safe work australia

SOMETHING TO THINK ABOUT -
MOTIVATIONS, ATTITUDES, PERCEPTIONS AND SKILLS IN WORK HEALTH AND SAFETY

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Something to Think About – Motivations, Attitudes, Perceptions and Skills in Work Health and Safety

A Review of the Literature on Socio-Psychological Factors and Their Influence on Organisations' and Individuals' Responses to Regulation

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Main findings of the literature review

This literature review has been conducted as part of the second stage of the MAPS project. The key aim of the review is to be thought provoking and to generate discussion about the socio-psychological dimension of work health and safety, and possible areas for future research.

Willingness and capacity - socio-psychological factors are relevant to understanding organisations' and individuals' willingness and capacity to address work health and safety, and to comply with regulation (both legislation and its enforcement).

Motivations – these differ between organisations' and individuals' but, as they relate to work health and safety, may stem from legal, economic and/or social pressures which provoke a fear of adverse consequences, a sense of moral obligation, or a sense of opportunity that can be realised through addressing work health and safety.

Attitudes – these are settled ways of thinking or feeling which can influence action in relation to work health and safety. For example, the common attitude that workers are the cause of work-related deaths, injuries and disease (the unsafe worker attitude) is a significant influence on the quality of risk control action in workplaces.

Perceptions - how individuals perceive risks has implications for how they assess risks, recognise hazardous situations and anticipate catastrophic events. The factors influencing risk perception include the individual's sense of control, familiarity with a risk, how risks and benefits are shared, and the immediacy or delay in harm occurring.

Knowledge and skills – individuals learn through participation in activities with others, at work and in other aspects of their lives. They also have different capacities, agency and experience which shape how they interpret and construct knowledge. If health and safety is weak or absent in workplace practice, or if health and safety information, education and training are not integrated with authentic work, the quality of what people learn about work health and safety is likely to be poor.

'Safety culture' – this concept is so diverse that any claims about culture and work health and safety demand close scrutiny of the proponent's meaning and underlying assumptions. Some approaches emphasise worker behaviour, others prioritise management factors, and some highlight the influence of power. There are also differences of opinion about the uniformity or diversity of organisational culture, and whether it can be socially engineered. A productive approach is to recognise culture as the basic or underlying values, assumptions and beliefs embedded in an organisation (work site or work group), which impact on work health and safety.

Work health and safety regulation – regulators' compliance support initiatives, inspection and enforcement may influence regulatees'[1] willingness and capacity to comply. There is promising evidence that:

- initiatives that use practical problem solving and dialogue between regulatees and regulators (or their agents), can build capacity and foster motivation to comply
- inspection captures management attention and encourages preventive action
- prosecution prompts organisations to reconsider their management of work health and safety and take preventive action (but this is more likely through specific deterrence among those prosecuted than general deterrence among others)
- regulators' and inspectors' approaches to communicating and interacting with regulatees, and attention to procedural fairness, impact on how regulatees respond.

The wider context - an organisation's interactions with and position in relation to external actors and the distribution of responsibilities, resources and power between them, affect that organisation's willingness and capacity to comply.

Research about socio-psychological factors – there are many gaps in our understanding of how socio-psychological factors influence organisations' and individuals' actions in relation to work health and safety, and how socio-psychological factors can be shaped or influenced. This report proposes a series of questions to guide work health and safety research relating to motivations, attitudes, perceptions, knowledge and skills, and organisational culture.

Research about work health and safety regulation – there are many gaps in our understanding of how particular regulatory strategies and mechanisms, and ways of engaging with regulatees impact on their willingness and capacity to comply. This report suggests a series of questions to guide research relating to work health and safety regulators' compliance support, inspection and enforcement activities.

[1] Regulatees may be organisations or individuals.

Executive Summary

Safe Work Australia is an independent statutory body which has primary responsibility to improve work health and safety arrangements across Australia, and support significant and continual reductions in work-related death, injury and disease. Safe Work Australia is conducting the Motivations, Attitudes, Perceptions and Skills (MAPS) project to focus attention on the socio-psychological factors that shape organisations' and individuals' actions and behaviours and, in turn, influence work health and safety outcomes.

This literature review brings together contributions from the psychology, sociology, anthropology, education and regulation disciplines. It pays special attention to empirical studies relevant to socio-psychological factors and work health and safety.

The model Work Health and Safety Act, due to commence from 1 January 2012, frames the literature review. Willingness and capacity to comply is a particular concern for persons conducting businesses or undertakings who have the primary responsibility under the model Act, and the obligation to eliminate risks to health and safety, so far as is reasonably practicable. The willingness and capacity of officers of corporations, the Crown or public authorities are also crucial as they must exercise due diligence to ensure compliance. For workers, willingness and capacity to comply relates to the lesser duty to take reasonable care.

In talking about compliance, the review recognises 'substantive compliance' which concerns duty holders' achievement of regulatory goals or objectives and 'rule compliance' which is conformance with specific provisions of the law. The review also recognises 'self-regulation' which concerns commitment, capacity and action (through arrangements or processes) to comply with the continuing duties in work health and safety law on an ongoing basis.

The review begins by examining four key socio-psychological factors – motivations, attitudes, perceptions and skills. These sections provide definitions for each of these factors and discuss some relevant literature for each relating to its potential influence on organisations' and individuals' willingness and capacity to address work health and safety issues.

The literature for motivations (section 2) shows that organisations' and individuals' motivations are diverse, contextualised and that different motivations may co-exist and mutually interact. Motivations differ in the context of an organisation's operations and individual dispositions, and the interactions of organisations and individuals with external actors. Health and safety compliance motivations stem from a complex mixture of legal, economic and social pressures, which in turn may instil a fear of adverse consequences, a sense of moral duty or obligation, or a sense of opportunity that can be realised through complying.

The literature for attitudes (section 3) describes these as learned tendencies to act in a consistent way, which are settled ways of thinking or feeling that may reflect underlying values, and may be altered but do not change quickly. The review then illustrates the potential significance of attitudes with the example of the commonly prevailing attitude that workers are the cause of incidents, injuries and illness arising from work (the unsafe worker attitude). The impact of this attitude in influencing the actions taken by workplace parties with regard to hazard prevention and risk control is discussed.

The literature for perceptions (section 4) describes these as an immediate or intuitive recognition, understanding or insight. In work health and safety, perceptions may concern the types and severity of risks, the quality of the work environment and conditions, management or supervisor commitment and responsiveness to health and safety matters, and arrangements for managing health and safety, among other factors. This section focuses on research concerning perception of risks which has demonstrated that how individuals perceive risks depends on social contexts as well as psychological processes. Relevant factors include an individual's sense of personal control, knowledge of and familiarity with the risk and its consequences, perceived equity in sharing risks and benefits, and delay in the manifestation of harm. Risk perception has implications for day-to-day assessment of risks as well as anticipation of catastrophic events.

The literature concerning knowledge (section 5) highlights very different perspectives on acquisition of knowledge and learning. In the traditional cognitive perspective learning is a process of 'knowledge delivery' from a more knowledgeable source to a less knowledgeable one. The social constructivist perspective, within socio-cultural theory, emphasises the interdependence of social and individual processes in the construction of knowledge. Of particular relevance to learning about work health and safety is empirical evidence that individuals learn through participation in activities with others, at work and in other aspects of their lives. Contributions from the cognitive field are also useful as s/he brings different capacities, agency and experience which shape how s/he interprets and constructs knowledge from encounters and interactions with others. The implications of the empirical research and theory relating to workplace learning are that if health and safety is weak or absent in workplace practice, or if work health and safety information, education and training are not linked with authentic work the quality of what people learn about health and safety is likely to be poor.

After discussing these four key socio-psychological factors the review then examines the related concepts of 'safety culture' and 'safety climate' (section 6). These are aggregate concepts which encompass human, work environment and organisational factors that affect work health and safety. The review notes that there is considerable variation in the use of these terms by researchers and practitioners, and in approaches to their study or measurement. To facilitate understanding of these concepts the review distinguishes three approaches. The *ethnographic* approach focuses primarily on understanding the underlying values, beliefs and assumptions of an organisation or group (the cultural core). The *psychometric* approach uses standardised, self-administered survey questionnaires to provide a 'snap shot' of organisation members' (or a sub-group) perceptions or subjective evaluations of different organisational, work environment, behavioural or socio-psychological factors. The *pragmatic* approach is primarily derived from experience and expert judgement and focuses on the structure and processes of an organisation which it is believed influence culture and work health and safety performance.

