The Safe Learner:

the impact of individual differences and workplace environment on attitudes to health and safety training

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ies
Interim Report

Published by:

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Acknowledgements

The authors are indebted to Chrissy Falck and John Atkinson at the LSC for their support for this work, and to Jill Joyce and Marilyn MacFarlane for first commissioning the work. We would also like to thank Professor Dave Hofmann at the University of North Carolina and Professor J. Craig Wallace of Oklahoma State University for permission to use the Frequency of Unsafe Behaviors Scale (Prof. Hofmann) and the Cognitive Failures Scale (Prof. Wallace). We would also like to thank Gill Howd for her assistance in producing this report.

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Executive Summary

Training is important but it is only one of the factors which play a part in keeping learners safe. The research attempted to find out what other factors influence the behaviour of learners in work.

The Safe Learner blueprint sets out the health and safety information that should be covered by training providers and employers of individuals in work-based learning. The intention of the Safe Learner blueprint is to influence learners' safety behaviours in work as well as in the learning situation, by increasing their health and safety knowledge and awareness of the actions they should take.

However, many factors other than quality of health and safety training influence health and safety at work: the learner's own attitudes, workplace safety culture, role overload and individual differences can reinforce or moderate the impact of health and safety training. These factors were assessed as part of this research.

Supervisors can play a crucial role in ensuring safe behaviour at work – but often fail to talk to learners about safety issues. A significant proportion of young workers report being left to work unsupervised.

Around a fifth of learners claimed they had received no health and safety induction at work and fewer than half of the learners said that their supervisor gave them any health and safety instruction.

Over half of apprentices reported being left unsupervised on occasions. This included quite young apprentices (those aged 16 and 17) and in many cases they were left unsupervised for substantial lengths of time.

Those who are left unsupervised are nearly three times more likely to have accidents and two and a half times more likely to have seen a colleague have an accident. Sixteen year olds left unsupervised were twice as likely to have an accident as those not left unsupervised. By the time they reach the age of 17, unsupervised learners

were five times more likely to have had an accident or incident compared to those who were not left to work unsupervised (40 per cent compared to 8 per cent).

A quarter of learners who were left unsupervised also said that their supervisor never discussed health and safety issues with them. More of the learners who report being left unsupervised said that they did risky or dangerous things at work, and were also more likely to say that their colleagues did risky things.

Those learners who work in organisations with a poor safety climate are more likely to engage in unsafe behaviours, have accidents and witness accidents.

Safety climate is a psychological phenomenon, usually defined as the 'perceptions of the state of safety at a particular time' and offers a 'snapshot' of safety culture. Learners gave an assessment of the safety climate of their employing organisation on a standard measure of safety climate.

Those learners who worked in workplaces with lower safety climate scores were more likely to admit to engaging in unsafe workplace behaviours. Those who gave their employer a poorer rating of safety climate were more likely to have been involved in an accident or incident and seen a colleague have an accident.

Those who are overloaded at work more frequently engage in unsafe behaviours and are more likely to have an accident.

Role overload occurs when people are given an excessive amount of work to do in the time available.

Increased levels of role overload were slightly, but significantly, associated with likelihood of having an accident. There was a stronger association between increasing levels of role overload and frequency with which the learners report engaging in unsafe behaviour. This suggests that role overload leads to increasing levels of unsafe behaviour which, in a proportion of cases, result in accidents.

Supervisors influence learners' attitudes which, in turn, influence learners' behaviour.

The more relevant a learner believed the health and safety training to be, the less likely they were to have had an accident. Learners whose supervisors discussed health and safety issues and risky activities with them viewed the health and safety training as being more useful and more relevant than did those whose supervisors did not discuss health and safety with them. Learners who saw the safe learner training as more relevant were also less likely to report engaging in risky behaviours than were those who thought it was less relevant.

Cognitive failure can result in accidents.

Cognitive failure is defined as a 'cognitively based error that occurs during the performance of a task that the person is normally successful in executing'. Learners who reported higher incidences of cognitive failure were more likely to have had an accident or incident. There was a slight but significant association between role overload and cognitive failure amongst learners: increasing role overload leads to increasing cognitive failures.

Learners believe they are less likely to suffer accidents, injuries or occupational illnesses than others, but their estimates become more realistic after having or witnessing an incident

Unrealistic optimism is the belief that unfortunate events are less likely to happen to oneself than to other people. Learners tended towards unrealistic optimism regarding their likelihood of having an accident or incident, of suffering an injury or of suffering from an occupational illness.

If a learner had already been involved in an accident/incident then they were more realistic in their assessments of the likelihood of being involved in an accident or incident or suffering an injury. They were also more realistic in their assessments of their likelihood of suffering from an occupational disease. An accident appears to make them generally more realistic about the likelihood of negative events occurring in the future.

The same effect is also seen where learners have witnessed an accident. These learners also become more realistic in their assessments.

Learners quite quickly become acculturated to workplace attitudes to health and safety.

Learners who work in workplaces with a poor health and safety culture (as indicated by their being left to work unsupervised) perceive the training as less relevant and useful than do those who work in workplaces where supervisors do not leave learners unsupervised. This is demonstrated by comparing the correlation values obtained for learners at two time points. For those who had been employed for less than four months, there was no significant association between perceived relevance of the safe learner training and whether or not they worked unsupervised. Amongst those who have been employed for longer than four months a significant inverse association emerges which indicates that those who are left unsupervised (ie work with supervisors who show little regard for safe working practices) view the training as less relevant than do those who are not left unsupervised.

1 Introduction

The Safe Learner blueprint sets out the health and safety information that should be covered by training providers and employers of individuals in work-based learning. It is based on the Safe Learner model, which the Learning and Skills Council (LSC) piloted during 2005-06 with a group of learners who were mainly, though not exclusively, in work-based learning.

The Institute for Employment Studies (IES) evaluated the extent to which the programme impacted on learners' health and safety knowledge. This involved the use of a test of health and safety (H&S) knowledge custom-designed by IES for the evaluation. Two types of questions were included in the test: questions about H&S knowledge ('knowledge' questions) and questions regarding what individuals should do in hazardous situations (termed 'behaviour' questions, although of course they interrogate knowledge rather than behaviour per se). In addition, the test included questions regarding learners' confidence that their answers were correct; and asked them to state whether they could remember their tutors or workplace supervisors having instructed them on each point.

Performance of the 'safe learner' (SL) group was compared to that of a comparison or 'control' (C) group of learners who had not undertaken the programme. The comparison group was recruited specifically for the evaluation; some were registered at the same provider organisations as were the SL learners; others, however, were recruited through contact with non-participating provider organisations. Analyses indicated that there was a slight, but significant, increase in the number of 'behaviour' items that the SL group answered correctly. Furthermore, while the SL group was no more confident regarding their correct answers than were their counterparts in the C group, they were significantly less confident about their incorrect answers, suggesting that the programme serves to make learners more aware of where their gaps in knowledge lie.

The evaluation provided evidence at the level of 'learning' (ie, level 2 in Kirkpatrick's evaluation model). Of more importance, in terms of improving health and safety, is the question of the extent to which the programme impacts on behaviour and

attitudes, that is, the issue of transfer to the workplace. To assess this, the evaluation needs to be conducted at Kirkpatrick levels 3 and 4, that is, impact on individual behaviour and at organisational level.

IES therefore proposed to undertake a longer-term evaluation of the impact on behaviour of the safe learner programme on learner behaviour. However, many other factors apart from quality of health and safety training and the actions of individuals have been demonstrated to influence health and safety at the level of work unit and organisation. For this reason the proposal also set out plans to assess the extent to which workplace safety culture, role overload and individual differences serve to reinforce or moderate the impact of the SL training. This part of the work would use existing validated measures. The background to selection of these measures is set out below.

1.1.1 Existing literature on factors influencing safety behaviours

Training in health and safety is clearly an important first step in ensuring the safety of learners. However, training on its own is not sufficient. A range of other factors impact on workplace safety. Previous research by IES (Kerrin et al., 2002) has pointed to the importance of the workplace supervisor in encouraging learners to transfer safe behaviour learnt in training into the workplace. For this reason we propose to include supervisors within the research.

Furthermore, a range of workers have noted the importance of workplace safety culture in encouraging safe behaviour: these include Pidgeon (1991), Cooper (1986) and Cox and Cox (1991). There have been as many, if not more, attempts to develop instruments to assess workplace safety culture and climate or to determine factors that impact on safety culture (as examples, see Cox and Cheyne, 2000; Lee and Harrison, 2000; Lingard, 2000, 2002; O'Toole, 2002). In this work, the Salminen and Seppala (2005) measure of safety climate and the Zohar (2000) Group Safety Climate scale were both used.

In addition to training and organisational safety culture, individual factors play a part too. This is one area in which there has been much research attention in recent years. Individual factors may include attitudes and beliefs; they may also include issues such as conscientiousness and propensity to cognitive failure. In recent years, Vodanovich and Wallace have been leading researchers in the impact of such variables on occupational safety (Wallace and Vodanovich, 2003; Wallace, 2004; Wallace, Vodanovich and Restino, 2003). Wallace's recent work has focussed on development of a measure of cognitive failure (Wallace and Chen, 2005) and this was used in the current work.

A further variable of interest is the phenomenon that has been labelled 'unrealistic optimism' Robertson, 1977; Weinstein,1980). This has been defined as the tendency to perceive negative events as being less likely to happen to oneself than to others, and,

conversely, for positive events to be more likely to happen to oneself. It is easy to see how a tendency to believe that one is relatively immune to accidents could impede the adoption of safe behaviour at work (and elsewhere) and thereby undermine the effectiveness of the safe learning training input. If learners view accidents at work as being more likely to happen to other people than to themselves then learners may see little reason to alter their own behaviour. We therefore included some measures of unrealistic optimism within the questionnaire.

Lastly, people tend to have more accidents when under pressure. Role overload has been associated with lapses in concentration and subsequent accidents and incidents (Hofman et al., 1995). We therefore decided to include a measure of role overload within the overall package of assessment measures to be utilised in the research.

1.2 Objectives

1.2.1 Aims of the research

The aims of the research were to:

- examine learners' use of health and safety knowledge gained through their learning provider
- examine learners' use of health and safety knowledge gained through their employer
- explore how health and safety knowledge is drawn on by learners in situations in which they are at risk
- explore what additional health and safety knowledge learners' believe would be useful in situations in which they are at risk
- examine the additional situational and individual difference factors that impact on learner health and safety at work
- explore the retention of safety messages, the differential recall of different messages and the impact of different messengers or instructors
- explore whether attitudes to safety change as a result of greater maturity, changed roles or states.

