Make Safety Habits By Finding Your Cues, Routines, and Rewards for Safety

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- ACS 1942-1984
- ICI Americas Research Scientist, Industrial Toxicology, Health & Environmental Affairs
- CHAS Founding Committee: Councilor, Awards Chair, CCS Liaison
- Delaware Section: Councilor, Chair (first woman), Secretary
  - Service award: Tillmanns-Skolnik Award
- Division of Chemical Information: Program Chair, Asst Secretary, Committee on Membership Chair
  - Herman Skonik, Leader; Achievement Award in his name
Eye injury from an explosion

- 1st year Grad student making 1 g diazonium perchlorate
- Explosion, Serious Injuries
- Working alone using metal spatula on open bench
- Wearing ordinary prescription (non-safety) glasses
- Explosion shattered glasses, fragments in cornea.
- Required eye surgery (no permanent damage); lacerations treated

1 The Safety Zone: More on the UC Berkeley Diazonium Explosion, Sept 15, 2015; Berkeley EHS Lessons Learned, May 2015; C&EN, Aug 24, 2015 (V93, #33, p.36)
Eye Injury from Explosion

• Graduate student not wearing safety glasses
• Did not follow SOP (signed documentation)
  • Work in hood
  • No metal spatula
  • Not working alone
• Corrective actions
  • ID hazards, use GHS “H” codes;
  • ID controls for high risk
  • Use of perchlorates requires PI’s written advance approval
Safety Ethics and Safety Culture

- Underlying (Root) Causes- Not reported but implied
- Student lacked safety knowledge; weak safety ethic
- “Systemic Failure” - Weak safety culture
- PI: How do we make safety “second nature”?
- “How can we make safety a habit?”

“\textit{It’s not to the student’s benefit if we restrict hypothesis- and curiosity-driven research. But we have to change the culture so that it’s second nature to always put on safety glasses and other PPE and to check the SOPs.}”

Grad Student’s PI
The Power of Habit: Why we do what we do in life and business. Charles Duhigg
The Habit Loop

• Most “choices” we make are not decisions but habits.
• Duke study: >40% of actions are habits (not decisions)
• Brain wants to reduce effort:
  • Encodes habits
  • Seeks to make any routine a habit, so it can ramp down
• Brain’s dependence on automatic routines can be dangerous
  • Does not recognize habits as “good” or “bad”
• Habits:
  • More automatic with time;
  • Never disappear, but can be ignored, changed, or replaced
THE HABIT LOOP

• Habit loop: 3 steps
  • CUE OR TRIGGER
  • ROUTINE OR ACTION
  • REWARD
• Cues: visual; thoughts sequences; emotion
• Routines: complex or simple
• Rewards: physical or emotional sensations

Cue: Time for break
Routine: Go to café for snack
Reward: Food, drink, chats
Creating or Changing Habits

- Creating new habits
  - Create a craving, need for new habit (neurological)
  - Find simple, obvious cue
  - Clearly define reward(s)

- Changing old habits
  - Don’t change cue or reward
  - Find alternate routine
  - Must believe change will make a difference (believing critical)
  - Does not mean this is easy; requires determination

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*Your beliefs become your thoughts, Your thoughts become your words, Your words become your actions, Your actions become your habits, Your habits become your values, Your values become your destiny.*

Mahatma Gandhi
MAKING SAFETY A HABIT

• Teaching Labs - Rules
  • CUE: Entry to lab
  • ROUTINE: Wearing safety eyeware, closed toed shoes, no shorts, no short skirts, no mid-drifts, tied up hair,..... Etc.
  • REWARD: Allowed to do lab exercises; Completing lab for grade; Not being injured
Making Safety A Habit

• Researchers, Independent Lab Workers Need:
  • More than rules
  • To know WHY!
  • To care about safety beyond basic PPE
  • To understand safety principles, practices
  • To work in a strong, positive safety culture - where safety is continually reinforced by PIs, supervisors, managers
  • To build good safety habits
Making Safety A Habit

• Safety glasses
  • Cue: Box of glasses w/ names at lab entrance
  • Routine: Put them on when entering lab
  • Reward: Keeping themselves safe; following desires/requirements of leaders?

• Lab Coats
  • Cue: Lab coats w/ names at lab entrance
  • Routine: Put them on when entering lab
  • Reward: Keeping themselves safe; following desires/requirements of leaders?
Making Safety a Habit

• Lab air flow
  • Enter lab (cue); Check air flow (routine); Safe entry (reward)

• Using a hood or BSC
  • See hood (cue); Check air flow (routine); Safe for use (reward)

• Walk around lab
  • First daily entry into lab (cue); Check to ensure all is okay (routine); Safe to work (reward)
R.A.M.P. Up for Safety

Four Principles of Safety
- **Recognize** hazards
- **Assess** the risks of hazards
- **Minimize** the risks of hazards
- **Prepare** for emergencies

R.A.M.P. Up for Safety

• Discuss applying to their lab work
  • Recognize hazards
    • Specific hazards; Understand all hazardous properties
  • Assess the risk of hazards
    • Potential exposure; Consequences
  • Minimize the risks of hazards
    • Controls, practices prevent exposures
  • Prepare for emergencies
    • Need to know how you will respond before emergencies happen
R.A.M.P Up for Safety

• **Cue:** Open lab notebook

• **Routine:**
  • Write RAMP in lab notebook daily
  • Circle one letter
  • Add notes about RAMP

• **Reward:** Maintains safety at forefront

RAMP
Et$_2$O: peroxides, flammable
HNO$_3$: corrosive, oxidizer
Liquid N$_2$: cryogen; potential asphyxiant
Safety Habits for Principal Investigators

• One-on-one discussions with students/lab investigators about safety
  • Initially (expectations) [Meeting: cue]
  • Appoint mentors to 1st year students/new investigators
  • At least monthly (combine w/ research updates) [Meeting: cue]

• Demonstrate their safety is important
  • Walk arounds wearing appropriate PPE
  • Checking status of research and safety
  • Observe
  • Talk about RAMP
Safety Habits for Principal Investigators

- Have safety moments at every group meeting [cue]
  - Preassigned or impromptu
  - Discuss specific hazards, risk assessments, safety measures,
    - Discuss incidents, direct & root causes, preventive measures
- Seminars/reports (cue)
  - Safety informational moments integral at beginning (students, visiting speakers)
- Rotate safety assignments (timing cue)
  - To mentor others
  - Safety representative to safety committees
Building Caring Safety Attitudes, Cultures

- Positive attitude about safety
- Developing good safety habits
- Changing habits that devalue safety
- Continuous safety education builds knowledge, caring for safety
- Continuous reinforcement from leaders with expectations, guidance, discussions, requirements for safety
- Actively considering safety in all work
Making Safety A Habit

**MAKING SAFETY HABITS**
- Helps incorporate safety into daily routine
- Keeps safety at the forefront
- Keeps us and others safe
- Builds Strong Safety Cultures

“We are what we repeatedly do. Excellence, then, is not an act, but a habit.”

Aristotle