The literature review discusses some issues in culture/climate research including the emphasis on worker behaviour in the psychometric approach, the inclusion of health and safety management and worker behaviour in some approaches to culture, the abstract and arbitrary naming of factors, the notion of a unifying culture rather than diversity, the limited consideration of power, and whether culture can be socially engineered or not. The review then considers the empirical evidence for the effects of organisational culture on health and safety action, behaviour and outcomes, as well as contrary evidence for the influence of adverse outcomes on culture.

Work health and safety regulation may contribute to regulatees' willingness and capacity to comply by influencing socio-psychological factors, or it may have a more direct influence on organisations' and individuals' actions and outcomes. This is the subject of section 7. This section introduces the variety of compliance support strategies, inspection and enforcement mechanisms and approaches that regulators may use, and reviews empirical studies concerning their impact.

Regulator health and safety information is a valued resource for those with some knowledge of work health and safety but empirical research suggests that additional and different strategies are needed if regulators, or other parties, are to contribute to building the knowledge and capacity of 'the unitiated' and those not 'linked in' to the regulatory system. There is promising evidence of the effectiveness of interventions that are more collaborative in nature, and prioritise dialogue and practical problem solving (section 7.2).

There is good evidence that inspections can improve compliance with work health and safety and other social regulation, at least in particular contexts or in organisations with particular characteristics. Inspection and enforcement can capture the attention of management, trigger some action that advances compliance, but may be more far-reaching or quite limited. Regulatees may also be provoked to take action by inspection and enforcement of other organisations, provided that the message about that enforcement gets through. However, the mechanism for change prompted by inspection is unclear as many of the studies identify a relationship between inspection and risk control, injury or compensation claim rates without elucidating *how* inspection and enforcement lead to these outcomes, and whether changes in socio-psychological factors are mediators of that process (section 7.3).

Prosecution has an instrumental function, to deter further non-compliance by an organisation (specific deterrence), or to send a message about the risk of non-compliance to other organisations (general deterrence). Prosecution may also have a symbolic function, for example making a moral statement in response to an organisation exposing workers or the public to very serious risks. Whether conducted for instrumental or symbolic reasons, prosecution can impact on regulatees' compliance motivations such as motivations grounded in fear of adverse consequences, such as financial penalties or reputational damage. Empirical studies suggest there is some evidence of a specific deterrent effect through prosecution but the potential for general deterrence is more limited, although health and safety specialists may play a role in channelling and interpreting information about prosecutions for action in organisations (section 7.4).

The approach or style that regulators and their inspectors use to communicate and interact with regulatees may also influence regulatees' response. The literature distinguishes between the *cooperative* or accommodative approach, a more insistent approach, and the *coercive* or sanctioning approach. Other variations are *facilitation* which is a more helpful and supportive style, and *formalism* which is a more rigid style of interpreting and applying legal requirements. Procedural fairness research also suggests that unfair treatment by a regulator can affect a regulatee's perception of the regulator's legitimacy, and influence the regulatee's cooperation and compliance. Regulatees may also adopt certain stances or motivational postures towards a regulatory system. The motivational postures research suggests that a regulator can influence a regulatee's stance towards the regulatory system by developing trust, respect and shared understandings in communications and interactions with regulatees. On the other hand, the perception of unfair treatment or abuse of power by a regulator can engender a more dismissive or defiant response. Empirical studies relating to the approach or style of enforcement suggest it may be

quite difficult in practice for a regulator to operationalise, implement and realise the potential benefits of using different approaches. Key issues are how inspectors determine which approach to use and whether it is possible for a regulator (or inspector) to communicate trust, respect, cooperation or another approach in its interactions with a regulatee, in a way that ensures that the regulatee perceives the regulator's approach as the regulator intended (section 7.5).

The literature suggests that it is simplistic to consider the actions of a single organisation in isolation as each organisation is part of a web of influences. Multiple external actors may influence the operations of an organisation and, in turn, that organisation may influence others. An organisation's interactions with and position in relation to external actors and, in particular, the distribution of responsibilities, resources and power between them, can critically affect that organisation's willingness and capacity to comply with work health and safety regulation. Mapping the dynamics within, outside and between organisations which influence their decisions and actions, may be a necessary starting point for regulation. Also, inspecting and enforcing among all players in a market or supply chain through coordinated, networked interventions may be needed to overcome constraints to compliance (section 7.6).

While work health and safety regulation and compliance support activities of regulators are among the factors that contribute to regulatees' willingness and capacity to comply, there is much more to learn about how particular strategies, mechanisms and approaches can be best used to effectively elicit compliance in terms of organisations' action and arrangements to self-regulate and achieve substantive reduction in work deaths, injuries and illness. It is a continuing refrain in work health and safety regulation in Australia that we need research and evaluation to better understand what works, for who, how, in what circumstances and under what conditions. This review draws the same conclusion and finishes by summarising some suggestions for research identified through the review (section 8).

1. Introduction

This report presents a review of the literature relating to motivations, attitudes, perceptions, skills and other socio-psychological factors as they relate to organisations' and individuals' responses to work health and safety generally, and work health and safety regulation in particular. This literature is vast as researchers and practitioners from psychology, sociology, anthropology, education and regulation disciplines have investigated or had something to say about socio-psychological factors and work health and safety. The relationship between contributions from different disciplines is not always clear and there is little cross-over between the literature from different disciplines.

It is therefore useful to introduce the first organising theme in this report. This is to think of socio-psychological factors as broadly relevant to understanding organisations' and individuals' willingness and capacity to address work health and safety, and to comply with work health and safety regulation.[2] As researchers from a variety of perspectives have emphasised, in order for an organisation or individual to take particular action successfully they must have the necessary willingness (commitment or motivation) and capacity (knowledge and skills) to take that action (Black 2001a, pp 123, 126; Genn 1993, p 219; Griffin and Neal 2000, p 347; OECD 2000, pp 7, 11; Parker 2002, p IX). The topics discussed in this report have therefore been included because they are relevant to understanding organisations' and individuals' willingness and capacity in relation to work health and safety. These topics include motivations, attitudes, perceptions, knowledge (including skills), culture, climate, regulatory strategies, mechanisms and approaches, motivational postures and wider contextual issues relating to the operation of organisations and their interactions with external actors.

A second organising theme in this review is work health and safety law. In particular, the obligations in the national model Work Health and Safety (WHS) Act frame this review. The person conducting a business or undertaking (PCBU) is the primary duty holder and must ensure, so far as is reasonably practicable, the health and safety of workers (in any capacity) and other persons (model WHS Act s 19). To ensure health and safety, the PCBU must eliminate risks to health and safety, so far as is reasonably practicable and, if it is not reasonably practicable to eliminate risks to health and safety, must minimise risks so far as is reasonably practicable (model WHS Act ss 17). A PCBU may also have other duties as a designer, manufacturer, supplier or otherwise which mean that they need to address risks to those who use their products at a workplace.

The model WHS Act anticipates the need for businesses and undertakings to have and verify the provision and use of systems and processes for complying with the Act. This is the obligation of officers of corporations, the Crown or public authorities who must exercise due diligence to ensure compliance by a PCBU. Due diligence includes taking reasonable steps to acquire and keep up-to-date knowledge of work health and safety matters, and gain an understanding of the nature of the operations of the business or undertaking, and of the hazards and risks associated with those operations which may be quite diverse. It includes ensuring that the PCBU has

[2] Regulation here refers to the law (Acts and regulations) as well as inspection and enforcement of the law (Black 2001a, p 129). We might also include approved codes of practice which although advisory instruments have evidentiary status under the work health and safety statutes and are part of the 'legislative framework'.

available for use, and uses, appropriate resources and processes to eliminate or minimise work health and safety risks from work carried out as part of the conduct of the business or undertaking, and for receiving, considering and responding in a timely way to information regarding incidents, hazards and risks.

The important point here is that PCBUs as well as officers have the primary responsibility for ensuring work health and safety. Workers must take reasonable care for their own health and safety, and reasonable care that their acts or omissions do not adversely affect the health and safety of others (model WHS Act, s 28). They must comply, so far as they are reasonably able, with any reasonable instruction that is given by the PCBU, and they must cooperate with any reasonable policy or procedure of the PCBU relating to health or safety at the workplace that has been notified to workers. Workers do not however have primary responsibility for ensuring work health and safety.