1.3 Method

The intention, therefore, is to explore the impact of the safe learner training model on learner behaviour in the workplace in the longer-term (over two years), while taking into account the role of supervisory attitudes, organisational safety culture, role overload and individual differences as moderating variables mediating the exhibition of safe or unsafe behaviours.

1.3.1 Method

The intention is to follow up a group of apprentices over two years to determine the extent to which each of the following impacts on safety attitudes:

- the training they receive
- organisational safety culture
- supervisor influence
- time pressures
- individual differences
- individual attitudes (that is, the extent to which outcome attitudes remain in line with, or change from, attitudes at start-out).

1.3.2 Materials

In section 1.1.1 above we set out the reasoning behind selection of the instruments to be used in the work. The questionnaire contained several sections; the focus of each section, and the reason for its inclusion, are set out below.

- **Perceptions of personal relevance and utility of the content areas of the Safe Learner blueprint.** The first section of the questionnaire opens by asking the learners their views about the content of the Safe Learner framework. Learners were asked to indicate on a five point scale how relevant to their work situation each content area is, and how useful they feel the information will be. These questions sought to gauge whether each learner was generally interested or disinterested in the content of the safe learner programme in general, or interested just in areas they saw as being of immediate relevance to them (or not at all).
- **Application and importance of health and safety information.** Following on from that, learners were asked if they believed they would be able to apply the health and safety information they learnt in training within their everyday work environment, how important they felt it was to remember the information, and if there were any areas of particular importance to their work situation.
- **Employer's health and safety induction.** The safe learner blueprint requires employers to give apprentices a health and safety induction[1]. The next section of the questionnaire asked apprentices whether they had received an induction and, if so, what topics it had covered.

[1] In fact, all employees should receive a health and safety induction from their employer; however, this is emphasised in the contract for employers with apprentices registered on programmes built around the safe learner blueprint.

- **Health and safety instruction at work**. The earlier Safe Learner report had discovered that an apprentice's supervisor was a key factor associated with their level of health and safety knowledge. For this reason learners were asked whether they had received any type of health and safety instruction from their workplace supervisor or from their health and safety officer or manager. As there is much interest in the role of trade unions in workplace learning (and workplace safety) we also included a question that asked if they had received health and safety instruction from their trade union health and safety representative. We also asked whether their supervisor or trade union representative ever discussed health and safety issues or told the individual about activities that were risky or dangerous.
- **Risky behaviours at work**. This section asked learners whether they perceived any activities undertaken by their colleagues or that they undertook to be risky or dangerous, and about the actions they were able to take (and subsequently took) to minimise risks and dangers.
- **Supervision and accidents at work**. Because of concerns raised by the earlier research we also asked learners if they were ever left unsupervised and, if so, for how long and how frequently. Finally in this section they were asked if they had ever had an accident at work.
- **Frequency of unsafe workplace behaviours**. A 29-item scale developed by Hofmann and Stetzer (1996) was used to calculate frequency of unsafe workplace behaviours. The scale consists of six general items and a further 23 specific items. Because not all of the items would be relevant to all apprentices we therefore allowed apprentices to indicate where they felt that these items were not relevant to them. A five point scale, used by Hoffman and Stetzer, ('never', 'two or three times a year', 'about once a month', 'once a week' and 'more than once a week') was used to assess frequency.
- **Role overload**. Because perceived work pressure has been shown to impact on safety behaviours a measure of role overload (Cammann, Fichman, Jenkins and Klesh, 1983) was included.
- **Safety climate**. A safety climate questionnaire was developed based on that of Saminen and Seppala (2005). The original Saminen and Seppala questionnaire was modified to make the language more accessible to an English audience. This involved rewording some items[1], removing one item ('My work group values safety') and adding two new items to clarify one ambiguous item: 'co-workers comment about risk-taking' became two items 'co-workers encourage me to take

[1] Changes were as follows: 'I am interested in working safely' became 'I always try to work safely'; 'Haste at work influences risk taking' became 'pressure at work influences risk-taking'; 'foremen take care of workplace safety' became 'supervisors look after workplace safety', 'co-workers comment about risk-taking' became 'Co-workers disapprove of people taking risks at work', 'I emphasise safety in my work habits' became 'I always make sure I work safely'.

risks' and 'co-workers disapprove of people taking risks at work'. One new item ' I always make sure I work safely' replaced two others: 'I emphasise safety in my work habits' and 'I am interested in working safely'. Learners answered on a five point scale from 'completely disagree' through 'don't know' to 'completely agree'.

- **Work habits.** The five items from the work habits subscale of the Workers' Assessment of Safety Action and Work Habits scale (Saminen and Seppala, ibid.) were modified for purposes of clarity and included within the safety climate section of the questionnaire. These related to the use of safety switches, knowledge of fire extinguishers, easy access to first aid, availability of personal protective equipment and guidelines on health and safety. The original item relating to PPE in this scale asked about the availability of PPE; we re-worded this to become 'where PPE is required, it is always provided' and added a further item relating to enforcement of its use: 'if PPE is required, supervisors always make sure we use it'. Learners answered on a five point scale from 'completely disagree' through 'don't know' to 'completely agree'.

- **Group Safety Climate**. Six of the ten items from the Zohar (2000) Group Safety Climate scale were reworded slightly to improve clarity and included in the next section of the questionnaire, with a five point scale from 'completely disagree' to 'completely agree'.

- **Unrealistic optimism**. Six items were designed to assess the extent to which the individual was unrealistically optimistic. These asked 'how likely are you to have an accident at work?' (and the average apprentice to do so); 'how likely are you to suffer an injury at work?' (and the average apprentice to do so); and' how likely are you to suffer from an occupational illness such as dermatitis or respiratory problem?' (and the average apprentice to do so).

- **Conscientiousness**. Eight items contribute to the Conscientiousness factor of Saucier's Mini-markers scale (Saucier, 1994). In keeping with Saucier's methodology, individuals were asked to assess themselves on a nine-point scale from 'extremely inaccurate (not at all like me)' to 'extremely accurate (exactly like me)'. The eight items were: efficient, organised, systematic, practical, disorganised, sloppy, inefficient and careless. To serve as foils, a further eight items were included: talkative, bold, energetic, shy, quiet, cooperative, creative and extroverted.

- **Cognitive failure**. Lastly, individuals were asked to assess themselves on the Workplace Cognitive Failure Scale (Wallace and Chen, 2005). This fifteen item scale asks individuals how often they find that they have forgotten work-related items or failed to attend to a matter (eg turn off equipment; listen to what a colleague was saying). The items are assessed on a five point scale from 'never' to 'constantly'.

2 Procedure

During 2007, four of the organisations which had participated in the Safe Learner pilot were contacted and agreement to participate in the extension research was gained from three: Leeds College of Building, JTL and Barnsley College. At each site tutors gave learners an information sheet about the research and asked those learners who were willing to participate to sign a consent form.

A set of first and subsequent years' questionnaires was printed and sent to each of the providers, along with the requisite number of £10 Love2Shop vouchers for providers to give to the learners as a reward for their participation. The questionnaires were distributed to the three sites who had distributed those for first year learners early in the autumn term, before the learners had started received any health and safety training. Questionnaires for second and third year learners were distributed later on, as and when tutors met with them. Following receipt of the completed questionnaires, the tutors gave learners the £10 voucher and each learner signed a receipt confirming that they had received the £10. Providers returned the completed questionnaires and receipt forms, along with any spare vouchers, to IES.

The questionnaire data were analysed using the SPSS version 16 software package.

2.1 Distribution of questionnaires and responses

The numbers of questionnaires distributed and returned are shown in Table 2.1.

Table 2.1: Questionnaires distributed and returned

	Distributed	Returned
Leeds College of Building	105	105
JTL	150	96
Barnsley College	100	33
Total	355	234

Source: IES survey of apprentices, 2007

3 Analyses

Analysis of the survey outcomes are reported in this chapter.

3.1 Profile of learners

A total of 234 completed questionnaires were returned. Distribution of learners across entry level (level 1) and years of apprenticeship is shown in Table 3.1.

Table 3.1: Distribution of learners across level and year of programme

Level of qualification	Year of programme	Number of learners
Level 1	First year	26
	Second year	2
	Third year	1
Level 2	First year	65
	Second year	23
	Third year	2
Level 3	First year	77
	Second year	16
	Third year	13
Total		225

Source: IES survey of apprentices, 2007

Table 3.2 shows the age distribution of learners who participated in the research.

Table 3.2: Age range of learners

Age in years	Number of learners
16	75
17	61
18	39
19	18
20	13
21	8
22	4
23 +	7
Total	225

Source: IES survey of apprentices, 2007

Table 3.3 shows the mean, minimum and maximum length of time the learners had spent in employment. Year one apprentices had been in employment on average for just over two years[1], with one the minimum being less than a month's experience and the maximum having been in employment for over seven years (a total of 17 had been in employment for less than a year); second year apprentices on average had been in employment for just over 30 months and third year apprentices for an average of four years.

Table 3.3: Length of employment by level and year of apprenticeship

Year	Level of apprenticeship	N	Mean number of months in employment	Minimum number of months employed	Maximum number of months employed
1	Level 1	9	21.9	4.0	61.0
	Level 2	16	20.1	2.5	58.0
	Level 3	25	30.7	0.0	87.0
	All	50	25.7	0.0	87.0
2	Level 1	1	82.0	82.0	82.0
	Level 2	9	28.8	15.0	60.0
	Level 3	8	26.0	14.0	40.0
	All	18	30.5	14.0	82.0
3	Level 2	1	47.0	47.0	47.0
	Level 3	6	48.3	12.0	80.0
	All	7	48.1	12.0	80.0

Source: IES survey of apprentices, 2007; note that many apprentices were excluded from this analysis as they did not give information to one or more of these questions

[1] The table reveals that one level 1 learner had been in employment for 82 months. If this outlier is removed from the calculation, the mean length of employment for year 2 apprentices falls from 30.5 to 27.5 months.

3.2 Health and safety induction at work

All employees should receive a health and safety induction, or information about health and safety as part of their general induction to work. The Safe Learner blueprint requires employers to sign up to provide a full health and safety induction for apprentices. Over one-fifth of the learners surveyed (22 per cent) said they had received no health and safety induction. Most of those who said they had received no health and safety induction were in their first year, so it is possible that employers were merely slow in arranging this aspect of induction, although in principle this should be provided as early as possible. Neither is forgetfulness likely to be an explanation: if apprentices were simply forgetting that they had received some H&S induction then the proportion reporting no H&S induction would be expected to rise with distance from induction, that is, a higher proportion of second and third years would be expected to say this than first years.

