



Measuring and Improving Safety Climate in Different Industries

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Why is safety climate important?

- Study of 413 **high-risk workgroups**: only **19%** of daily discussions and **66%** of observable behaviors were safety-oriented by the companies' own rules (Zohar & Luria, 2005)
- **Failure to use** protective gear **provided** at work accounts for **30%** of lost workdays (WHO, 2010)

➢ Strong tendency for **workarounds** (at-risk behavior) under routine conditions (managers & workers alike)

Where is it coming from & how can it be reversed?

Answer: Safety climate can reverse this tendency

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Where is the tendency for workarounds coming from?
Background information

- Most jobs can be **successfully performed at different safety levels**: Safety constitutes an independent, yet **not-necessary** performance dimension (i.e. an add-on).
Example: Drive more or less safely from A to B without accident
- Safety entails investment of non-productive individual effort + org. resources, **coupled with low injury chances**
- **Affects workers & managers alike**: "won't happen to me"
Examples:
(a) Pause work for preventive maintenance → fall behind schedule
(b) Invest \$ in machine guards / rusty pipe replacement → more costs
(c) Wait until pressure relief valve reaches required level → fall behind

➡ **Workarounds: rational choice under ordinary (if risky) work: maximize gains at no immediate costs due to low injury chances**

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What is safety climate?

A rational & functional perspective

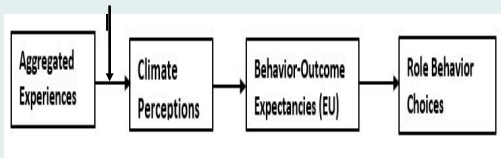
- Org climate is a **social cognitive construct** referring to employee shared perceptions regarding the kinds of role behavior likely to be recognized and rewarded
- Given the complexity of the org environ. (policy-practice gaps, inconsistent policies), workers use each other experiences to identify positive/negative consequences
- When everyone agrees about expected consequences of safety behavior, safety climate emerges (high/low scores)

Detecting the (implicit) reward structure helps employee adaptation by choosing the better-rewarded role behaviors

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Conceptual model of org. climate emergence

Which role behaviors get rewarded?



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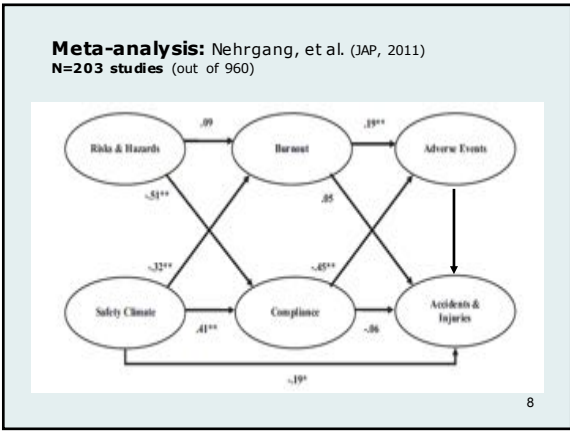
Safety climate as explanation for workarounds

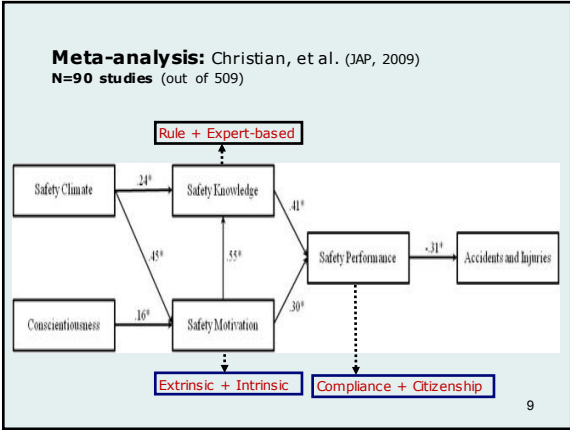
- Workers safety climate perceptions appraise org. reward structure, affecting their choices of safe/unsafe behavior
→ **managerial reward practices as key for worker safety**
- Answer questions such as: (1) *Was I rewarded for meeting a deadline although he violated some safety rules?*
(2) *Does my production manager turn a blind eye to safety shortcuts that help reduce production costs?*
- Unless safe behavior is (financially/socially) rewarded more than competing behaviors, a rational choice would be workarounds or at-risk behavior ($EU_{unsafe} > EU_{safe}$)
- Safety climate counters the choice of workarounds in routine work by informing workers the **priority of safety vs.** competing demands (using expected rewards as metric)