This report therefore keeps clearly in focus the motivations, attitudes, perceptions, skills, or other socio-psychological factors and compliance action of organisations and key individuals in them – the regulated entities (regulatees) with primary responsibility for preventing work-related death, injury and illness. The report does not concentrate on worker behaviour and worker attitudes, behaviour or other attributes. Why is this point highlighted here? It is emphasised because some of the literature conceives worker behaviour as the mechanism for preventing work-related death, injury and illness. In reviewing the literature, it is therefore important to keep legal obligations in mind. These obligations are also consistent with work health and safety professional practice and empirical evidence relating to effective control of risks at work.

The duties of PCBUs and of officers also point to some of the actions that these duty holders will need to take (including processes or arrangements). They will therefore need to have the willingness and capacity to accomplish these things, in order to comply with their legal obligations.

In this regard it is also important to clarify what is meant by ‘compliance’. Compliance with work health and safety law can be treated in several different ways (Hutter 2001, pp 15-16, 301-302; Johnstone and Jones 2006, pp 485-486; Parker 2002, pp ix-x, 27, 43-61). ‘Substantive compliance’ concerns duty holders’ achievement of regulatory goals or objectives, such as whether they have eliminated or minimised risks, so far as is reasonably practicable. ‘Rule compliance’ concerns conformance with specific provisions of the law, such as whether the duty holder has registered particular plant. As work health and safety law establishes continuing duties, compliance is not a one-off event and compliance also concerns a duty holder’s ‘self-regulation’ of work health and safety – their commitment, capacity and arrangements for managing health and safety and ensuring compliance on an ongoing basis.

The literature review examines socio-psychological factors as they may shape or influence organisations’ and individuals’ willingness and capacity to comply, with a particular focus on willingness and capacity to self-regulate and to achieve substantive outcomes. This literature can also help us to understand why some of what we do as work health and safety professionals, regulators and researchers appears to have little impact in changing the way health and safety is ‘done’ in workplaces, and the level of work-related death, injury and disease. It provides us with some clues about what we might need to do differently or know more about, although it does not provide easy and ready-made solutions. It provides something to think about.

2. Motivations

Motivations are the factors that drive or energise the action and behaviour of an organisation or individual (Glendon et al 2006, pp 104-105 and 108; Reber and Reber 2001, pp 447-448; May 2005, pp 318, 320). With regard to work health and safety, motivations may favour action and behaviour that supports compliance with regulation and enhances health and safety, or they may favour action and behaviour that is harmful to health and safety.

Hale 2003 (p 198) argues that emotion must be the basis for concern with health and safety, and that without moral outrage at unnecessary suffering and premature death, health and safety has no purpose or meaning. Yet empirical studies of organisations or individuals' responses to work health and safety and other social regulation point to a series of legal, economic and social motivations for addressing these issues, and more rarely to moral outrage. Organisations' and individuals' motivations for compliance (and non-compliance) are diverse, contextualised and different motivations may co-exist and mutually interact. That is, motivations differ in the context of an organisation's operations and individual dispositions, and the interactions of organisations and individuals with external actors. Also, a particular set of motivations in combination shapes an organisation or individual's response to regulation (Bluff 2010; Gunningham et al 2003; May 2005; OECD 2000, p 73; Parker 2002, p 82).

A series of empirical studies have demonstrated the plurality and diversity of organisations' and individuals' motivations. For example, among the 127 risk, insurance or finance managers in Britain's largest firms surveyed by Ashby and Diacon (1996), work health and safety regulation and legal liability were the principal motivations for managing risks. The perceived contribution of risk management to compliance and reducing legal liability was highest in firms with high capital intensity. Genn (1993) identified self-interest as the primary motivation for addressing work health and safety in 40 industrial and agricultural firms in Britain. Genn's study, based on qualitative interviews found that firms that carried out highly hazardous processes that might threaten the existence of the facility were most motivated to address work health and safety, as well as very large[3] facilities where the operation was highly visible to inspectorates and the local community, which might impact on public relations and the image of the company (Genn 1993, pp 223- 224). Firms that either had no major or well recognised hazards, or were small and invisible to the inspectorate and the community, did not have a strong self-interest in addressing work health and safety and were primarily motivated by the pressure to complete production on time and at low cost.

Hopkins' study of senior managers' motivations for addressing work health and safety conducted in 25 Australian companies found that their attention to work health and safety was variously motivated by legal, economic and reputational concerns, and a moral commitment to prevent harm (Hopkins 1995, ch 11). Haines' study of Victorian construction firms' responses to workplace fatalities found they were influenced by the social and economic context of their operations (Haines 1997, chs 2, 4, 6, 7, 10).[4] Haines found that the motivation to profit was the driving force behind

[3] In Genn's study, large firms had workforces of 500 employees or more, medium firms had 100 to 400 employeees, and small firms had less than 100 employees.

[4] Haines refers to the social and economic context as structure, and concerning firm size and position in the contracting hierarchy at construction sites, and their market generally.

firms' decisions and actions, with those prone to competitive pressures being forced to choose between work health and safety and profit, while influential or large firms were better able to accommodate work health and safety. She also found that firms' responses to fatalities were shaped by whether managers interpreted work health and safety action as consistent (or inconsistent) with future success of the firm, and justified health and safety action (or inaction).

Jamieson et al (2010) examined the effect of prosecutions for work health and safety offences on the practices and procedures of 19 non-prosecuted employers in New South Wales and Victoria, including a mix of large, medium and small organisations. Prosecution had some impact on the participating organisations (see section 7.4) but respondents also expressed other motivations for compliance including a moral and ethical duty to provide a safe workplace, concern about their self-insurer status and reputational concerns.

In her study of corporate management of social and legal responsibility generally, Parker established the plurality of top management motivations for self-regulation (Parker 2002, chs 3 and 4). These included the potential for a competitive advantage, a sense of responsibility under a social contract, the need to garner good publicity and legitimacy in public eyes, litigation or the threat of it, and personal moral codes.

In Bluff's study of Victorian and South Australian firms that designed and manufactured workplace plant, a diverse set of motivations was in play. While the key individuals[5] broadly derived motivations from their experience or perception of legal pressures, and their commercial goals to ensure the marketability of their plant and firm profitability, their specific motivations varied quite widely (Bluff 2010, ch 8). Some motivations stemmed from key individuals' concern to avoid legal action under the common law or Australian work health and safety law, or the desire to market plant as complying with particular technical standards or legal requirements. Other motivations related to commercial concerns to minimise business risks, ensure product quality, optimise plant functionality, secure a competitive advantage (or avoid a disadvantage), meet customer requirements, protect firm reputation, minimise costs, or market plant as safety solutions. (Data were collected using in-depth interviews, observation and document analysis). Some key individuals also expressed a moral obligation to protect health and safety, and an ethical responsibility to ensure that the firm's plant did not hurt people and which motivated them to take preventive action.

Gunningham et al (2003) investigated environmental management and pollution control in 14 firms in the bleached paper and pulp industry in the United States, Canada, Australia and New Zealand. They examined firms' performance through interviews with environmental and middle managers, data on water pollutants and interviews with industry association officials, environmental consultants, financial analysts, corporate lawyers, other commercial third parties and, in some instances, mill employees. The authors identified three broad categories of external pressures that motivated enterprises towards improved environmental performance. These were economic pressures relating to shareholders, banks and customers; legal pressures relating to environmental regulators, legislators and environmental organisations seeking to enforce regulations; and social pressures concerning the local community, environmental organisations and the general public. These researchers observe that economic, legal and social pressures gained their force through mutual interaction, and the interaction between firms and respective

[5] These individuals were principal decision makers in their firms.

economic, legal and social stakeholders. Environmental performance varied according to the mix of economic, legal and social pressures, as well as management style which affected the ways in which these external pressures were translated into firm level environmental measures.

Through a telephone survey of officials in 233 firms in the United States, Thornton et al (2005) investigated whether firms learned about and changed their behaviour in response to severe legal penalties against other firms in the same industry. The authors found little evidence of this type of general deterrence but concluded that officials were motivated by general awareness of the possibility of enforcement and imposition of penalties, which prompted concern about damage to a firm's reputation, a manager's job or professional standing should enforcement action be taken. In a study of small trucking firms in the United States, Thornton et al (2009) found a different set of motivations for operators in the trucking industry. Among this group, the key influences on environmental performance were economic pressures relating to the general market, a firm's market niche and its financial condition.

