p < .05$)
- > Sites in which employees are **more favorable regarding working relationships** have **lower rates** of accident-related workday interruptions ($r = -.44, p < .05$)



Interim Summary: Common Dimensions Impacting Safety

- > Consistent with prior research, 4 employee attitude dimensions emerge as correlates of better safety performance:
 - **Supervisory practices:** found in Hayes et al. (1998) to predict accident rates; its impact mediated by safety climate in Barling et al. (2002)
 - **Workload:** shown to correlate with more injuries (e.g., Rundmo, 1992)
 - **Empowerment:** found to correlate with unsafe behaviours and injuries in Hechanova-Alampay and Beehr (2002)
 - **Working relationships:** more effective teams shown to improve safety (reviewed in Turner & Parker, 2004)
- > The third case example provides the ability to examine **supervision**, **empowerment**, and **working relationships** as predictors with 163 units, permitting specific model tests of attitude - safety performance linkages

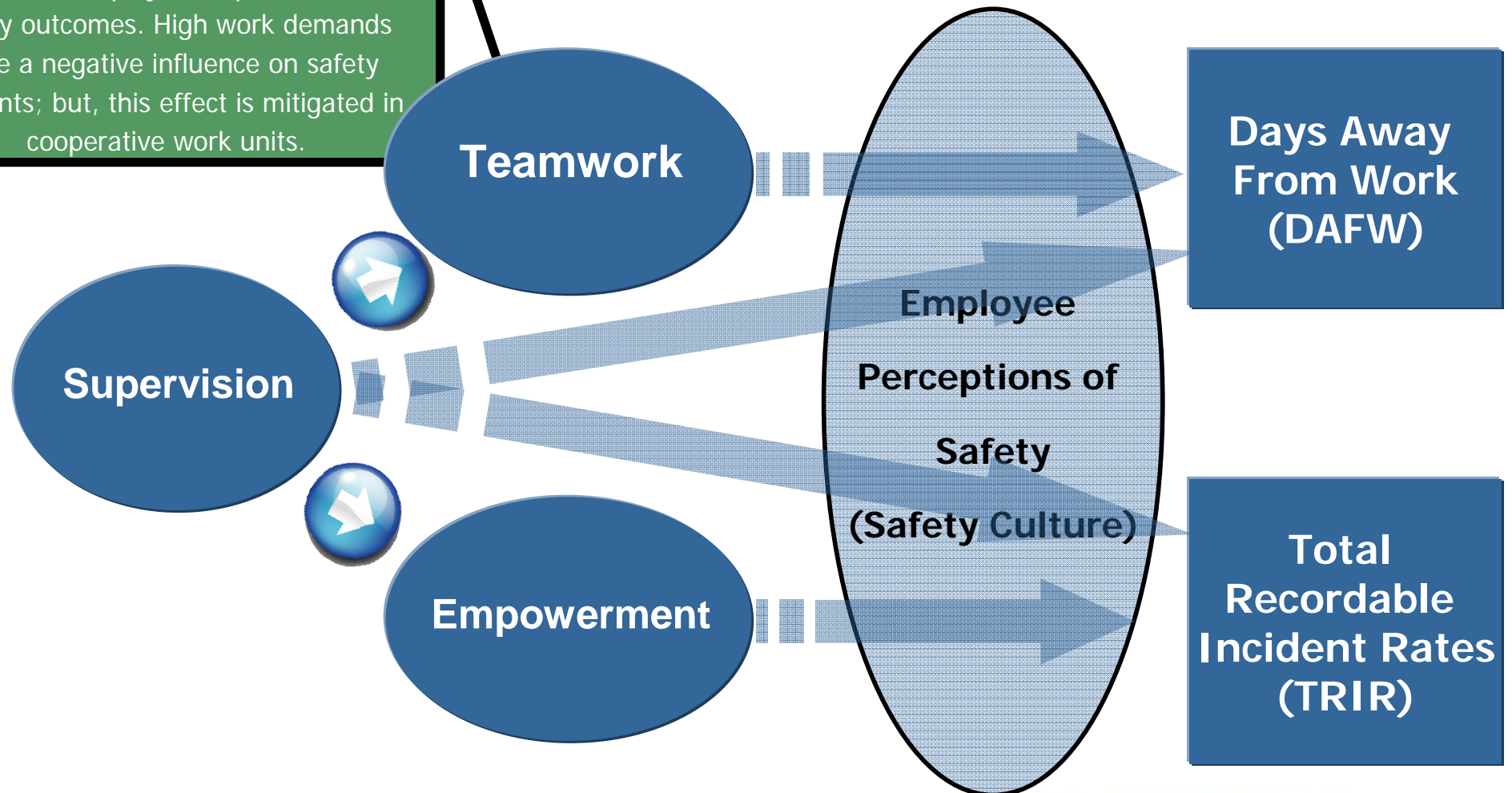


Case Example 3: Global Petrochemical

- > Global energy producer with operations in 180 countries
- > Employee attitude survey
 - Data from 30,346 employees analyzed
 - Survey data available from 163 sites
 - 12 scales derived from survey data
- > Safety statistics available only at the overall site level (163 sites)
 - DAFW: rates of days away from work due to injury (standardized by headcount)
 - TRIR: total recordable incident rates (standardized by headcount)
- > Cross-sectional design; separate data sources aggregated to the site level
- > Employee attitude dimensions linked with rates of safety incidents

Final Research Tested and Validated Model of Culture's Impact on Safety Performance

A refinement of our model indicates that work demands play an important role in safety outcomes. High work demands have a negative influence on safety incidents; but, this effect is mitigated in cooperative work units.





Research Insights

- **Previous Case Studies Leading to Theoretical Model**
- **Further Evidence with Global Energy Provider**
- **Expanding the Research: Tapping Our Normative Database**



Further Validating the Safety Culture Research: Snapshot of the 2004 to 2007 Global Case Study

- > Global energy producer, with operations in 180 countries, representing over 35,000 employee across 100 sites
- > Broad culture survey, with a focus on safety
- > Safety statistics available only at the site level (100), outcomes:
 - TRIR: total recordable incident rates
 - DAFW: rates of days away from work due to injury

Findings:

