The Self-Administered Witness Interview Tool (SAW-IT): Enhancing witness recall of workplace incidents

Abstract

Given the often crucial role of witness evidence in Occupational Health and Safety investigation, statements should be obtained as soon as possible after an incident using best practice methods. The present research systematically tested the efficacy of a novel Self-Administered Witness Interview Tool (SAW-IT); an adapted version of the Self-Administered Interview (SAI©) designed to elicit comprehensive information from witnesses to industrial events. The present study also examined whether completing the SAW-IT mitigated the effect of schematic processing on witness recall. Results indicate that the SAW-IT elicited significantly more correct details, as well as more precise information than a traditional incident report form. Neither the traditional report from, nor the SAW-IT mitigated against biasing effects of contextual information about a worker's safety history, confirming that witnesses should be shielded from extraneous post-event information prior to reporting. Importantly, these results demonstrate that the SAW-IT can enhance the quality of witness reports.

Keywords: cognitive bias; workplace incident investigation; Self-Administered Interview; eyewitness memory; incident report form

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Introduction

Investigating workplace-based accidents and incidents requires collecting accounts from the people involved in, and witness to, the incident as well as information about any equipment involved and the physical environment. This information is typically collected in order to (i) comprehensively understand how and why the incident occurred, (ii) prevent future similar adverse occurrences, and; (iii) pursue criminal investigations or inquiries if appropriate (Det Norske Veritas, 2003; Vincoli, 1994). Witness reports are often pivotal in such investigations; for instance, Canadian incident investigators (N = 186) estimated that testimony from workers comprises approximately 60% of the evidence they collect in an investigation. Significantly, 86% of the investigators rated this testimony evidence as either very important (61%) or important (25%) to their fact finding of event cause (MacLean, Brimacombe & Stinson, 2006).

Challenges of investigating adverse industrial events

The needs of Occupational Health and Safety (OHS) investigators are similar to that of police, i.e., the timely and unbiased questioning of witnesses. However, at present, in OHS investigation there is significant variability in how witnesses are managed after an event. Some investigators engage in brief interviews at the scene and follow-up with eliciting full statements at a later date, while others ask witnesses to write down their account of what happened using an incident report form (see Montgomery, 1996, for an example). Many organizations develop their own bespoke incident report forms, which typically lack any firm theoretical background or framework (Mearns, Whitaker, Flin, Gordon, & O'Connor, 2003). The rail industry provides an example of how the full range of these techniques are used to collect data from a witness: If a driver misses a sign or signal s/he may be notified of the incident initially in a telephone call and will be required to write a report about the missed signal at the end of his/her shift. Next, s/he will have an initial interview within 24 hours, and then a full investigative interview within seven-days, possibly longer (Ryan, Hutchings & Lowe, 2010). This example reveals that investigators may rely on information obtained from witnesses using different information gathering approaches; in this case, incident report forms and different questioning formats. Given the importance of reliable witness evidence in investigations and the observation that OHS investigators may use incident report forms that vary in quality or only have the most basic of training in interview techniques, if any at all (Kelloway, Stinson & MacLean, 2004), the absence of a standardized best-practice method of collecting information from people involved with industrial events is a cause for concern.

A further challenge for OHS investigators to workplace-based accidents and incidents is that eliciting thorough witness statements in a timely manner is often not practicable due to demands on resources. Investigators at the scene of an event may be faced with multiple responsibilities that take precedence over procuring thorough witness statements (e.g. preserving life and property, securing and preserving the scene, etc.). Furthermore, geographical remoteness of some locations (e.g. offshore oil and gas fields; remote mining) may delay the initial questioning of witnesses. Psychological research informs us that the quality of eyewitness accounts may be significantly compromised by a delay between witnessing an event and providing a report about it. Therefore, ideally, witnesses should be interviewed as soon as possible after an incident (see Brock, Fisher & Cutler, 1999; McCauley & Fisher, 1995). Any delay in reporting threatens the quality of information elicited because memory is prone to rapid decay (Ebbinghaus, 1885; Wixted & Carpenter, 2007), but also because memory is fallible and vulnerable to the influence of misleading information from alternate sources. Information shared between witnesses may be related to the adverse event (e.g., a worker's action during the incident), or contextual details not directly relevant to the incident (e.g., the injured worker's safety history), yet both types of information may shape a witness's recollections (Davis & Loftus, 2007; Frenda, Nichols, & Loftus, 2011). Hence, any delay before reporting may compromise recall of detailed information and increase the opportunity and likelihood that erroneous post-event information will be encountered and incorporated into witness accounts.

The role of contextual information

Knowledge of contextual details (such as a worker's safety history), can bias an investigation by influencing how people understand the cause of an incident/accident (MacLean, Brimacombe & Lindsay, 2013), and how an investigator questions witnesses about the incident (Hill, Memon, & McGeorge, 2008; Kelloway et al. 2004). For example, people's expectations, knowledge and motivations enable them to rapidly select and incorporate information into their perception, encoding, and recollection of events (i.e., top down processing; Rumelhart & McClelland, 1986). MacLean and Dror (2016) outlined a five-level model of potential external sources of cognitive contamination that are separate from internal, self-generated, tendencies such as hindsight bias or the fundamental attribution error. The sources of bias in the model range from irrelevant information imbedded in the data itself (e.g., the vehicle looks like a liability but is, in fact, structurally sound); to the reference materials used (e.g., degraded tire tracks are compared and judged a match to the clear tracks from Truck A when in reality they belonged to another vehicle); to the surrounding context of the event (e.g., knowing that the employee was talking on his/her cell phone at the time of the incident); to one's expectations based on experiences of what has occurred in the past (e.g., poor safety history of the worker); to broader organizational and motivational factors (e.g., an organizational culture that blames the worker).

Dror's (2012) "bias snowball effect" describes the magnitude to which the effect of context can distort investigative judgements. The snowball effect describes a process in which an opinion held by one information source (e.g., a witness) does not remain siloed but is shared and acts as information that cognitively contaminates other, seemingly independent, sources of information (e.g., other witnesses, forensic experts). This spreading contamination amongst information sources can result in investigators rendering biased conclusions about event cause even though they have made rational decisions based on the evidence presented to them.