Using in-depth telephone interviews with managers in 35 electroplating and chemical facilities in two states in the United States, Gunningham et al (2005) explored the economic, legal and social motivations for firms' environmental behaviour. They found various interwoven and contextualised motivations which depended on the size and sophistication of companies, and the characteristics of the industry sector in which they operated. The generally small[6] electroplating firms attributed their improved performance to environmental regulation and enforcement, with some larger firms also identifying economic motivations, and those that had aerospace or motor vehicle manufacturers as major customers were also influenced by the demands of these large customers. The much larger chemical facilities had a broader range of motivations. For the largest facilities[7] environmental regulations provided the base line for their activities but these facilities were motivated to achieve high standards of environmental performance by concerns relating to risk management, the potential for adverse publicity to damage corporate reputation and the desire to maintain the trust of local communities. For the smaller chemical facilities the imposition of fines or gaol sentences involving their own or other firms was also a motivation, as were pressures from larger trading partners (Gunningham et al 2005, pp 301, 305-307).

A series of other studies have found evidence of a relationship between inspection and enforcement, and action to address work health and safety and/or reductions in work-related injuries. These studies suggest that inspection and enforcement influences organisations' and individuals' motivations, at least in some contexts. The findings of these studies are presented in section 6.

A further point to note is that most studies that examine compliance focus on regulatees' response to a particular regulatory regime. However, Haines and Gurney (2003) warn that conflicting regulatory goals across different regimes may themselves become motivations for non-compliance – compliance in one area can create incentives to breach regulatory requirements in a competing regime. For example, a firm motivated to comply with the provisions of Australian trade practices law that discourage anti-competitive behaviour might frown on selecting contractors

6 These firms has had from 1 to 117 employees with a median size of 32 employees.

7 The largest chemical firms had more than 1000 employees. Some smaller ones had less than 1000 employees.

on the basis of work health and safety performance or imposing health and safety requirements that could be treated as 'implied conditions'. Yet chain of responsibility provisions in Australian work health and safety law require employers and others conducting businesses to address risks arising in the work of contractors.

The series of studies of organisations' and individuals' responses to social regulation presented here show that compliance motivations stem from a complex mixture of legal, economic and social pressures. These pressures in turn may instil a fear of adverse consequences (legal, economic or social), a sense of duty or moral obligation to comply with the law, or a sense of opportunity relating to the perceived value or opportunity that can be realised through complying. Precisely what the different motivational strands are for a particular organisations or individuals, and how they play out depends on context. It depends, for example, on the characteristics of an organisation such as its size, capital intensity or sophistication, the nature of its operations with regard to the risks arising and the industry and market(s) in which it operates, the history of enforcement in an organisation and the industry in which it operates, among other factors.

Among the empirical studies reviewed above, some also provide evidence of a link between organisations' or individuals' motivations, and their action (processes or arrangements for complying) (Bluff 2010; Genn 1993; Haines 1997; Parker 2002). Some provide evidence of a link between organisations' or individuals' motivations and substantive outcomes such as quality of risk control measures, or reduction in injuries or environmental pollutants (Bluff 2010; Gunningham et al 2003, 2005; Thornton et al 2005, 2009). Other studies are silent or provide little insight about any link between motivations, actions and outcomes, and do not explore whether or how claimed motivations drive compliance action. An important consideration then for research into compliance motivations must be to examine the evidence relating to action and outcomes attributed to particular motivations, and the quality of the action or outcomes. It is not sufficient, for example, to document that firms are motivated by reputational concerns without exploring the evidence that those reputational concerns actually drive constructive action and better substantive outcomes.

Although the diversity of motivations has been well established in empirical research, less is known about how the mix and balance of an organisation or individual's motivations in turn influence the type and quality of action by them, or whether and how motivations can themselves be shaped and influenced. Research into these issues could be fruitful. In particular, how do particular regulatory strategies, mechanisms or approaches influence motivations? How do motivations influence compliance action and substantive outcomes? How can regulators or practitioners analyse and understand compliance motivations, in order to take them into account in designing their communications and interactions with particular organisations, individuals, industry sectors or other groups?

3. Attitudes

Attitudes are learned tendencies to act in a consistent way towards something or someone. They are settled ways of thinking or feeling which reflect an individual's disposition to a person, situation or thing, and may reflect underlying values (Ajzen and Fishbein 1980; Aronson et al 1997; Glendon et al 2006, p 187; Reber and Reber 2001, p 63). Attitudes cannot be observed directly but may be revealed in observable behaviour and in what people say. They may be altered but do not change quickly and may last for some time, although they may not be identical in every situation.

Attitudes serve several functions (Aronson et al 1997). They serve a function of adaptation by facilitating an individual's acceptance and integration into a group. They serve a knowledge function by helping the individual to interpret phenomena and behave accordingly. They can also have a defence function, protecting an individual from understanding himself or herself as vulnerable or insignificant, or to deny unpleasant realities which are threatening or anxiety producing.

A commonly prevailing attitude central to work health and safety is the attitude that workers are the cause of incidents, injuries and illness arising from work (the unsafe worker attitude). This perspective is an attitude in the sense that it is a learned tendency to interpret and respond to work-related incidents, injuries and illness in a particular way, and represents a settled way of thinking about these occurrences. The unsafe worker attitude is also resistant to change. As a common perspective in Australian society, the unsafe worker attitude can be adaptive, integrating the individual into the group (a kind of group think about safety). In the event of work-related injury or illness, this attitude can also serve a defensive function for others at the workplace protecting them from the unpleasant reality that they might have contributed to the event or that they might also be at risk.

A series of studies have provided evidence of the prevalence and persistence of the unsafe worker attitude in Australian workplaces and society generally. A national survey of a representative sample of 2004 Australians commissioned by the National Occupational Health and Safety Commission in 1995, found that 47% of respondents nominated worker carelessness as one of their top three perceived causes of work-related injury and illness (ANOP 1995, p 9). A national survey in 2009-2010 found that 41% of respondents identified worker carelessness in their top three perceived causes of work-related injury and illness (Safe Work Australia 2010).

In his study of Victorian commercial fishermen and motor vehicle repair operators, Cowley (2006) found that 49% cited worker carelessness as the main cause of work-related injury and illness. In her study of Victorian and South Australian plant designer-manufacturers Bluff (2010, ch 8) found that 55% of the key individuals in these firms expressed the attitude that users act unsafely with workplace plant. According to this attitude users were at fault or to blame for injury or incidents involving plant, acted foolishly when interacting with plant, or actively disarmed or removed safeguards.

In other research, Hasle et al (2010) interviewed the owners of 22 small businesses in the Danish construction and metal industries, about the causes of reportable accidents. Like the Australians, the Danish business operators predominantly attributed accident causation to worker faults. In her study of workplace fatalities in Victorian construction firms, Haines also found that key individuals in the construction firms in her study attributed responsibility for the death to the worker who died or

rationalised workplace deaths as beyond their control (Haines 1997, pp 69, 83-86 and 88).

That the unsafe worker attitude should be prevalent in workplaces and in society generally is discouraging for work health and safety professionals but perhaps not unexpected. The perspective is predicted by attribution theory which holds that in order to make sense of their world, individuals make inferences (attributions) about the causes of events and have a strong tendency to over emphasise individual responsibility when judging others' behaviour – the fundamental attribution error (Dejoy 1994; Glendon et al 2006, pp 83-91). Causal inferences or attributions are influenced by well-established beliefs about causes and effects involved, as well as motivations to make certain types of causal inferences. For employers and others in a workplace where a worker is injured or dies, attributing the event to the worker or to unforeseeable circumstances serves a self - or group-defensive function to avoid responsibility or provides a coping strategy to reduce emotional pressure on others in the workplace (Gyeke and Salminen 2006; Haines 1997, pp 83, 85-86).

There is no doubt that despite longstanding legal obligations establishing that the primary responsibility for work health and safety rests with employers or other PCBUs, the perspective that work health and safety can best be improved through workers taking more care has changed little in the last 15 years. Substantial changes in the labour market, work and its organisation may have contributed to the strength of the attitude in some sectors. The growth in casual, part-time and temporary work, small businesses, outsourcing, the use of labour hire, franchising and complex supply chains, and home-based work have fragmented responsibility, fostered uncertainty about where responsibility lies and limited training for workers (Frazer et al 2008; House of Representatives Standing Committee 2005; Quinlan 2004; Quinlan and Bohle 2008; Quinlan et al 2010, pp 374-378). These changes can also be expected to reinforce the unsafe worker perspective.