- > Important links between culture and rates of safety outcomes measured

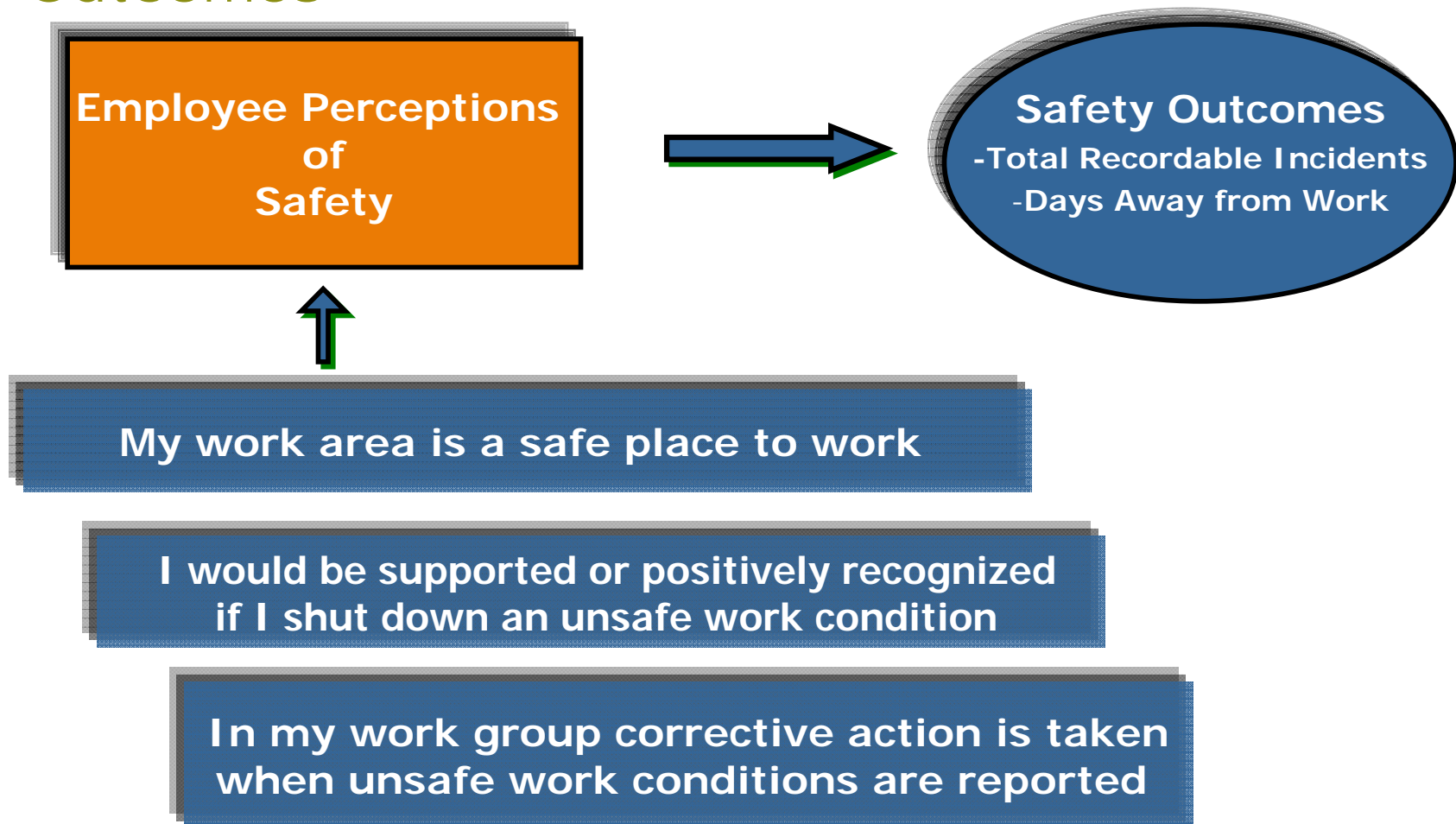


Key Findings from 2004 to 2007 Global Case Study

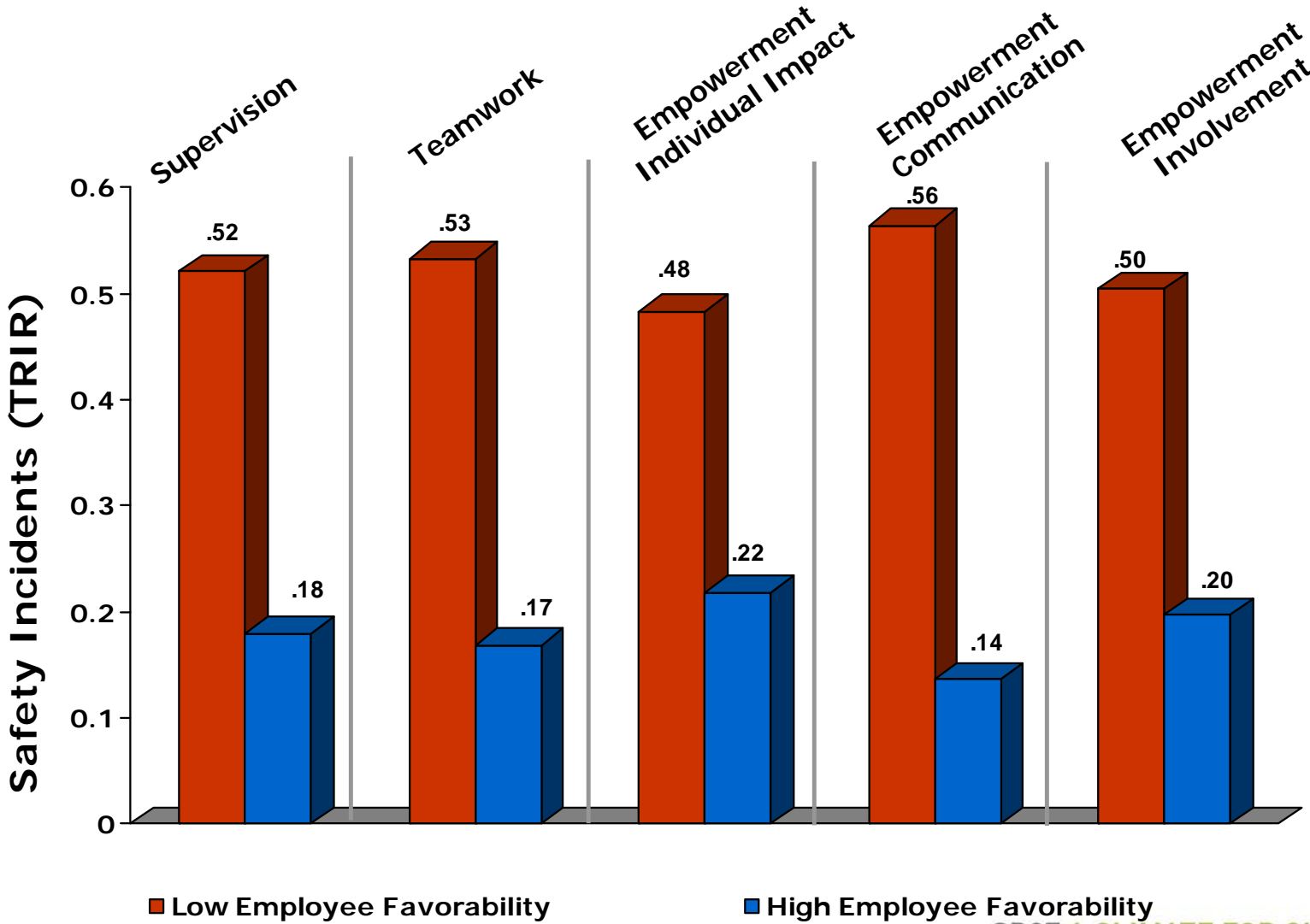
Findings:

- > Consistent with past research, employees' perceptions of safety (safety culture) linked strongly to actual safety outcomes
- > Additionally, sites with stronger **Supervision, Empowerment, Teamwork,** and **Workload** had better safety track records
 - Two new cultural elements – **Senior Management** and **Employee Respect / Well-being** – were shown to correlate with safety data. These elements may be indirect influencers of safety outcomes. More research is need to explore these relationships
- > Sites that made improvements in key areas of organisational culture across the 2004 and 2007 studies had fewer safety incidents in 2007
- > Such findings demonstrate that companies can reduce safety incidents by focusing on specific, important aspects of organisational culture

