Behavioral-based safety overview

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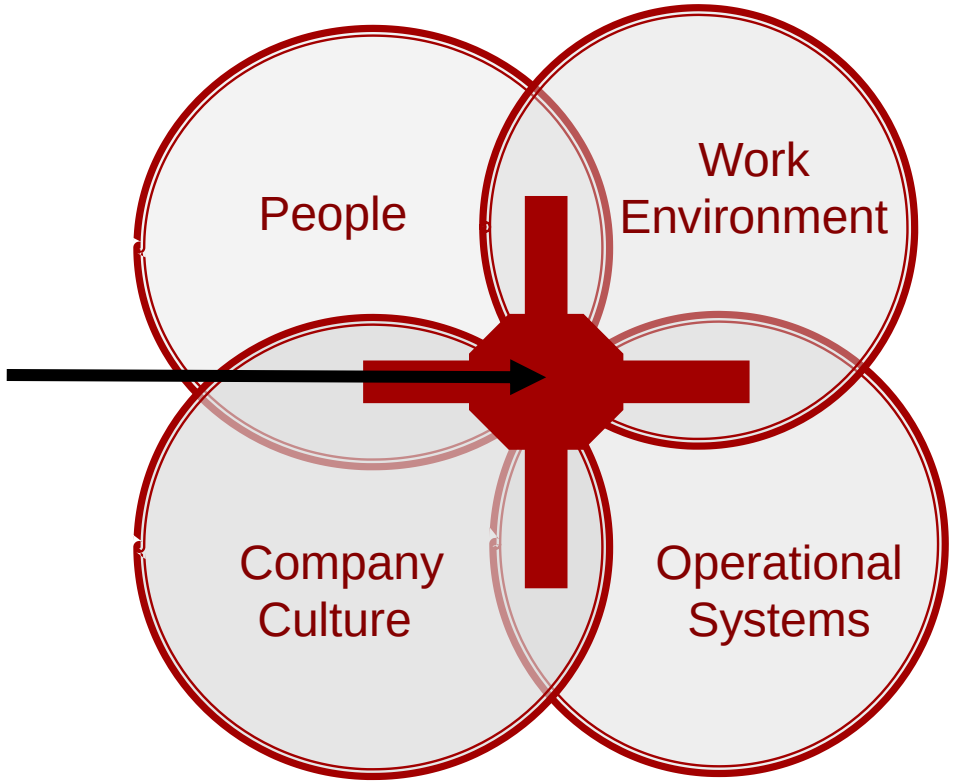
What is Behavioral-Based Safety?

Simply a safety management system component focusing on safety behavior

BEHAVIORAL-BASED SAFETY



It occupies the ‘crossroads’ where people, systems, the working environment and company culture converge.

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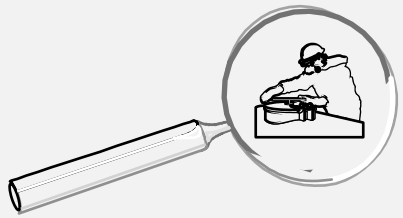
Main BBS Process Models

Top-down

Supervisors are trained in the method, which they then apply to 'hourly' employees.



Bottom-up

Employee-led with management providing resources.

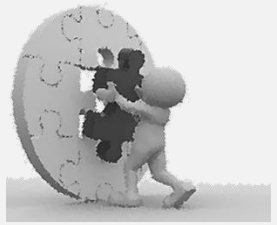
BBS

All-inclusive

Safety partnership between Management and Employees.

Self-Managed

People monitor their own behavior



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Underpinning Assumptions of Behavior-Based Safety

- Behavior is often the final trigger for an incident/injury
- A small proportion of behaviors are implicated in the lions share of injuries
- Addressing associated behaviors will reduce incidents / injuries

- People respond to performance feedback
- Regular safety observations and conversations provide the basis for focused performance feedback and corrective action(s)

- Attending to the precursor conditions driving unwanted behavior, will help sustain behavior change