In formal analyses of hazards or incidents, and informally in daily workplace interactions and job activities, attribution determines the actions that are taken by workplace parties to correct hazards and prevent injuries (DeJoy 1994; Hasle et al 2009). The consequence of the unsafe worker attitude is that those in a position to change work design, systems of work, risk control measures for equipment or substances fail to implement these preventive measures, instead devolving responsibility to workers. Bluff's (2010, ch 8) research documented how the unsafe worker attitude provided key individuals in plant designer-manufacturer firms with a justification for limiting or not taking action to eliminate or minimise work health and safety risks. They failed to recognise that workers might simply make mistakes through faults in plant, error, fatigue, to get the job done with less strain, or for other reasons, or that changes to design could reduce the potential for unintended use. They did not look for reasons underlying unsafe practices but instead settled on the attitude that whatever they did as a designer-manufacturer would not be enough to protect unsafe workers. They continued to use safeguards that they knew to be inadequate and relied on cautions or warnings about hazards or to work safely with the plant.

What then are the prospects for changing the unsafe worker attitude? Attitudes are most stable and enduring when founded in an individual's central values (integration). They are firm but may be altered when an individual adopts the ideas or premises of others in order to feel a sense of belonging to a group or other persons (identification). Such attitudes are internalised but may change if an individual changes group or social contacts. The weakest attitudes are those formed through imitation of others but not based on inner approval (Nja and Fjelltun 2010, p 1075). It

seems likely the unsafe worker attitude is, for many people, a firm one if not a stable, enduring and strongly embedded assumption.

The literature concerning the unsafe worker attitude points to the need for renewed efforts and strategies to challenge this attitude and build knowledge of human factors and effective safe place controls, also making clear the primary responsibility of the PCBU to ensure that risks are eliminated or minimised, so far as is reasonably practicable. The literature also suggests that an attitude is most likely to be questioned and changed when a person finds it is no longer useful, and therefore has an incentive to change (Glendon 2006, p 207). The challenge is to render the unsafe worker attitude less useful for diffusing or evading responsibility. A worthwhile line of research could be to examine whether and how the unsafe worker attitude may be shifted and risk control decision making enhanced.

4. Perceptions

Perceptions are the result of perceiving – they are the product of individuals gaining knowledge through seeing, hearing or through the other senses (Glendon et al 2006, pp 83, 189; Reber and Reber 2001, p 519). Perceptions involve an immediate or intuitive recognition, understanding or insight. In work health and safety, perceptions may concern the types and severity of risks, the quality of the work environment and conditions, management or supervisor commitment and responsiveness to health and safety matters, and arrangements for managing health and safety, among other factors.

There is an extensive research literature reporting studies investigating 'safety climate' by examining organisation participants' perceptions and subjective evaluations of various organisational, work environment, behavioural and socio-psychological factors. The safety climate literature is a specific line of research and is reviewed separately below with the literature on culture (see section 6).

Here the focus is on one aspect of perceptions especially relevant to work health and safety. This is the perception of risks. Risk perception research has demonstrated that how individuals perceive risks depends on social contexts as well as psychological processes. Seminal studies by Fischhoff et al (1978) and Slovic (1987) investigated the basis of lay people's judgements about risk. Individuals tended to give a risk a higher ranking if they perceived that it was uncontrollable (in the sense of low personal control over the risk), relatively unknown to science and to those facing the risk and/or potentially catastrophic (killing many people at one time or over a period of time).

The Royal Society concluded that a series of factors impact on individuals' perceptions of the seriousness of risk (Royal Society 1992, ch 5). In addition to the degree of personal control over the size or probability of the risk, familiarity with the risk and catastrophic potential, other factors were the degree of perceived equity in sharing risks and benefits, visibility of the benefits of risk taking, potential to impose blame on risk creators, delay in the manifestation of harm and voluntariness with which the risk is undertaken.

In more recent research Mullett et al (2004, pp 284-286) studied lay people's perceptions of health risks. They asked individuals to assess the severity of risks based on information about the severity of the health risk, the number of people affected and the level of scientific expert knowledge of the risk. The health risk factors had more impact on the judgement of risk severity than the knowledge factor, and much more impact than the number of people affected. Also, the effect of each of the health risk and knowledge factors was stronger when the level of the other one was low. The authors explain individuals' lower consideration of the number of people affected as being because they mainly consider what could happen to them personally rather than the hazardous consequences to other people as well.

Other studies have focused on risk perception by individuals in the work environment rather than lay people generally. For example, Holmes (1995) and Holmes et al (1997a) report a study in which 154 people working in the painting sector of the Australian construction industry were asked to identify work health and safety risks and rank them in order of importance. They compared the industry ranking with risks identified in workers' compensation claims data and in the international scientific literature on painters. The workers' compensation data preferenced occupational

injuries, while the international literature highlighted occupational diseases. The risks identified by industry participants lay between these two extremes.

In a second study 87 employers and 81 employees in the Australian painting industry were asked to rate ten risks in order of riskiness from 0 to 100 (Holmes 1995; Holmes et al 1997b). The risks were those identified in the previous study and, using industry language, were paint chemicals, skin diseases, dust, unsafe ladders and scaffolds, electrical hazards, work at heights, messy worksites, accidents and injuries, careless workers and spray painting. The authors report significant differences between employers' and employees' ratings for four of the risks. Employers rated careless workers and messy worksites significantly higher than did employees. Employees rated paint chemicals and skin diseases significantly higher than did employers. The two groups did not rate the other risks significantly differently but overall employers rated risks associated with immediate injury higher than employees while employees rated risks associated with delayed effect disease higher than employers.

Sanne's (2008a) ethnographic research in the Swedish rail industry provides another perspective on workers' perceptions of risks. Sanne explored how track maintenance workers perceived risks and showed that workers' risk perceptions were influenced by their sense of personal control over the risk, familiarity with the risk, the voluntariness with which the risk was undertaken and benefits of risk taking. They perceived that in certain circumstances working in risky situations was justified or required for public safety and to avoid delays in train services. They perceived safety risks as an occupational responsibility and manageable through competence, vigilance, carefulness, mutual responsibility for team safety and application of 'rules of thumb'.

Based on studies conducted in complex socio-technical systems in the United States, Vaughan (1999) provides insights into perceptual processes that can lead to misinterpretation of events, mistakes and disaster. Rather than experiencing each moment, phenomenon or interaction as if for the first time, individuals categorise and respond to each unusual event as an example of something known and familiar for which there are interpretations and established responses. By interpreting uncertain and unusual events as routine, individuals and the organisations they work in can fail to identify emerging disasters.

Silbey has reviewed a series of ethnographic studies of complex socio-technical systems which have revealed factors contributing to the misperception of risks (Silbery 2009, pp 357-358, 360-361). Information that might shape more cautious and responsive interpretation is often missing, actively buried or discredited. Dangers that are not spectacular, sudden or disastrous can remain ignored and unattended, and not interpreted or responded to as hazards. When disaster strikes, situations that have been repeatedly misperceived and misinterpreted may be treated as random, incidental or contingent occurrences rather than the product of risks that have been ignored and unattended over a long period of time. There is also evidence that even the most rational and rigorous analysts can fail to imagine contingencies that later generate catastrophic hazards. There is a tendency for organisations to focus on what they do well and, in so doing, to fail to value what lies outside their normal view and capacities. Organisational structures, roles and routines, as well as language and norms shape interpretation of risk and safety.

The studies presented here provide some insights into the complexities of risk perception. They cast considerable doubt on any assumptions about the reliability of simplistic processes for estimating and ranking risks, as incorporated in conventional

risk assessment and risk management methods. They highlight the reality that PCBUs are likely to have different perceptions of risks from those working for them, and that there is no single 'correct' source of information to identify and prioritise work health and safety risks. They point to the need to ensure different perceptions are harnessed in hazard and risk identification activities through consultation, and to challenge routine thinking through critical self-reflection and scrutinising near misses.

A worthwhile topic for research might be, as Silbey (2009, p 361) proposes, to investigate how to challenge processes which impede recognition of hazardously deviant events by unsettling organisational routines and making the unthinkable recognisable and the invisible apparent. For example, can critical self-reflection through open discussion of the most minor variations or mishaps facilitate self-scrutiny and sensitivity to mishaps?