In workplace environments employees are often knowledgeable about the safety history of the people, machinery, or other worksite factors and this information is a potential source of bias. This kind of contextual information about the safety of the worker shared just prior to an investigation of a workplace event has indeed been shown to bias both undergraduate-investigators' and professional-investigators' causal judgments of a workplace accident (MacLean et al. 2013). Witnesses naïve to a worker's history prior to witnessing the event, but not prior to reporting, are similarly at risk of providing contaminated testimony as they may reconstruct the way in which the incident occurred to fit expectations once a co-worker shares unsafe contextual information with them. Hence, using strategies that limit the effects of bias in witness testimony is foundational for good investigative decision-making.

Potential solution to investigating adverse industrial events

The current research addresses the challenges of (i) lack of standardized best-practice incident report form for the investigating of workplace incidents/accidents; (ii) frequent unavoidable delay in eliciting high quality witness accounts, and; (iii) potential for biased accounts resulting from irrelevant contextual knowledge, by investigating the efficacy of a Self-Administered Witness Interview Tool (SAW-IT™[1]) as a method of enhancing the quality and quantity of information obtained from witnesses to an industrial event. In addition to tackling the challenges discussed above, this research also addresses appeals for professional organizations to become more scientifically oriented in their workplace inquiries (Haber & Haber, 2013; Mnookin, Cole, Dror, Fisher, Houck, Inman et al., 2011; Thompson, 2010).

The SAW-IT is a derivative of the highly effective Self-Administered Interview used in policing (SAI©, Gabbert, Hope & Fisher, 2009). The Self-Administered Interview (SAI©) is a powerful evidence-based investigative tool designed to elicit comprehensive initial statements from witnesses and victims (Gabbert et al., 2009). The form is a standardised protocol of clear instructions and questions that enables witnesses to provide their own statements. The SAI© was developed to address the serious challenge faced by investigators when an incident occurs for which there are numerous eyewitnesses (e.g. a terrorist attack, a large-scale major incident or accident, serious assault on a train). Any of these witnesses may hold potentially vital information about the incident, i.e., information that will provide both critical leads for the investigation or compelling evidence in a trial. However, investigators may not have the resources in terms of time, expertise, or personnel to conduct interviews with many witnesses shortly after an incident. Early stage development and testing of the SAI© revealed that the recall tool elicited significantly more information from witnesses, across multiple content categories (i.e., people, actions, objects, and settings), with high accuracy rates (Gabbert et al., 2009). Furthermore, the initial completion of a SAI© increased the amount of information provided by

[1] The Self-Administered Witness Interview Tool (SAW-IT) is a registered trademark (UK trademark number: UK00002545493)

witnesses in a delayed interview, as well as, supported them in being more resistant to misleading information encountered after an incident (Gabbert, Hope, Fisher & Jamieson, 2012; Hope, Gabbert, Fisher & Jamieson, 2014; Gittins, Paterson, & Sharpe, 2015). A recent meta-analysis (Pfeil, 2017) reporting the results of 15 empirical studies observed a substantial increase in the reporting of correct details for the SAI© with a large summary effect size of d = 1.20, comparable to the benefit found for the CI (see Memon, Meissner, & Fraser, 2010). Analyses also suggested that this increase in reporting of correct details also transfers to a later witness interview (d = .92). Despite being a relatively new investigative tool for officers tasked with eliciting initial witness accounts, the SAI© has been implemented effectively in a number of incidents involving multiple witnesses including murders, shootings, assaults, and other major crime incidents (see Hope, Gabbert & Fisher, 2011).

The SAW-IT retains the information enhancing features of the SAI© but has been modified in content and structure in accordance with the occupational health and safety (OHS) literature. The modifications have been designed to support witnesses with their recall of information specifically relevant to industrial incident investigation (e.g. risk factors, workplace conditions; see Method). In accordance with the SAI©, the SAW-IT is an incident report form developed in line with current theoretical predictions concerning how information is accessed in memory. However, it differs from the SAI© in that it queries OHS relevant content, as well as employing cognitive probes developed using the human factors model SHELL (Liveware, Software, Hardware, Environment; Edwards, 1972; Hawkins, 1993). The SHELL model targets information about such factors as the people involved (Liveware), procedures and resources (Software), physical environment and workplace operations (Environment), as well as, physical structures and equipment (Hardware). Initially developed for aviation, SHELL has been proven useful in a host of other industrial environments where adverse events may occur. The main objective of the current study was to assess the efficacy of these modifications to the original SAI© and evaluate the SAW-IT for the reporting of adverse industrial events.

A secondary pursuit of the present research was to test the SAW-IT's potential to offset the effect of bias in witnesses' reports. Broadly, once our perceptions and judgements are biased it is exceedingly difficult to undo the mental modifications that have produced the bias (MacLean & Dror, 2016). In an attempt to de-bias people who have been exposed to contaminating information, researchers have explored the benefits of encouraging people to invest resources in the processing of the information at a deeper level (Gervais & Norenzayan, 2012; Rassin, 2016). This cognitive investment discourages the 'fast and frugal' cognitive strategies (e.g., Gigerenzer & Goldstein, 1996; Gigerenzer & Selten, 2001; Gigerenzer, Todd, & the ABC Research Group, 1999) that can bias intuitive judgement and undermine accurate recall. As the SAW-IT promotes a deeper and more effortful processing of the experienced event than a free recall form it may, therefore, work to mitigate the biasing effect of contextual information on witnesses' reporting.

The Current Research

Using witnesses to a mock industrial incident we addressed the following research questions: First, does the SAW-IT add measurable value to the collecting of eyewitness memory post-event compared to a traditional incident report form (which typically takes a free recall format)? Second, how does knowledge regarding the safety history of a worker influence witnesses' reporting of an incident, including the content of opinions and confabulations, and perception of causality? Third, can the SAW-IT mitigate the effect of contextual knowledge on witness reporting compared to a traditional free-recall incident report form? This research also collected users' experiences of the SAW-IT and compared them to those who used a traditional free recall incident report form. The current research asked participants to provide a statement about an adverse workplace event that they witnessed using either the traditional free-recall incident report form or the SAW-IT. Half of the participants were informed that the driver had an unsafe work history.