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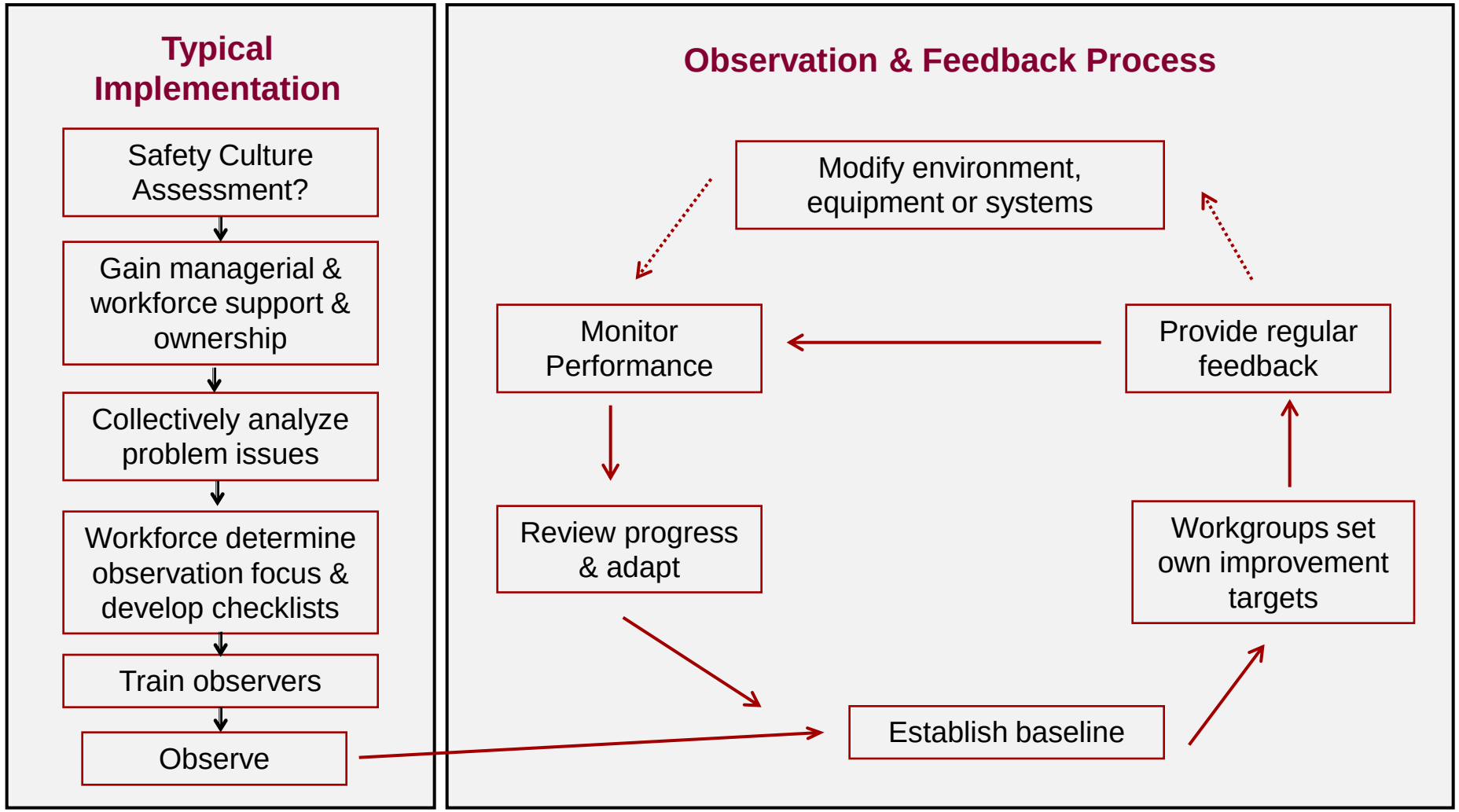
How Do We Implement Behavior-Based Safety?



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Claims associated with a Behavioral-Based Safety Process

Claims of fact

- The design of the process determines its impact on behavior and incidents
  - Daily observations or 2-3 X p.w. reduces incidents more than 1 p.w. observations
  - Use of more feedback channels means less incidents & bigger behavior change
  - Training & Feedback reduces incidents more than other methods
  - Goals & Feedback leads to greater behavior change than other methods
  - Participative improvement goals are more impactful than implicit or assigned goals