Table 3.4: Proportion of learners who reported receiving health and safety induction from employer (%)

	Year of apprenticeship			
	First year	Second year	Third year	Total
Received H&S induction from employer	77.9	72.5	93.3	78.0
Did not receive H&S induction from employer	22.1	27.5	6.7	22.0
Base N	172	40	15	227

Source: IES survey of apprentices, 2007

Those who had received a health and safety induction were asked what topics it had covered. Table 3.5 shows the responses. The proportions shown are for those who had reported receiving a health and safety induction.

Table 3.5: Topics covered in health and safety induction (%)

Topics covered	Covered in induction	Not covered in induction	Not covered but not relevant
Emergency arrangements (fire, accidents, first aid)	91.9	3.2	4.8
Any significant risks you may face in the workplace (eg hazardous substances, manual handling, etc.)	86.0	6.5	7.5
Control measures for those risks (eg safe ways of working, protective measures)	91.9	4.8	3.2
Supervision arrangements and contact person for health and safety concerns?	87.4	9.3	3.3
Any restrictions that prevent you from working eg on certain equipment or in certain areas while you are still training?	81.2	7.0	11.8
Any personal protective equipment or clothing you should use?	94.6	3.2	2.2
Welfare arrangements, such as food & drink, toilets, washing, hours?	82.2	10.3	7.6
The company's safety policy and 'dos and don'ts'?	87.6	7.6	4.9

Source: IES survey of apprentices, 2007

The data suggest that while most employers are covering most areas of health and safety, there are some odd omissions. While we did give learners the opportunity to say where they felt that any issues were not relevant to their situation, it is difficult to see in quite what circumstances emergency arrangements (first aid, fire and accidents) would not be relevant. Without the ability to check against the actual induction programmes, though, it remains possible that these reports of gaps in coverage are attributable more to learners' inattention to some parts of the induction.

3.3 Health and safety instruction

Before starting work, just over half (57.3 per cent) had been told about health and safety issues by their school or work placement organisation.

The earlier Safe Learner evaluation had suggested that supervisors play a key role in helping young people to build up a sound knowledge base of health and safety information. In general, those young people who said that their workplace supervisor talked to them about health and safety issues scored more highly on the health and safety test (Miller and Hunt, 2007).

There are, of course, other people in the workplace who may be instrumental in focusing young learners' attention on health and safety issues. We therefore asked learners whether they had received any health and safety instruction from their workplace supervisor, their health and safety manager, their trade union health and safety representative, from a trainer, advisor or consultant or from any other individual. Table 3.6 shows the proportions of apprentices who reported receiving health and safety instruction from these various sources.

Table 3.6: Proportions of apprentices who reported receiving health and safety instruction from people in work/external to the organisation

Work role	% of apprentices saying individual gave instruction about health and safety
Workplace supervisor	44.9
Health and safety manager	18.8
Trade union health and safety representative	10.3
Other workplace individual	23.9
People external to the workplace: trainers, advisors, consultants	17.1

Source: IES survey of apprentices, 2007

Fewer than half of the apprentices said that their supervisor gave them instructions about health and safety at work. The apprentices' supervisors appear to be their main source of health and safety instruction outside of college or training provider environment; less than one-fifth of apprentices said that their health and safety manager gave them instruction and only one in ten said that their trade union health and safety representative gave them any health and safety instruction (although given

that some of the employing companies are quite small this might be more related to lack of trade union representation than to lack of activity).

Appendices 1-5 present the details that apprentices gave regarding the type of instruction that was given by these individuals. The largest groups of responses referred to general points ('do's and don'ts' 'general health and safety' 'just telling what to do and what not to do'), safe use of equipment ('how to use tools safely' 'power tool safety' 'toolbox talks') and ensuring safe work practices and use of PPE ('told to wear safety equipment', 'gave brief details at work about the risks of injury you can have', 'gives me PPE and tells me how to use it'). Some supervisors, however, clearly do take their responsibilities seriously. One apprentice said that their supervisor told them about:

> *'Safe ways of working, protective clothing that must be worn, hours, wages, supervision arrangements, significant risks'*

However, it was left to a person external to one apprentice's workplace to tell them:

> *'Not to use unsafe scaffold'*

3.3.1 How useful is health and safety training to young people?

Second and third year learners were asked whether they could recall any occasions when the health and safety training that they had received had helped them to avoid an accident or incident or assist some who was involved in an accident or incident. Eight of the second and third year learners said that it had; of these, five gave general examples of how it had improved their practice in general:

> *'More aware of dangers, more cautious'*

> *'Tripping over bits of re-bar at work, I pick them up'*

Three gave specific examples either of their changed behaviour or incidents they had been able to respond to:

> *'A stone fell on a [man's] leg, I kept the man calm and still and kept him company while we informed the hospital and first aider. Wrote it up in the accident book.'*

> *'When a lad fell off the scaffolding I knew who to tell.'*

Appendix 6 reports the comments appendices made regarding the occasions when safety information has been useful to them to avoid an accident or help someone who had had an accident.

3.3.2 Gaps in health and safety instruction

The second and third year learners were also asked if they could think of a situation where they would have liked more health and safety knowledge to help them to deal

with the situation or incident. Just six said they would. One said they would like more information about everything. Some pointed to specific issues, such as safety at heights (two identified this) and storing materials for short periods of time. One said they would have liked more knowledge to help them deal with the situation when a workmate had an accident. One report though raises real concerns:

'When working in workshop with loud machinery as it has damaged my hearing.'

Appendices 7-8 show the responses given by apprentices on additional information they would have liked and areas of health and safety that should have more coverage.

3.4 Supervision at work

The earlier evaluation had indicated that a sizeable proportion of young people in the Safe Learner group were left to work unsupervised. No additional information was gathered on this point in the evaluation and it was agreed that this was an important issue to follow up in the next stage of the work. Therefore, in the questionnaire, learners were asked whether they were ever left to work unsupervised and, if so, for how long and how frequently.

Table 3.7 shows the proportions of apprentices who reported being left to work unsupervised, broken down by qualification level and age.

Table 3.7: Numbers of apprentices left to work unsupervised, by age and level of qualification

Supervision	Level of apprenticeship	Learner age 16	17	18	19	20 +	All	%
Not left unsupervised	1	9	1	1	0	2	13	50.0
	2	6	8	4	2	2	22	25.3
	3	22	16	5	3	7	53	52.0
Total not left unsupervised		37	25	10	5	11	88	40.9
% not left unsupervised		50.7	43.1	28.6	27.8	35.5	40.9	-
Left unsupervised	1	6	3	1	1	2	13	50.0
	2	18	18	11	9	9	65	74.7
	3	12	12	13	3	9	49	48.0
Total left unsupervised on occasions		36	33	25	13	20	127	59.1
% left unsupervised on occasions		49.3	56.9	71.4	72.2	64.5	59.1	-
Base		73	58	35	18	31	215	-

Source: IES survey of apprentices, 2007

The responses reveal that a sizeable proportion of apprentices are left unsupervised at times. While it might be acceptable for older apprentices, and those at level 3, to be left to work unsupervised, the data reveal that sizeable proportions of very young, unqualified learners are also being left unsupervised. However, this might be for just short periods of time, or just on occasions when a supervisor cannot avoid being away

from where the learner is working. For this reason we asked apprentices how long they were usually left unsupervised. Their responses are shown in Table 3.8.

Table 3.8: How long left to work unsupervised, by age and level of qualification

Level of apprenticeship	How long unsupervised	Learner age 16	17	18	19	20 +	All	%
1	A few minutes	2	0	0	0	0	2	15.4
	Up to half an hour	1	1	0	0	1	3	23.1
	Up to an hour	2	2	0	1	0	5	38.5
	Up to a couple of hours	0	0	0	0	1	1	7.7
	Up to a day	1	0	1	0	0	2	15.4
	Total, level 1	6	3	1	1	2	13	-
2	A few minutes	5	1	0	1	0	7	11.3
	Up to half an hour	2	4	3	0	1	10	16.1
	Up to an hour	1	2	1	2	0	6	9.7
	Up to a couple of hours	6	7	5	5	4	27	43.5
	Up to a day	2	4	2	1	3	12	19.4
	Total, level 2	16	18	11	9	8	62	-
3	A few minutes	6	2	3	1	1	13	26.5
	Up to half an hour	4	2	4	0	3	13	26.5
	Up to an hour	1	4	0	2	0	7	14.3
	Up to a couple of hours	1	4	5	0	1	11	22.4
	Up to a day	0	0	2	0	3	5	10.2
	Total, level 3	12	12	14	3	8	49	-
Total left unsupervised on occasions		34	33	26	13	18	124	-
% left unsupervised on occasions		46.6	56.9	74.3	72.2	58.1	57.7*	-
Base		73	58	35	18	31	215	-

* Missing responses account for difference in total per cent unsupervised reported here compared to Table 3.7

Source: IES survey of apprentices, 2007

Table 3.8 reveals that a sizeable proportion of young learners are being left unsupervised for up to a day at a time. Table 3.9 shows an overview of the same data, with level removed as a factor.

Table 3.9: Numbers of apprentices left to work unsupervised, by age

How long unsupervised	16	17	18	19	20+	Total	%
A few minutes	13	4	3	2	1	23	17.7
Up to half hour	9	7	7	0	5	28	21.5
Up to an hour	4	8	1	6	0	19	14.6
Up to a couple of hours	8	12	10	5	6	41	31.5
Up to a day	3	4	5	1	6	19	14.6
Total	37	35	26	14	18	130	-

Source: IES survey of apprentices, 2007

The table shows that 29.7 per cent of 16 year olds were being supervised for periods over an hour, and nearly half of 17 year olds (45.7 per cent) were being left unsupervised for periods over an hour. By the time they have reached the age of 20 or over, two-thirds of learners were being left to work unsupervised. While this may perhaps be of less concern, given their relative maturity, it should not be assumed that these older people are more experienced: only 44.4 per cent of this older group were registered on level 3 awards.

Table 3.10 shows the data summarised for level, with age removed as a factor

Table 3.10: Numbers of apprentices left to work unsupervised, by level of qualification

	Level of apprenticeship				
	1	**2**	**3**	**Total**	**%**
A few minutes	2	7	13	22	17.7
Up to half hour	3	10	13	26	21.0
Up to an hour	5	6	7	18	14.5
Up to a couple of hours	1	27	11	39	31.5
Up to a day	2	12	5	19	15.3
Total	13	62	49	124	-

Source: IES survey of apprentices, 2007

The data show that three (23.1 per cent) of the learners at level 1 had been left unsupervised for more than an hour, 12 (19.4 per cent) of the learners at level 2 had been left unsupervised for up to a day, and 27 (43.5 per cent) of level 2 learners had been left unsupervised for up to a couple of hours.