5. Knowledge and Skills

Knowledge encompasses all that a person knows or believes to be true, whether or not it is verified as true in an objective or external way. It is the individual's personal stock of information, skills, experiences, beliefs and memories (Alexander 1991, p 317; Reber and Reber 2001, pp 380-381). Knowledge is always idiosyncratic as it reflects the vagaries of a person's own history (Alexander 1991, p 317). There are also different types of knowledge (Alexander 1991, pp 323, 332-333; Reber and Reber 2001, p 381). Declarative knowledge concerns factual information (knowing what). Conceptual knowledge is knowledge of ideas and includes content knowledge of some aspect of the physical, social or mental world, and discourse knowledge about language and its use. Procedural knowledge is practical knowledge about how to do something (knowledge of processes and routines). Conditional knowledge is knowledge of when and where the other types of knowledge (declarative, conceptual, procedural) could or should be applied.

These different types of knowledge are distinct and having one does not guarantee that a person has the others (Alexander 1991, p 323). For example, a person who conducts a business might have conceptual knowledge that work health and safety law requires her/him to eliminate or minimise risks, so far as is reasonably practicable. S/he might also know that the meaning of reasonably practicable is set out in the Act and how it is defined. However, s/he might have no procedural knowledge about how to identify, eliminate or minimise risks in practice.

In the traditional view, learning is a process of 'knowledge delivery' from a more knowledgeable source to a less knowledgeable one, and occurs when we participate in classroom education or training, read a book or other information (in print or online), or watch audio-visual material (Brown and Duguid 1992, p 47; Gherardi et al 1998, pp 273-274). The traditional perspective originates in cognitive psychology which focuses on internal processes of the mind and holds that learning involves an individual acquiring and organising knowledge in memory (Billett 1996, p 264; 2001, p 432).

For socio-cultural learning theorists, the traditional perspective takes insufficient account of learning through social practice, in the type of situation where knowledge is deployed. They shift the focus from the transfer and acquisition of information to participation in social practice which provides and sustains the context for learning (Brown et al 1989; Brown and Duguid 1991; Gherardi and Nicolini 2002, p 195). While information provision, education and training are important, individuals also learn through participation in everyday activities, and talking about them with others (Gherardi et al 1998, p 274). Through participation in activities with others individuals construct knowledge and negotiate the meaning of terms, actions and situations. From this perspective, knowledge is not what resides in our heads or information sources. Rather, it is the capacity to participate with competence in activities and interactions with others, and learning takes place through social processes (Gherardi et al 1998, pp 274-275; Gherardi and Nicolini 2002, pp 192-193; Lave and Wenger 1990; see also Vygotsky (1986/1934).

Socio-cultural learning theory identifies contributions to knowledge from the evolving history of the human species (for example communication practices), the particular requirements of social practice (for example the technologies and norms of a vocation), the ongoing products of individuals' learning throughout their lives, and the moment by moment learning of individuals engaging with the social world (Billett 2001). Learning therefore includes all the opportunities that individuals have to learn

throughout their lives - from the teaching curriculum during schooling and vocational or higher education, as well as the 'situated curriculum' in their working lives, and all the formal and informal occasions for learning in day-to-day life.

Within socio-cultural learning theory the 'social constructivist' perspective emphasises the interdependence of social and individual processes in the construction of knowledge (Gergen 1992; Palincsar 1998). As a person participates in activities with others s/he learns through processes of interaction, negotiation and collaboration but s/he also transforms those experiences into learning, which is characterised by facility with language, norms and practices (Palincsar 1998, pp 352, 365).

In the field of vocational education, Billett argues that to understand learning necessitates a bridging of the socio-cultural perspective and cognitive theories of learning, to reconcile external contributions and internal attributes (Billett 1996, 2001). Contributions from the cognitive field are useful for understanding and identifying individual attributes required for performance, while socio-cultural theories help to account for sources of knowledge and their formation or transformation in the social world. The knowledge that each person constructs is unique as the situations s/he encounters and the interactions s/he has differ, and s/he brings different capacities, agency and experience which shape how s/he interprets and constructs knowledge from those encounters and interactions (Billett 2003, 2006, 2009). The relational interdependence between social and personal contributions make it difficult to prescribe, describe or account for the construction of knowledge (Billett 2008, p 55).

Empirical studies illustrate how individual's activities at work are significant sources of learning both about how to perform work, and about work health and safety. Drawing on ethnographic research by Orr which investigated service technician's learning and practice, Brown and Duguid identified three central features of work practice (Brown and Duguid 1991, pp 44-47). Through narration or story telling, the technicians interpreted each new situation in the light of accumulated wisdom and constantly changing circumstances, helping them to diagnose and solve problems. Through collaboration, individual learning was inseparable from collective learning. Through social construction, they developed a shared understanding out of conflicting and confusing data (whatever the situation threw at them), which represented their view of the world. They constructed knowledge and understanding out of social and physical circumstances as well as the histories and social relations of the people involved.

In ethnographic research with railway maintenance technicians in Sweden, Sanne (2008b) also found that storytelling was an important part of technicians' practices, as well as being integral to their understanding of incident causation. Story telling contributed to the local team's learning, social relations, practices and identities, and assisted individuals to 'save face' when they were involved in risk incidents. Story telling was a way for technicians to address risks but from a narrow perspective as their local practice emphasised vigilance, carefulness, skill and responsibility and usually neglected root causes of exposure to risks. In contrast, the railway authority's incident reporting scheme was not integrated into technicians' practices, was not well used by them, did not seem to serve their interests and did not provide them with useful feedback if they did report incidents. As a consequence, the potential for organisational learning through more rigorous reporting and a systems response to incidents was impeded.

In ethnographic studies on Italian building sites, Gherardi et al (1998) and Gherardi and Nicolini (2002) investigated learning by new managers and workers. These individuals learned through observing the behaviour of others, conversations and non-verbal communication, and through physical action, and by questioning, proposing and supporting alternative ways of doing things. Managers who were more authoritarian in style or were guarded, rather than sharing their own experience, were less conducive to learning by others. A key finding was the 'silence' about safety and danger at the construction sites as these issues were not addressed explicitly. Learning about safety reflected the habits and attitudes of others on site – the perspective that safety was an individual rather than an organisational matter, that incidents were personal shortcomings and that risk-taking demonstrated strength and courage.

In her study of 66 Australian firms that designed and manufactured workplace plant Bluff found that three practices were central to their activities – drawing upon their own and other industry experience, interacting with customers and referring to technical standards (2010, ch 6). Beyond these central practices, actual practices in each firm and the health and safety knowledge constructed by individuals varied widely with differences in the operations of particular firms, and the professional and vocational backgrounds of the individuals involved in plant design and manufacture. Neither work health and safety legal obligations nor regulators (or their guidance materials) were key constituents of work health and safety knowledge among those involved in plant design and manufacture. Also, the practice of plant design and manufacture was largely disconnected from the substantial, specialist safe design body of knowledge in safety engineering and ergonomics sources.

Mayhew (1997a) found that small business operators of garages, cafes, newsagents and printing firms operated from an oral rather than a written tradition, and respected the health and safety knowledge of their peers rather than government officials. A series of other studies focusing on small businesses have also highlighted their oral culture and their preference for face-to-face communication and guidance from peers, although some studies also suggest that health and safety inspectors may be among businesses sources of information (Caple et al 1997; Cowley 2006; James et al 2004; Mayhew 1997b; Mayhew and Young 1999; Mayhew et al 1997).

Another series of studies point to the pivotal role of work health and safety advisers and specialist staff in helping to promote workplace dialogue around health and safety, providing a conduit between an organisation and external regulatory and professional communities, helping to name and frame work health and safety issues for attention, and helping to improve risk management (Bluff 2010, ch 6; Broberg and Hermund 2007; Hale and Hovden 1998, pp 147-148; Jamieson et al 2010; Jensen 2002, p 218; Nytrö et al 1998, p 299; Parker 2002, pp 57, 99; Vanderkruk 1999).

