# Safety Climate as Key for Studying Safety Behavior

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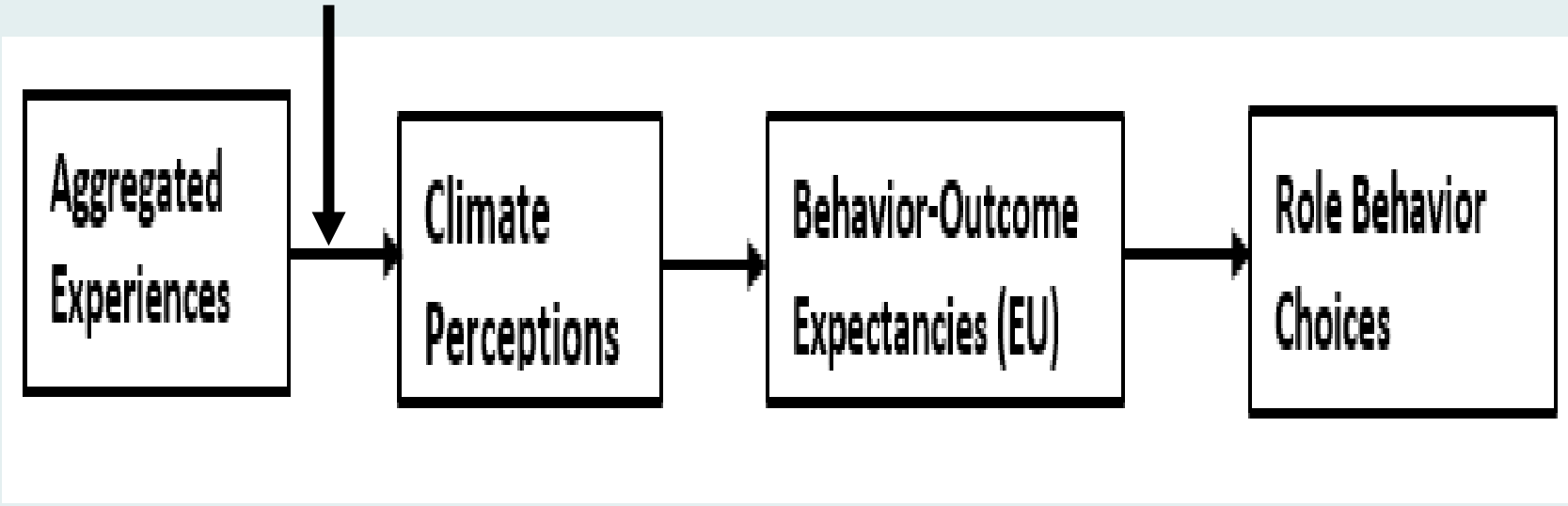
# What is safety climate?
## A rational & functional perspective

- 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. (e.g. competing demands, inconsistent policies), workers use each other experiences to identify positive/negative consequences
- When everyone agrees about consequences of safety behavior, safety climate emerges (high vs. low scores)