Do these findings matter?

It was suggested to the researchers that learners may have misinterpreted this question. Rather than asking whether their supervisor was absent, it is possible that they had assumed we were asking whether the learners were allowed to proceed with work activities without close supervision (inspection) by their supervisor.

If this was the case, then one might not expect there to be very much impact of the above findings. We therefore looked at the rates of reporting of incidents occurring to these learners and of incidents they witnessed in the workplace. Tables 3.11 and 3.12 show the outcomes of these analyses.

Table 3.11: Percentage of apprentices who have had an accident or incident at work, analysed by whether or not left to work unsupervised

Have you personally ever had an accident or incident at work?	Are you ever left to work unsupervised		
	No	Yes	Total N
Not had accident or incident	88.9	69.7	172
Have had accident or incident	11.1	30.3	50
Base N	90	132	222

Source: IES survey of apprentices, 2007

Table 3.11 shows that some 11.1 per cent of learners who had not reported being left unsupervised had experienced some type of accident or incident at work, compared to 30.3 per cent of those who had been left unsupervised. In other words, nearly three times as many learners who report being left unsupervised experience some type of accident or incident, compared to those who do not report being left unsupervised.

A similar pattern is also seen in table 3.12. The data in this table reveal that those who reported they were left to work unsupervised were also more than two and a half times more likely to report having seen a colleague have an accident or incident than those who did not report being left unsupervised: while just 13.3 per cent of those who had not been left unsupervised had witnessed colleagues have accidents, more than a third – 36.1 per cent – of those who were left unsupervised at work had witnessed colleagues have accidents.

Table 3.12: Percentage of apprentices who have seen a colleague have an accident or incident at work, analysed by whether or not left to work unsupervised

Have you ever seen a colleague have an accident or incident at work?	Are you ever left to work unsupervised		
	No	Yes	Total N
Not seen colleague have accident or incident	86.7	63.9	163
Have seen colleague have accident or incident	13.3	36.1	60
Base N	90	133	223

Source: IES survey of apprentices, 2007

Table 3.13 presents the personal accident and supervision data from 16 and 17 year olds only. The table reveals that at 16, those who reported being left unsupervised were twice as likely to report having had an accident as were those who were not left unsupervised (23.1 per cent compared to 10.5 per cent). By the time they reach 17, unsupervised learners have a 40 per cent chance of having an accident or incident compared to under eight per cent of those who are supervised all the time.

Table 3.13: Numbers of 16 and 17 year olds who had had an accident or incident at work

Have you personally ever had an accident or incident at work?		Not left unsupervised	Left unsupervised	Total
Age 16	No	34	30	64
	Yes	4	9	13
% that had had accident		10.5	23.1	16.9
Age 17	No	24	21	45
	Yes	2	14	16
% that had had accident		7.7	40.0	26.2

Source: IES survey of apprentices, 2007

These findings, that significantly higher reports of accidents and incidents are occurring in the workplaces where learners report a lack of supervision, support our contention that learners are, in fact, accurately reporting fairly substantial negations of supervisory duty through their reports of being left unsupervised. The higher rates of accidents amongst learners in these workplaces indicate inadequate supervision; the higher rates of accidents amongst colleagues suggest that this is part of a wider cultural disregard for health and safety.

3.4.1 Discussing health and safety issues at work

Discussions with workplace supervisors

First year apprentices were asked two questions about the extent to which their supervisor discussed health and safety with them. These asked whether their supervisor discussed workplace health and safety issues with them and whether their supervisor ever told them about, or discussed with them, any particular workplace activities that s/he felt were risky or dangerous.

Second and third years were also asked whether their supervisor ever discussed with them what they were being taught about health and safety by their college or training organisation. First year learners were not asked this question because the survey was timed for before their first health and safety induction and hence their supervisor could not realistically have been expected to have discussed this with them yet.

To ascertain the extent to which the issue of lack of supervision is a key indicator of poor health and safety culture in general, these three questions were crossed with whether or not learners were left unsupervised in work.

Table 3.14: Proportion of learners who report that supervisors discuss health and safety issues with them (%)

	Supervisor discusses workplace H&S issues with you?			
	Yes, often	Yes, occasionally	No, never	Total N
Not left unsupervised	21.1	74.4	4.4	90
Left unsupervised	25.4	51.5	23.1	134
Base N	53	136	35	224

Source: IES survey of apprentices, 2007

Table 3.14 shows that nearly a quarter (23.1 per cent) of those who were at times left unsupervised said that their supervisor never discussed workplace health and safety issues with them, compared to just 4.4 per cent of those who were not left unsupervised.

Similarly, more of the 'unsupervised' apprentices said their supervisor never discussed risky or dangerous activities with them, compared to just 8.9 per cent of those who were constantly supervised. These data are shown in Table 3.15, below.

Table 3.15: Proportion of learners who report that supervisor discusses risky activities with them (%)

	Supervisor discusses risky activities with you?			
	Yes, often	Yes, occasionally	No, never	Total N
Not left unsupervised	37.8	53.3	8.9	90
Left unsupervised	33.6	49.3	17.2	134
Base N	79	114	31	224

Source: IES survey of apprentices, 2007

Table 3.16 shows a third question on this topic that was only included in the version of the questionnaire given to second and third year apprentices. This asked apprentices whether their workplace supervisor ever discussed with them what they had learnt about health and safety at their college or training organisation.

Table 3.16: Proportion of learners who report that supervisor discusses what they have learnt about health and safety at college/training provider with them (%)

	Supervisor discusses what you have learnt about H&S at college/training organisation?			
	Yes, often	Yes, occasionally	No, never	Total N
Not left unsupervised	16.7	66.7	16.7	6
Left unsupervised	18.2	45.5	36.4	33
Base N	7	19	13	39

Source: IES survey of apprentices, 2007

Just 39 people answered this question; of these, 19.5 per cent said that their supervisor often discussed what they learnt about health and safety with them and 48.8 per cent

said they occasionally did so. Examining these data for differences between those left unsupervised or not, the analysis is rendered difficult by the very small number of individuals in this group who report not being left unsupervised. The data for this particular analysis are, therefore, not robust. So far as any reliability can be placed on these data, they suggest that, in the small group that was not left unsupervised, just one person, (16.7 per cent of that group) said their supervisor never discussed health and safety training with them, while in the group that did report being left unsupervised, twelve individuals (36.4 per cent) said that their supervisor did not discuss this with them. Conversely, more of the group who were not left unsupervised reported that their supervisors occasionally discussed this with them (66.7 per cent compared to 45.5 per cent), although there was no real difference between the proportions reporting that their supervisor often did so (16.7 per cent compared to 18.2 per cent).

Discussions with trade union representatives

Returning to look at the group of apprentices as a whole, it appears that where there is good supervisory practice this is part of – or alternatively, that this contributes to – good health and safety practice in general. Table 3.17 shows the proportions of apprentices who reported that their trade union representative discussed workplace health and safety issues with them and told them about risky activities. Again we have grouped the apprentice responses according to whether they had previously said that they were left to work unsupervised or not.

Table 3.17: Trade union involvement in workplace health and safety (%)

	Yes, often	Yes, occasionally	No, never
Trade union rep discusses health and safety issues relating to your work with you			
Not left unsupervised	13.6	23.5	63.0
Left unsupervised	8.7	21.3	70.1
Base N	22	46	140
Trade union rep tells you about workplace activities they feel are risky or unsafe?			
Not left unsupervised	11.2	26.2	63.5
Left unsupervised	7.1	23.8	69.0
Base N	18	51	137

Source: IES survey of apprentices, 2007

The data reveal that more of the apprentices from workplaces where apprentices are never left unsupervised, report that their trade union representatives discuss health and safety issues with them and talk to them about risky or dangerous activities, than do the apprentices from workplaces where they are left unsupervised.

We do not know whether this is because trade unions are less frequently represented within the poorer workplaces, or because what trade union representatives there are in these workplaces are acculturated to the general lack of interest in health and safety

issues. Quite likely it is a combination of the two. Whatever the reason, the message seems to be that supervisory absence is a key indicator of a lack of health and safety awareness that runs throughout the culture of these organisations and is evidenced by a range of other factors such as a failure of both supervisors and trade union representatives to take an interest in apprentice health and safety.

Supervision and behaviour at work

This next section focuses on the relationship between risky behaviour and supervision. Tables 3.18 and 3.19 present the data for all the learners surveyed for two questions that focused on risky activities in the workplace.

Table 3.18: Are any of the activities you undertake risky or dangerous, by whether or not ever left unsupervised (%)

	Are any of the activities you undertake risky or dangerous?			
Ever left to work unsupervised?	**Yes, often**	**Yes, occasionally**	**No, never**	**Total N**
Not left unsupervised	13.3	24.4	62.2	90
Left unsupervised	12.1	48.5	39.4	132
Base N	28	86	108	222

Source: IES survey of apprentices, 2007

Table 3.18 shows that while nearly two-thirds of those apprentices who are never left unsupervised report that they never undertake risky or dangerous activities (62.2 per cent), just 39.4 per cent of those who are left unsupervised say this. Twice the proportion of those left unsupervised say that they occasionally undertake risky or dangerous activities at work compared to those who are constantly supervised (48.1 per cent compared to 24.4 per cent).

A similar pattern is seen in Table 3.19 for the question that asked whether their colleagues ever undertake risky or dangerous activities. Those learners who report being left unsupervised are also more likely than those who are constantly supervised to say that their colleagues often undertake risky activities (17.3 per cent compared to 12.0 per cent) or occasionally do so (54.1 per cent compared to 44.4 per cent) and are consequently far less likely to say their colleagues never take risky actions (28.6 per cent compared to 45.5 per cent).

Table 3.19: Are any of the activities your colleagues undertake risky or dangerous, by whether or not ever left unsupervised (%)

	Are any of the activities your colleagues undertake risky or dangerous?			
Ever left to work unsupervised?	**Yes, often**	**Yes, occasionally**	**No, never**	**Total N**
Not left unsupervised	10.0	44.4	45.6	90
Left unsupervised	17.3	54.1	28.6	133
Total N	32	112	78	223

Source: IES survey of apprentices, 2007

3.4.2 Sector and size of employer

The data were examined to determine whether there are any differences in patterns of supervision and accidents arising from size of employer or sector in which the young person is employed. The findings from these analyses suggest that there is no significant difference in either accident rates ($X^2 = 0.18$, p = n.s.), incident rates ($X^2 = 0.28$, p = n.s.) or quality of supervision (at least, in terms of health and safety discussion ($X^2 = 2.94$, p = n.s.) and being left unsupervised ($X^2 = 0.81$, p = n.s.) in micro, versus other sized companies. However, learners in carpentry and joinery report more accidents ($X^2 = 24.53$, $p < 0.001$) and incidents than other sectors ($X^2 = 23.27$, $p < 0.001$) and in addition more report working unsupervised ($X^2 = 22.30$, $p < 0.001$). Additionally, there was a significant difference between carpentry and joinery and other learners in the extent to which they report that their supervisor discusses health and safety issues with them ($X^2 = 15.98$, $p < 0.001$), with the supervisors of carpentry and joinery learners being less likely to do so.