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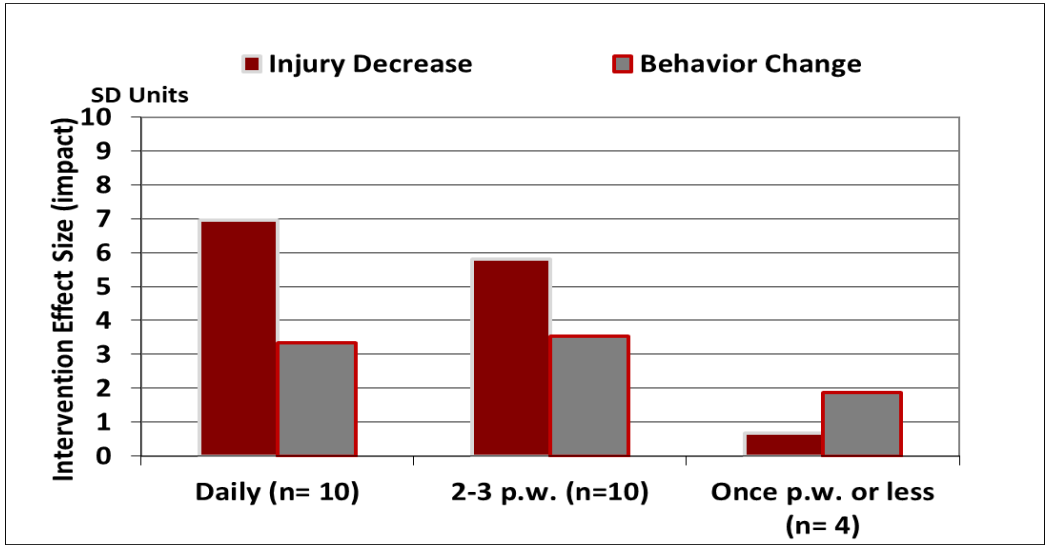
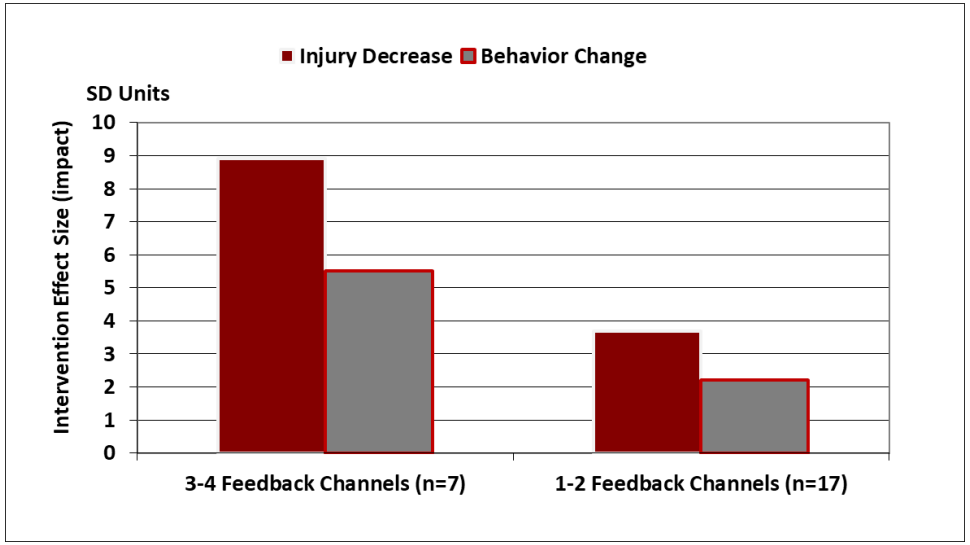
Study Data Supporting Claims of Fact about BBS