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Meta-analytic studies of safety climate

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Generic vs. industry-specific climate scales

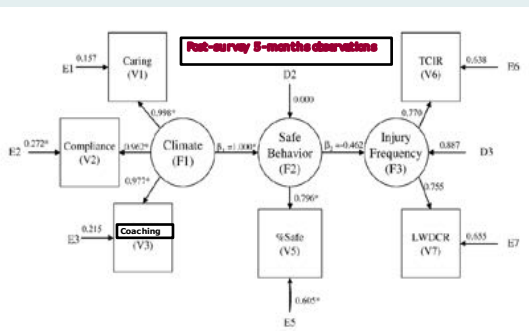
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Safety climate factorial structure
 Managerial commitment as single higher-order factor
 Meta-analytic study (Beus, JAP, 2010)

Safety Climate factors	SC → Injury effect size (r_c)
Management safety commitment	-0.30
Management safety practices	-0.09
Safety rules & procedures	-0.19
Safety communications	-0.19
Safety reporting	-0.30
Co-worker safety behavior	-0.07

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Boeing study (20 sites): Johnson (JSR, 2007)



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Generic safety climate scale
Group level (Zohar & Luria, 2005)

Caring:

- Strict about working safely at end of shift, when we want to go home
- Frequently talks about safety issues throughout the work week
- Spends time helping us learn to see problems *before* they arise

Compliance:

- Refuses to ignore safety rules when work falls behind schedule
- Makes sure we follow *all* safety rules (not just the most important ones)
- Insists that we obey safety rules when fixing equipment and machines

Coaching:

- Discusses how to improve safety with us
- Uses explanations (not just compliance) to get us to act safely
- Frequently tells us about the hazards in our work

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Industry-specific SC scales

Unique cues can double injury/error prediction

SC for long-haul truck drivers:

- *My dispatcher overlooks log discrepancies if I deliver on time*
- *Lets me to change my routs when I see safety problems*

Specific scale doubled the prediction of generic scale: $R^2=0.21$ vs. 0.10 (*safety behavior*) & $B=-0.46$ vs. -0.21 (*traffic injury*)

SC for hospital nurses:

- *We have to give medications on time even during busy hours*
- *Notice any patient's irregularities (even if not under my care)*

Specific scale nearly doubled prediction of medication errors: $B=-0.70$ vs. -0.32

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Intervention strategies for improving safety climate

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Strategy 1: Repeated climate surveys & goal setting

Combine monthly safety climate + feedback + climate goals

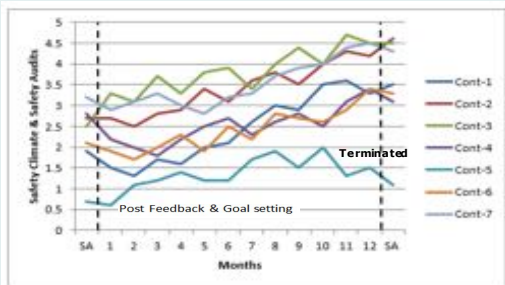
1. Use full-length climate scale to establish base-line score & analyze its data to develop a brief 10-item scale
2. Use brief scale for monthly data collection & managerial feedback, paired with setting of unit-level climate goals
3. **Web-based** data collection, using random sampling of employees in each organizational sub-unit (> 20%)
4. **Monthly feedback** (frontal or remote), accompanied by goal setting & rewarding goal progress or by on-line training/guides for climate improvement in poor units

Strategy 1 duration: up to 12 months (company's decision)

AP chemicals: Monitoring sub-contractor safety climate

Brief SC scales at monthly intervals (5-point scale)

Goal setting: 1.0% quarterly increase; Annual rewarding: 10% bonus



Strategy 1 Conclusions

Monthly measurement of safety climate, coupled with feedback & goal setting by unit managers can improve safety climate & performance

