



EAST for Health & Safety

Applying behavioural insights
to make workplaces safer

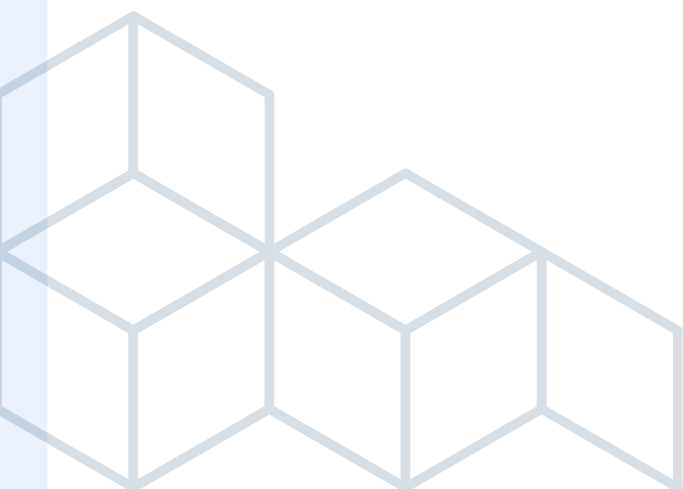
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THE
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Executive Summary

The EAST framework focuses on four simple principles to encourage a behaviour: make it **Easy, Attractive, Social and Timely** (EAST). This version of EAST focuses on how the behavioural insights approach can help keep people safe when they are at work. This field of health and safety in the workplace is often referred to as occupational safety and health (OSH).

The original EAST framework was published in 2014. Since then we have received feedback from many policy makers and practitioners that they find it useful to have a simple, memorable framework to think about effective approaches to influence individual behaviours. We think it can have an impact in making our workplaces safer. Therefore, this document tailors the EAST framework to examples and thinking on OSH.



The principles from EAST are:

1. Make it Easy

- **Design for safety with defaults.** We have a strong tendency to go with the default or pre-set option, since it is easy to do so. Design workplaces and processes so that safe behaviour is the default, with no additional action required.
- **Reduce the 'hassle factor' of performing a task safely.** Even small effort to perform an action can put people off. Reducing the effort required to follow a procedure safely can increase how many people do so (and vice versa to discourage unsafe behaviour).
- **Simplify procedures, forms and other written messages.** Making the message or procedure clear and simple often results in a significant increase in compliance. Given the focus on written procedures in promoting safe behaviours, it is useful to think about how procedures can be shortened and simplified.

Example: Increasing hassle to reduce unsafe behaviour

Deaths from paracetamol poisoning fell by **43%** when legislation reduced the maximum number of pills allowed in a pack. The reduction in pack size meant slightly more effort was required to access a large number of pills.

2. Make it Attractive

- **Attract attention.** We are more likely to do something that our attention is drawn towards. Ways of doing this include the use of personalisation, colours, signs, and markings.
- **Frame the message for maximum effect.** The way information is framed can influence our decisions. Safety campaigns often make use of framing (such as calling attention to the consequences of unsafe behaviour), but these messages' impact on behaviour are rarely tested. Safety practitioners should test different frames to see which have the most influence on behaviour.

Example: Making nudges culturally meaningful

Adding a series of gold coin stickers, a symbol of good fortune, to the floor of a Chinese garment factory reduced the amount of waste thrown on the floor by **20%**.



3. Make it Social

- **Show that most people perform the desired behaviour.** Describing what most people do in a particular situation encourages others to do the same.
- **Use the power of networks.** Workplaces consist of a variety of networks, and what our colleagues do or say can shape our own behaviour. Harnessing networks to spread behaviours can be effective, as can selecting influential messengers.
- **Introduce opportunities for employees to participate in decision making.** Employees are more engaged when they can participate in decisions. Organisations should encourage employee participation as a way of building a collective commitment to safety.

Example: Using social norms and networks to reduce accident rates

Informing safety managers via email that their organisation had an accident rate that was higher than the sector average reduced accident rates in the short term. Sending employees safety information about their workplace had a larger and longer-lasting impact compared to the manager emails.



4. Make it Timely

- **Prompt people when they are likely to be receptive.** The same information given at different times can have drastically different levels of success. Behaviour is generally easier to change when habits are already disrupted, for instance, around events like the closing of a plant for maintenance.
- **Help people plan to reach their goals.** It can be easier to achieve complex goals if they are broken down into more manageable chunks. Another strategy is to have people identify any barriers they are likely to encounter, and then plan how to overcome them.
- **Provide feedback to encourage change.** Feedback is central to how we learn. Giving employees feedback on their behaviour can help them understand how they are performing (which is not always obvious) and gives them an opportunity to adjust their behaviour.

Example: Prompting passengers to speak up for road safety

Using stickers in public minibuses to encourage passengers to speak up against unsafe driving reduced the number of insurance claims from minibuses by **25-33%** and was associated with lower average speeds for minibuses.

Many of the ideas presented in the EAST framework will be familiar to OSH specialists. However, context matters and even ideas based on the best evidence can backfire. Testing ensures that we continue to learn what works in different circumstances and helps to maximise impact. Finding creative ways to measure success presents an excellent opportunity for the public, private and academic sectors to collaborate to find scalable solutions to increasing workplace safety.

We hope regulators, OSH specialists, and front line managers find our EAST framework useful as they strive to create safer workplaces. If you would like to discuss any of the ideas or examples presented here further, please get in touch with us at info@bi.team.



Introduction

If you want to encourage a behaviour, make it Easy, Attractive, Social and Timely (EAST). It is five years since the original EAST framework was published. In that time, the framework has been downloaded and shared tens of thousands of times as an introduction to applying behavioural insights to policy challenges.

This paper narrows the scope of the original EAST to focus on occupational safety and health (OSH). OSH is a crucial issue across a range of industries, but it is especially important where staff work in potentially dangerous environments such as warehouses and factories. According to the International Labour Organisation, workplace accidents cause millions of injuries and hundreds of thousands of deaths each year.¹ Ensuring that our workplaces are as safe as they can be for workers is a shared priority among governments, regulators and private sector companies.

Good occupational safety is about organisations taking “reasonable steps to prevent accidents or harm to your employees”.² Using behavioural insights to design OSH interventions recognises that our environment influences the way we behave. Therefore, we can apply what we know from behavioural insights and the study of human behaviour to encourage behaviour change. From large disasters like the Deepwater Horizon oil spill³ to false alarms such as when a text message warning of an incoming missile attack went out to all Hawaiians,⁴ the actions and decisions of people operating systems and machinery are key to keeping us and our surroundings safe.