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

# Conceptual model of climate emergence

**Which role behaviors get rewarded?**



## Safety Climate as Best Predictor

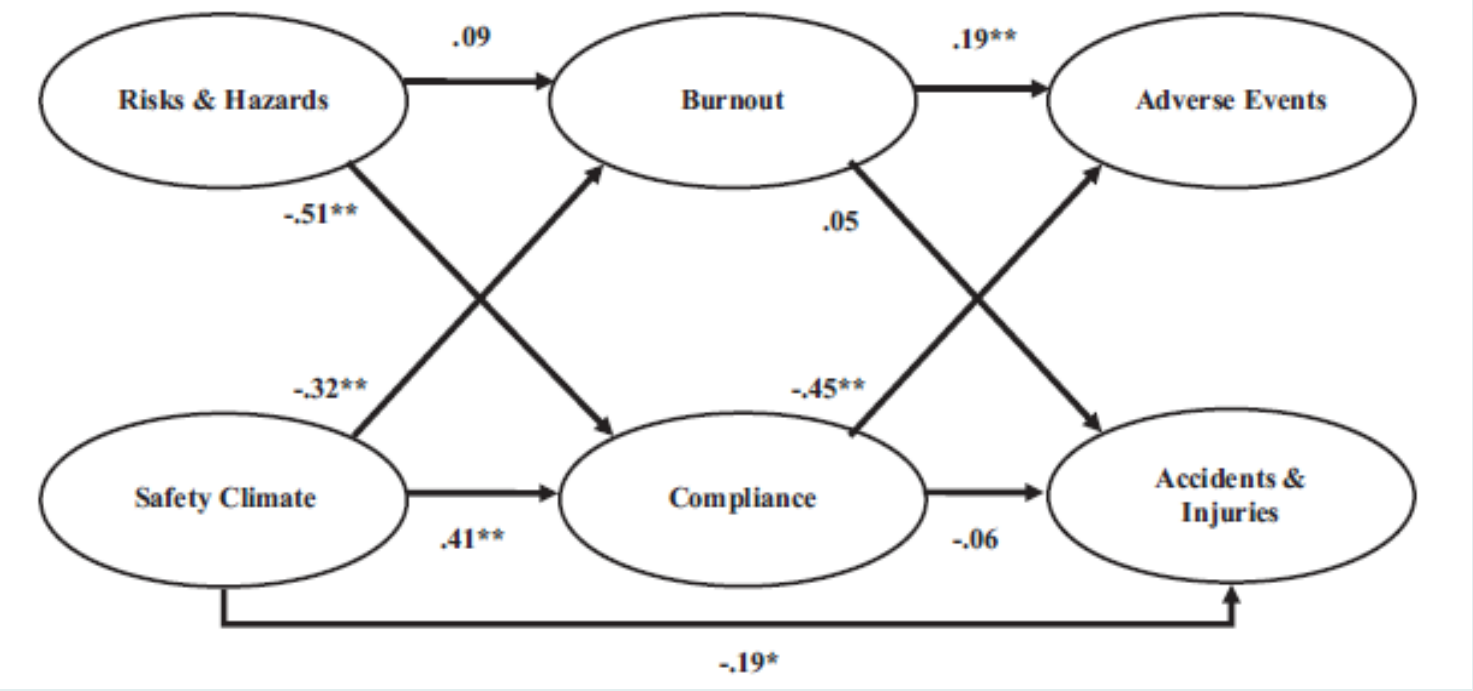
**Safety climate as measurable proxy of safety culture**

**Safety culture enhances safety engineering by influencing the motivation for safety compliance**

# **Safety climate → safety compliance & injuries**
**Meta-analysis of 202 scientific studies** (JAP, 2011)

Safety climate is a strong & reproducible behavior-based indicator: r**c**=-0.45 (unsafe behavior); r**c**=-0.24 (injury)

Risks & hazards *(engineering-based indicator)* relationships are weaker: r**c**=0.12 (unsafe behavior) and r**c**=0.13 (injury)



# What makes safety climate the best predictor?
## Affects workers & managers behavior alike

- Workers & unit managers safety climate perceptions appraise org. reward structure, affecting choices of safe /unsafe behavior → counters the choice of workarounds
- Answer questions such as: (1) Is meeting deadlines more important than complying to safety rules? (2) Is it better for me to cut (safety) corners in order to work faster/cut costs?
- Whenever safety goals are (financially/socially) rewarded less than competing goals, a rational choice is at-risk behavior as long as the chances for injury remain low
- When everyone agrees about org. rewards for safety behavior, safety climate emerges (high vs. low scores), resulting in worker-level & management-level climates

# 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 → predictive recognition + immediate feedback*
- Due to the fact that leaders can influence desired outcomes, leaders strongly influence safety climate level

# Measurement issues

# Safety climate metrics: level & strength

Two metrics:

- Climate level (high or low) referring to the mean score of aggregated work-unit climate perceptions
- Climate strength (strong or weak): how much agreement is there that safety is a priority (SD, AD**j**, R**wg**)