Strategy 2: Leadership & goal-setting training
 Use leadership as leverage for safety climate change

- **Effective supervisors** do 2 things: frequent monitoring + offering timely consequences (Komaki, 1998)
- **Goal setting** boosts the effect of such acts: set specific & observable daily goals + incentives for goal progress
- Top incentives at work: Financial (23%)* = Social (21%);
Social → *predictive recognition & immediate feedback*
- **Discipline alone is least effective** → org. mis-behavior

Safety goal examples:

(a) Use electrical isolated gloves; (b) Barricade a lifting area

❖ Performance improvement

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Safety leadership training
 Half-day workshop

Use formal talks + safety-related scenarios during workshop to achieve the following objectives:

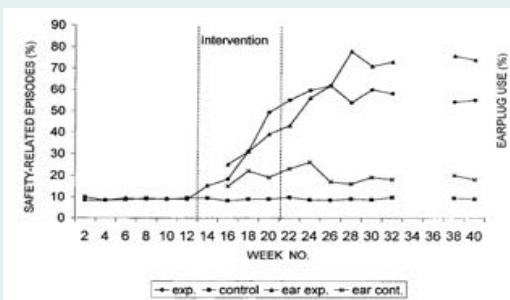
1. How to set daily (specific & observable) safety goals for performing today's work assignments (do's and don'ts)
2. How to schedule 3 daily walk-rounds to observe worker behavior & progress towards safety goals (mobile app)
3. How to offer positive/negative feedback based on observed behavior + on-the-spot coaching for safety violations soon after completing each walk round

Workshop can be followed by personal FB → turn into habits

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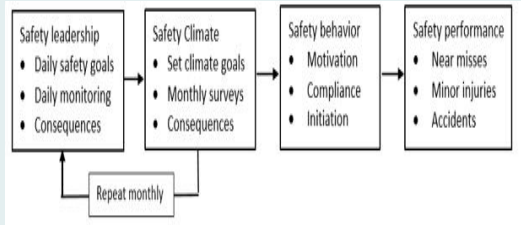
Safety leadership intervention

Workshop + Personal FB → General safe behavior & Earplug use
 Zohar, JAP, 2002



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**Combine strategies 1 & 2:
Leadership workshop + Monthly climate surveys**



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Strategy 2 Conclusions

Safety leadership workshop followed by feedback using safety walk-round data or monthly safety climate surveys can improve safety performance

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**Strategy 3: Increase daily safety messages
Supervisor-worker conversations**

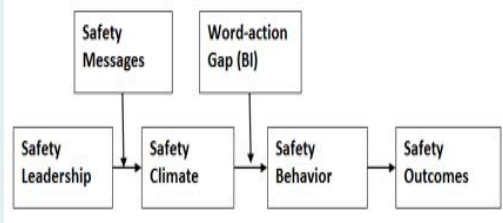
- Given that the primary medium for influence processes is words and language (**discourse/speech driven**), climate perceptions often depend on safety messages embedded in daily work-related conversations
- Challenge: Safety messages are weak & transient, e.g. *what has been said vs. what has been left out; text (explicit) vs. sub-text (implicit); formal vs. informal messages*

Examples:

- "Take a break if you're tired" (*Safety*)
- "This job must be completed on time" (*Speed*)
- "Can you tell Ben & Al about it tomorrow morning?" (*Team*)

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Conceptual framework for interventions



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Safety messages intervention project

Methodology

- Web-based/mobile apps to randomly select workers & send them brief checklist to spot supervisory safety vs. speed messages on last conversation (5 min)
 - Use 9-10 exchanges to derive individual FB data per supervisor; Offer frontal/remote FB sessions
 - Measure safety climate & safety behavior 2 months before & after project: *Compare Exp & Control groups*
- Strategy 3 duration:** up to 6 monthly FB sessions + before/after safety observations (company's decision)