This updated version of the EAST framework complements the existing focus on safety behaviours and human factors by applying what we know about decision making from the behavioural sciences to OSH. EAST is, by design, a simplified model aimed at helping practitioners think about how they can apply behavioural insights to OSH challenges. Behaviour change is complex⁵ and much OSH research has focused on the role of awareness,⁶ motivation,⁷ leadership,⁸ safety culture⁹ and safety climate¹⁰ on safe behaviour in the workplace. This guide does not address the influence of all these factors on behaviour. Instead, the EAST framework focuses on presenting well evidenced and practical solutions to changing individual behaviours.

Many of the ideas in this report will be familiar to OSH experts. Initiatives such as Human Factors and Behavioural Based Safety programmes have increased the focus on encouraging safe behaviours in the workplace.¹¹ One difference in our approach is our focus on rigorous testing of new initiatives. In organisational settings, where projects may be influencing both individual and group behaviour, it is even more important to understand the context of the behaviour and to test that interventions have the desired effect. We strongly believe that incorporating testing into OSH projects is key to making them more effective.

The examples in this report are taken directly from OSH as well as from the broader behavioural science literature (such as from road safety). Several of the studies use creative ways to evaluate behaviour change interventions in workplace settings. We hope it can inspire practitioners to consider how they can evaluate safety initiatives in their workplaces. This document is structured in the same way as the original EAST, with one section for each part of the EAST framework (make it Easy, Attractive, Social and Timely), followed by a section on testing and evaluation.



1. Make it Easy

There are several aspects of work in a warehouse or on a production site that contribute to what behavioural scientists call our cognitive bandwidth: our capacity to process information and make informed decisions. Having too many tasks and decisions can lead to omissions and errors. For example, firefighters often forget to put on their seatbelt when they are on their way to a fire. It is one of the leading causes of death for firefighters. Firefighters generally wear seatbelts in their daily lives. Yet on the way to a fire, they focus on preparing for the rescue. In doing so, they block out all other tasks, including putting on a seatbelt.¹²

Having limited cognitive bandwidth makes it harder to focus on following procedures and interpreting information. For example, a meta-analysis found that more complex cognitive demands in the workplace explained the largest variance in unsafe workplace behaviours.¹³ Exhaustion, both emotional and physical, also influence behaviour in the workplace. Burnout and stress are correlated with accidents for both bus drivers¹⁴ and doctors.¹⁵ Research in the maritime industry also found a correlation between workplace accidents and fatigue arising from shift work.¹⁶

OSH initiatives are often designed to push people towards reasoned and deliberative thinking, such as focusing on getting operators to follow specific operational guidelines. However, that is not necessarily the most effective way to get people to behave safely.¹⁷ Many workplace injuries or near misses are driven by the daily frustrations of time pressure, workarounds, or having many tasks to consider at once, among others.¹⁸ Therefore, the first principle is to consider how to make it easier for people to behave safely. Some ways to 'make it easy' include:

- Design for safety with defaults
- Reduce the 'hassle factor' of performing a task safely
- Simplify procedures, forms and other written messages

1.1 Design for safety with defaults

We have a strong tendency to stick with the default option. Thus, one of the most effective ways to increase safe behaviour is to ensure workplace equipment, technology and processes are designed with safe behaviour as the default. For example:

- Machinery is often designed so that, by default, people are not exposed to hazardous moving parts. For example, industrial mixers are designed so they cannot be started until safety covers are in place.¹⁹
- Workplaces with noisy machinery can be made quieter by fitting sound insulating hoods over the machinery. Better still would be to select inherently quieter machinery. Both are better choices than trying to get everyone to wear ear plugs.²⁰
- Meters can be positioned at a height and angle so that staff do not have to stand in dangerous or strained positions to read them (also known as ergonomic design).²¹

While these examples have not always been evaluated to see if they impact behaviour or injury rates, they exemplify the thinking behind designing for safety by using defaults. Designing for safety as a default is effective because it makes it very easy to behave safely: no action is required.²²



1.2 Reducing the ‘hassle factor’ of performing the task

Reducing ‘friction’ associated with an action can encourage more people to follow through. Behavioural science has shown that small hassles can have disproportionately large impacts on our behaviour. For example, in one BIT project, removing one click from the process of filing a tax return increased the number of people who filed their returns on time by 20%.²³

In OSH, complicated safety procedures may make people less likely to follow through with the procedure as people end up taking short cuts.²⁴ Sometimes, procedures are unintentionally cumbersome: one study cited a workplace safety checklist with over 100 items on it for a task. This resulted in staff photocopying checklists that had already been filled in for other purposes as it was too long to go through the checklist again.²⁵ Excessive bureaucracy has also frequently shown up in analysis reports of what went wrong during accidents or near misses.²⁶ Even small frictions can discourage safe behaviour, such as having to walk to another part of the site to retrieve the correct personal protective equipment.²⁷

Just as reducing friction can encourage safe behaviour, adding friction can discourage unsafe behaviour. There are several examples of how adding friction to a process has influenced people to behave in a safer way. For example, deaths from paracetamol poisoning fell by 43% when legislation reduced the maximum number of pills allowed in a pack. The reduction in pack size meant slightly more effort was required to access a large number of pills. This resulted in 765 fewer deaths between 1998 and 2009.²⁸

Redesigning systems to encourage safe behaviour (or discourage unsafe behaviour) does not need to be costly: for a start, OSH specialists can try going through the process themselves to see if they can identify unnecessary frictions directly. They should also consult those who work with the process for their insights and try to observe the process in action.

1.3 Simplify procedures, forms and other written messages

OSH teams use written procedures, guidelines and checklists to communicate how to perform operational processes and maintenance work in a safe and efficient manner. How easily these documents are to read and understand can have an impact on whether or not people follow them.²⁹ BIT has found that simplification can have a significant impact on several types of behaviours. For example, a BIT project found that simplifying the prescription forms used in hospitals significantly reduced prescribing errors.³⁰



Several key lessons have emerged from BIT's simplification work in both the public and private sectors. These lessons are also applicable to OSH:

- **Keep language simple and avoid jargon.** For example, safety specialists often refer to safety 'incidents,' when referring to a situation that could have led to an accident or injury.³¹ Some people may not understand what is meant by 'incident,' or they may interpret it in a way that is different from the way it is used by OSH specialists. Using more descriptive terms, such as injury or property damage, could increase understanding.³²
- **Be specific about recommended actions.** For example, unclear guidelines about lubrication for an airplane part were one factor in an Alaskan Airlines plane crash in 2000. The mechanic who performed the maintenance before the crash said it took him 'about an hour' whereas the airplane manufacturer stated that the task should take 'around 4.5 hours.'³³
- **Remove information that is not absolutely necessary for performing the action.** For example, modern cockpits focus on how to present relevant information to pilots only when needed, rather than presenting as much information as possible.³⁴
- **Make sure that the key message is presented early, ideally in the first sentence or subject line.** For example, many occupational safety processes are presented as written, step-by-step procedures. Given that people are more likely to recall things that occur at the beginning and end of a list or message it is important to put key messages first.