Hypotheses

First, we predicted that the SAW-IT would facilitate the reporting of detailed eyewitness accounts in industrial investigation compared to a traditional incident report form. Specifically, we predicted that the retrieval support provided by the SAW-IT would elicit more (i) correct details about the event, than the traditional measure, without compromising the accuracy rate (i.e., overall percentage of correct to incorrect information) and (ii) fine-grained information compared to witnesses completing a free-recall form.

Second, we predicted that providing participants with contextual knowledge about the poor safety history of the forklift driver involved in the event, shared after the witness viewed the event, would result in biased witness reporting (see Davis & Loftus, 2007; Frenda et al., 2011). Specifically, we predicted that witnesses in receipt of negative contextual knowledge would (i) allocate a greater percentage of cause for the event to the forklift driver, as well as, (ii) generate a greater number of opinions and confabulations characterising the forklift driver as unsafe.

Third, deep processing of information can, at times, mitigate the effect expectation has on judgments (e.g., Gervais & Norenzayan, 2012). Our next prediction was that the more involved memory retrieval activities required by the SAW-IT would reduce the amount of bias evident in witnesses' cause allocations, opinions and confabulations.

Because people have a latent bias to draw worker-focused conclusions post-event (e.g., DeJoy, 1987, 1994; MacLean, et al., 2013) bias was not operationalized as a departure from what an objective, evidenced-based, appraisal of the event would have been. Rather our criteria for witness bias was evidence of more unsafe forklift driver attributions by participants who received the unsafe worker file post-event compared to those who received safe worker information. Last, in order to assess the usability of the SAW-IT for reporting of incidents of this nature, we asked witnesses in the SAW-IT and traditional incident report form conditions to provide us with feedback about their respective forms.

Method

Participants and Design

The current study used a 2 (background information about the forklift driver: safe or unsafe) x 2 (incident report form: SAW-IT or traditional form) between-subjects design. Participants were randomly assigned to one of four experimental conditions, i.e., unsafe/SAW-IT (n = 29), unsafe/traditional form (n = 33), safe/SAW-IT (n = 17) or safe/traditional form (n = 25). Data from 104 undergraduate students (20 men and 84 women) ranging in age from 17 to 52 years ($M = 21.73$, $SD = 4.68$) was used in our analyses. Students participated in exchange for bonus credit in their courses. All participants were fluent in English; of the 30 participants who reported that English was not their first language, they had been speaking it an average of 14 years ($SD = 5.26$; range from 3 years to 23 years).

Our *a priori* power analysis showed that a minimum $N = 128$ was required to reach statistical significance for a medium-sized effect with power ($1 - \beta$) set at 0.80 and $\alpha = 0.05$. All data were collected before coding and analyses took place. We used this workflow to ensure that the integrity of the data collection could not be tainted by knowledge acquired in the course of coding. Although our initial sample was 153 participants, our final sample size was 104 participants after participants were screened on a manipulation check item. The manipulation check item asked participants to rate the driver's safety history (1 = extremely unsafe; 3 = unsafe; 5 = average safety; 7 = safe; 9 = extremely safe). Participants given an unsafe history who selected Likert options 1 – 4 were retained for analysis as were participants who received safe contextual information and selected Likert options 5-9. Forty-nine participants categorized the driver's safety level inaccurately and were eliminated from analyses (32% of our initial sample). Participants who were removed from our analyses were similar to those retained, i.e., age (*M* = 21.71, *SD* = 4.06) and gender (10 men and 39 women). However, a sizeable (and larger) percentage of the participants removed reported that English was not their first language (43%; 21/49) although the average number of years they had been speaking English was consistent with those retained in our analyses (*M* = 12.55, *SD* = 7.46; range from 2 years to 27 years). In order to make meaningful deductions about the effect of safety history information on witness reporting, participants who rated the unsafe safety information as "safe" and the safe information as "unsafe" needed to be eliminated from our analyses as their ratings suggest that they did not fully attend to the safety history information provided[2]. Eliminating these

[2] A criterion for making causal statements about the effect of contextual information on witness reporting was that participants needed to interpret our context manipulation accurately (i.e., unsafe information was interpreted as "unsafe" rather than "safe", and vice versa). We thus verified that participants interpreted our information accurately via the manipulation check item and removed from analyses participants who did not interpret the manipulation as intended. Alternatively, we could have disregarded the safety condition that participants were randomly assigned to and instead compared those participants who rated the background information as "safe" to those who rated it as "unsafe" thereby maintaining our entire sample but casting aside our manipulation. As a check of our results we did analyse the data using this alternative method (i.e., we separated participants based on how they *rated* the background information); here we found that all of the significant effects reported in our manuscript replicated.

participants resulted in us abstaining from all analysis of the Report form x Context interaction because of low power (see cell sizes presented above).

Materials

Industrial event video

The stimulus industrial event was a 1:18 minute video of a staged event in which a forklift truck driver navigated a lumber yard in a forklift. At a point near the end of the video two pedestrians approached the lane where the forklift was advancing. Neither the driver nor the pedestrians could see the other party approaching because of stacks of lumber at the intersection. Both the forklift and the pedestrians entered the intersection at the same moment and the video then showed a bloodied helmet on the ground indicating that the pedestrian(s) had been hit. It is unclear if only one or both pedestrians were injured. Pilot testing of the video ($N = 20$) revealed that the majority of participants (80%) believed that the driver was at least partly responsible for causing the incident (20% did not indicate the driver as causal). Participants who indicated the driver was causal allocated approximately half of the incident cause to the driver ($M = 47.25\%$; $SD = 35.37$).

Contextual information about the forklift driver

Participants were randomly allocated one of two files about the lift driver's safety history (control or unsafe). The 'control' file indicated that the driver had: (i) no documented incidents of unsafe behaviour and (ii) had consistently demonstrated safe behaviour on the worksite. The 'unsafe' (biasing) file indicated that the driver had a poor safety history. Specifically, that (i) although unverified, this driver is suspected of causing two near misses (unplanned event that does not cause injury, damage or ill health but could do so) on the worksite in the last year, (ii) he had been found responsible for two incidents and one near miss in the last three years, and

(iii) the two incidents discussed above resulted in injury to three employees and cost the organization $20,000 in damages.