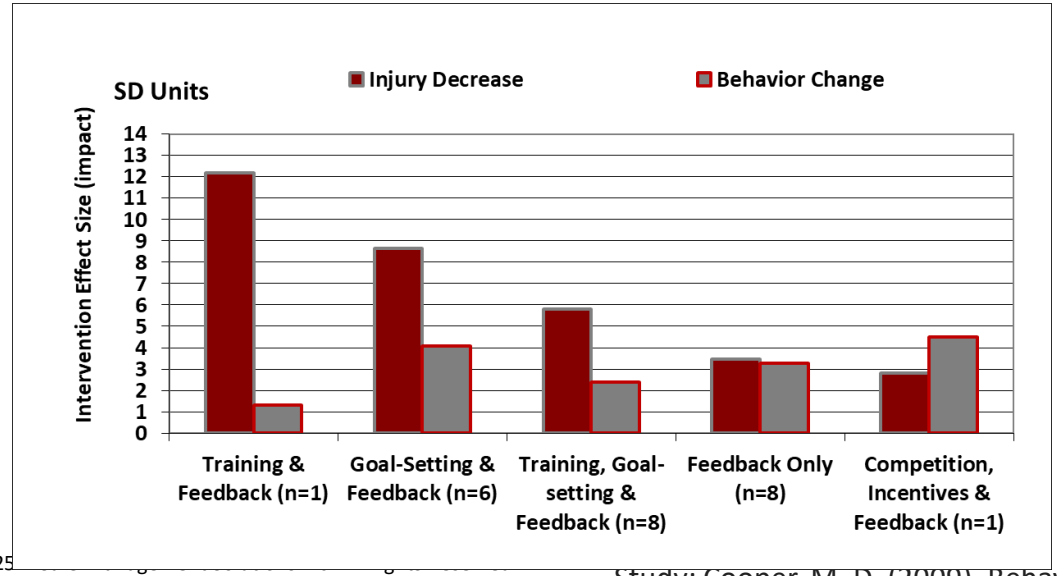
Observation Frequency per Observer



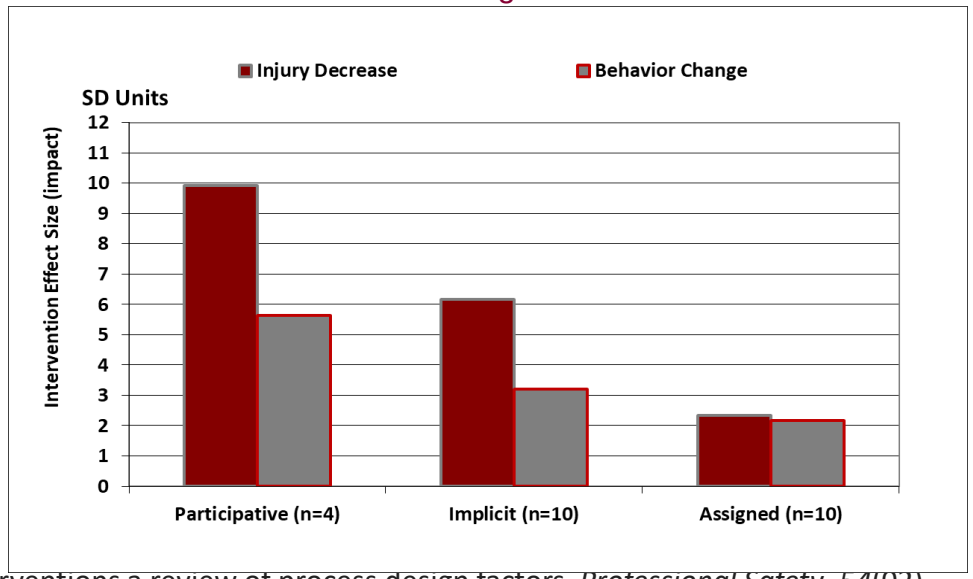
Number of Feedback Channels Used



BBS Protocols



Goal-Setting Involvement



Study: Cooper, M. D. (2009). Behavioral safety interventions a review of process design factors. *Professional Safety*, *54*(02).

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Claims associated with Behavioral-Based Safety

Claims of understanding of the facts

- Identifying problem behaviors helps to identify the context in which they arise (e.g. driven by situational constraints or by personal choice)
- Identifying any precursors to problem behaviors facilitates focused corrective actions

- Engaged employees are 5 X less likely to be involved in incidents
- Deciding observation focus (which behaviors), setting participative improvement goals, having on-the-spot conversations, and, regular group feedback meetings (discussing observations), facilitates employee engagement