Checklists are often used in OSH to distil complex information about how to perform a task and to remind people of key safety steps.³⁵ The effectiveness of checklists in reducing errors has been widely reported, particularly in medical settings such as operating rooms.³⁶ However, recent studies have reported on some limitations to the use of checklists (see Box 1).³⁷

Overall, it is unclear if checklists themselves are the key to reducing errors, or if it is the combination of checklists with broader programmes of quality improvement and staff participation that make a difference.³⁸ It is also unclear if checklists work as well on individual behaviour as they do with team behaviour. For instance, a key surgery checklist item is that everyone in the team introduces themselves, their role and key steps of the procedure. It may be that checklists work better in group situations because it encourages people to speak up if the group deviates from the task.³⁹

Box 1: Using checklists in food inspections

A natural experiment in the US found that using a checklist instead of a free text box to record safety violations did not have any impact on inspector behaviour: it did not change the amount of violations that inspectors recorded.⁴⁰

The authors hypothesise that the change to a checklist may not have had any effect because it was not implemented with any other quality initiatives. An alternative explanation is that checklists are not effective in all situations. This emphasises the importance of testing interventions to see that they are having an impact.

2. Make it Attractive

Habituation, or repeated exposure to the same task, can make us more prone to mistakes or shortcuts.⁴¹ This is because we are hard-wired to respond to things when they are novel, simple and accessible, and to tune things out that are more of the same. This means that if we want to encourage a particular safety behaviour, we need to capture people's attention.

Sometimes capturing our attention is relatively intuitive (for instance, using colours to make text stand out). Sometimes, it can be a more sophisticated reframing (such as saying a product is 90% fat free instead of 10% fat).⁴² Fundamentally, the goal is to draw our attention to something and then to make it more appealing for us to follow through.

There are two primary ways that OSH can make safety behaviour more attractive:

- Attract attention
- Frame the message for maximum effect

2.1 Attract attention

Safety specialists are already well aware of the need to attract attention to hazards: they use signs to alert drivers to traffic dangers, universal symbols to warn of hazardous substances and alarm systems to sound when something has gone awry. However, even here, better evaluation can upend accepted approaches. For example, fire trucks continue to be painted red even though in at least one study trucks painted bright yellow or green were found to have fewer visibility-related accidents.⁴³

We have found several evaluated examples of strategies to attract attention:

- **Personalisation:** adding an image of the recipient's car in letters to people who had not paid their vehicle tax increased payment rates compared to a control which did not include an image.⁴⁴
- **Colour:** Cyclists wearing high visibility jackets had a lower rate of accidents involving other vehicles (see Box 2).⁴⁵
- **Signs and markings:** Having markings on the floor of hospital operating rooms (indicating where equipment should be positioned) increased compliance with hospital guidelines on where equipment should be placed during surgery.⁴⁶
- **Clear call to action.** Green footprints leading to bins decreased littering. Experiments in both Denmark (handing out sweets both with and without the footprints)⁴⁷ and the UK (putting footprints at parks and retail sites)⁴⁸ found that people littered significantly less when footprints guided them to the bins.

While the above are all good ideas, we would encourage OSH specialists to test to see which strategies work best (and in a cost effective manner) in their workplaces.



Box 2: Avoiding accidents with high visibility jackets

An RCT in Denmark found that accidents between cyclists and other vehicles fell significantly when cyclists wore high visibility jackets.⁴⁹

However, the study reveals some of the issues with collecting data and measuring safe behaviour. The data on accidents was self-reported, which means participants were asked to report accidents via a monthly online questionnaire. In addition, participants knew what the purpose of the study was and whether they were in the treatment or control group (referred to as a non-blinded study).

This seems to have resulted in reporting biases. For example, the authors found that the treatment group reported a lower rate of solo accidents (accidents on their own bike that only affected them) than the control group. This discrepancy indicates a response bias in the treatment group's reporting, as the high visibility jackets should not impact the rate of solo accidents. The authors hypothesised that participants in the treatment group, perhaps supportive of safety regulations and wanting the study to succeed, systematically underreported accidents compared to the control.

The authors adjusted for this potential bias in reporting by adjusting the control group's overall accident rate downwards in proportion to the treatment group.⁵⁰ With this adjustment, the authors still found that the treatment group had a lower accident rate than the control.

Figure 1:
High visibility jacket



2.2 Frame the message for maximum effect

The way information is framed can influence our decisions.⁵¹ For example, when treatments are framed in terms of survival rates rather than death rates, doctors are more likely to recommend them and patients are more likely to choose them. Doctors treat a 40% chance of survival differently to a 60% chance of dying when no actual difference exists in the underlying rate.⁵²

Safety specialists often use framing in their campaigns, such as highlighting the consequences of unsafe behaviour or making safe behaviour personally meaningful. For example, road safety adverts often draw attention to the personal toll of accidents. However, the impact of these frames on safety behaviour tends not to be rigorously evaluated (see Section 5: Testing what works). Below are examples of different ways that safety specialists could frame safety messages and test which ones work best:

- **Highlight (future) consequences.** We tend to disproportionately value present costs and benefits over those in the future.⁵³ This is because the present is tangible but the future is abstract and hypothetical.⁵⁴ For example, firms may perform less preventative maintenance than they should on machines operating at full capacity, because this has high upfront costs and the benefits are long term. One way to combat present bias and encourage people to behave in their long term interest is to highlight future consequences. For example, a quasi-experimental study of safety behaviour found indicative evidence that giving front line operators personalised and salient information on their potential for hearing loss increased the number of operators who wore ear protection at work.⁵⁵