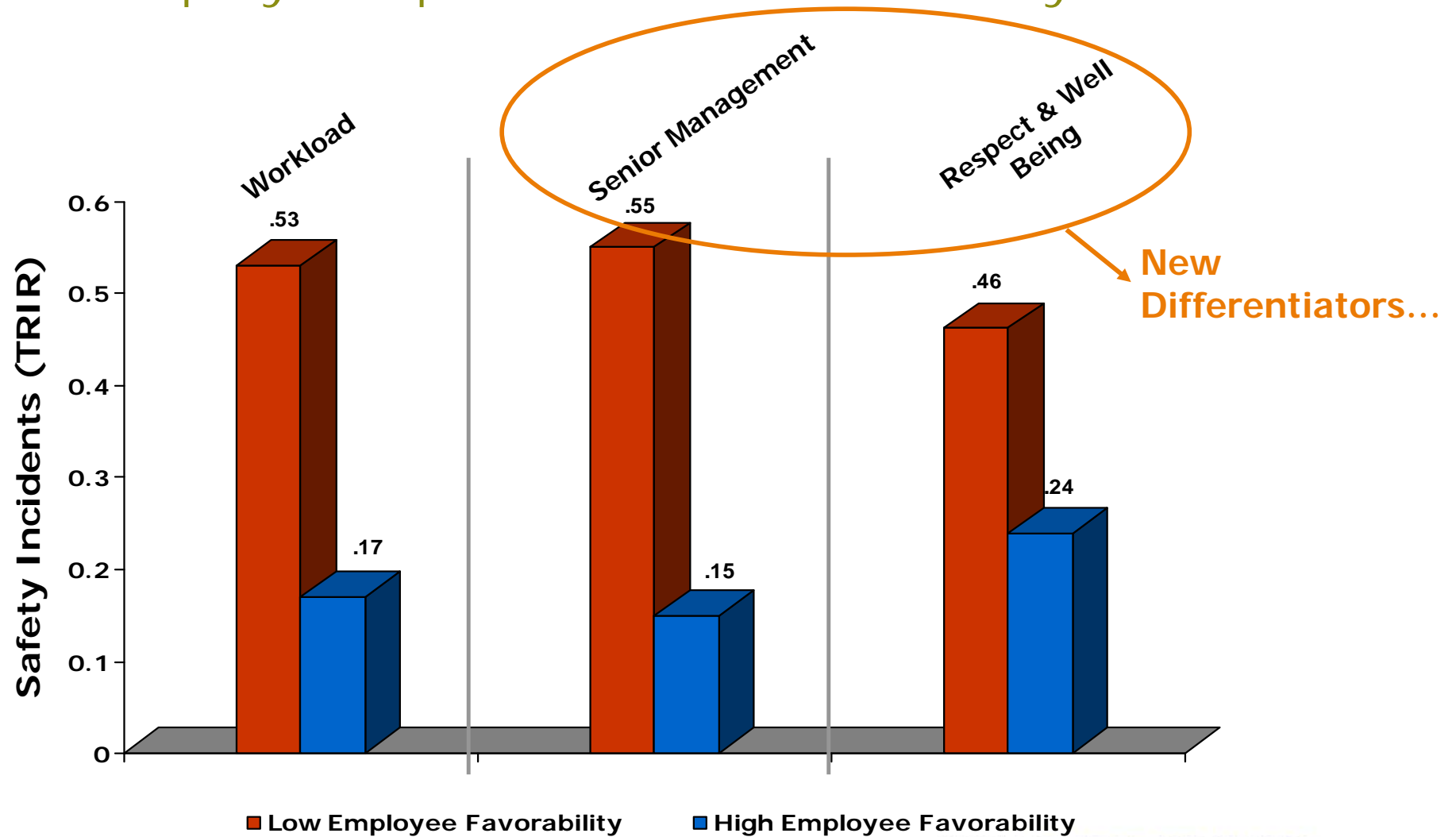
Validation:
Perceptions of Safety (Safety Culture) link to Actual
Outcomes



Strong Links also Established between Key Aspects of Employee Opinions and Actual Safety Outcomes