- Managerial safety leadership significantly affects employee behavior

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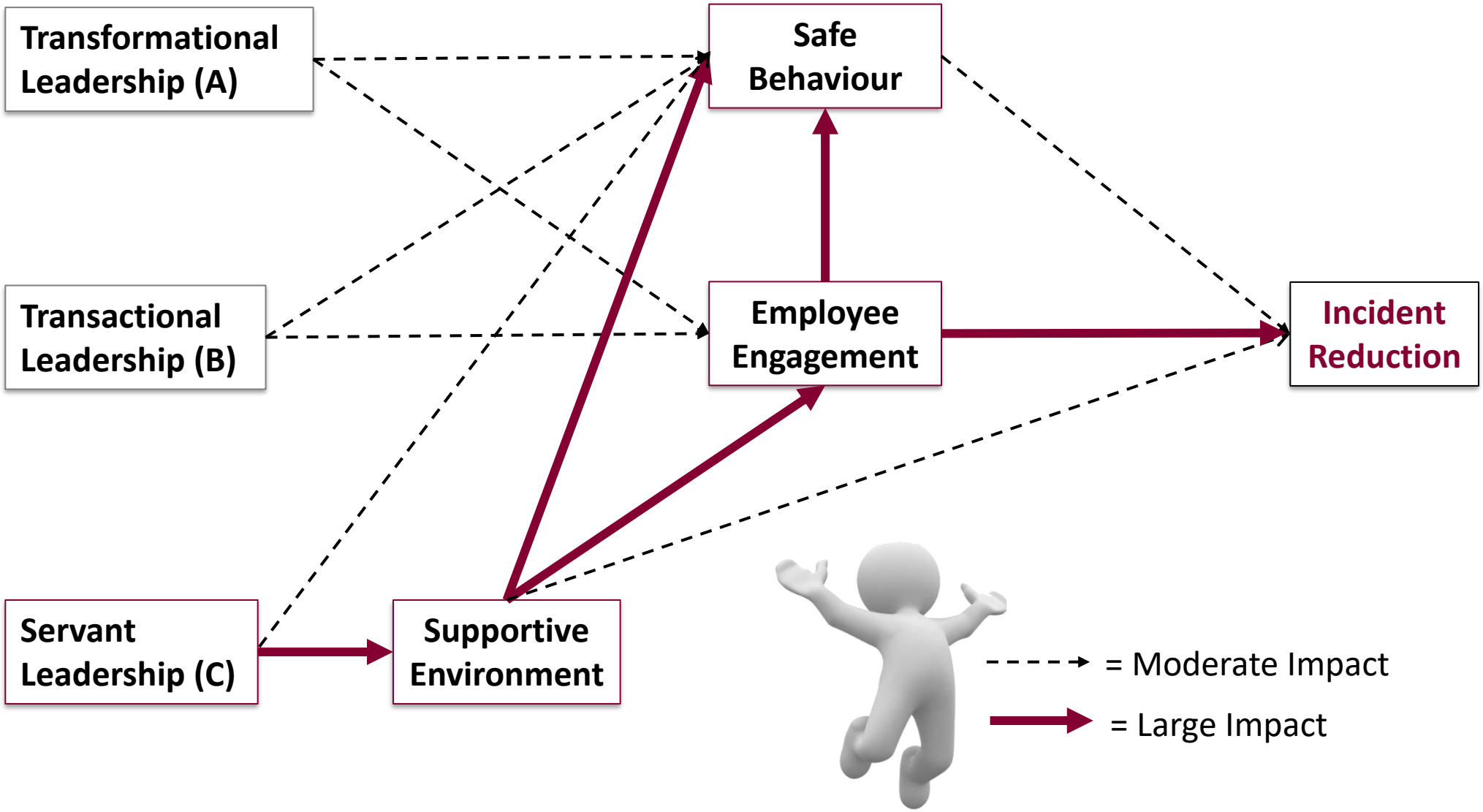
Evidence Supporting Claims of Understanding of the Facts



Study: Cooper, M.D. (2015). Effective safety leadership: Understanding types & styles that improve safety performance. *Professional Safety*, 60(02), 49-53.

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Claims associated with Behavioral-Based Safety

Claims of cause & effect

- Focusing on specific problem behaviors, reduces associated incidents / injuries
  - Focusing on a limited set of behaviors *known* to be associated with injuries gives a degree of measurement precision and operational control.
  - The ratio of safe to unsafe behaviors provides feedback (Percent Safe score) to track progress.
  - The Percentage Safe score reveals variability in performance
- Completing corrective actions changes the causal mechanisms driving unsafe behavior, and increases safe behavior by approx. 21.5%