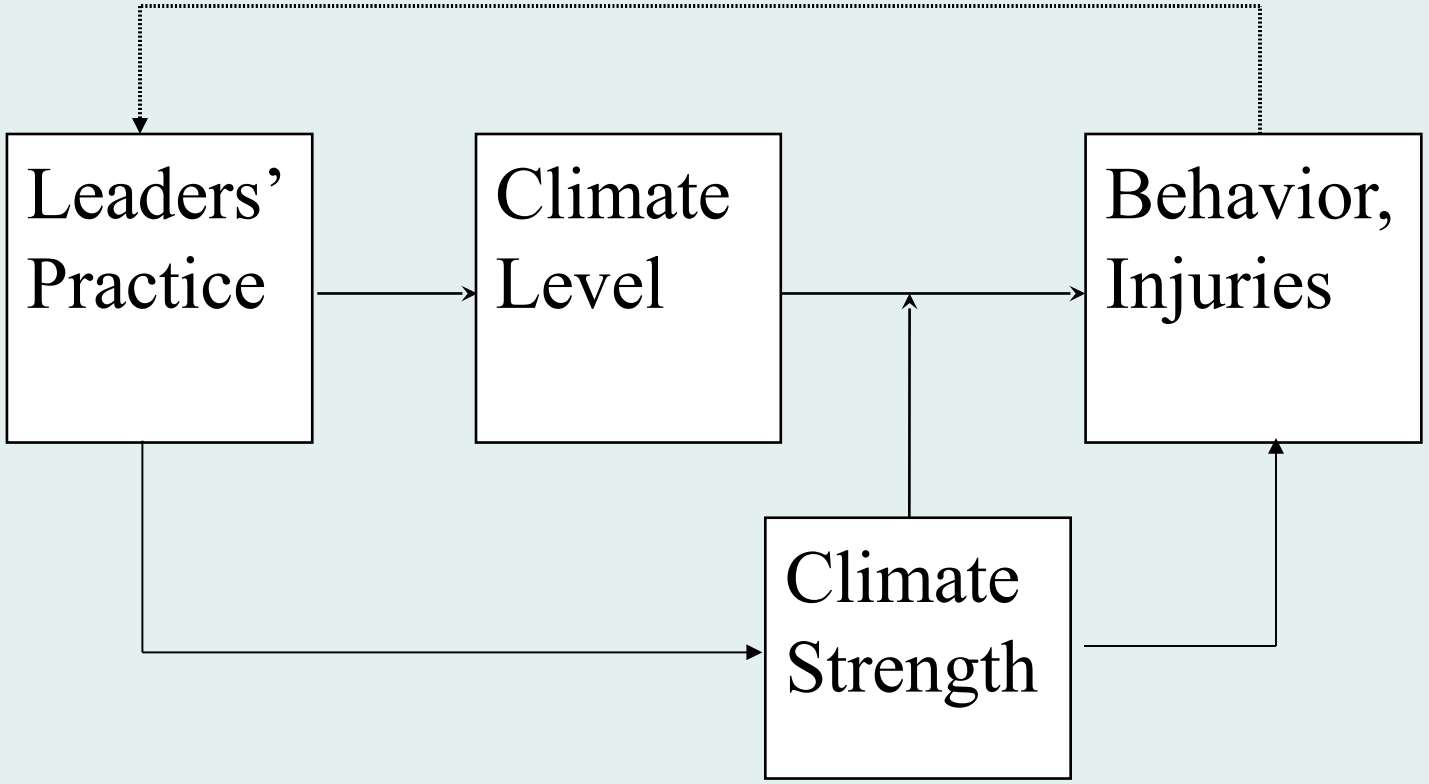
Notes: (1) Medium correlation between the 2 metrics (statistical artefact); (2) Leadership affects both

- Vicente Gonzalez-Roma & Jose Peiro (Univ. of Valencia)

# Climate level and strength

Strength as moderator

Note: Mixed evidence for moderation (vs. main-effects) model



# Validity of climate measurement
## Methodological issues

Authors often overlook key validation criteria:

- Within-unit homogeneity of climate perceptions (R**wg**>0.70): currently debatable
- Between-unit variability of climate scores, relating to relevant units of analysis (dept's or org's)
- Unit of analysis should correspond to natural social units (workgroups, dept's or org's)
- Unit of measurement (items, sub-scales) should correspond to unit of theory (group vs. psych climate)

# Measuring safety climate

**Scale items refer to observable indicators of safety priority: Priority → Expected rewards**

Employees discriminate between safety commitment & safety rewarding by senior vs. supervisory leaders