Incident report form

Participants reported their account of the witnessed event on either a traditional incident report form or the SAW-IT. The one-page, traditional report form was modeled after an incident report form that is currently used by an international company in the high-risk sector of construction. The traditional form asks the witness, in an open-ended format, to report the: (i) date and time of the event, (iii) who and what the statement was regarding, and (ii) the "specific" and "descriptive" details of the incident. The traditional report form instructs witnesses that when providing information, they should consider the sequence of events, in chronological order and to include "very specific and descriptive detail including: times, names and titles of people, specifics of what was said rather than general comments, and a sequence of events that is accurate and includes all information. The more descriptive a statement the better"

The SAW-IT report form uses cognitively-based retrieval strategies to support witnesses in recalling details about the event. The SAW-IT begins with a mental reinstatement of context instruction that requires participants to think about what they were sensing and generally experiencing at the time of the incident. Next, the form asks witnesses to freely recall as much information about the incident as possible. The instructions just prior to this free recall segment ask witnesses to try to recall what happened before, during and after the incident; strive for completeness and accuracy; and not guess about the incident's details.

The SAW-IT then encourages witnesses to sketch the scene and to include such details as the location and position of equipment and people. Next on the form is a checklist of OHS relevant topics (SHELL, Edwards, 1972; Hawkins, 1993; Canadian Centre for Occupational

Health and Safety [CCOHS], 2016), from which witnesses were asked to select the topics that that they felt were relevant to the incident that they had witnessed. Items in the checklist are categorized as either “information and documentation”, “equipment and physical needs”, “general working and environmental conditions”, and “people.” Following the checklist, the SAW-IT provides space for witnesses to elaborate on any information, that pertained to their checklist selections, that they did not share earlier in the form. The final page of the SAW-IT encourages participants to share information that they felt was relevant but had not been asked about. Periodically, throughout the form, witnesses are reminded not to guess.

Procedure

After giving informed consent, participants watched a video of an industrial incident in which a forklift struck a pedestrian causing the pedestrian serious injuries. Depending on experimental condition, some participants received a file with information that the forklift driver had an unsafe history while the others received a file that the forklift driver had no history of unsafe behaviour (control). Participants then rated the level of safety of the driver. Participants then reported their age, sex and proficiency at English (i.e., if English was their first language and if not what other language do they speak and how long have they spoken English). Participants also engaged in solving word puzzles and a word search for five-minutes. Next, participants answered “yes” or “no” to a question asking if they had received safety information about the forklift driver.

Participants then reported what occurred in the incident using either the SAW-IT or a traditional incident report form. Participants were unaware of a 30-minute time limit they had to complete their report and no participants exceeded the time limit afforded for reporting. Following completion of the incident report form and after a brief instruction demonstrating how to allocate 100% of the cause for the event, each witness allocated cause for the incident. Participants used an open-ended format in which they listed the factor(s) that they viewed as causal, such as a worker's action, the failure of a piece of equipment, and/or an environmental condition, and allocated a corresponding percentage of cause for each.[3]

Participants then rated the usability of the forms, reporting on how understandable the form was, the reading level required by the form, if the content of the form was confusing, and if they were ever unsure of how to use the form.

Recall Coding

Information on the SAW-IT and traditional report form was coded by two raters as either correct (correct items in the narrative); incorrect (items that were present in the video but reported incorrectly e.g., an action is performed but the wrong person is credited for it); confabulations (items reported that were not present in the video) or opinions (a subjective assertion about some aspect of the video, e.g., "[The driver] was driving too fast"). Within each of these four categories the items were also subcategorized according to the SHELL information categories of driver, pedestrian, hardware, software, or environment. In addition, opinions and confabulations were also coded as either safe, unsafe, or neutral safety.

The two coders followed a detailed set of definitions and rules developed from the participants' responses on the report forms to code the forms. Twenty-one of the traditional forms and thirteen of the SAW-IT incident report forms (22% of the original 153 participants'

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[3] In an exploratory task not related to the current hypotheses, witnesses completed eight final questions which queried aspects relevant for OHS investigation recommended by the CCOHS (2016; materials, environment, tasks, management, and personnel). Three questions explored the actions of the driver (i.e., speed, amount of attention, and the amount of notification given to others on the worksite of his presence), one question about the amount of attention paid by the pedestrians, two questions about the equipment (i.e., condition of the truck and driver's visibility) and two questions about the environment (i.e., lighting and road conditions). These questions were exploratory and as they do not relate to the current hypotheses, results are not reported in the current manuscript.

forms) were independently rated by each rater and this generated an inter-rater agreement rate (number of statements agreed upon by both raters divided by the total number of statements [number agreed + number disagreed]). Coders independently coded the witness statements for correctness (correct, incorrect, confabulations) and opinions. Mean inter-rater agreements for these categories were acceptable, ranging from .70 - .83. Inconsistencies were resolved via discussion using a common understanding of the coding rules.

The information on the witnesses' report forms was also coded for grain-size. Coarse grain reporting is characterized as general whereas fine grain is more precise (see Weber & Brewer, 2008). For instance, a coarse grain response would be reporting that the worker wore a "hat" whereas a fine grain response of this same content would be the report that the worker wore a "white hard hat." Nineteen content areas were assessed on their level of information specificity (See Table 2 for content categories and examples of fine and coarse grain content in each category). Twenty-eight percent of the initial 153 forms (n = 20 traditional forms and n = 23 SAW-IT forms) were coded by two coders for grain size. If a content item was present in the narrative, each coder independently coded it as coarse grain or fine grain. For each grain size category, the number of items agreed on was divided by the total number of items (number agree + number disagreed). Inter-rater agreement was .91 for coarse grain details and .97 for fine grain details.

The sketch instruction and the checklist are important aspects of the SAW-IT because of the value that they add in a real-world industrial incident investigation, as well as, the cognitive support they provide for witness recall. In the current study, however, these features of the SAW-IT were not coded as we focused on written output only which enabled us to compare between conditions. Importantly, all participants in the SAW-IT form condition sketched the scene and selected items from the OHS checklist. On average, participants selected 16 items on the checklist (*M* = 15.89, *SD* = 5.88; range 5 to 29).