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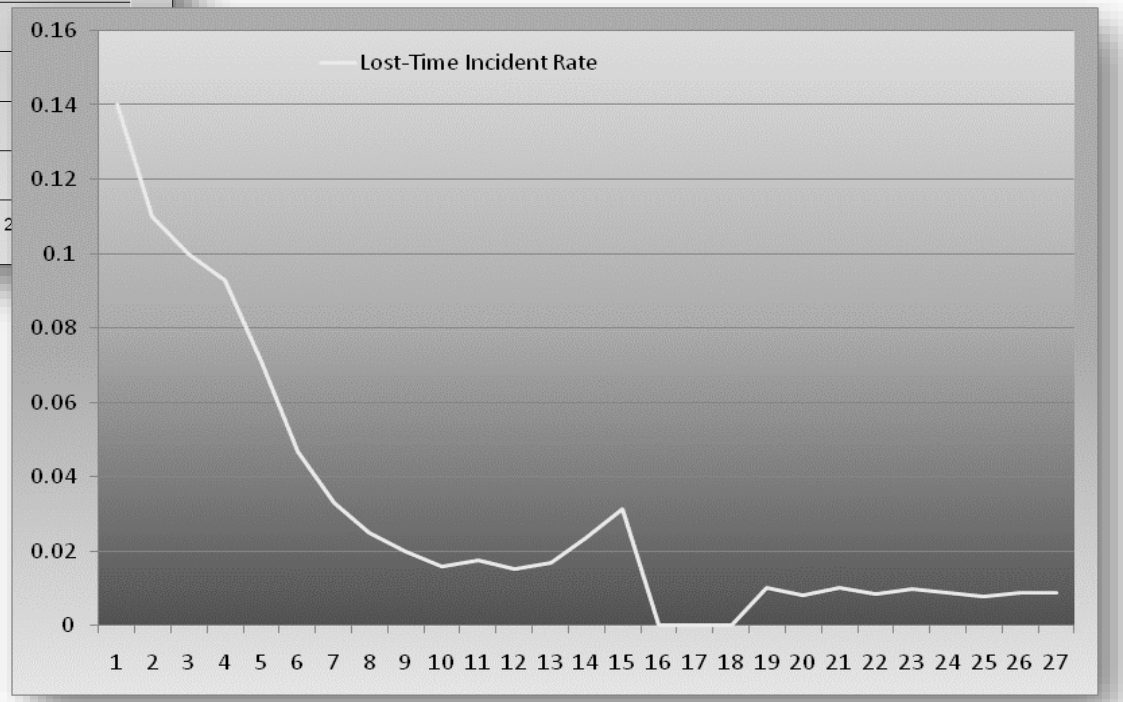
Evidence of claims of cause-effect (monthly aggregate data)

BBS Improves safety behavior

During the 27-month project duration, the BBS process generated an additional 2,973 completed corrective actions



BBS reduces incident rates

Study: Cooper, M.D. (2010). Safety leadership: application in construction site. *Giornale italiano di medicina del lavoro ed ergonomia*, 32(1 Suppl A), A18-23.

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Claims of worth associated with Behavioral-Based Safety (1)

Claims of Worth	Evidence to Support Claims of Worth
Reduces Injuries	1. Cooper, M.D., Phillips, R.A., Sutherland, V.J & Makin, P.J. (1994) 'Reducing Accidents with Goal-setting & Feedback: A field study'. *Journal of Occupational and Organizational Psychology, 67*, 219- 240. 2. Krause, T. R., Seymour, K. J., & Sloat, K. C. M. (1999). Long-term evaluation of a behavior-based method for improving safety performance: a meta-analysis of 73 interrupted time-series replications. *Safety Science*, *32*(1), 1-18. 3. Sulzer-Azaroff, B., & Austin, J. (2000). Does BBS work? Behavior-based safety & injury reduction: A survey of the evidence. *Professional Safety*, 45, 19-24 4. Grindle, A. C., Dickinson, A. M., & Boettcher, W. (2000). Behavioral safety research in manufacturing settings: A review of the literature. *Journal of Organizational Behavior Management*, *20*(1), 29-68. 5. Cooper, M. D. (2009). Behavioral safety interventions a review of process design factors. *Professional Safety*, *54*(02
Reduces unsafe conditions	1. Bence, H., & Rayson, P. (2000). Successfully Implementing a B-SAFE Behavioural Safety Program and Measuring the Success in Terms of a Pro-active Safety Culture. Tees Valley Business Awards 1998 - Category: The Safety Award Submission: 2. Hagge, M., McGee, H., Matthews, G., & Aberle, S. (2017). Behavior-based safety in a coal mine: The relationship between observations, participation, and injuries over a 14-year period. *Journal of Organizational Behavior Management*, 37(1), 107–118.
Reduces Insurance Premiums	1. Harrison, S. (2013). Behavioral safety programs help employers cut workers comp costs. Business Insurance. – Du Pont Study. https://www.businessinsurance.com/behavioral-safety-programs-help-employers-cut-workers-comp-costs/ 2. Olefins, Huntsman Petrochemicals (2003). 32 percent reduction in Insurance. Health and Safety Commission (HSC). Huntsman Petrochemicals Case Study. Retrieved Oct 13 from The British Health & Safety Executive site: http://www.hse.gov.uklbusinessbenefits/casestudy/huntsman.pdf, 2006.