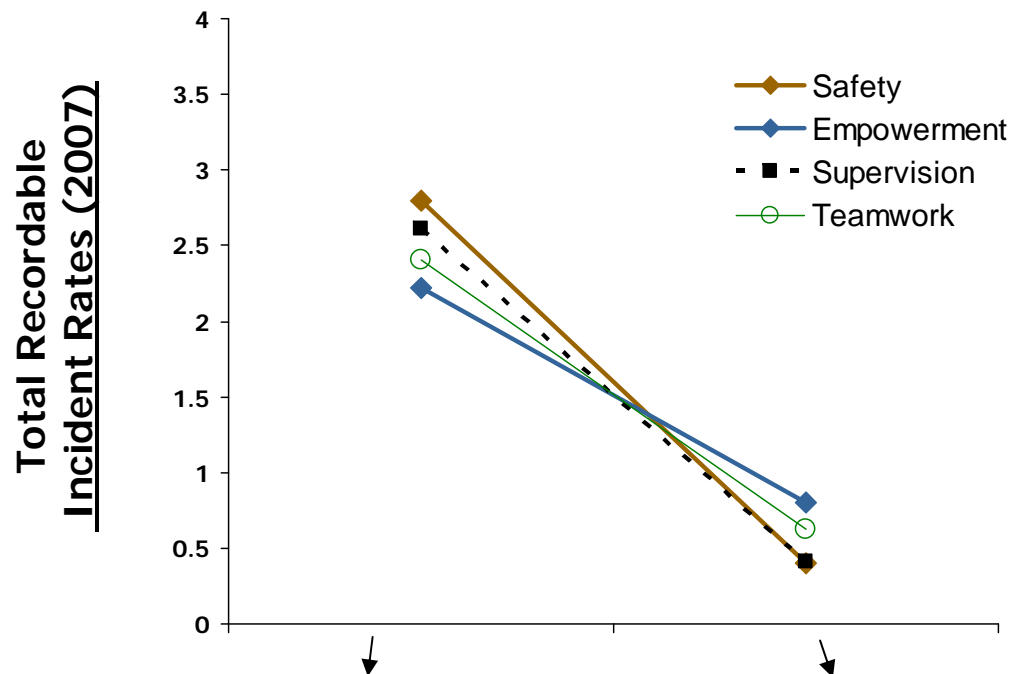
Strong Links also Established between Key Aspects of Employee Opinion and Actual Safety Outcomes



Focused Efforts on Culture can Lead to Improved Safety Performance

- > 28 organisational sites common to both data sets (2004 & 2007)