- Consider a loss or gain frame.** The same message can be framed as a gain or as a loss. For example, the risk associated with a surgical procedure can be described as a survival rate or death rate. There is substantial evidence from behavioural science that we feel financial losses more strongly than we feel equivalent gains.⁵⁶ A field experiment at an electronics manufacturer in China found that when worker bonus payments were framed as a loss, meaning the maximum bonus was given at the start of each week and withdrawn if targets were not met, productivity increased when compared to the traditional bonus scheme (with bonus paid at the end of the week if targets were met).⁵⁷ In public health messaging, loss-framing has been found to be effective when the behaviour you want to encourage involves early detection, such as encouraging people to go for cancer or HIV screenings.⁵⁸ By contrast, gain-framing has been found to be more effective in increasing preventive behaviours, such as physical activity.⁵⁹ This highlights the importance of further testing in OSH on the effectiveness of different frames.
- Make it meaningful.** Many OSH initiatives focus on making safety behaviours meaningful. Sometimes this can take the form of highlighting future consequences, such as the personal consequences of an injury (for example, not being able to play catch with your kids if you have a hand injury.) But safety nudges can also have social or cultural meaning. A study from China found that placing a gold coin sticker on the floor next to operators along a production line significantly reduced littering. The researchers found that this was because operators felt the coins were a gift of good luck from management and did not want to cover them with waste (see Box 3).

Box 3: Encouraging safe behaviour with a meaningful nudge

A garment factory in China had issues with workers dropping cloth scraps on the floor near their machines. Throwing cloth on the floor saved workers time in the short run, but it increased the risk of accidents in the long run (and meant the company spent longer at the end of a shift cleaning up, reducing overall productivity).

Managers tried several initiatives to stop the scraps ending up on the floor:

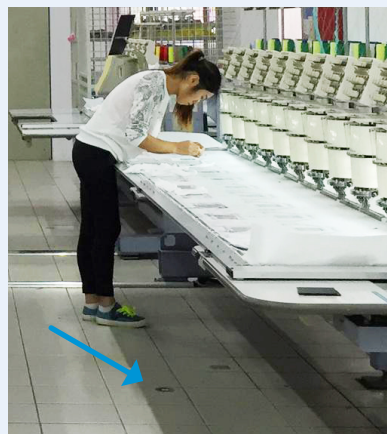
- Each worker had their own bin within a few steps
- Management rang a bell regularly to remind workers to clean up their waste
- Workers who did not keep their work area clean were fined (equivalent to 2% of their monthly salary)

A team of researchers tested placing gold coin stickers on the floor next to the workers and measured the impact this had on scraps thrown on the floor. The team used a gold coin sticker as these coins are a sign of good fortune and luck in China.

Adding the sticker reduced waste on the floor by an average of 20% (a statistically significant reduction) when the coin stickers were first put on the floor.

Interestingly, the trial was designed so that the coins were removed and reapplied at various points during the study. The significant 20% reduction became insignificant when the stickers were removed and then put back in place. One explanation could be that the novelty of the nudges wore off over time; however, the authors found that workers were similarly responsive to the coins after seeing them for the first time for 20 or 40 days. The authors interviewed study participants and found that it was the removal and reapplication of the coin that changed responsiveness levels: the unexplained removal of the coins changed their meaning from a symbol for good luck to just another sticker.⁶⁰

Figure 2: Gold coin



3. Make it Social

The actions of those around us have a large influence on our own behaviours. We reduce our energy consumption when we know that others in similar households use less energy than we do.⁶¹ We are more likely to wear a helmet when cycling if everyone around us is also wearing one.⁶²

Paying more attention to the social influences and networks in workplaces could help improve safety programmes. Knowing how social norms and networks affect behaviour can help safety specialists design more effective interventions and understand pitfalls to avoid. To incorporate social factors, safety specialists should:

- Show that most people perform the desired behaviour
- Use the power of networks
- Introduce opportunities for employees to participate in decision-making

3.1 Show that most people perform the desired behaviour

Social norms are the values, actions and expectations of a particular society or group. Social norms offer (often implicit) guides to our behaviour.⁶³ Descriptive norms are statements that describe what most people are doing.⁶⁴ If you are told what most people are doing, and it turns out this behaviour is more common than you expected it to be, then this can encourage you to shift your behaviour towards what others are doing. For example, letting university students know how much alcohol their peers are actually drinking has been found to reduce (self-reported) drinking among students if this amount is lower than what students expected.⁶⁵

Using descriptive norms (letting people know what most others are doing) has been effective at encouraging many types of behaviour.⁶⁶ There are also examples from OSH:

- A large-scale RCT in Chile found that informing the safety managers at small firms that they had higher than average accident rates lowered the number of accidents at those firms (see Box 4).
- A survey of farmers in Colombia found that farmers' use of protective equipment was influenced by their perceptions of others' behaviour.⁶⁷



Box 4: Using social norms to reduce accident rates

The Chilean Safety Association visits each of its small and medium sized industrial clients once a year to conduct a safety assessment. Following each assessment, the Association produces a non-mandatory prevention plan of approximately 20 pages for the firm.

The Association partnered with researchers to test the effect of sending follow-up emails to Association members after their assessment to see if this could have an impact on accident rates.

The emails were sent to the firm's safety manager, and included one of three treatment messages:

- **Simplification:** a simplified version of the firm prevention plan produced following the Assessment (reduced a 20 page document into a simple checklist)
- **Monetisation:** a translation of firm accident record into monetary costs (calculated based on expected effects on insurance premiums)
- **Social norms:** a graph comparing the firm's accident rate to the average accident rate in the firm's sector

The researchers measured the impact of these emails on accident rates following the intervention. The only email found to have a statistically significant effect on reducing accident rates was the social norms email. This reduced accident rates in the two months following the intervention. Firms who had accident rates above the sector average drove this effect. The letter did not affect firms who had accident rates below the sector average.⁶⁸

Note that if you want to discourage a particular behaviour, letting people know that the behaviour is more common than they assumed may increase the likelihood that they engage in that behaviour (see Box 5).

Box 5: When social norms backfire

Safety specialists should be wary of inadvertently reinforcing a negative social norm by emphasising the prevalence of an undesirable behaviour. In a desire to highlight important issues, people can sometimes inadvertently communicate that an unsafe behaviour is widespread. This signals to people that, even if we don't like or approve of the behaviour, lots of other people are doing it. The result can be that more people engage in that unsafe behaviour.⁶⁹

For instance, sites should be careful when using signs that communicate the number of days since the last injury or near miss. These signs can convey a positive social norm if injury rates are low; however they may inadvertently advertise that injuries and near misses are commonplace.