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Claims of worth associated with Behavioral-Based Safety (2)

Claims of Worth	Evidence to Support Claims of Worth
Increases safe behavior	1. Komaki, J., Barwick, K. D., & Scott, L. R. (1978). A behavioral approach to occupational safety: pinpointing and reinforcing safe performance in a food manufacturing plant. Journal of applied Psychology, 63(4), 434. 2. Chhokar, J. S., & Wallin, J. A. (1984). A field study of the effect of feedback frequency on performance. Journal of Applied Psychology, 69(3), 524. 3. Reber, R. A., Wallin, J. A., & Chhokar, J. S. (1990). Improving safety performance with goal setting and feedback. Human Performance, 3(1), 51-61. 4. Cooper, S. E., & Newbold, R. C. (1994). Combining external and internal behavioral system consultation to enhance plant safety. Consulting Psychology Journal: Practice and Research, 46(3), 32. 5. Reber, R. A., & Wallin, J. A. (1994). Utilizing performance management to improve offshore oilfield diving safety. The International Journal of Organizational Analysis, 2(1), 88-98.
Improves hazard reporting	1. Bence, H., & Rayson, P. (2000). Successfully Implementing a B-SAFE Behavioural Safety Program and Measuring the Success in Terms of a Pro-active Safety Culture. Tees Valley Business Awards 1998 - Category: The Safety Award Submission: 2. Cameron, I., & Duff, R. (2007). Use of performance measurement and goal setting to improve construction managers' focus on health and safety. Construction Management and Economics, 25(8), 869-881.
Improves corrective action completion	1. Duff, A. R., Robertson, I. T., Phillips, R. A., & Cooper, M. D. (1994). Improving safety by the modification of behaviour. Construction Management and Economics, 12(1), 67-78. 2. Bence, H., & Rayson, P. (2000). Successfully Implementing a B-SAFE Behavioural Safety Program and Measuring the Success in Terms of a Pro-active Safety Culture. Tees Valley Business Awards 1998 - Category: The Safety Award Submission:
Improves morale	1. Cooper, M. D., Phillips, R. A., Sutherland, V. J., & Makin, P. J. (1994). Reducing accidents using goal setting and feedback: A field study. Journal of occupational and organizational psychology, 67(3), 219-240. 2. Sulzer-Azaroff, B., & Lischeid, W. E. (1999). Assessing the quality of behavioral safety initiatives. Professional Safety, 44(4), 31. 3. Nelton, S. (1988). Motivating for success. Nation's Business, March, 18-26 4. Austin Burrow, A. S. (2017). A Look at Behavior-Based Safety Program Effectiveness: A Qualitative Study of Participants' Perceptions of Safety Program Effectiveness in a Bayer CropScience's Cottonseed Delinting Plant (Doctoral dissertation, Texas Tech University).
Improves communications between operatives & managers	1. Cameron, I., & Duff, R. (2007). A critical review of safety initiatives using goal setting and feedback. Construction Management and Economics, 25(5), 495-508. 2. Vidusha, R. S., Raghav, Y. S., Vaghasia, S., & Yadav, B. P. (2018). Correlating the factors of human error and Behavior-Based Safety using pareto analysis and BBS observation application. Advances in Fire and Process Safety, 271-289.
Provides returns on investment	1. Cooper, M.D. (2010). The Return on Investment of Behavior-Based Safety Processes. Italian Journal of Occupational Medicine and Ergonomics: Suppl. A Psychology, 32(1), pp A15-A17. 2. Jasiulewicz-Kaczmarek, M., Szwedzka, K., & Szczuka, M. (2015). Behaviour based intervention for occupational safety–case study. *Procedia manufacturing*, 3, 4876-4883.

Claims associated with Behavioral-Based Safety

Claims of solutions

- In static settings, designs that incorporate daily observations, focus on workgroup observations, and use participative goals with multiple feedback mechanisms will reduce injuries more than other designs.

- In dynamic settings (e.g. construction), one-on-one observations & conversations are more effective at reducing incidents/ injuries and changing behavior