Worker-level climate scores are related (but not identical) to management-level climate scores

Scale items (Zohar & Luria, 2005):

*My supervisor-*

- *Refuses to ignore safety rules when work falls behind schedule*
- *Is strict about working safely when we are tired or stressed*

*Senior management -*

- *Quickly corrects any safety hazard (even if it's costly)*
- *Considers safety when setting production speed and schedules*

# Safety climate as a social perception construct
## Aggregation of individual climate perceptions

Climate as an emergent (group-level) property:

(a) Climate scales should include perception items for employees exposed to the same work environment

(b) Target (referent) of climate perceptions: consequences (reward/punishment) of safety behavior

(c) Climate scales should not include individual-difference items whose aggregation makes no sense

Examples (individual-difference items):

- *Attributions: Accidents will happen no matter what I do*
- *Personal beliefs: It is only a matter of time before I am involved in an accident*
- *Risk perceptions: I am rarely worried about being injured at work*

# Safety climate factorial structure

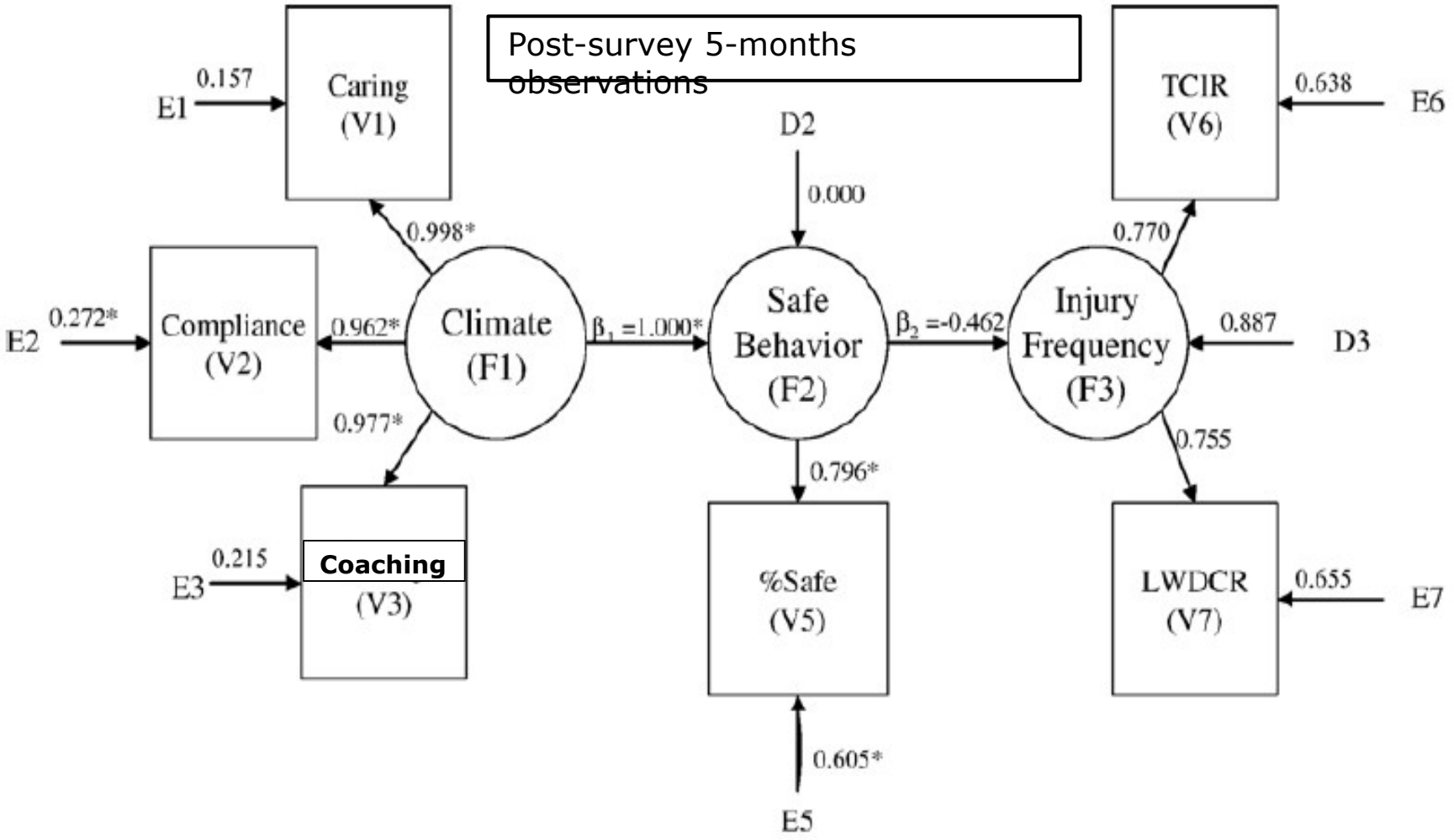
## Managerial commitment as single higher-order factor