The implications of the empirical research and theory relating to workplace learning generally, and work health and safety knowledge in particular are that an individual's experiences at work are significant sources of learning both about how to perform work and about work health and safety. It is also likely that this practical experience may make more of a contribution to how individuals think and act on work health and safety than more abstract information provided in a 'class room' setting, print or online guidance material if these are 'delivered' in a way that is disconnected from work practice. Individual learning about work health and safety means practicing and interacting with others in solving health and safety problems, and better learning about work health and safety is fostered by individuals having opportunities to observe and interact with competent practitioners, within competent communities of practice. If health and safety is weak or absent in workplace practice, or if work

health and safety information, education and training are not linked with authentic work the quality of what people learn about work health and safety is likely to be poor. Also, in the absence of opportunities to practice work health and safety in authentic work, any pre-existing knowledge may be re-shaped or dissipated through ongoing work experiences.

Much work health and safety information provision and training is based on the traditional model of knowledge delivery – information is provided by a knowledgeable source to others lacking or with less knowledge. Whether that information is provided in guidance or other information materials, in education and training courses, and whether provided face-to-face, in print or online, the underlying model is one of transfer of knowledge from the knowledgeable to the less knowledgeable. 'Knowledge transfer' approaches may contribute to individual's factual or content knowledge, but there is little evidence that such learning translates into practice and problem solving in workplace contexts (Billett 1996, 2001; Palincsar, p 347).

Research in this area needs to go beyond exploring ways to improve the quality and accessibility of work health and safety information, or the knowledge and experience of work health and safety educators, as these efforts will not automatically translate into better learning about work health and safety and application of that learning in workplaces. Research could usefully track individual learning about work health and safety from the teaching curriculum in vocational or higher education, through to learning in their working lives with a view to exploring how learning about health and safety can best be supported. Research could also examine the efficacy of alternative approaches to building work health and safety capacity (see also section 7.2).

6. Safety Culture and Safety Climate

6.1 Concepts and approaches in research

The related concepts of 'safety culture' and 'safety climate' are aggregate concepts which encompass human, work environment and organisational factors that affect work health and safety, although the use of these terms by researchers and practitioners alike varies considerably. The vague nature of these umbrella terms and the lack of agreement about their definition, how they are measured or studied, how they are constituted and their influence on work health and safety behaviour or outcomes has been widely documented in the literature (Choudry et al 2007; Clarke 2000; Guldenmund 2000, 2010; Haukelid 2008; Silbey 2009; Tharaldsen and Haukelid 2009).

To the extent that there is agreement about the concept of *safety climate* it is to regard it as an indicator or 'snap shot' of organisation members' perceptions or subjective evaluations of some facet(s) or health and safety in the organisation, at a particular point in time (Cavazza and Serpe 2009; Clarke 2000, p 75; Flin et al 2000; Griffin and Neal 2000; Guldenmund 2000, p 222). In contrast, *safety culture* is regarded as something deeper – the basic or underlying values, assumptions and beliefs embedded in an organisation (or work site or work group), and which impact on work health and safety (Clarke 2000, p 75; Guldenmund 2000, p 222; 2010).

Researchers working in the field of culture and health and safety have proposed that safety culture is integral to organisational culture and therefore that the principal focus for researchers and practitioners should be to understand organisational culture and its effects on work health and safety (Hale 2000, p 5; Haukelid 2008, p 417; Hopkins 2006, p 888; Richter and Kochs 2004, p 705). As an organisation or work group's values, beliefs and assumptions may not be directly discernible, those investigating culture may look for the ways that values, beliefs or assumptions are revealed through organisational structures and processes, and the social norms and practices, motivations, attitudes, perceptions and competencies of individuals or groups within the organisation (Clarke 2000, pp 75-76; Guldenmund 2010; see also Meidinger 1987, p 361). From this perspective, the culture and climate concepts start to look more similar at least with regard to the visible manifestations of culture and the elements measured in climate studies.

Although the terms 'safety culture' and 'safety climate' are both still used in the literature, the concepts have started to converge with the term culture taking in climate (Hale 2000, p 5). It is now well recognised that the key reason for the culture/climate distinction is the different disciplinary backgrounds of researchers as sociologists or anthropologists (for culture), and psychology or management (for climate). Researchers working from different disciplinary perspectives have adopted very different approaches to studying or measuring culture/climate phenomena and have different assumptions about the nature of culture/climate, whether they can be socially engineered or changed, and how they shape or influence work health and safety (Clarke 2000, pp 69-70; Hopkins 2006, Sibley 2009, pp 341, 356).

Guldenmund (2010) has helpfully distinguished three approaches in the literature. The first approach uses *ethnography* as its primary methodology. The researchers, who are typically sociologists or anthropologists, conduct ethnographic, narrative, phenomenological or case study research, or studies building grounded theory. They focus primarily on understanding the underlying values, beliefs and assumptions (the cultural core). In this approach culture is considered to be something that an

organisation 'is' rather than something that the organisation 'has'. (For examples of studies in this tradition see Guldenmund 2010, pp 2-3; Hopkins 2000, 2005, 2008; Richter and Koch 2004; Sanne 2005, 2008; Vaughan 1996).

In the second approach the researchers, who are often social or organisational psychologists, use standardised, self-administered, *psychometric* surveys. These surveys ask organisation members about their perceptions or subjective evaluations of different organisational, work environment, behavioural or socio-psychological factors. The factors vary but may relate to health and safety management (eg procedures, committees, training, communication), the work environment and level of risk, and the beliefs, motivations, attitudes, perceptions, competence and behaviour of managers, supervisors, workers (Clarke 2000, 2006a; Flin et al 2000). Such factors are taken to be manifestations of culture but the surveys do not tap into underlying values, assumptions and beliefs (Guldenmund 2000, p 234; 2007, p 741). Researchers have developed many different psychometric survey instruments, sometimes influenced by the requirements of a particular organisation (Flin et al 2000, pp 177, 179 and 188).

In this second type of research individuals' perceptions or evaluations are often referred to as attitudes[8] (Clarke 2000, p 75, 2006a; Guldenmund 2007, p 726). However, the survey instruments capture respondents' 'off the cuff' impressions at a particular point in time and, as such, are not necessarily capturing attitudes in the sense of individuals' settled ways of thinking or feeling, and disposition to act in a consistent way towards something or someone (see section 3). Researchers analyse the data on perceptions and subjective evaluations to identify clusters of factors (dimensions) as the basis for assessing organisational culture which is often called safety climate. In this research culture (or climate) is considered to be something that an organisation currently 'has', rather than 'is'. (For examples[9] of survey instruments and studies in the psychometric tradition see Beus et al 2010; Cavazza and Serpe 2009; Cooper 2004; Cox and Cheyne 2000; De Joy et al 2004; Fogarty and Shaw 2010; Glendon and Litherland 2010; Hahn and Murphy 2008; Health and Safety Executive 1997; Human Engineering 2005; Johnson 2007; Mearns et al 2010; Melia et al 2008; Neal and Griffin 2000; Neal et al 2002; Probst and Estrada 2010; Zohar 2000, 2008; Zohar and Luria 2005).

The third, *pragmatic* approach is primarily derived from experience and expert judgement rather than empirical research, and focuses on the structure and processes of an organisation which it is believed influence culture and work health and safety performance. Structure is concerned with how work is done in an organisation and by whom. Processes are an organisation's means for producing its main outputs, as well as the processes that support production such as management or quality control processes. An organisation may also have strategies and policies to drive and support production and management processes. Researchers and practitioners obtain the shared opinions of organisational members of structures and processes, as well as attitudes and perceptions, in order to assess the organisational strengths and weaknesses, which in some models are conceived as reflecting organisational maturity. This assessment provides the basis for change strategies to advance organisational maturity and, in turn, influence culture and health and safety

[8] The surveys typically include Likert scales and ask respondents to evaluate a statement according to their level of agreement or disagreement with the statement, from strongly agree to disagree on a scale with five or more levels. Some researchers consider that individuals' responses to such scales indicate affect (feeling of emotion) and use the term 'attitude' when referring to such responses.

[9] These are just some of the numerous examples of such studies.

performance. As with the second approach, culture is conceived as something that an organisation has rather than is. (For examples of work in this tradition see Guldenmund 2010, pp 4-5, 13; Hudson 2007; Parker et al 2006; Reason 1997. See also Hale 2000, p 12; 2003, pp 194-195).