We move next to consider organisational and individual factors in health and safety.

3.5 Influences on learner behaviours at work

3.5.1 Outcome measures

Scales used as outcome (dependent) measures

In the preceding analyses, learners' accounts of whether or not they had had, or witnessed, an accident were used as outcome or dependent measures. These are relatively objective measures of safety outcomes. In this section, we have also used learners' self-assessments on the Frequency of Unsafe Workplace Behaviours scale as an additional outcome measure.

3.5.2 'Input' measures

The research was designed to explore the impact of organisational and training factors on the development of safe practice. Here we describe the various measures that were used to assess the factors that were hypothesised to contribute towards the development of safety behaviours and outcomes.

Measures of organisational safety attitudes

Four measures of organisational safety attitudes were included within the study: the Salminen and Seppala (2005) safety climate questionnaire; the Zohar (2000) Group Safety Climate scale; and the Salminen and Seppala measure of safe work habits. In addition, three items to measure role overload were included.

Safety climate

The Salminen and Seppala (2005) safety climate scale asks learners about attitudes to safety amongst managers, supervisors and colleagues. Twelve of the 14 items in the original scale were used in the study. An aggregate score was calculated by summing across the items, with scores for reverse-scored items first transposed, so that a higher score equates to a safer climate at work.

An analysis of variance was conducted with learners grouped according to whether or not they had had an accident. Learners who had had an accident worked in environments that they assessed as having a significantly poorer safety climate, as measured via the organisational safety climate scale (X no accident 49.3; X accident 45.5, df 1,219, $F = 10.84$, $p = .001$).

Very similar figures were seen when the organisational safety climate ratings were compared for those who had seen a colleague have an accident. Those who had seen a colleague have an accident gave a significantly lower assessment of the safety climate in their organisation than did those who had not worked with colleagues who had had an accident (no accidents, X = 49.52; accidents X = 45.52; df 1,222, $F = 12.64$, $p < 0.001$). In other words, in workplaces where the safety culture is not viewed very positively, learners and their colleagues are more likely to have an accident.

Those learners who work in workplaces with lower safety culture ratings are more likely to admit to engaging in unsafe workplace behaviours. Pearson product-moment correlation of learners' scores of their own frequency of unsafe workplace behaviours on the Hoffman and Stetzer (1996) scale with their assessment of the workplace safety culture in their place of employment revealed a significant inverse correlation between the two measures ($N = 166$, $r = -.305$, $p = 0.001$). In other words, young people who work in environments that have a weaker safety culture are more likely to engage in unsafe workplace behaviours.

Safety action and work habits

The Salminen and Seppala (2005) work habits scale asks five questions that assess safe work habits within an organisation: whether employees are given safety guidance; accessibility of PPE; whether employees are given information regarding the location of safety switches; a similar question regarding the location of fire extinguishers; and information on access to first aid.

Analysis of variance reveals that learners who have had accidents or incidents are significantly more likely to assess their workplace as having a lower score on the safety action and work habits scale (X no accidents = 19.85; X accidents = 18.12; df1,219, F = 7.15, p = .008). There is a similar, but stronger, effect when learners are grouped into those who have witnessed, or not witnessed, a colleague have an accident. In other words, learners whose colleagues have had accidents assess their workplaces as being significantly poorer on safety actions and work habits (X no accidents = 20.02; X accidents = 18.02; df 1,220, F = 10.75, p = .001).

It is also worth reporting that young people working in workplaces that pay less attention to safe work habits admit to more cognitive failures than those young people in work environments that pay more attention to safe work habits. Correlation of the work habits scale and the cognitive failures scale shows a moderate, but statistically significant, inverse relationship between the two constructs (N = 224, r = -.221, p = 0.001). In other words, young people in work environments which pay more attention to safe work habits are less likely to lose concentration and work focus. Again, it is not possible to determine whether this is because safer workplaces tend to select more diligent young workers, or because safer workplaces encourage their employees to stay focused on the task in hand.

Group safety climate

The Zohar group-level scale of safety climate contains items that measure two factors: safety actions and safety expectations. Learners who had not been involved in accidents or incidents at work gave higher composite scores on this measure, than did those who had been involved in an accident or incident (X no accident = 24.4; X accident = 22.7; df 1,221. F = 4.78, p = .03).

As with the Salminen and Seppala measure of safety climate a similar, but rather more statistically robust finding was obtained for the analysis of incidents involving colleagues. Those who had seen an accident or incident involving a colleague gave lower assessments of group safety climate than did those who had not seen an accident or incident involving a colleague (X no accident = 24.5; X accident =22.6; df = 1,222, F = 7.21, p = .008).

Role overload

Role overload is the extent to which a member of staff feels pressurised in their job. It has been hypothesised to be positively related to workplace cognitive failure (Wallace and Chen, 2005). The three-item role overload scale of Cammann, Fichman, Jenkins and Klesh (1983) was used to assess this construct. For each learner a role overload score was computed by summing across the three scale items. Those learners that had been involved in an accident or incident gave slightly higher role overload scores than did those who had not been involved in accidents. Although slight, the difference was statistically significant (X no accident = 7.1; X accident = 7.9; df 1, 217, F = 5.35, p =.027). There was no difference in the role overload scores of those who had witnessed a colleague have an accident or not (F = 1.58, p = n.s.).

There was, however a significant positive correlation between reported role overload levels and frequency of unsafe behaviours (N =163, -.278 p < .001), that is, those who reported feeling pressurised also reported engaging in more unsafe behaviours. This suggests that role overload leads to increasing levels of unsafe behaviour which, in a proportion of cases, can result in accidents.

3.5.3 Individual differences

Two types of individual differences were assessed in the research: attitudes and traits. Learners' attitudes to the health and safety training were assessed by asking for their views on the relevance and utility of the training in health and safety they received. The two trait measures that were explored in the work were cognitive failure and conscientiousness.

In the following analyses we consider the impact of attitudes, cognitive failure and conscientiousness upon the outcome measures of whether or not the learner has had an accident or incident and the learner's own self-assessment of frequency with which they engage in unsafe behaviours.

Attitudes

A composite score for learners' assessment of the relevance and usefulness of the training was computed by summing across the relevance and usefulness scores given for all of the items.

Attitudes and accidents

The relevance and usefulness scores that were given by learners who been involved in an accident at work were compared with scores given by those who had not been involved in an accident at work.

Analysis of variance reveals that learners who had not been involved in an accident or incident at work rated the Safe Learner training as more relevant than did those who

had been involved in an accident or incident (X no accidents = 43.0, X accidents = 40.0, df 1,219, F = 6.14, p = 0.014). In other words, the more relevant the learner believed the health and safety training to be, the less likely they were to have had an accident.

The analyses also revealed that learners who had not been involved in an accident or incident also rated the Safe Learner training as more useful than did those who had been involved in an accident or incident (X no accidents = 42.4, X accidents = 38.5, df 1,213, F = 5.58, p = 0.019). The more useful a learner thought the Safe Learner training to have been, the less likely they were to have had an accident.

Attitudes and reports of unsafe behaviour

Learner scores on the relevance and usefulness were correlated with their self-reports of frequency of unsafe behaviours. Although there was a slight negative association in both cases, neither was statistically significant.

Cognitive failure

The young people who participated in the survey completed the Wallace and Chen (2005) Workplace Cognitive Failure Scale. This is a scale that assesses the extent to which an individual loses focus or concentration or suffers memory lapses at work.

Cognitive failure and accidents

Learners were grouped according to whether or not they had had an accident or incident at work and the two groups' scores for cognitive failures were compared. Those who had been involved in an accident or incident had significantly higher scores on the measure of cognitive failure (X no accident = 27.2; X accident = 31.7, df 1, 216, F = 10.14, p = .002). In other words, those learners who had reported having had an accident or incident were more likely to be those who were more prone to cognitive lapses.

Cognitive failure and frequency of unsafe workplace behaviours

For each learner, composite scores for cognitive failure and for frequency of unsafe workplace behaviours were computed. Correlation of these scores across learners revealed a significant positive relationship between the two measures (N = 162, r = .292, p < 0.001). In other words, those who were prone to more cognitive lapses were also more likely to say that they rushed jobs, used incorrect tools, did not use appropriate protective equipment and so on.

Cognitive failure and role overload

It should be noted that there is a weak (but statistically significant) positive correlation between role overload and cognitive failure (r = 0.21, N = 223, p = .002). In

other words, the more overloaded a young learner is at work the more likely he or she is to suffer some form of cognitive failure.

Conscientiousness

The learners' scores on the eight items of the conscientiousness sub-scale from the Saucier Mini-markers scale were summed to give an aggregate conscientiousness score. Analyses revealed that conscientiousness was positively correlated with perceived relevance of the safe learner training ($N = 228$, $r = .339$, $p < .001$) and with perceived usefulness of the safe learner training ($N = 221$, $r = .285$, $p < .001$).

Conscientiousness was also found to be inversely correlated with learners' tendency towards cognitive failure ($N= 226$, $r = -.290$, $p < .001$) but not to frequency of unsafe workplace behaviours ($N = 166$, $r = - .05$, $p =$ n.s.). In other words, learners who were more conscientious tended to have fewer cognitive lapses, but this was not related to the number of unsafe workplace behaviours they reported engaging in.

Conscientiousness was not found to be related to the learner's likelihood of having an accident or not. Although those who had not had an accident had slightly higher conscientiousness scores than did those who had (54.6 cf 52.5) the difference was not statistically significant (df 1, 218, $F = 1.445$, $p =$ n.s.).

Conscientiousness was positively correlated with the measure of safe workplace habits ($N = 226$, $r = .268$, $p < 0.001$) and with the measure of workplace safety culture ($N = 230$, $r = .238$, $p<.001$). These findings are difficult to explain. It is possible that young people working in safer organisations become more conscientious. It is equally possible that organisations that pay more attention to safe working practices also pay more attention to selecting more conscientious (and perhaps, also more mature) individuals. At present we have no evidence to support either interpretation. The fact that correlation of the learners' conscientiousness self-ratings with their age suggest that, as young learners age, they tend to become more conscientious ($N = 234$, $r = .172$, $p = .009$) do not really help to unpick this particular issue.