**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 |

Small effect size due to word-action gaps

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



# 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

# Generic vs. industry-specific SC scales

## Unique industry-based cues can <u>double</u> 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*

*Sp*ecific scale <u>doubled</u> 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 <u>doubled</u> prediction of *medication errors*: *B*=-0.70 vs. -0.32

# Theoretical/conceptual issues

# Safety Culture vs. Safety Climate

Alternative explanations for role behavior:

- Culture uses deep-level values & basic assumptions that are shared and taken for granted by employees
- Climate uses cognitive appraisals (sense-making) of culture artifacts as markers of priorities at workplace:
  Culture (values/assumptions) → Climate (priorities) Climate is a measurable proxy of culture
- Climate cues are multiple culture artifacts relating to few underlying values/assumptions (Many-to-one mapping)

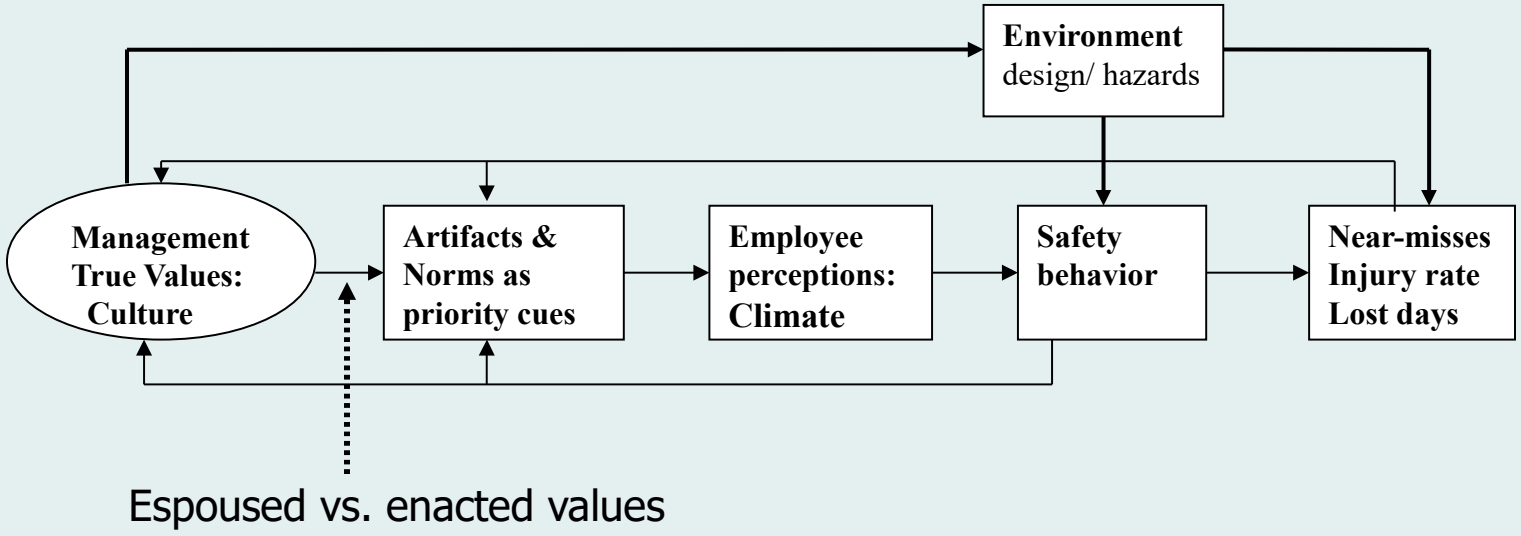
Value examples (espoused vs. enacted):