Results

Comparing performance of the SAW-IT with the traditional report form

Correct details, incorrect details, confabulations, and opinions

Univariate ANOVAs were used to test the between-subjects variables of context (control safe or unsafe) and incident report form (traditional form or SAW-IT) on the main dependent variables: the number of correct details, incorrect details, confabulated details and opinions reported. To adjust for multiple comparisons, the effects of the ANOVAs were evaluated at the $\alpha = .01$ level of significance. Participants in the SAW-IT condition reported significantly more correct details than those in the traditional statement form condition, $F(1, 100) = 18.79$, $p < .001$, $\eta^2_p = .16$, 95% CI [.05, .28]. However, the main effect of context was not significant, $F(1, 100) = 2.64$, $p = .11$, $\eta^2_p = .03$, 95% CI [0, .11].

Participants in the SAW-IT condition reported significantly more opinions than those in the traditional statement form condition, $F(1, 100) = 60.11$, $p < .001$, $\eta^2_p = .38$, 95% CI [.23, .49]. Again, the main effect of context was not significant, $F(1, 100) = 4.09$, $p = .05$, $\eta^2_p = .04$, 95% CI [0, .14].

Witness reporting form had no effect on the number of incorrect details reported, $F(1, 100) = 2.01$, $p = .16$, $\eta^2_p = .02$, 95% CI [0, .10], or confabulations, $F(1, 100) = 0.25$, $p = .61$, $\eta^2_p = .003$, 95% CI [0, .05]. Likewise, context did not affect the number of incorrect details reported, $F(1, 100) = 0.04$, $p = .85$, $\eta^2_p < .001$, 95% CI [0, .02], or confabulations, $F(1, 100) = 0.13$, $p = .72$, $\eta^2_p = .001$, 95% CI [0, .05].

Accuracy rates were computed by dividing the number of correct details by the sum of the total correct details, incorrect details and confabulations. Opinions were not included in the accuracy rate calculation as opinions are not factual details about what occurred, rather they are people's impression of what happened. Participants in the current research were, on average, quite accurate (M = .86, SD = .09). There was no significant difference between participants in the report form conditions, F (1, 100) = 0.21, p = .65, η^2_p = .002, 95% CI [0, .05] or the context conditions, F (1, 100) = 0.19, p = .66, η^2_p = .002, 95% CI [0, .05]. See Table 1 for means and standard deviations relating to report form.

Recall of OHS category details

Narratives were coded according to the OHS relevant topic categories of driver, pedestrian, hardware, software and environment. Again, we adjusted for multiple comparisons by setting an α = .01 level of significance. Although the accuracy rate in the two forms was comparable, for nearly all of the coding categories that we analysed, the *number of correct details* reported was significantly higher in the SAW-IT condition than in the traditional statement form condition (driver: F [1, 100] = 7.14, p = .01, η^2_p = .07, 95% CI [0, .18]; pedestrians: F [1, 100] = 4.49, p = .04, η^2_p = .04, 95% CI [0, .14]; hardware: F [1, 100] = 18.96, p < .001, η^2_p = .16, 95% CI [.05, .29]; environment: F [1, 100] = 14.28, p < .001, η^2_p = .13, 95% CI [.03, .25]). See Table 1 for means and standard deviations.

In relation to our manipulation of context, there were no significant effects on number of correct details (driver: F [1, 100] = .30, p = .58, η^2_p = .003, 95% CI [0, .06]; pedestrians: F [1, 100] = .15, p = .70, η^2_p = .001, 95% CI [0, .05]; environment: F [1, 100] = 2.14, p = .15, η^2_p = .02, 95% CI [0, .10]; and hardware: F (1, 100) = 5.52, p = .02, partial η^2 = .05, 95% CI [0, .16]).

The software category was not analyzable due the very low number of details categorized as such in both reporting conditions.

Grain size

Two univariate ANOVAs were used to test the effects of context and incident report form on the number of (i) total fine-grain details and then (ii) total coarse-grain details provided by witnesses in their narratives regarding nineteen event-relevant details. Details analysed were descriptions of the equipment, environment and people, as well as, information about what happened immediately before, during, and after the contact event between the driver and pedestrian(s) (See Table 2). To adjust for multiple comparisons, the effects of the ANOVAs were evaluated at the $\alpha = .01$ level of significance.

Participants in the SAW-IT condition reported significantly more fine-grained details ($M = 4.93$, $SD = 2.25$) than participants in the traditional form condition ($M = 3.67$, $SD = 2.19$), $F(1, 100) = 9.32$, $p = .003$, $\eta^2_p = .09$, 95% CI [.01, .20]. There was no main effect of context, $F(1, 100) = 2.53$, $p = .12$, $\eta^2_p = .03$, 95% CI [0, .11]. Regarding coarse-grain details, no significant effects were found for context, $F(1, 100) = .02$, $p = .88$, $\eta^2_p < .001$, 95% CI [.00, .01], or report form, $F(1, 100) = 1.87$, $p = .17$, $\eta^2_p = .02$, 95% CI [.00, .10].

Context Effects

Effect of context on perception of cause

A mixed-factorial ANOVA was used to test the between-subjects variables of context (control safe or unsafe) and incident report form (traditional form or SAW-IT) and the within-subjects dependent variable of cause (percentage of cause to the driver and percentage of cause to the pedestrian(s)). Note that the driver and pedestrian(s) were two factors, out of a number of factors (e.g., environment, forklift), to which participants allocated a percentage of cause for the incident. Findings demonstrated a significant difference between the proportions of causality attributed to the driver and the pedestrians, respectively, F (1, 100) = 7.89, $p < .01$, $\eta^2_p = .07$, 95% CI [.01, .18] and a significant interaction between context and the proportion of cause, F (1, 100) = 18.88, $p < .001$, $\eta^2_p = .16$, 95% CI [.05, .29]. Participants in the control bias condition did not significantly differ in the amount of cause that they allocated to the forklift driver (M = 27.42, SD = 28.92) and the pedestrians (M = 32.73, SD = 30.75), F (1, 40) = .70, $\eta^2_p = .02$, 95% CI [.01, .16]. However, participants who received biasing contextual information about the safety of the forklift driver allocated significantly more cause to the driver (M = 46.81, SD = 27.21) than the pedestrians (M = 18.26, SD = 18.74), F (1, 60) = 43.97, $p < .001$, $\eta^2_p = .42$, 95% CI [.23, .56].