Learner assessments of workplace and group safety climate, frequency of unsafe behaviours, cognitive failure and role overload were entered into a series of analyses of variance in which the following items were used as pseudo-independent grouping variables:

- extent to which their workplace supervisor discusses health and safety issues with them
- extent to which workplace supervisor discusses risky activities
- extent to which TU representative discusses health and safety issues with them
- extent to which TU representative discusses risky activities
- extent to which colleagues engage in risky behaviours at work

- extent to which the learner engages in risky behaviours at work.

The outcomes of these analyses are summarised in Table 3.37 at the end of this chapter. The table shows that those who say that neither they nor their colleagues ever engage in risky behaviours give more positive scores to their workplace on measures of organisational and group safety climate; those who say their supervisor discusses health and safety issues and risky activities with them see the health and safety training they receive at college or training provider as being more relevant and useful; and those who report that their colleagues and themselves engage in risky activities at work give higher scores on the frequency of unsafe activities scale. In addition, learners who perceive the health and safety training they receive to be more relevant report engaging in fewer unsafe workplace behaviours.

Unrealistic optimism

Unrealistic optimism is the tendency to perceive negative events as being less likely to happen to oneself than to others, and, conversely, for positive events to be more likely to happen to oneself. We included measures of unrealistic optimism within the questionnaire because a tendency to believe that one is relatively immune to accidents could well serve to impede the adoption of safe behaviour at work (and elsewhere) and thereby undermine the effectiveness of the safe learning training input. Learners who think accidents at work are more likely to happen to other people than to themselves may see little reason to alter their own behaviour.

How likely are you to have an accident or injury at work or suffer from an occupational illness?

In this set of analyses we start by comparing apprentices' estimates of their own likelihood of having an accident or injury at work or suffering an occupational illness with their estimates of the likelihood of an 'average' apprentice of their own sex and age having an accident or injury or suffering from an occupational illness. For each of the three sets of questions (those relating to having an accident or incident; sustaining an injury; or suffering from an occupational illness) we then compare the likelihood estimates that were given by apprentices who had reported that they had, or had not, had an accident or incident since starting work with those given by apprentices who had not been involved in an incident.

For the sake of brevity, in this section where we refer to responses to the questions in which apprentices were asked how likely it was that something would happen to 'an average apprentice of your age and sex' we simply say 'the average apprentice'.

Accidents and incidents at work

Apprentices were asked to rate the likelihood that they would have an accident at work, and how likely it was that an average apprentice of their age and sex would

have an accident at work. They gave their estimates on a seven point scale, from 'extremely unlikely' to 'extremely likely', with 'don't know' as the mid-point. The percentage distribution of responses in each category are shown in Table 3.20, below.

Table 3.20: Comparison of apprentices' estimates of likelihood of themselves, or an average apprentice, having an accident or incident at work (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
You	12.0	14.5	32.9	17.9	15.4	2.1	2.1	227
An average apprentice of your age and sex	5.1	9.4	15.8	32.9	23.5	8.1	2.1	227

Source: IES survey of apprentices, 2007

The data reveal that, in keeping with theory, apprentices estimated their chance of having an accident at work as being lower than those of an 'average apprentice'.

If we examine these data by whether or not the apprentice has had an accident themselves, we can see that the estimates made by those apprentices who have had accidents have shifted, so that now these apprentices see accidents as more likely to happen to other apprentices than do those apprentices who have not had an accident previously (Table 3.21).

Table 3.21: Impact of having already had an accident on apprentice estimates of how likely it is that they will have an accident or incident (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
Apprentices who had not had an accident	13.1	16.7	36.3	19.6	11.9	1.8	0.6	168
Apprentices who had had an accident	5.9	11.8	27.5	15.7	29.4	3.9	5.9	51

Source: IES survey of apprentices, 2007

Next we looked at the impact that having had an accident themselves made to the apprentices' estimates of how likely it was that an average apprentice would have an accident or incident (Table 3.22).

Table 3.22: Impact of having already had an accident on apprentice estimates of how likely it is that an average apprentice will have an accident or incident (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
Apprentices who had not had an accident	5.4	10.1	17.3	35.1	22.6	7.7	1.8	168
Apprentices who had had an accident	2.0	5.9	15.7	31.4	29.4	11.8	3.9	51

Source: IES survey of apprentices, 2007

The data show that having witnessed an accident or incident also increased apprentices' estimates of the likelihood that an average apprentice would have an accident. However, the effect was less pronounced than for their estimates of their own likelihood.

Next, we looked at the impact of having witnessed a colleague having an accident upon the assessments made by apprentices on their own likelihood of having an accident, and an 'average apprentice's' chances of having an accident (Table 3.23).

Table 3.23: Impact of having witnessed a colleague having an accident upon the assessments made by apprentices on their own likelihood of having an accident (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
Apprentices who had not seen an accident	14.3	18.0	34.8	20.5	11.2	0.6	0.6	161
Apprentices who had seen an accident	3.4	8.5	32.2	13.6	20.5	6.8	5.1	59

Source: IES survey of apprentices, 2007

The data reveal that witnessing a colleague have an accident also has an impact on apprentices' estimates of how likely they are to have an accident. Those apprentices who had witnessed an accident at work thought it was more likely that they themselves would have an accident or incident at work (Table 3.24).

Table 3.24: Impact of having witnessed a colleague having an accident upon the assessments made by apprentices on the average apprentice's likelihood of having an accident (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
Apprentices who had not seen an accident	5.0	11.8	18.0	33.5	24.2	6.2	1.2	161
Apprentices who had seen an accident	3.4	1.7	13.6	35.6	25.4	15.3	5.1	59

Source: IES survey of apprentices, 2007

The data in Table 3.24 indicate that apprentices who had witnessed an accident at work also gave increased assessments of other apprentice's chances of having an accident.

Injuries at work

In this section we look at unrealistic optimism amongst apprentices in relation to their perceived likelihood of sustaining an injury at work. As before, we then go on to examine the impact of having already been involved in some sort of accident or incident and of witnessing a colleague have an accident or incident, on these assessments.

Table 3.25: Comparison of apprentices' estimates of likelihood of themselves, or an average apprentice, sustaining an injury at work (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
You	10.3	13.2	27.8	22.2	17.1	3.8	2.1	226
An average apprentice of your age and sex	6.4	9.4	18.8	33.3	19.7	6.4	2.6	226

Source: IES survey of apprentices, 2007

The data presented in Table 3.25 show that apprentices feel that they are personally less likely than an average apprentice to sustain an injury at work. More than half (51.3 per cent) of the apprentices who answered this question believed that they personally were unlikely to suffer an injury at work, whereas only 34.6 per cent said that an average apprentice was unlikely to suffer an injury at work.

Table 3.26: Impact of having already had an accident on apprentice estimates of how likely it is that they will sustain an injury (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
Apprentices who had not had an accident	10.8	15.0	29.9	24.0	15.6	3.6	1.2	167
Apprentices who had had an accident	5.9	11.8	25.5	21.6	23.5	5.9	5.9	51

Source: IES survey of apprentices, 2007

Table 3.26, above, shows that apprentices who had previously had an accident or incident saw themselves as more likely to sustain an injury than were those who had not had accidents. Some 35.3 per cent of apprentices who had been involved in an accident thought it was likely that they would sustain an injury, compared to 20.4 per cent of apprentices who had not been involved in an accident.

Table 3.27 shows the impact of having had an accident on apprentices' estimates of how likely they are to sustain an injury.

Table 3.27: Impact of having already had an accident on apprentice estimates of how likely it is that an average apprentice will sustain an injury (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
Apprentices who had not had an accident	7.2	10.2	19.2	36.5	18.6	7.2	1.2	167
Apprentices who had had an accident	0.0	7.8	21.6	29.4	27.5	5.9	7.8	51

Source: IES survey of apprentices, 2007

Only 27.0 per cent of apprentices who had not been involved in an accident or incident at work believed that an average apprentice would be likely to sustain an

injury at work compared to 41.2 per cent of those who had been involved in an accident or incident.

Next we examined the impact of witnessing a colleague having an accident or incident on apprentices' ratings of the likelihood of themselves or an average apprentice sustaining an injury at work. Table 3.28 sets out these data.

Table 3.28: Impact of having witnessed a colleague having an accident upon the assessments made by apprentices on their own likelihood of sustaining an injury (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
Apprentices who had not seen an accident	11.9	15.6	28.8	24.4	15.0	3.1	1.2	160
Apprentices who had seen an accident	3.4	10.2	30.5	20.3	23.7	6.8	5.1	59

Source: IES survey of apprentices, 2007

The data reveal that witnessing a colleague have an accident has an impact on apprentices' estimates of their likelihood of suffering an injury at work. Nearly twice as many of those who had seen an accident thought it was likely that they would suffer an injury as did those who had not witnessed an accident: in total, 35.6 per cent said it was likely, very likely or extremely likely that they would suffer an injury, compared to just 19.3 per cent of those who had not witnessed an accident.

Table 3.29: Impact of having witnessed a colleague having an accident upon the assessments made by apprentices on the average apprentice's likelihood of sustaining an injury (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
Apprentices who had not seen an accident	6.9	11.9	21.6	31.9	21.2	6.2	1.2	160
Apprentices who had seen an accident	1.7	3.4	18.6	42.4	18.6	8.5	6.8	59

Source: IES survey of apprentices, 2007

Table 3.29 shows the proportions of apprentices who thought it was likely that an average apprentice would suffer an injury at work, again with the data grouped for those who had witnessed, or not witnessed, an accident involving a colleague. While some 40.4 per cent of those who had not witnessed an accident said they thought it was unlikely that an average apprentice would suffer an injury at work, only 23.7 per cent of those who had colleague who had been involved in accidents or incidents thought this was unlikely.

Occupational illnesses

The next sets of analyses look at apprentices' assessments of the likelihood of acquiring an occupational illness such as dermatitis, muscular problem or respiratory

problem). Table 3.30 shows the apprentices' views of their own likelihood of acquiring an occupational illness alongside their views of how likely it is that an average apprentice would acquire an occupational illness.

Table 3.30: Comparison of apprentices' estimates of likelihood of themselves, or an average apprentice, acquiring an occupational illness (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
You	11.9	16.9	24.2	32.9	9.1	4.1	0.9	227
An average apprentice of your age and sex	8.2	12.8	18.7	43.4	12.3	3.2	1.4	227

Source: IES survey of apprentices, 2007

The data presented in Table 3.30 above show that for occupational illnesses too apprentices feel that they are personally less likely than an average apprentice to suffer an occupational illness. More than half (53.0 per cent) of the apprentices who answered this question believed that they personally were unlikely to suffer from an occupational disease, while just 39.7 per cent of them thought this was unlikely to happen to an average apprentice.