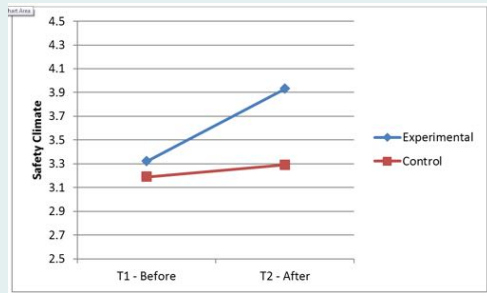
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Example 1: Lagin Metal Containers



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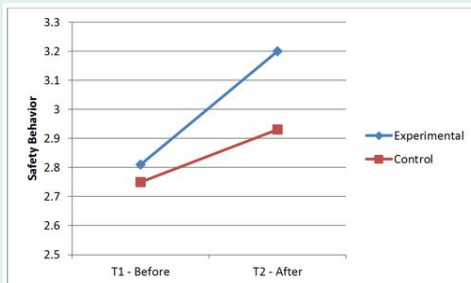
Example 2: Midsize manufacturing plant (364 workers)
 Zahar & Polachek, JAP, 2014



Note: 14 Experimental & 14 Control workgroups

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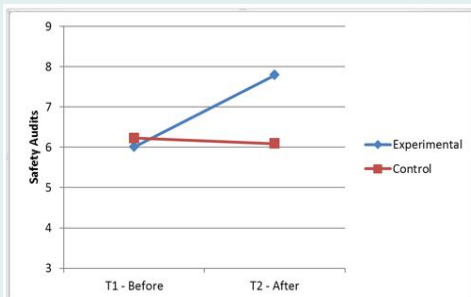
Effect of intervention on safety behavior



Note: Contrary to expectations, resulting from project methodology 29

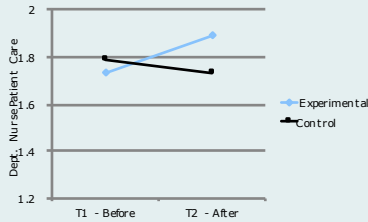
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Effect of intervention on safety audits
 Use 2 double-blinded safety experts

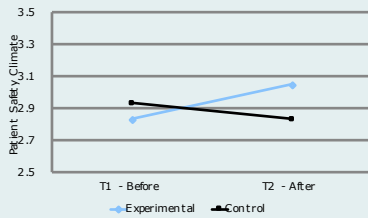


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Example 3: Patient Safety messages
 Mid-size hospital (28 medical wards; 445 nurses)



Patient Safety Climate improvement
 Before vs. after intervention



Conclusions

- **Safety climate** as strongest factor affecting safety behavior can be used to improve corporate safety
- **Intervention strategy:** SC can be improved using:
 - (a) monthly surveys + goal setting + FB/rewarding;
 - (b) non-verbal safety leadership practices (daily safety goals + monitoring walk rounds + consequences)
 - (c) verbal safety messages in daily work-related conversations (priority of safety vs. productivity/costs)
- **Experimental (vs. correlational) design** of field studies allows testing of causality among model variables
- **Cost-effective:** Reduce intervention costs (2 FB sessions offered by grad students & data collected by undergrad students)

Thank you
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Policy-practice de-coupling
Word-action gaps → perceptual confusion

Companies adopt socially-approved policies to improve its reputation among key stake holders (QHSE, diversity)

Because such policies often compromise (short-term) profitability goals, they have been shown to be poorly applied in daily activities: **Policy-Practice de-coupling**

Safety: 81% of conversations & 44% of worker behavior were not safety-oriented (41 high-risk manufacturing companies)

Quality: 73% of companies who have adopted TQM or ISO-9000 certification showed no improvement in product quality

Ethics: 67% of companies who have adopted ethics policies & standards failed to implement it on a daily basis

Cue-based climate perceptions diffuse confusion → true priorities

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Expected reward as metric for safety priority
Behavior-outcome expectations

- Safety priority signalled by: **size, frequency, immediacy** of rewards/incentives for safety behavior
- Climate predicts safety behavior based on the ratio of $Utility_{safety} : Utility_{speed/costs}$ (expected-utility model)
- Top incentives at work: **Financial (23%) = Social (21%); Social → recognition predicting future personnel decisions**

Because leaders can influence desired personnel decisions, they strongly influence safety climate level

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