The effect of report form was significant, F (1, 100) = 3.96, $p = .05$, $\eta^2_p = .04$, 95% CI [0, .13], and demonstrated that those in the traditional form condition averaged more cause to the worker and pedestrian (M = 34.29, SD = 26.32) than those in the SAW-IT condition (M = 27.39, SD = 28.28). Hence, those in the SAW-IT allocated more cause to other factors on the worksite. There was no significant effect of context, F (1, 100) = .96, $p = .33$, $\eta^2_p = .01$, 95% CI [0, .08], nor a Report form x Cause interaction, F (1, 100) = .05, $p = .83$, $\eta^2_p < .001$, 95% CI [0, .02]. Because of low power for the interaction, we were unable to test the Report form x Context x Cause interaction to determine if the SAW-IT mitigated the effect of context on participants' cause allocations.

Effect of context on narrative content

Participants' confabulations and opinions were coded for how safely they characterized the truck driver's behaviour, i.e., either safe, unsafe, and no valence. To explore the effect of context on confabulations and opinions about the driver we computed two variables, one that summed confabulations and opinions that suggested *unsafe* driver behaviour and one that summed confabulations and opinions that suggested *safe* driver behaviour. These two new variables were then used in a mixed factorial ANOVA that tested the between-subjects variables of context (control safe or unsafe), incident report form (traditional or SAW-IT) and the within-subjects variable of safety content (sum of confabulations and opinions indicating unsafe driver behaviour and sum of confabulations and opinions indicating safe driver behaviour).

Participants tended to make confabulations and deliver opinions that characterized the driver as unsafe (M = 5.08, SD = 4.02) rather than safe (M = 1.39, SD = 2.72), F (1, 100) = 54.08, p < .001, η^2_p = .35, 95% CI [.21, .47]. The Context x Safety content interaction was significant, F (1, 100) = 5.13, p = .03, η^2_p = .05, 95% CI [0, .15]. Figure 1 illustrates that participants in both the control contextual information condition, F (1, 40) = 13.66, p < .01, η^2_p = .26, 95% CI [.05, .44], and unsafe context condition, F (1, 60) = 51.08, p < .001, η^2_p = .46, 95% CI [.27, .59], generated a greater number of statements that characterized the driver as unsafe rather than safe but the magnitude of this difference was greater for those who received unsafe background information.

A significant main effect of report form revealed that those in the SAW-IT condition (M = 4.75, SD = 4.27) reported significantly more opinions and confabulations about safety compared to those in the traditional statement form condition (M = 2.04, SD = 1.57), F (1, 100) = 41.61, p < .001, η^2_p = .29, 95% CI [.15, .42]. There was no significant Report form x Safety content interaction, F (1, 100) = .26, p = .61, η^2_p = .003, 95% CI [0, .06].

Usability Questionnaire

Participants in the both the SAW-IT and traditional form conditions reported that the form was understandable (SAW-IT, M = 6.67, SD = 1.31; traditional form condition, M = 7.09, *SD* = 1.67; 1 = very hard to understand to 9= very easy to understand). On a scale that asked about participants comfort with English (1 = very uncomfortable to 9 = very comfortable), participants in both form conditions rated that they were comfortable with the reading level required by the forms (SAW-IT, $M = 8.51$, $SD = 1.31$; traditional form condition, $M = 8.19$, $SD = 1.78$) and with writing their report in English (SAW-IT, $M = 7.98$, $SD = 1.47$; traditional form condition, $M = 7.55$, $SD = 1.62$).

A small number of participants indicated that they were confused by words or phrases on the forms (traditional form, 3/58; SAW-IT, 4/46), but no form was found to be more confusing than the other, X^2 (1, $N = 103$) = .55, $p = .46$, $\Phi = -.07$. The words or phrases listed as confusing were: “substandard”, “safety culture” or, more generally, “terms in the checklist.” These terms may have been confusing to participants because they were not an industry-based sample. Further analysis of the usability of the forms found that some participants reported that they were unsure of what they were supposed to do on the form (traditional form, 9/58; SAW-IT, 18/45); here a significant difference was found between conditions, with a greater number of participants using the SAW-IT form expressing uncertainty, X^2 (1, $N = 103$) = 7.85, $p = .01$, $\Phi = -.28$. Responding participants in the SAW-IT condition cited that the checklist was unclear (n = 9) and that some instructions did not fit with their experience given that they were not physically present for the incident (e.g., context reinstatement or where to situate themselves when drawing; n = 8). One participant completing the traditional form reported that (s)he would have preferred instructions on the bottom of the form be located at the top. The remaining participants in both conditions made the error of using the opportunity to report that the filler activities or other aspects of the testing were unclear to them (traditional form, n = 7; SAW-IT, n = 1).

Discussion

The SAW-IT elicited significantly more correct details, and more precise information, about the witnessed incident than the traditional incident report form often used in industry. This increase in the number of correct details reported occurred across all relevant OHS categories (e.g., equipment, environment, worksite employees; CCOHS, 2016; Edwards, 1972; Hawkins, 1993). Importantly, the enhanced reporting performance observed in the SAW-IT condition was not achieved at a cost to the accuracy rate (percentage of accurate information). Accuracy rates in the SAW-IT condition were as robust as those observed for the traditional incident report form. We found that witnesses who completed the SAW-IT tended to share more opinions than those who completed the traditional report form which may be a by-product of a format that cognitively engaged the witness and facilitated communication. Our participants also reported that the SAW-IT was easy to understand, that it was not confusing, and that the required reading level was comfortable. Hence, the finding that the SAW-IT elicits a large amount of correct information is promising and suggests that it may be a valuable investigative tool for those OHS professionals charged with investigating industrial events.

A novel contribution of the current research was the exploration of the effect of contextual information on witnesses' perceptions of cause and reporting of information. Due to low power however, we did not test whether an innovative reporting format would mitigate those effects. We found that context had significant effects on participants' reports. Specifically, participants who received the unsafe forklift driver history reported that he was more causal for the incident and they generated more unsafe confabulations and opinions in their narratives about the driver's behaviour than those who received safe background information. The effect of the biasing information shared post-event is not entirely surprising as research has consistently shown that information encountered post-incident can be both influential and resistant to correction (Davis & Loftus, 2007).