Table 3.31 shows the ratings for likelihood that they themselves would suffer from an occupational illness with the apprentices grouped according to whether or not they have had an accident or incident at work.

Table 3.31: Impact of having already had an accident on apprentice estimates of how likely it is that they will acquire an occupational illness (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
Apprentices who had not had an accident	10.1	12.5	19.6	42.3	12.5	2.4	0.6	168
Apprentices who had had an accident	2.0	13.7	15.7	47.1	11.8	5.9	3.9	51

Source: IES survey of apprentices, 2007

The data in Table 3.31 reveal that, even for this measure, there appears to be an impact of previous exposure to some sort of incident or accident at work. While 42.2 per cent of those apprentices who had previously not had an accident or incident said it was unlikely that they themselves would suffer from an occupational injury, this reduced to less than a third (31.4 per cent) amongst those who previously had been involved in an accident or incident.

Table 3.32 shows the impact of having had an accident or illness on apprentices' estimates of how likely an average apprentice is to suffer from an occupational illness.

Table 3.32: Impact of having already had an accident on apprentice estimates of how likely it is that an average apprentice will suffer an occupational illness (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
Apprentices who had not had an accident	10.1	12.5	19.6	42.3	12.5	2.4	0.6	168
Apprentices who had had an accident	2.0	13.7	15.7	47.1	11.8	5.9	3.9	51

Source: IES survey of apprentices, 2007

While 31.4 per cent of apprentices who had been involved in an accident or incident at work believed that an average apprentice would be likely to suffer from an occupational illness this rose to 42.2 per cent of those who had previously been involved in an accident or incident.

The last pair of analyses in this section examines the impact of witnessing a colleague having an accident or incident on apprentices' ratings of the likelihood of themselves or an average apprentice suffering from an occupational illness. Tables 3.33 displays these data.

Table 3.33: Impact of having witnessed a colleague having an accident upon the assessments made by apprentices on their own likelihood of suffering an occupational illness (%)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
Apprentices who had not seen an accident	13.7	16.8	23.6	37.3	6.2	2.5	0.0	168
Apprentices who had seen an accident	6.8	16.9	27.1	20.3	16.9	8.5	3.4	51

Source: IES survey of apprentices, 2007

The data reveal that witnessing a colleague have an accident has an impact on apprentices' estimates of their likelihood of suffering from an occupational illness. While just 8.7 per cent of those who had not witnessed a colleague have an accident believed it was likely that they would acquire an occupational illness, some 28.8 per cent of apprentices who had witnessed an accident believed it was likely that they would suffer from an occupational illness. Table 3.34 now considers the impact of witnessing an accident on the apprentices' estimates of the average apprentices' likelihood of acquiring an occupational illness.

Table 3.34: Impact of having witnessed a colleague having an accident upon the assessments made by apprentices on the average apprentice's likelihood of suffering an occupational illness (per cent)

	Extremely unlikely	Very unlikely	Unlikely	Don't know	Likely	Very likely	Extremely likely	Total N
Apprentices who had not seen an accident	10.6	13.0	19.3	42.2	11.8	2.5	0.6	161
Apprentices who had seen an accident	1.7	11.9	18.6	45.8	13.6	5.1	3.4	59

Source: IES survey of apprentices, 2007

The data in table 3.34 show that more of the apprentices who had previously witnessed an accident thought it was likely that an average apprentice would suffer from an occupational illness than did those who had not seen an accident: 22.1 per cent compared to just 12.9 per cent.

3.5.4 Predicting accidents

In order to determine the main predictors of likelihood of having an accident, a forward stepwise logistic regression was undertaken. This revealed that cognitive failure was the main predictor, followed by relevance of the health and safety training (or, more accurately, perceived lack of relevance). Together, these two variables account for almost 14 per cent of the variance in likelihood of the young person having an accident (Nagelkerke R Square = 0.139). This in turn suggests that cognitive failure and (perceived lack of) relevance of the training are significant predictors of an accident but it is not inevitable that one will occur.

Table 3.35: Significant terms in stepwise logistic regression

Variable	Model Log Likelihood	Change in -2 Log Likelihood	df	Significance of the change
Step 1 Cognitive failure	-66.839	6.824	1	0.009
Step 2 Cognitive failure	-64.890	7.154	1	0.007
Relevance	-63.433	4.239	1	0.039

Source: IES survey of apprentices, 2007

Given that 'working unsupervised' was associated with increased incidence of reports of accidents to learners and their colleagues it was of interest to determine why this variable (whether or not left unsupervised) had not emerged as a significant factor in this analysis.

A point-biserial correlation was conducted correlating learners' scores for relevance of the training and whether or not they worked unsupervised. Separate correlations were conducted for learners who had been in work for less than four months and for more than four months. Table 3.36 shows these correlations.

Table 3.36: Point-biserial correlation (Spearman's rho) between relevance of the health and safety training and whether or not left to work unsupervised and between usefulness of the health and safety training and whether or not left to work unsupervised; learners grouped by length of employment

	Employed < 4 months	Employed 4 months or more
Relevance of health and safety training	-.045	-.188
	N = 89	N =126
	non-significant	p = .012
Usefulness of health and safety training	-.115	-.212
	N = 85	N = 122
	non-significant	p = .003

Source: IES survey of apprentices, 2007

For those who had been in work for less than four months, there was no significant association between perceived relevance of the safe learner training and whether or not the learners worked unsupervised. For those who had been in work for more than four months there was a significant inverse association between perceived relevance of the training and whether or not they were left to work unsupervised. Those who had been in work for more than four months and were left unsupervised gave lower ratings of relevance of the training than did those who were not left unsupervised. The same was true for the learners' ratings of the perceived usefulness of the health and safety training. Again, amongst the longer-employed group, those who were left unsupervised felt the health and safety training was less useful than did those who were not left unsupervised.

In other words, it appears that learners quite quickly become acculturated to workplace attitudes to health and safety. Those who are in workplaces with a poor health and safety culture (as indicated by the fact of their being left to work unsupervised) perceive the training as less relevant and less useful than do those who work in workplaces where supervisors do not leave learners unsupervised.

Table 3.37: Summary of relationships between observed behaviours at work and development of attitudes towards health and safety training, assessment of safety climate, role overload, cognitive failure and conscientiousness

	Relevance of H&S training	Usefulness of H& S training	Frequency of unsafe behaviours	S&S safety climate	S&S safe work habits	Group safety climate	Role overload	Cognitive failure	Conscientiousness
Supervisor discusses work H&S issues	Higher relevance scores by those whose supervisors discuss work H&S	Higher usefulness scores by those whose supervisors discuss work H&S	n.s	Higher scores on work safety climate by those who say supervisor discusses work H&S	Higher scores on work safety habits by those who say supervisor discusses work H&S	Higher scores on group safety climate by those who say supervisor discusses work H&S	n.s.	n.s	Higher conscientiousness scores by those who say supervisor discusses work H&S
	<.001	.001		<.001	<.001	<.001			.021
Supervisor discusses risky activities	Higher relevance scores by those whose supervisors discuss risky activities	Higher usefulness scores by those whose supervisors discuss risky activities	n.s.	Higher scores on work safety climate by those who say supervisor discusses risky activities	Higher scores on work safety habits by those who say supervisor discusses risky activities	Higher scores on group safety climate by those who say supervisor discusses risky activities	n.s.	n.s.	n.s.
	.045	.007		.001	<.001	<.001			
TU rep discusses work H&S issues	Higher relevance scores by those whose TU reps **never** discuss work H&S	n.s.	n.s.	n.s.	n.s.	n.s.	Higher role overload scores by those whose TU reps discuss work H&S	n.s.	Lower conscientiousness ratings by those whose TU reps often discuss work H&S
	.014						.001		.003

	Relevance of H&S training	Usefulness of H& S training	Frequency of unsafe behaviours	S&S safety climate	S&S safe work habits	Group safety climate	Role overload	Cognitive failure	Conscientiousness
TU rep discusses risky activities	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	Higher role overload scores by those whose TU reps discuss work H&S	Higher cognitive failure score by those whose TU reps discuss work H&S	n.s.
							.001	.033	
Colleagues' actions are risky	Higher relevance scores by those whose colleagues **never** do risky things	n.s.	Higher frequency of unsafe behaviours by those whose colleagues do risky thing	Higher scores on safety climate by those who say colleagues **never** do risky things	Higher scores on work safety habits scale by those who say colleagues **never** do risky things	Higher scores on group safety climate by those who say colleagues **never** do risky things	Higher role overload scores by those who say colleagues do risky things	Higher cognitive failure score by those who say colleagues do risky things	n.s.
	.003		<.001	<.001	<.001	.014	.001	<.001	
Own actions are risky	Higher relevance scores by those who **never** do risky things	n.s	Higher frequency of unsafe behaviours reported by those who do risky things	Higher scores on safety climate by those who say they **never** do risky things	Higher scores on work safety habits scale by those who say they **never** do risky things	Higher scores on group safety climate by those who say they **never** do risky things	Higher role overload scores by those who say they do risky things	Higher cognitive failure score by those who say they do risky things	n.s.
	.011		.001	<.001	.01	.02	.001	.001	

4 Discussion

We briefly discuss the many issues this research has raised before presenting our conclusions.

4.1.1 Supervision

In keeping with the findings from the earlier Safe Learner evaluation, many of these learners were regularly being left unsupervised. It was suggested to the research team that this finding may have arisen from apprentices misunderstanding the meaning of the question. They may have thought the question meant a lack of close supervision of work, rather than an absence of the supervisor from the immediate work environment. While it is possible that this is the case, some of the additional analyses we undertook imply that learners were in fact reporting on actual absence of supervisors. Three times as many of the apprentices who reported being left unsupervised reported that they had been involved in an accident or incident at work as did those who did not report being left unsupervised. Nearly three times as many of those left unsupervised also reported that colleagues had been involved in accidents or incidents than did those not left unsupervised.

This suggests that supervisory absence is a key factor impacting workplace safety in general. In addition to the finding that accidents and incidents were more likely to happen to these apprentices and their colleagues, the analyses also revealed that apprentices who reported absence of supervision were also less likely to report that their supervisors discussed health and safety issues with them and similarly that they were less likely to talk to the apprentices about any workplace activities they felt were dangerous or risky.

Apprentices who were left unsupervised were more likely than those who were not, to report that the actions of their colleagues were often or occasionally risky and to admit that the actions they themselves took were occasionally risky.

The supervisory absence question, therefore, appears to be a key indicator variable that points to poor workplace health and safety culture in general.