3.2 Use the power of networks

The influence of those around us is particularly relevant in workplace settings. When looking to change behaviour at work, it is important to consider how relationships between employees influence individual behaviours. For example, measures of a firm's safety climate (employees' perception of the company's safety practices) correlate with individual safety behaviours (such as wearing protective equipment and/or engaging in voluntary activities such as attending meetings).⁷⁰ As people take their cues from the behaviour of those around them, this means changing individual behaviour can influence the rest of the workforce.⁷¹ Tapping into existing networks within an organisation can also help spread new behaviours across groups.

One example of tapping into organisational networks comes from the earlier mentioned Chilean email study (see Box 4). In the study, the researchers conducted a second study focused on communicating safety norms directly with workers rather than sending emails to the safety manager. This second trial had a longer term impact. It significantly lowered accident rates for firms 12 months after the intervention (see Box 6).

Box 6: Using employee networks to reduce accident rates

Researchers working with the Chilean Safety Association randomly selected a subset of firms from the email trial discussed in Box 4 to be part of a second experiment on communicating safety information directly with workers.

The researchers sent a package of 20 pamphlets to treatment firms, with a cover letter specifying that the pamphlets should be distributed to employees. The pamphlet was personalised to the firm, and included specific information on work hazards based on the Chilean Safety Association's annual assessment. The pamphlets were mailed out within one month of the Association's visit to the firm.

Firms who received the pamphlets saw accident rates fall by an average of 15% over the 12 months of the study.⁷² The authors suggest that this points to the potential benefits to safety from overcoming information barriers between management and frontline employees. Providing safety information from an outside expert directly to employees may be one way to overcome those barriers.

Along the same lines, the messenger of information can heavily influence the information's perceived credibility. Sometimes we find experts or a person with informal authority most credible, but peers can also be effective messengers. OSH specialists should consider that they themselves may not always be the most effective messengers for conveying safety information. For instance, messages endorsed by senior managers can be effective. In a non-safety context, BIT found that getting a personalised email from the CEO more than doubled the rate at which investment bankers donated a day's salary to charity.⁷³



3.3 Introduce opportunities for employees to participate in decision making

When looking to change behaviour in a work setting, it is not enough to address each person's behaviour individually. For change to last, the group as a whole needs to reinforce the changes in behaviour. Participation from employees – from sharing views in meetings to designing processes – is a good way to change group behaviour collectively.⁷⁴ For example, a field experiment introduced one 'participatory' meeting to a random selection of teams at a clothing manufacturer in China. During the once-a-week participatory meeting, employees were encouraged to speak up and share their experiences. This participatory meeting replaced the regular team meeting led by the supervisor (which continued to be held on the other days of the week). After six weeks, teams that had the participatory meetings saw an average increase of 10.6% in worker productivity.⁷⁵

Employee participation is part of many OSH programmes.⁷⁶ The Health and Safety Executive in the UK has found that employee participation in identifying safety hazards and determining control measures is correlated with good safety performance.⁷⁷ To this end, regulators around the world have mandated the use of Safety Committees with representation from workers and management to identify OSH issues that require attention.⁷⁸ Several studies have found that employee participation on Safety Committees is correlated with an increase in safety behaviours⁷⁹ and a reduction in accident and injury rates,⁸⁰ but that the empowerment of the Committee is key to its success⁸¹ (see Box 7).

Box 7: Measuring the effectiveness of Safety Committees in Bangladesh

Researchers worked with a large apparel manufacturer in Bangladesh to measure the impact of more focused training, monitoring and activities for Safety Committees on safety behaviours and safety compliance.⁸²

Bangladeshi law requires that all sites have Safety Committees, but the enforcement and effectiveness of these committees is mixed. The researchers in this experiment (a randomised controlled trial) randomly assigned half of the apparel manufacturer's sites to receive more focused training and monitoring of specific safety activities, such as conducting risk assessments.

The study found that the sites who received the Safety Committee training and monitoring increased their compliance with regulation and increased the frequency of key safety behaviours such as regular risk assessments and the rate of wearing protective equipment compared to the control sites in the short term. The study is still running and long-term impacts have yet to be published.⁸³

Preliminary analysis suggests that sites implementing Safety Committee training saw a negative impact on job satisfaction and absenteeism in the short run, as measured by a reduction in referrals of family or friends to jobs at the factory and by workers who report they are considering leaving the job for safety related reasons. The authors speculate that this could be due to making safety-related issues more salient.

4. Make it Timely

When we prompt people can influence how likely they are to follow through. Safety specialists can use findings from behavioural science to help people follow through on their intentions (through better planning) as well as reinforce a safe behaviour once someone followed through (through feedback). Safety specialists can make safety programmes timely in three ways:

- Prompt people when they are likely to be most receptive
- Help people plan their response to events
- Provide feedback to encourage behaviour

4.1 Prompt people when they are likely to be most receptive

The timing of a message can drastically change the level of its success. For example:

- **Prompting passengers to speak up for road safety:** A large-scale randomised trial in Kenya put stickers with emotive messages in minibuses to increase safe driving. The stickers had emotive messages to encourage people to speak up if the driver was driving unsafely. The study found that the stickers reduced the number of insurance claims made by minibuses by 25-33% and were associated with lower average speeds (see Box 8).⁸⁴
- **Timely hygiene reminders:** Telling people to wash their hands straight after using the toilet made them more likely to wash their hands. The study was conducted in motorway service stations and measured the amount of soap dispensed. The most effective messages increased the amount of soap used by 12%.⁸⁵
- **Warn workers when they face a hazard:** Some construction sites in Hong Kong have started using location-based data to warn workers when they are approaching a hazardous area. The construction site is recreated in virtual reality. Both the workers and the site's equipment carry trackers (installed on helmets for workers) that send location information back to the virtual site. The trackers warn workers if they are approaching a hazard, such as a drop or a hole. As information is updated in real time, the tracker also alerts workers if they are near new hazards, such as the path of a crane boom.⁸⁶