- > Sites split into top and bottom groups based on change scores in employee opinion

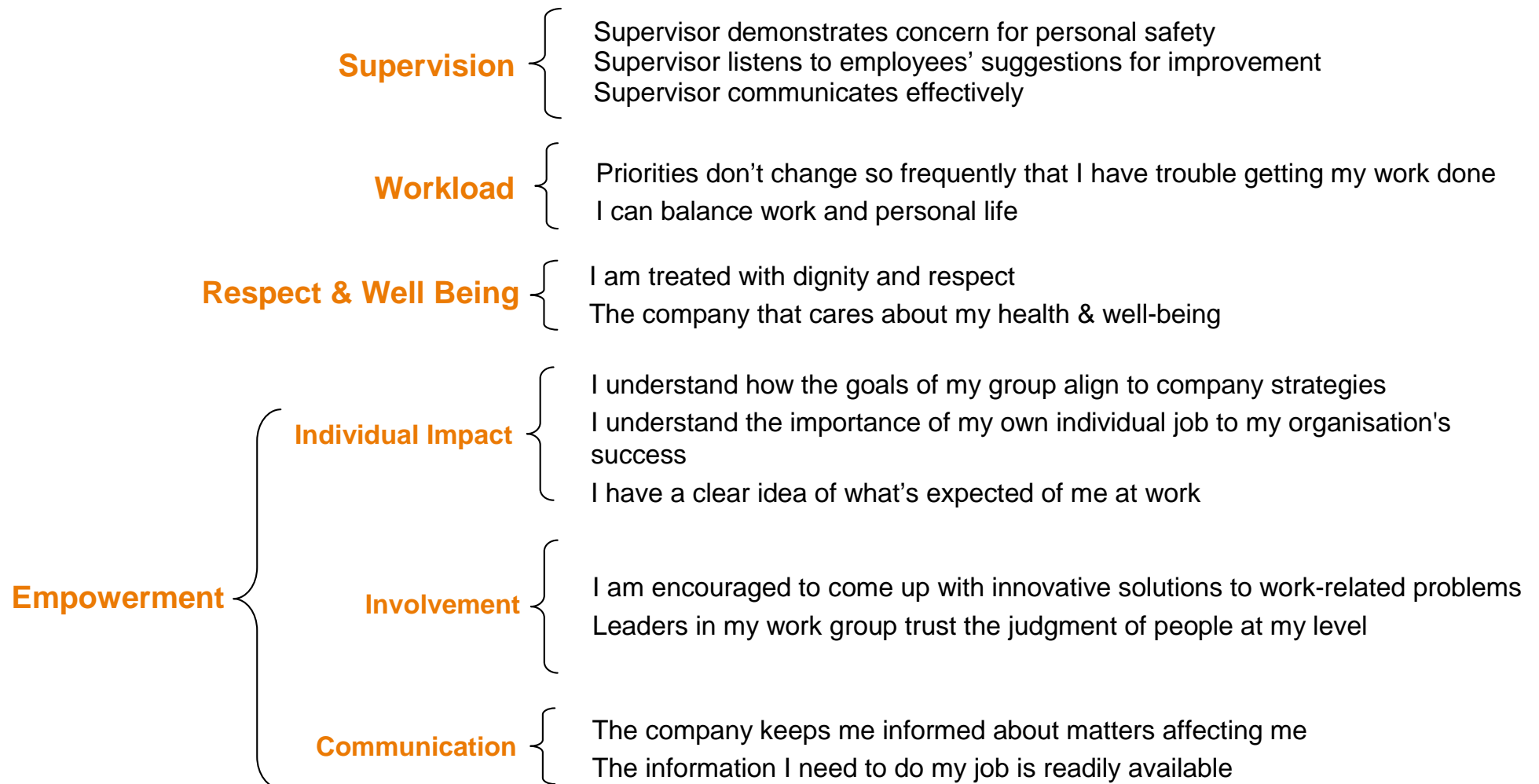
Take-away: Sites with the greatest improvements in employee opinions (culture) had the fewest safety incidents in 2007