4.1.2 Workplace safety climate

Two measures of workplace safety climate were used, one which measures organisational level safety and one that operates at group level. In addition, a measure of safe work habits was also used. Those who gave more positive assessments of their workplaces on these three measures of safety climate and habits were more likely to say that their supervisor discussed work health and safety issues and risky activities with them, and were also less likely to say that either they or their colleagues engaged in risky behaviours at work.

4.1.3 Individual differences

Attitudes

We contrasted the attitudes towards health and safety of those who had had an accident with those who had not. Attitudes to H&S training are associated with the chances of learners having an accident. Importantly, supervisors appear to have a significant formative role in the development of learners' attitudes towards health and safety. Where supervisors talk to young people they are more likely to think that the health and safety training received at college or training provider is relevant and useful.

Cognitive failure

In keeping with the work of Wallace and Chen (2005), we found that the measure of cognitive failure was significantly related to learners' likelihood of having an accident; learners who reported higher levels of cognitive failure were also more likely to report higher frequencies of unsafe workplace behaviours and were more likely to say that they engage in risky behaviours at work.

Conscientiousness

The results relating to conscientiousness are difficult to interpret. In general, learners in better workplaces (in the sense that there is a more positive safety climate and the supervisor is more engaged with the learner) tend to have higher levels of self-reported conscientiousness. Those learners who are more conscientious are less prone to cognitive failures. However they were no less likely than other learners to be involved in an accident. We have suggested that one explanation of the findings is that those learners in safer environments tend to internalise the safety culture and hence give higher ratings of conscientiousness; a simpler, alternative explanation is that more safety-conscious companies put more effort into selecting more conscientious apprentices, but we have no real proof of either, and it is difficult to see quite how one would best determine what is cause and what is effect here.

Unrealistic optimism

We included a measure of unrealistic optimism as this tendency can impede efforts to communicate safety measures to individuals and militate against the likelihood of individuals changing their behaviour in line with healthy or safe practice. The analyses showed that the apprentices were subject to unrealistic optimism, but also demonstrated that those who had been involved in incidents, or had witnessed colleagues being involved in an incident at work, were also subsequently less optimistic about their likelihood of being involved in an accident in future and of sustaining an injury than those who had not been involved in or witnessed accidents. Moreover, this effect extended even to their estimates of the risk of suffering from an occupational illness. Those who been involved in, or had a colleague who had been involved in an accident or incident, were far less optimistic about their own likelihood, and the likelihood of an average apprentice, of avoiding future accidents and incidents, injuries and occupational illness.

4.2 Conclusions

Given that this is a relatively small sample for such research a surprisingly large number of hypotheses were borne out. It is clear that the finding of the earlier stage of the Safe Learner evaluation, that in many cases relatively young and inexperienced learners are being left unsupervised, was not a fluke, and indeed appears to be a startlingly widespread practice.

Indeed this single factor – whether or not a supervisor leaves a young learner unsupervised – appears to be as effective an indicator of workplace health and safety ethos as were either of the safety climate measures we tested within the work. The end results of being left unsupervised are shocking but perhaps not surprising: young learners left unsupervised are three times as likely to be involved in an accident as are learners who are not left unsupervised. These unsupervised learners appear to be working in generally unsafe environments, for their colleagues are far more likely to be involved in accidents too. There is a further knock-on effect of this supervisory disinterest too – those learners with unsafe supervisors fail to develop the same level of awareness of the relevance and utility of what they are being taught about health and safety by their learning provider.

The profound impact of witnessing an accident on young learners' realism regarding the likelihood of sustaining an accident, injury or occupational disease suggests that there is scope for taking a rather more graphic and visual approach to health and safety induction than might currently be the norm. Indeed, since undertaking this work colleagues have brought to our attention safety films that were made in the past by ICI, and indeed two that are currently featured on Wikipedia:

http://en.wikipedia.org/wiki/Building_Sites_Bite

http://en.wikipedia.org/wiki/Apaches_%28Public_Information_Film%29

We wonder if there would be scope for the LSC to produce a short video featuring real apprentices who have witnessed or been involved in accidents for providers to use as part of health and safety induction.

4.3 The next stage of the work

The next stage of the work will be to refine the second stage questionnaire in light of these findings. Some of the items can probably be removed, as they do not appear to add very much value: the Zohar Group Safety Climate measure is one such item. Apart from that we plan to continue to the next phase of the work, which will track the existing cohort one year on, and will add in a new cohort of first years, which will allow for some analysis of the impact of time on the learners' attitudes and behaviours.

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Appendix 1 – H&S instruction received from supervisor

Training on tools

Foreman

General health and safety

What to do and not to do on site

Site induction

Site induction

Tools I can't use

Booklet

Induction on site

Was explained how to work on an electric tower

Induction

General safety

When using new tools/machinery

What to do and not what to do

Do's and dont's

Always wear personal protective equipment

Safe ways of working, protective clothing that must be worn, hours, wage, supervision arrangements, significant risks, emergency

The boss

Keep work place tidy, put tools away in a safe place always wear correct PPE for job in hand

Demonstrations etc.

Just talked about it

How to use tools

How to use tools correctly, when to wear protection

Tour round site showing safety equipment

Working safely/smoking and drinking

Gave brief details at work about the risks of injury you can have etc.

Just the usual H&S rules

Tool box talks, asbestos talk

General do's and dont's

About power tools and floor safety

Skanska H&S trainer for induction

Power tool safety

Isolation procedures, talks

What areas not to go in

When working with loud tools I must wear ear protection

Told what to do in emergencies and other situations

Was advised to purchase knee pads and given induction

Site Foreman

Letter and booklet

Site induction

Ladders

Just telling me little things

Do's and dont's

Told to wear safety equipment

Supervisor gives info out

Receive toolbox talks every week

Tool box talks

Areas of site out of access

People I work with, how to do things safely

Power tool H&S

Just telling me what to do and what not to do

How to go about health and safety abroad

On site dangers

How to work safely with machinery

How to use some machines

Toolbox talk

Gives me tips on how to work safely

Just general do's and dont's

Safety with tools

Dad

Machine use and protection

Wear hi-vis vest at all times

David Handforth

Gives me PPE and tells me how to use it

First Aid

When using new tools/power tools

Showed me what to do

On big sites

How to use certain tools safely

Standard H&S Procedures

Clearly explained

Do's and don'ts

Boss

About PPE

Toolbox talks

Helped with all aspects

Appendix 2 – Health and safety instruction received from H&S officer or manager

General H&S

Safety aspects in the yard and workplace

Health & Safety induction

My employer

Told what to do in emergencies and other situations

Site foreman

Job interview

All of the above

Machinery not allowed to use

Site induction

How to be safe working around machinery

Wear hard hats

Gave details about work hazards, how to use tools properly etc.

General do's and dont's

Power tool safety

Power tool safety

General health and safety

Tool box talks

Gives me PPE and tells me how to use it

PPE

Clearly explained

Very brief

Appendix 3 – H&S information received from trade union H&S representative

UCATT induction

Giving me little safety tips

Standard H&S Procedures and PPE

Clearly explained

Very brief

Appendix 4 – H&S information received from some other person in the employing organisation

Tells me what to do if not safe

How to use sharp and dangerous tools properly

JTL

I get told by engineers that I work with about the health and safety need in different environments

Use of signs put up by workmen

College

H&S about scaffolding and ladders

Clean up after your mess (good housekeeping)

Told what to do in emergencies and other situations

Internet site from company

Information and important points

College

On a building site I had about an hour lesson on it before I could go in

General ways to do things safely

How to keep somebody calm in an accident

Working at heights

Gave sheets to read through

How to use tools correctly and when to wear protection

Other workmen

Joinery

Erecting room scaffold (tower)

Be aware of dumper trucks etc

First Aid

General rules like ladder safety and PPE

How to use power tools

College

Workmate tells me how to do things safely

Other joiners about using equipment

JTL person discussed some issues

Foreman - road safety

Clearly explained

Other employees

Very brief

Appendix 5 – H&S Information from somebody external to the employing organisation

Not to use unsafe scaffold

Tower, ladders, power tools

Ladders, manual handling, hazardous substances

Told what to do in emergencies and other situations

JTL

First aider at work training

In JTL training centre

Foundation certificate in H&S in the workplace. Certificate in working/operating safely

Visit from fire brigade

Asbestos awareness

wear ear guards when using power tools

Constructing Futures

Came to see how we are getting on

I took a course at school construction

General information

On big sites

Clearly explained

College

Very brief

Appendix 6 – Any specific occasions when H&S training helped you avoid an accident or help someone who had had an accident?

More aware of dangers, more cautious

PPE avoiding eye injuries. Manual handling techniques, safe working practices eg tidy workplace

Tripping over bits of rebar at work, I pick them up

A tidy site made practice more efficient

Setting machinery up ie guards

Stone fell on leg, kept the man calm and still and kept him company whilst we informed the hospital and first aider. Wrote up in accident book.

Working at height

When a lad fell off the scaffolding I knew who to tell etc.

Appendix 7 – Any areas of health and safety should receive more coverage?

Noise and vibration

The more dangerous areas

Working with machinery safely

Working at height

Wearing PPE

All of it

Hands

Working at heights

Site

Feeling secure and safe when working on heights

Burns

Electrical safety

Machinery

All of it

Safe isolation

Electric shocks

Electric shocks, cuts, falls

Electrical

Electric shock

Situation of electrical shock

CPR (revival techniques)

Working round vehicles

Hazard signs

Working with dangerous equipment

Using machinery correctly

The basics, no point for PJ DDUR, COSM.

Working at heights

PPE

Safety at heights

High scaffolding

Working at heights and with ladders

Heights, breathing (dust etc) sound (ear protection)

Hazards

Ladders

Emphasis on what has happened and what PPE should be supplied

Violence, harassment and bullying

Manual handling

PPE what should be worn and why

Manual handling, Electricity hazards, slips, height, fire, alcohol, drugs, violence, hazardous substances	Every aspect of work
Dealing first aid for people who have had an electric shock	All of it
Setting up scaffold	Electricity hazards
The risks of stuff such as asbestos	Electrical safety
Working at heights	Safety for yourself and others
Building sites	First aid
Safety wear	Handling machinery
All of them	All in general
Manual handling	All in general
All of it	First aid
Don't touch a live wire	Injuries
Areas involving machinery	First aid
Classification and control of hazardous substances	Fire
Electrics, plumbing etc.	All
Electricity cautions and what to do in case of shock	How to use equipment correctly
	Electrical and fires
	Fire hazards

Appendix 8 – Any situations at work for which you would have liked more H&S knowledge?

When working in workshop with loud machinery as it has damaged my hearing

Storing materials for short periods of time

Everything

When a workmate had an accident

Working at heights

Safety at height