Our findings that exposure to information about a driver's unsafe work history biased witnesses reporting is relevant to OHS investigations. Witnesses who had received unsafe history information reported that the driver was more causal in the incident and generated more opinions and confabulations that characterized the driver as unsafe in the incident compared to those who received neutral/safe background information. Interestingly, we found that those in the safe condition generated a greater number of opinions than those in the unsafe condition. We speculate that this increase could be a product of the fundamental attribution error, which likely encouraged the opinions of all participants to intimate unsafe worker behaviour, and the safe history information. The history information may have encouraged participants to also generate opinions characterising the worker as safe increasing the total number of opinions.

Recall that initial opinions, exaggerations, and confabulations shared by a person can affect other people's judgements in investigative environments (i.e., bias snowball effect, Dror, 2012). Opinions shared by a witness with an investigator may not only influence the fact-finder to seek and interpret information in a biased fashion (for reviews on confirmation bias; Kassin, Dror, & Kukucka, 2013; Nickerson, 1998) but also affect the perceptions, judgments and testimony of other people related to the investigation. OHS investigators' conclusions are used to develop safety protocols post-event so that similar events do not happen in the future. Biased judgements can, therefore, have a legacy in that factors that should have received more investigative attention go unanalysed in favour of other leading or 'preferred' hypotheses. Although future research on the SAW-IT should be executed in a more ecologically valid environments, we believe that our findings reinforce the importance of blinding (Robertson &

Kesselheim, 2016) not only investigators to unnecessary information that may be biasing, but also other individuals providing information in the investigation.

In workplace scenarios where witnesses are at risk of experiencing biasing information post-event, an easy and effective method of protecting people's recollections is to administer the SAW-IT as soon as possible post-incident. This strategy should not only support the capture of a high-quality witness statement but may also protect against misinformation encountered post-questioning (see Gabbert, Hope, Fisher & Jamieson, 2012; Gittins, Paterson, & Sharpe, 2015). However, in industrial investigation, the remedy for mitigating the effect of biasing expectations generated via context may be more complex than immediate questioning. Unlike many criminal incident scenarios, workers may have entrenched expectations of the factors involved in the event, e.g., coworkers, machinery, developed via years of experience. This information is *a priori* knowledge that can taint testimony at both the level of encoding and recollection and is difficult to manage with practical bias reducing strategies such as Linear Sequential Unmasking (LSU; a protocol in which potentially biasing information is masked and then revealed as needed, Dror et al. 2015; also see Dror, 2013 for practical strategies). Hence, future research should pursue strategies designed to minimize the effect of biasing expectations in the industrial investigation.

The limitations and benefits of the SAW-IT are similar to those outlined for the SAI© (Gabbert et al., 2009) and consistent with those faced by incident report forms currently used by industry. The SAW-IT is a written reporting format which may pose a barrier for people with language and writing difficulties. Developments are underway to support responding in alternative formats to navigate communication difficulties. In addition, witness motivation to complete the form may be a limiting factor in industrial incident investigation. Workers may be uncomfortable providing a detailed account of an event if it negatively affects their employment (e.g., regulatory body suspends work to resolve the worksite issues) or in which they, or a close colleague, are partially responsible. This resistance should be partially mitigated by the instructions on the SAW-IT that the shared information will be used to enhance safety; however, OHS investigators could further motivate witnesses to share information by communicating, when possible, that the information will not be used to generate penalties. Furthermore, the ecological validity of the current study was limited by our use of students who have minimal knowledge of the workplace involved in the incident and a video rather than a staged event. It is reasonable to assume that the effect of biasing contextual information will differ in magnitude when paired with familiar versus unfamiliar workplace environments. Future development of the tool should examine its performance with a sample of individuals knowledgeable about specific work contexts.

Reviews of the usability of the form were broadly positive. A small number of participants who completed the SAW-IT noted that the checklist portion of the form could have been presented more clearly. Some confusion regarding terms on the checklist may have occurred because our sample comprised of university students who were unfamiliar with common industrial terminology. Instructions of how to use the checklist could also be clarified for participants to better support their use of it. Finally some participants expressed confusion because some aspects of instructions were likely more relevant for people who had experienced an event rather than viewed it on a video screen; this is unlikely to be an issue for witnesses to real workplace events. Taken together, this feedback is useful and will assist in the forward development of the SAW-IT.

These limitations are relatively minimal in light of the procedural benefits for OHS professionals that might accrue from use of the SAW-IT. For example, the investigator does not need to tackle decisions about witness priority at the moment of the incident when more pressing aspects of the investigation may need to be managed. All witnesses can complete the form in a timely manner and preserve their memory regardless of their status in the investigation as a key or peripheral witness. Investigators are then in a position to prioritise any follow-up interviews on the basis of the most meaningful initial accounts. In addition, generating a thorough account of the event immediately post-incident has been shown to preserve memory for more comprehensive recall at a later date (Hope et al., 2014). The SAW-IT is an incident report form that provides a standardized questioning format, based on psychological theory and existing guidelines for best practice investigative interviewing. Multiple witnesses can individually complete the SAW-IT simultaneously, without being monitored by the investigator. This concurrent information collection releases valuable resources during incident investigation, such as enabling investigators to pursue other tasks including managing the scene and securing physical evidence.

Conclusion and Practical Application

Our results demonstrate that the SAW-IT ™ offers a novel and effective strategy for collecting witness information post-incident. This reporting format is easy for investigators to administer and for witnesses to use. The results of the current study are promising and suggest that the SAW-IT can provide a useful approach to information gathering, informed by psychological science, in the industrial incident investigation context. We encourage others to build on our initial findings in applied contexts.

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Table 1

Mean correct details, incorrect details and confabulations, and accuracy rates reported in each report form condition, standard deviations in parentheses.