Bottom half: Sites where opinions declined by 3% on average (07' vs. 04')

Top half: Sites where opinions improved by 5% on average (07' vs. 04')

Breaking down the Cultural Differentiators: What Specific Aspects of Employee Opinions Matter?





Breaking down the Cultural Differentiators: What Specific Aspects of Employee Opinions Matter?

Workload

Priorities don't change so frequently that I have trouble getting my work done
There is usually sufficient staff to handle the workload

Senior Management

Through their commitments and actions, leaders demonstrate visible support of operational excellence
Management provides a clear sense of direction
I have confidence in the decisions made by management

Respect & Well Being

I am treated with dignity and respect
The company cares about my health & well-being



Research Insights

- **Previous Case Studies Leading to Theoretical Model**
- **Recent Validation with Global Energy Provider**
- **Expanding the Research: Tapping Our Normative Database**



Tapping Our Normative Database: Background on the Top and Bottom Performing Safety Norms

How:

- > Defined a Personal Safety Index (4 Items)
- > Isolated the the top and bottom performing Safety Cultures based on their Scores on the Index (took the top and bottom quartiles)
 - Top Performers: 42 companies, over 315,000 employees
 - Bottom Performers: 41 companies, over 216,500 employees

Why:

- > Benchmarks for clients
- > Broadening in scope of validation efforts beyond case studies and longitudinal work
 - Benchmarks representative of numerous companies and industries

Tapping Our Normative Database: Evidence of Generalization and Unique Opportunities



Culture, Safety Culture, and Safety Performance: Practical Implications

- > Aspects of organisational culture have a strong impact on Safety Culture (perceptions of safety) and actual safety performance
 - Perceptions of Safety (Safety Culture)
 - Supervision
 - Teamwork
 - Empowerment
 - Leadership
 - Workload
 - Respect & Well-Being
- > Modeling can help us understand consistent drivers of excellent safety performance, but unique opportunities exist within organisations
- > Understanding Safety Culture and other Cultural Drivers of safety performance in context is important – benchmarking to uncover strengths and opportunities leads the way...





What Specific Steps Can Companies Take to Improve Safety Performance?

Start with senior leadership, implement through local leaders...

Give employees the knowledge and tools to make decisions

- > **Inform:** Employees who have a clear understanding of their job roles, know their place within the team and organisation, and are updated regarding matters affecting them, are more likely to make well-informed decisions in the face of safety threats.
- > **Involve:** Trusting employees and encouraging them to solve problems will heighten their sense of accountability and enhance their motivation to “own” projects – preventing the likelihood of safety issues arising.

