INATTENTIONAL DEAFNESS

Experiment Overview



GOAL: Assess how well workers notice critical auditory changes while performing a task.

METHOD

Two high-risk sounds

(hissing or air horn) introduced at varying volumes and random intervals during an assembly task.

SAMPLE

136 students

enrolled in construction management and engineering courses, representing inexperienced construction professionals, randomly assigned to work individually or in pairs.

ANALYSIS

Detection rates analyzed using generalized linear mixed-effects models.

Key Results

Individuals working alone detected 58% of sounds.

Pairs detected 72% but underperformed probabilistic expectations of (84%).

Distinctive sounds (air horn) were detected more frequently than subtle sounds (hissing).

Fatigue, ADHD, and emotions showed no measurable effect on auditory change detection performance.



Implications

- Working in pairs **increases the likelihood of change detection** compared to working alone, but not as much as expected.
- Designing **distinctive alerts** may matter more than increasing loudness.
- No evidence was found that **human factors** influenced change detection rates.

Future Questions

- How do detection rates change when crews are under competing demands, distractions, or time pressure?
- What common sounds signal that a high-risk change has occurred?
- Which interventions sustain vigilance by improving detection of unpredictable changes across successive days on site?



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CHANGE BLINDNESS

Experiment Overview



GOAL: Measure how well workers visually detect site changes under controlled conditions.

METHOD

Participants completed a

flicker experiment

simulating construction changes of varying size, location, and risk.

SAMPLE

614 participants,

including inexperienced workers (students/green hats) and field professionals.

ANALYSIS

Detection performance modeled with signal detection theory and regression tests for demographics, experience, and cognitive traits.

Key Results

Average detection rate 74%

This is a best-case scenario when workers are hyper-focused on detecting changes.

- Age negatively related to detection skills.
- Experience positively related to detection skills.
- Workers that enjoy analytical thinking and tackling complicated cognitive activities were able to see more changes.
- ADHD, fatigue, and emotions showed no measurable effect.
- Participants downplayed the risk of changes they missed compared to changes they detected, especially when those changes occurred in peripheral vision.
- This discounting effect was more pronounced among experienced workers.

Implications

- Even at their most focused, workers **miss 1 in 4 changes**, suggesting detection rates are likely worse in real work settings.
- While **experience sharpens detection**, it can also **distort risk judgment** when changes are missed.
- People systematically **downplay the risk of changes they missed**, even when those changes are later pointed out.
- This pattern indicates that risk perception is shaped less by the objective hazard and more by whether **workers personally notice the change**.



Questions Raised

- How do detection rates shift when attention is divided across tasks, production goals, and external pressures?
- How do crew dynamics, including the mix of experience levels, influence whether blind spots are reduced or amplified?
- How does the source of feedback on an overlooked change affect workers' perception of risk?
- How can workers learn not to downplay missed risks?

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