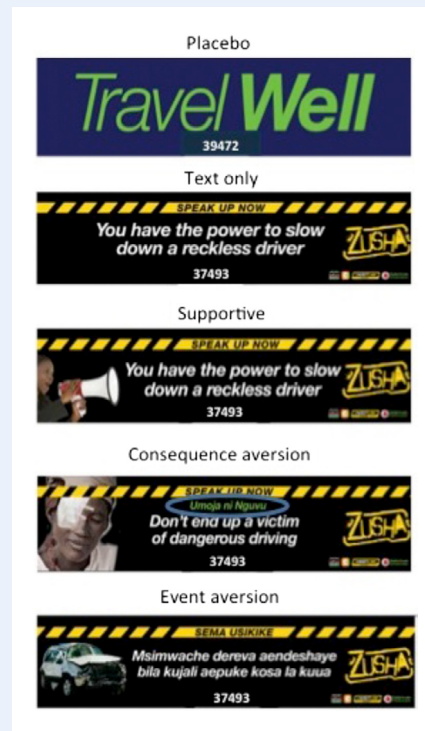
Box 8: Prompting passengers to speak up for road safety in Kenya

Thousands of Kenyans die in road traffic accidents each year, many of them as a result of unsafe forms of public transportation.⁸⁷ Researchers ran a randomised trial across 12,000 minibuses (known as 'matatus'), one of Kenya's most common forms of public transport. The trial tested the effectiveness of placing stickers with different types of messages encouraging passengers to speak up against bad driving. The study found that the stickers reduced the number of insurance claims made by minibuses by 25-33% and were associated with lower average and maximum speeds.⁸⁸

The study included nine treatment groups and one control group (which had a 'Travel Well' placebo sticker with no call to action). Four different messages were tested (Text only, Supportive, Consequence aversion & Event aversion) and two versions of each message were tested: individual and 'collective action'. In the collective action version, the phrase "Umoja ni nguvu", roughly translating to "Together we can", was added in green to the sticker. The collective action stickers had larger impacts on lowering insurance claims and average speeds than individual action messages.

In addition to the sticker campaign, the researchers also evaluated the impact of five, one-week road safety radio campaigns. Effectiveness was measured by comparing insurance claims in the regions exposed to the radio campaigns against insurance claims in a region geographically very far from where the campaigns were aired. The evaluation found no evidence that radio campaigns had any impact on insurance claims.

Figure 3: Stickers used in experiment



Another consideration is that we are more likely to change our habits and behaviours at key moments of change in our lives.⁸⁹ For example, a BIT trial in the US found that households were four times more likely to sign up for a bike share programme when they were sent information after a recent move, compared to those who were sent information after a bike station was built near their home.⁹⁰ In OSH, moments of change may include the introduction of new machinery, the shutting down of a plant for maintenance (known as a turnaround) or a change in shift schedules.

4.2 Help people plan their response to events

In the workplace, setting challenging and specific goals has been shown to have a positive impact on performance.⁹¹ Many organisations have goals around OSH, including initiatives focused on eliminating accidents and injuries (often known as zero accidents or zero harm).⁹²

When you have a complex goal such as zero accidents, it can be especially useful to break it down into simpler, concrete actions. This is based on the insight that it is easier to affect change through simple steps and that we learn by using simple 'chunks' of information.⁹³ The Japanese practice of *shisa-kosho*, or pointing and calling, is one example of this from OSH. Procedures are not only broken down into clear steps, but staff are then encouraged to point at the object (for example, a dial that needs to be adjusted) and announce what they plan to do before they actually perform the action. Breaking the task into chunks and 'pointing and calling' helps the person performing the task to focus on each distinct step.⁹⁴ There is some, but limited, evidence from simulations and educational settings that *shisa-kosho* can reduce errors.⁹⁵ For the practice to be effective (and for staff not to feel embarrassed about doing it), it is important that staff are trained in why it works and how it is useful.⁹⁶

A very well-evidenced approach to planning better is to identify any barriers you are likely to encounter, and then plan how to overcome them.⁹⁷ For example, if the goal is to ensure everyone wears a lifejacket when boarding a boat a simple plan might be: 'When boarding the boat, I will always go to the storage area and put on a lifejacket'.⁹⁸ This 'implementation intentions' approach ensures there is a timely plan already in place when people are confronted with the behaviour.

Implementation intentions have been shown to encourage changes in safety-related behaviour such as reducing speeding,⁹⁹ increasing recycling in the workplace¹⁰⁰ and increasing attendance at safety training courses (see Box 9).



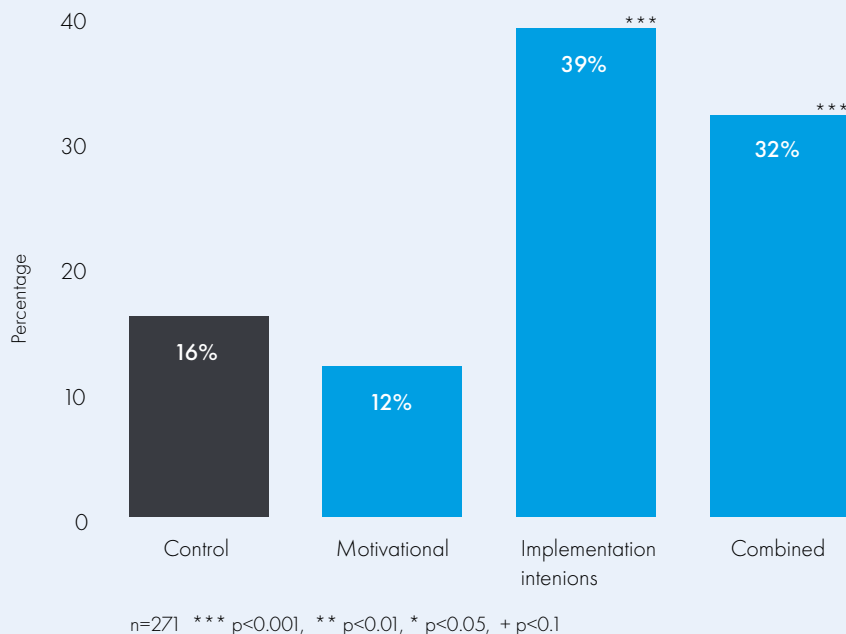
Box 9: Using implementation intentions to increase attendance at a workplace fire safety training

A study aimed to increase attendance at a university's fire safety training course. Researchers sent questionnaires to a random sample of university employees asking them about safety attitudes and informing them about upcoming fire safety training. They added different messages to the questionnaires:

- 1. Motivational:** message on why attending the training is important for the safety of you and your colleagues
- 2. Implementation intentions:** asked participants to write in the time, date and location of the next safety course on spaces provided in the questionnaire
- 3. Motivational and Implementation intentions:** combined the messages from 1 and 2
- 4. Control:** No additional message; only included questions about safety attitudes and information about the upcoming training.