(a) *We take care of our workers; (b) Protect the environment*

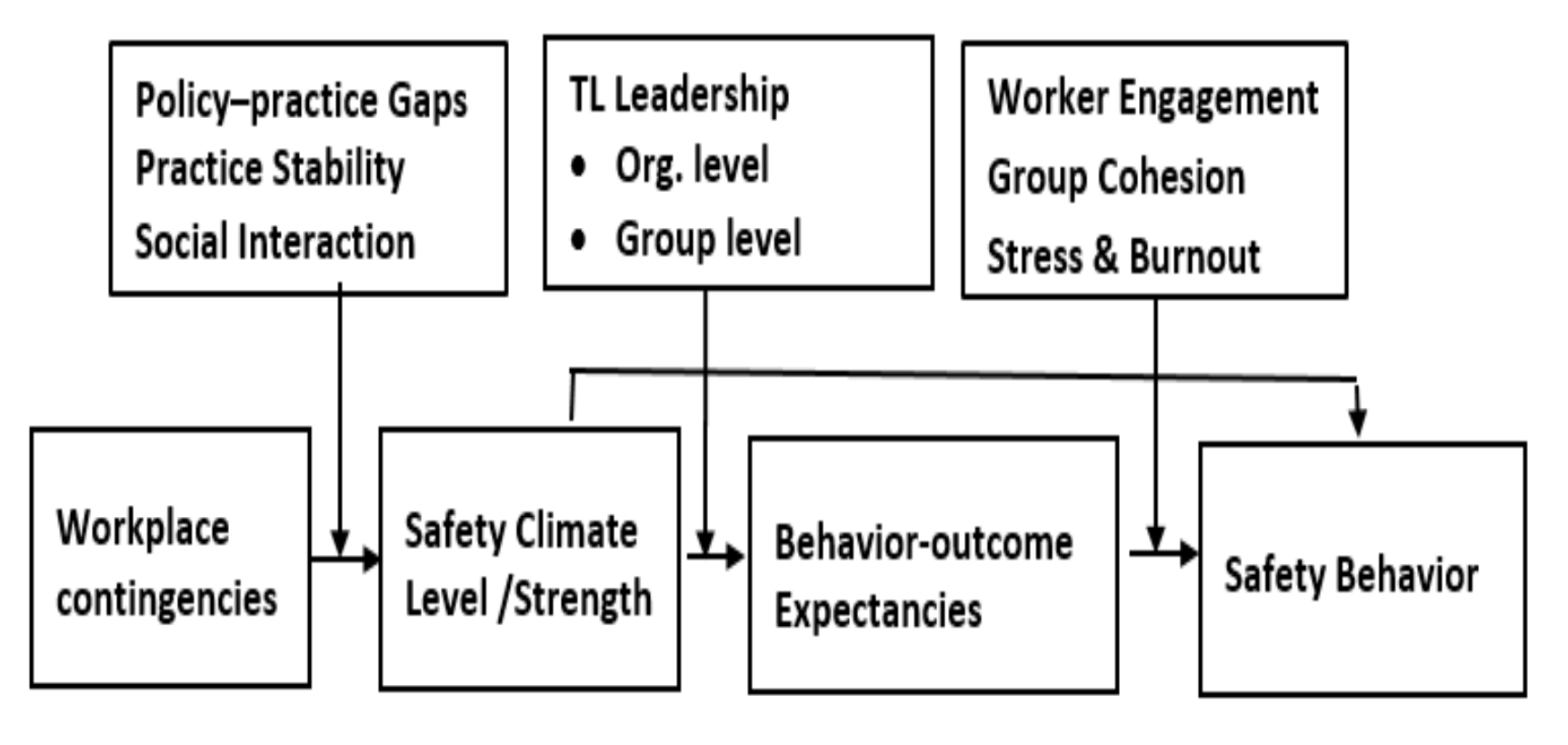
⇒ Need to study Culture-Climate relationship

# Safety culture/climate model

Climate mediates org. practices and employees' behavior – it explains 22% of injuries (meta-analysis)