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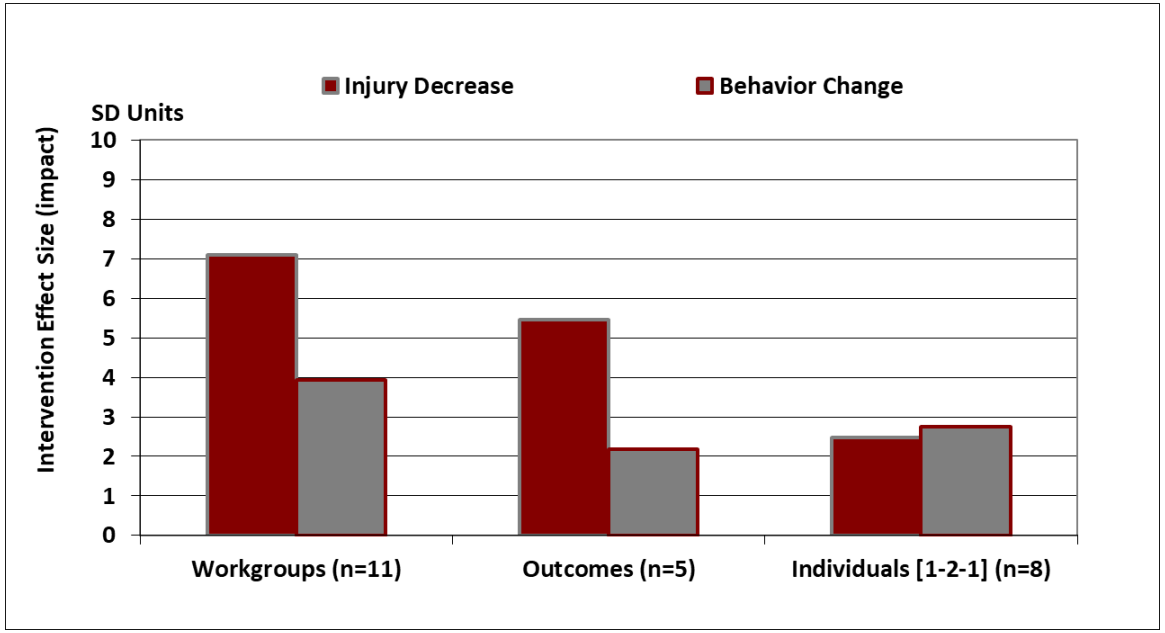
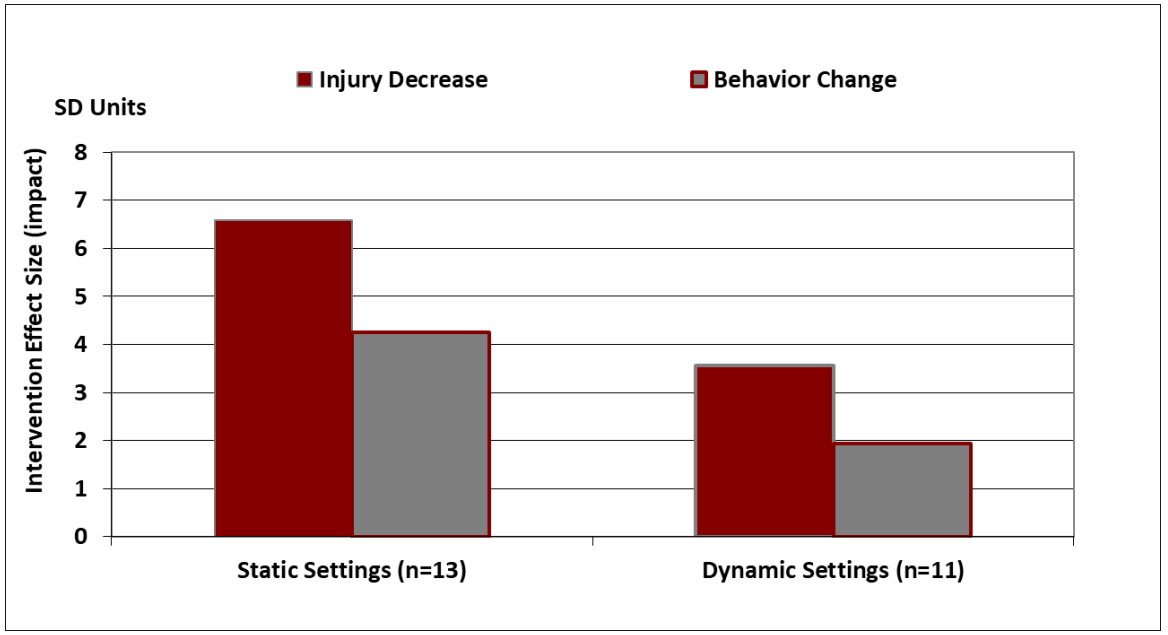
Evidence of claims of Solutions

Observation Focus



Implementation Setting



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Summary

Claims of

Facts about behavior-based safety are supported by a large evidence base

Understanding of the facts show a safety partnership between workers and managers is vital as problem behaviors and their precursors are addressed

Cause & effect show a systematic focus on behavior significantly reduces injuries

Worth show evidence-based

- reductions in injuries, unsafe conditions, and insurance premiums;
- improvements in safe behavior, hazard reporting, corrective action completion, morale, and worker - managerial communications.
- Significant returns on investment have also been realized

Solutions show that different BBS designs are required for different settings

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Questions?

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