People who were encouraged to write the time, date and location of the safety course (implementation intentions) were more than twice as likely to attend fire safety training compared to participants who did not. The motivational message reduced the number of people attending training compared to the control group.¹⁰¹

Figure 4: Percentage who attended fire safety course by condition



Another way that OSH specialists identify and plan responses to major workplace hazards is through risk assessments. The effectiveness of risk assessments could be increased through the use of pre-mortems, where the team imagines a future scenario in which a major incident has taken place and works backwards to identify why things went wrong.¹⁰² The advantage of adding this structure to risk assessments is that it can help overcome optimism bias, which is our tendency to overestimate the quality of our plans.¹⁰³ A pre-mortem can encourage a team to explore doubts and potential weaknesses that can be addressed by reframing the conversation into a conversation about a potential adverse event in the future.

4.3 Provide feedback to encourage change

Feedback is central to how we learn. Getting feedback on our behaviour gives us dynamic and, sometimes, real-time information about how we're performing (which is not always obvious to us) and presents an opportunity for us to adjust our behaviour.¹⁰⁴ OSH programmes often use group feedback to motivate employees (for example, by posting key safety performance indicators on communal message boards).¹⁰⁵

Some OSH programmes also incorporate personal feedback on key safety behaviours. For example, Behaviour Based Safety programmes use volunteer observers to provide personalised feedback to workers.¹⁰⁶ It is worth noting that observation may act as an intervention on its own: research suggests that we may behave differently when we know we are being observed (see Box 10).¹⁰⁷

Behavioural insights can be used to increase the effectiveness of feedback:

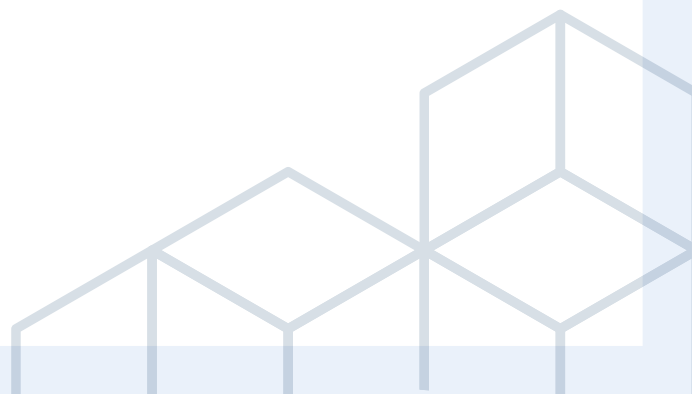
- **Provide personalised feedback.** Providing people with personalised feedback can help build good habits. A study with Virgin Atlantic found that giving pilots personalised feedback on their fuel usage significantly improved their fuel efficiency (saving the company millions of pounds during the study period). Adding a personal target (improving their fuel efficiency by 25%) improved pilots' fuel efficiency further.¹⁰⁸
- **Provide suggestions for how to improve.** Helping people understand how they can improve can increase the effectiveness of feedback. One study of truck drivers found that combining personalised feedback on the driver's unsafe behaviours (such as using a mobile device while driving) with coaching sessions with supervisors was more effective at reducing unsafe behaviour than the feedback on its own.¹⁰⁹
- **Ensure feedback is continuous.** Providing people with feedback on their performance over time can help ensure that habits stick. For example, a large randomised controlled trial that gave people feedback on their household energy usage found that feedback continued to influence people's behaviour over a period of several years.¹¹⁰

Box 10: We may behave differently when we know we are being watched

OSH programmes sometimes make use of observers, whose job it is to observe people while they are working and give them feedback on specific safety behaviours. This in and of itself can change people's behaviour, as studies have found that we may behave differently when we know we are being observed.

This effect, known as the Hawthorne Effect, can vary in size depending on the behaviour being observed.¹¹¹ People often change their behaviour in a way that they think is what they should be doing or what they think the person observing them is looking for.¹¹²

For example, the study providing feedback to Virgin Atlantic pilots on their fuel efficiency found that telling pilots their fuel efficiency performance was going to be monitored improved their fuel efficiency. (Providing feedback and targets increased the effect, but being informed that they were being monitored also had an impact).¹¹³

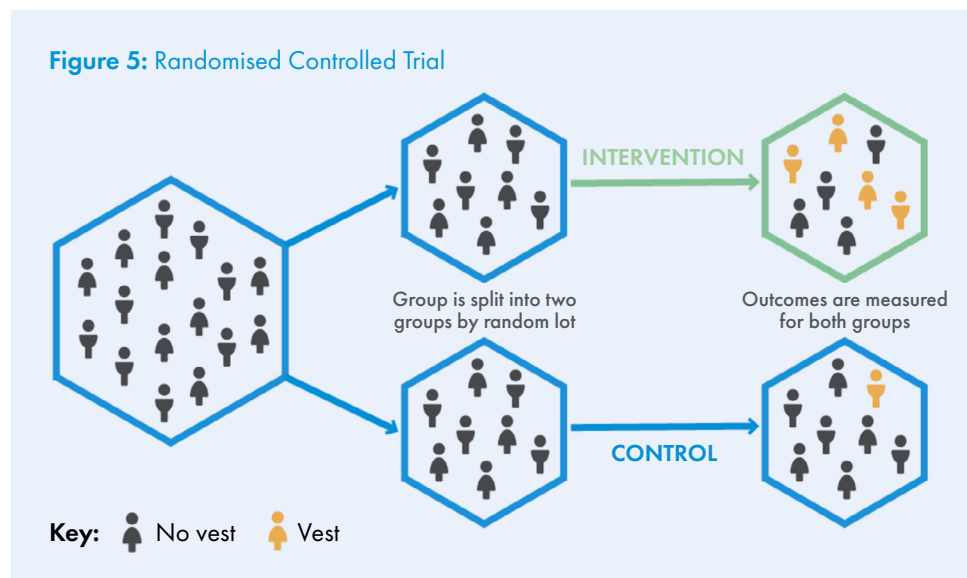


5. Testing what works

Testing what works is a key component of BIT's approach to behaviour change. Using rigorous evaluation methods such as randomised controlled trials (RCTs) are key to understanding whether your project is doing what you set out to do. In OSH, there is an interest in understanding the effectiveness and economic implications of OSH programmes through cost-benefit analysis, however the quality of many such evaluations is poor.¹¹⁴ Scholars and practitioners have called for both better quality studies,¹¹⁵ studies that go beyond cost-benefit (looking at productivity and safety outcomes),¹¹⁶ and studies that look at organisation-level interventions (rather than individual-level).¹¹⁷

OSH scholars and practitioners have called for more RCTs in organisational settings.¹¹⁸ What makes RCTs different from other types of evaluation is the introduction of a randomly assigned control group. This enables you to compare the effectiveness of a new idea against what would have happened if you hadn't made any changes. For example, if you introduce a new scheme to encourage people to wear high visibility vests, how will you know whether those taking part in the scheme would have worn the high visibility vest anyway?