Details		SAW-IT		Traditional			
		M	(SD)	*M*	(SD)	*F*	*p*
Driver	Correct details	6.80	(2.47)	5.48	(2.37)	7.14	.01
	Incorrect details & confabulations	0.70	(0.99)	0.86	(1.03)		
	Opinions	3.22	(2.14)	2.41	(1.88)		
	Accuracy rate	0.92	(0.13)	0.88	(0.14)		
Pedestrians	Correct details	5.28	(2.92)	4.16	(1.98)	4.49	.04
	Incorrect details & Confabulations	1.07	(0.95)	0.64	(0.67)		
	Opinions	1.13	(1.54)	0.66	(1.09)		
	Accuracy rate	.83	(0.16)	.86	(0.17)		
Hardware	Correct details	4.09	(2.80)	2.24	(1.76)	18.96	<.001
	Incorrect details & Confabulations	1.09	(1.22)	.79	(0.95)		
	Opinions	1.48	(1.98)	0.16	(0.45)		
	Accuracy rate	0.78	(0.26)	0.71	(0.35)		
Environment	Correct details	3.57	(2.01)	2.21	(1.74)	14.28	<.001
	Incorrect details & Confabulations	0.46	(0.72)	0.26	(0.55)		
	Opinions	2.76	(2.64)	0.57	(0.82)		
	Accuracy rate	0.88	(0.18)	0.92	(0.16)		
Software	Correct details	0.04	(0.21)	0	(0)		
	Incorrect details & Confabulations	0	(0)	0	(0)		
	Opinions	2.54	(3.76)	0.12	(0.68)		
	Accuracy rate						
Total	Correct details	19.99	(7.57)	14.30	(5.54)	18.79	<.001
	Incorrect details	2.04	(1.52)	1.53	(1.49)	2.01	= 0.16

Confabulations	1.20	(1.00)	1.02	(1.11)	0.25	= 0.62
Opinions	10.85	(6.47)	3.95	(2.74)	60.11	<.001
Accuracy rate	0.85	(0.09)	0.85	(0.09)	0.21	= 0.65

* The "Correct details," "Incorrect details," and "Confabulations" categories demonstrate the mean *number* of statements made by participants. "Accuracy rate" is a calculation in which the number of correct details is divided by the sum of the number of correct details, incorrect details and confabulations. Note that the "software" category is not included in the present table due to extremely low numbers.

Table 2

Grain Size of Report Form Content

Description of the Critical Items in the Event Video	Example		Frequency		
	Course Grain (CG)	Fine Grain (FG)	No Mention	CG	FG
1. Equipment: Type of Vehicle	work vehicle	forklift	9	21	74
2. Equipment: Colour of Vehicle	coloured	red and white	102	0	2
3. Environment: Description of Road	road	wet road	79	15	10
4. People Description: Colour of Driver's Clothes	dark jacket	green jacket	102	1	1
5. People Description: Head Protection of Driver	hat	hard hat	95	0	9
6. People Description: Hearing Protection of Driver	ear protection	ear plugs	84	4	16
7. People Description: Colour of Pedestrians' Clothes	jacket	florescent jacket	92	2	10
8. People Description: Head Protection of Pedestrians	hat	hard hat	84	2	18

Immediately Before Contact					
9. Environment: Viewing Obstruction between the driver and pedestrians	obstacle	stacked wood	30	20	54
10. People Action: Pedestrians Communication Behaviour	walking	talking while walking	95	1	8
11. People Action: Pedestrians Walking Direction	walking on the site	coming to an intersection	14	41	49
12. People Action: Pedestrians Looking Behaviour	walking	heads down	72	0	32
13. People Action: Speed of Vehicle	driving the vehicle	didn’t slow down	77	4	23
14. People Action: Direction of Vehicle	driving through site	coming to an intersection	25	39	40
15. People Action: Movement to Wheel	turns wheel	turns the wheel left or right	89	10	5
Moment of Contact					
16. Environment: Pedestrians’ sight	workers hit	workers didn’t see the truck	75	17	12

17. Environment: Driver's sight	hit with workers	didn't see the workers	20	35	49
Immediately After Contact					
18. People Description: Pedestrian Injury	workers hurt	hard hat with blood	79	9	16
19. People Action: Stopping Action of the Lift Truck	forklift stops	forklift stops immediately	90	6	8

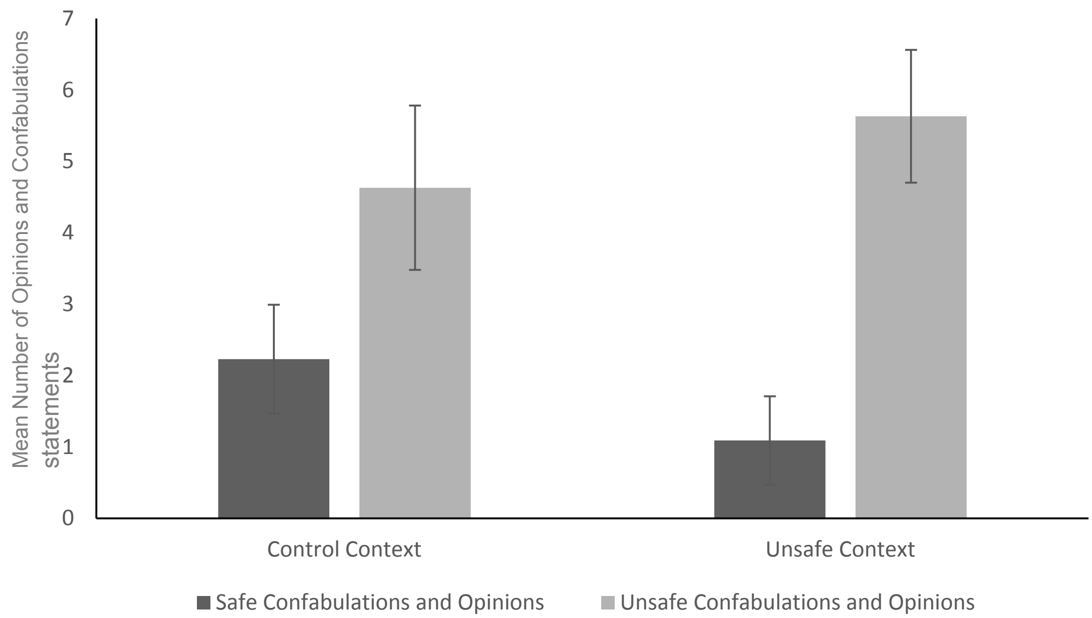

Figure 1. Participants' mean number of safe and unsafe opinion and confabulation statements about the driver when they had received either the safe or unsafe contextual information about the driver. Error bars represent the 95% between-subjects confidence intervals based on the standard error of the mean.