Give employees social support

- > Work environments promoting strong teamwork can off-set the negative impact of work overload. Teamwork provides mutual monitoring to ensure safety protocols are followed, and supports employees when work demands exacerbate the likelihood of mistakes, accidents, etc.

Create a culture of Balance

- > Cultures that emphasize employee well-being and production quality (rather than bottom-line numbers) are more likely to make safety a top priority. Management must communicate and demonstrate a set of principles that support and enhance the well-being of its workforce.



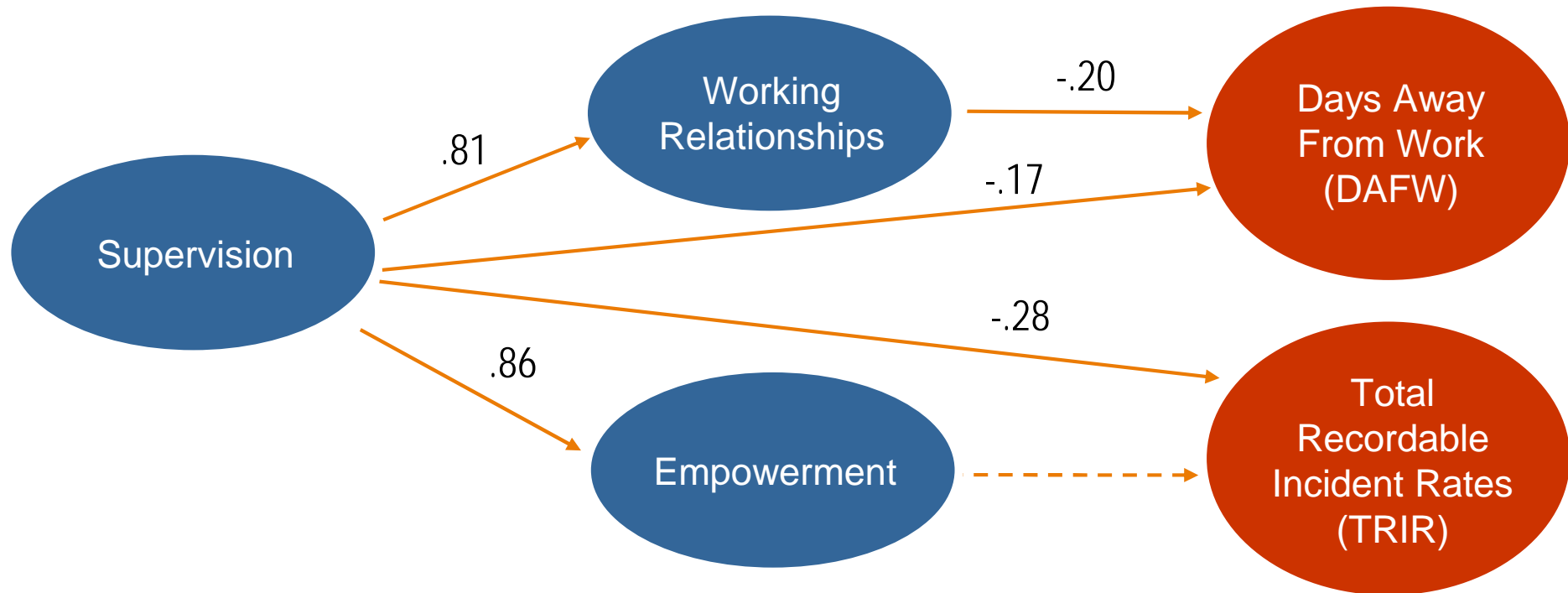
Questions?



Appendix

Model Results

- Impact of including direct link from Supervision is to reduce to non-significance the impact of Empowerment, but retain the significant impact of Working Relationships, suggesting Supervision has a direct and somewhat mediated role



.XX = Standardized regression coefficients, all significant at $p < .05$ level or lower
Model fit statistics; GFI: .99, AGFI: .99