In the fictitious example in Figure 6 below, we can see that those who received the vest intervention ('INTERVENTION') were more likely to wear a high visibility vest than those who did not. Having a control group allows us to compare what would have happened without our scheme, to ensure that the change we see is driven by our programme and not some other factor (such as a national safety campaign).



There are different ways to randomise people into the intervention and control group: either as individual employees or as a team or work site (known as a cluster). In OSH, it is often difficult to randomise people at the individual level.¹¹⁹ For example, take the vest intervention: you randomised employees at the same site into different groups, meaning that some staff are sent emails explaining how important it is to wear a vest, while others are not. It is likely that, even if only some employees received the emails, the intervention would spread: staff would talk to each other about what they read in the email or they would see their colleagues starting to wear vests more often and therefore also do so. This is known as a spillover effect. This means you are no longer measuring the effects in an intervention and control group, as the intervention has 'spilled over' into the control. In such cases, you need to ensure that trial participants are groups of people, such as different sites or shifts. You then randomise which groups receive the intervention and control.

Running RCTs in organisational settings can contribute to high quality evidence of what works and what is cost effective for behaviour change. There are many ways to run workplace trials (see Box 11). However, running RCTs in organisation settings (rather than with individual people) tends to be more complex, given that the evaluation cannot disrupt the everyday running of the business.¹²⁰ Given that many organisations are focused on productivity, it can be harder to run trials focused on non-financial goals: for example, one study of firms in the UK found that, while many firms designed their reward strategies to improve morale, wellness and organisational culture, not a single firm measured these outcomes.¹²¹ In addition, most participants in organisational trials have not given explicit consent to take part.¹²² Therefore, it is important to take care in designing a workplace trial.

Box 11: Types of workplace trials

Running a trial in a company will usually involve changing one of the following elements:¹²³

- **Inputs to a process:** these trials test if a process is working as intended, and if changing particular inputs can have an effect on output. For example, the study in Box 4: Using social norms to reduce accident rates explored if changing the input (sending emails to safety managers) had an effect on safety processes.
- **Components of an existing process:** these trials test to see how changing parts of an existing process influences outcomes. For example, the study in Box 1: Using checklists in food inspections changed a component of the process for recording health code violations (they changed the form for recording violations from a free text box to a checklist) to see if it impacted how frequently inspectors recorded health code violations.
- **Introduction of a new process:** these trials introduce a new process to see how it affects outcomes, often known as a pilot. For example, the study in Box 7: Measuring the effectiveness of Safety Committees in Bangladesh introduced new training and monitoring activities to see its effects on safety processes.



There may be projects where using an RCT to measure impact is not possible or appropriate. This could be for reasons of ethics, feasibility or generalisability.¹²⁴ In such cases, there are other evaluations methods that can be used. These alternatives could be quantitative (stepped wedge, quasi-experimental) or qualitative (implementation and process evaluation):

- **Stepped wedge RCTs:** A stepped wedge RCT randomly assigns the order in which an intervention is rolled out across sites. This means that sites where the intervention has not yet been rolled out act as a control for sites where the intervention has been rolled out. It is important that the intervention is rolled out randomly (not to the sites that volunteer first.) The advantage of a stepped wedge design is that, eventually, all sites will be exposed to the intervention.
- **Quasi-experimental methods:** RCTs randomly assign participants to the intervention or the control group; quasi-experimental methods attempt to mimic randomisation to create the best possible counterfactual. Some common quasi-experimental methods include a difference-in-difference design (compares trends in an intervention group to another group with similar trends over time) or matching (matching a participant in the intervention with a nonparticipant based on relevant characteristics).
- **Implementation and process evaluation (IPE):** IPEs examine what the intervention aims to do, whether it is being delivered as planned, and how the context of the intervention's delivery may be impacting its effectiveness. The idea is to gather insights on how stakeholders perceive the intervention, to develop insights into why an intervention did or didn't work, or why it may have worked differently for different people. IPEs are useful for evaluating ongoing projects as findings can directly feed into project delivery.

OSH programmes often evaluate their impact by comparing a baseline measure before the intervention to the same measure after implementing the intervention. This is known as a 'pre-post' evaluation design. This type of analysis is the easiest to conduct, but it is also the least robust. This is because it is not possible to know whether any of the changes observed were due to the intervention or to other factors. However, it may be preferable to no evaluation at all, in particular if the team considers what other factors beyond the intervention itself may be impacting the results.

Rigorously testing and trialling behaviourally-informed ideas are the hallmarks of the BIT's methodology. We think that it should become a more routine aspect of a safety specialist's toolkit, too.

6. Conclusion

OSH specialists are increasingly focusing on behaviour as they strive towards making workplaces safer. BIT believes the EAST framework, including a focus on testing to see what works, can contribute to this field.

We have adapted the EAST framework to help safety specialists in both the private and public sectors to apply behavioural insights to OSH. We know that many people are already using these approaches; however we would urge that organisations incorporate systematic testing of their approaches as well. Behavioural science has taught us that context matters: even ideas based on the latest evidence can backfire. Testing ensures that we continue to learn what works (and why) to maximise our impact.

Conducting trials in organisational settings is complex. Yet it is as an opportunity for the public, private and academic sectors to collaborate to ensure interventions have the best chance of success. Finding creative ways to measure impact will be key. We encourage organisations to work with experts and academics to develop rigorous ways of testing new approaches. Collaboration can also help further discussions about the ethics behind experimentation and nudges in OSH, as the use of behavioural insights does not eliminate the need for vigorous democratic debate.¹²⁵

While behavioural insights are now widely used in public policy and private sector settings, there are more opportunities for applying behavioural science to improve safety outcomes. Alongside new applications to individual behaviour, we hope to see more research focused on group behaviours, as well as the relationship between individual and group behaviours.

We are already working with organisations to apply behavioural insights. Our current work includes testing new ways to improve health and safety, gender diversity, and workforce performance. We look forward to working with more organisations who are interested in this approach. We hope this document will help develop more sophisticated ways of improving safety in the workplace. For more information, visit www.bi.team or get in touch at info@bi.team.



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