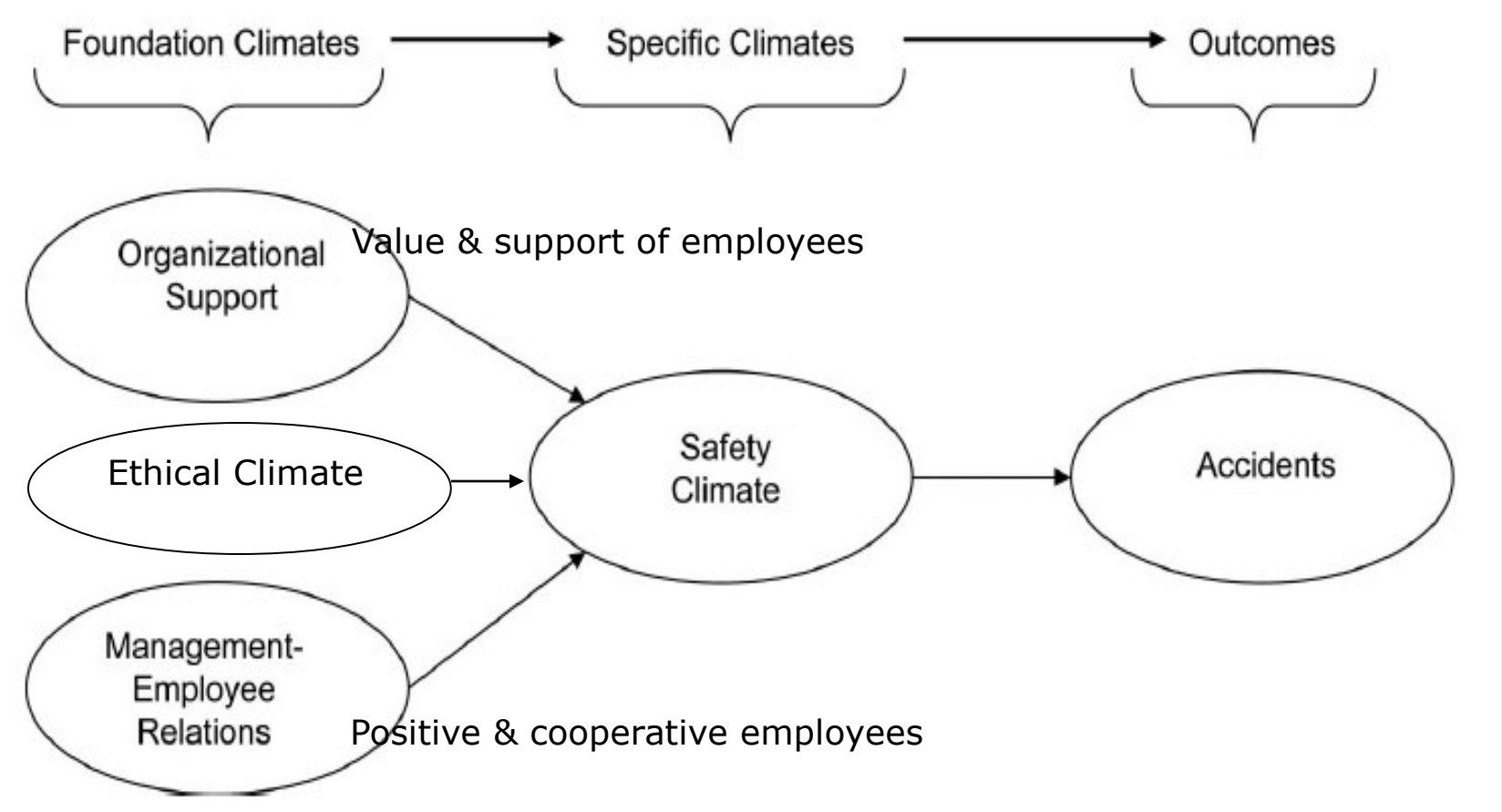
# Safety climate nomological network (1)
## Mediator & moderator variables




Note: different variables affect climate level & strength

# Safety climate nomological network (2)
## Foundation & specific climates

Wallace, JAP, 2006



**Thank you**

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