The three approaches are all broadly concerned with 'culture' but they are grounded in very different traditions, and entail quite different assumptions about the nature of culture, how it can be studied or measured, and its relationship to work health and safety performance and outcomes. Also, the timing of studies in the three approaches differs (Guldenmund 2010, pp 11, 12). The ethnographic approach tends to study an organisation's past to understand embedded values, beliefs and assumptions and their effects on health and safety. Psychometric surveys take a snap shot of organisation members' perceptions and evaluations of various factors at a particular point in time, in the present. The pragmatic approach assesses current structures and processes with a view to organisational change in the future. Across the literature relating to culture and its effects on work health and safety, researchers and practitioners have identified a series of issues concerning the conceptualisation and study of culture, and its effects on work health and safety.

6.2 Issues in climate and culture research

6.2.1 The emphasis on worker behaviour

The assumption underlying much of the culture research in the psychometric survey (safety climate) tradition is that culture influences accident and injury rates (or other health and safety outcomes) through its effects on worker behaviour (Clarke 2006b; Guldenmund 2007, pp 738-740; Silbey 2009, (351-352). That is, worker behaviour is seen as *the* mechanism for accident/injury prevention, and following safe work practices or rules, and using personal protective equipment (PPE) are key behaviours for 'compliance' according to this model (see for example Neal and Griffin 2002).

This assumption is rather curious. It is clearly out of step with work health and safety law in Australia and other developed countries where this type of research is undertaken, which establishes that the employer or the PCBU has the primary responsibility to ensure health and safety at work[10] (see section 1). It fails to take account of the limited resources and power that workers have to bring about greater health and safety (Silbey 2009, p 362). The assumption is also incompatible with work health and safety professional practice and empirical evidence relating to risk control. The literature relating to control of work health and safety risks establishes that measures that eradicate or reduce the danger (safe place controls) are more effective as they prevent harmful forms and levels of energy from being generated, released or transferred to people (Atherley 1975, 1978; Brauer 2006, pp 26-28, 98-103; Haddon 1973, 1974, 1980). Such safe place controls are passive countermeasures that function automatically without a person needing to activate or implement them and are therefore not weakened by the fallibility of human beings.

[10] For examples of specific requirements see the US *Occupational Safety and Health Act 1970*, section 5; or the European Framework Directive which is the basis for law in member states of the European Community, European Commission (1989) 'Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work', *Official Journal* L 183 , 29/06/1989, pp 1 – 8, Article 5.

The safe worker behaviours that are centre stage in the safety climate model are *safe person* measures. They depend on workers being continually alert to and actively avoiding risks and are rendered ineffective or impaired by worker fatigue, errors or mistakes, and other everyday work pressures. Consequently, they are less effective measures than safe place controls that eliminate or minimise risks.

As a mechanism for injury and illness prevention worker behaviour can only ever account for a small part of the preventive action required in workplaces. We might therefore predict that even if culture has an effect on worker behaviour, that relationship will not account for the incidence of work-related injury and illness. That in fact appears to be the case. Even within the safety climate research there is little evidence that worker behaviour predicts work health and safety outcomes in the form of accident and injury rates (see section 6.3).

6.2.2 Distinguishing culture from organisational management and behaviour

In much of the research, culture (or climate) is interpreted from organisational, work environment or behavioural factors that are perceptible to researchers, or to organisation members whose impressions they seek. In focusing on these manifestations or artefacts of culture, the research often measures or studies things other than culture (Beus et al 2010, pp 714, 716; Guldenmund 2010, pp 1, 7).

Recognising this problem, some researchers have proposed that culture studies should separate out psychological factors from work health and safety management and behavioural factors (Cooper 2000, 2004, pp 120-121; Hale 2000, pp 6-7; Neal and Griffin 2002, p 69**)**. The health and safety management factors would then become the focus of an audit, while behaviours might be studied by sampling behaviours. Studies conducted in workplaces using ethnography or in-depth interviews, observation and content analyses of documentation may also be better suited to understanding underlying values, assumptions and beliefs and their effects on health and safety decision-making and action, for example assumptions about what causes incidents, injury and illness, and what should be done to prevent them (Hale 2000, p 10; Haukelid 2008, p 424).

6.2.3 Abstract and arbitrary concepts

In the psychometric approach, researchers use statistical techniques to determine the dominant factors and clusters of factors indicating the safety climate, at organisation, group or individual levels (Beus et al 2010; Clarke 2000; Guldenmund 2007). Statistical analyses of data collected through surveys, without reference to workplace 'reality', can lead to researchers generating rather abstract aggregations of factors (factor structures or factor solutions) that cannot be replicated in subsequent studies, even within the same company (Glendon and Litherland 2001; Guldenmund 2007). That is, safety climate is made up of different elements each time it is studied.

Researchers also use their own discretion to name factors and factor structures (Glendon and Litherland 2001**,** p 160). The terms they use may or may not reflect common usage, and may or may not reflect all the factors in a cluster. For example, Johnson (2007) uses Zohar and Luria's (2005) factors for assessing safety climate but renames them. He uses the term 'coaching' for factors relating to communication and the term 'compliance' for factors relating to supervisors strictly controlling the behaviour of workers. He uses the term 'caring' for factors relating to the practices of

warning workers and reinforcing safety requirements. The combined effect of the methods for data collection, analysis and the naming process is to generate some rather abstract and arbitrary factors or factor clusters as the elements of safety climate.

6.2.4 Variation in culture

An underlying theme in culture research, across the different approaches, is that for there to be a culture it must be shared between members of a group (Guldenmund 2010, p 9; Hale 2000, p 7). Some researchers and practitioners assert that an organisation has a single unifying culture and set out to find it. One reason for the lack of success in replicating psychometric assessments of safety climate, apart from the methodological issues mentioned above, may be that organisations have multiple changing cultures and sub-cultures (Clarke 2003; Guldenmund 2010, p 10; Gunningham and Sinclair 2009a, p 887; Haukelid 2008, p 418). Organisations are open systems with changing leaders, different locations, non-permanent or contingent workers, relationships with other organisations and members that bring their own values, assumptions and beliefs.

Cultural diversity was well demonstrated in Richter and Koch's ethnographic study in three medium to large Danish organisations (Richter and Koch 2004, pp 709-710). The researchers identified multiple configurations of culture relating to health and safety, which developed and changed as organisation members related to culture and material conditions in and outside the organisation. They only found a wider culture in relation to management networks, unions, professional identity and societal regulation which tended to have an impact across organisations. This macro-culture, along with structures, social relations (division of labour, work content, power relations, participation) and broad commitment to safety impacted on the quality and outcomes of work health and safety effort. These researchers argue that culture must be understood in a specific context and that it may change as material conditions and social relations develop. The conclusion is that identifying or engineering a unified health and safety culture is rather an abstract and unachievable idea.

6.2.5 Power

Some researchers are critical that much of the literature concerning organisational culture and its effects on health and safety ignores power which they suggest is closely intertwined with culture and must be considered for a realistic account of the dynamics of organisational life (Antonsen 2009, p 2009; Hale 2003, p 197; Pidgeon 1998, pp 210-213; Richter and Koch 2004, p 720; Silbey 2009, p 362). The argument is that while culture provides grounds for decision-making, power influences decision-making processes in organisations which are arenas for conflicting interests.

Antonsen defines several dimensions of power (Antonsen 2009, pp 185-186). The first concerns position power, control of information and expertise, control of rewards and resources, control over sanctions, alliances and networks, and personal power. The second dimension relates to the ability to keep potential issues out of decision-making processes, which concerns actors' access to and control of agendas. The third dimension is the tendency for social systems to be biased in reflecting the values of a few groups at the expense of others. Antonsen proposes that an organisational culture that influences work health and safety positively will not necessarily be free of conflict but will deal with conflicting views in a constructive manner (Antonsen 2009, p 190). Silbey calls for research to explore the features of complex systems omitted in the talk about culture including conflict, inequalities in

power and authority, and competing sets of legitimate interests within organisations (Silbey 2009, p 341).

6.2.6 Culture as a malleable or emergent phenomenon

The research on culture offers different perspectives on whether culture is emergent or something that can be changed. Haukelid (2008) has described the evolution of a culture that is more supportive of work health and safety in the Norwegian offshore petroleum industry. He tracked the changes in North Sea oil drilling from a 'macho' culture with many accidents from which change started to occur after a disaster in 1980. Subsequent internal control reforms involving new technology, committed leadership and employee participation in the 1980s brought further change, followed by the introduction of comprehensive management systems in the 1990s and measures introduced, after 2000, intended to address safety culture. The latter involved regulation by the Petroleum Safety Authority requiring the responsible party to promote a sound work health and safety culture, a forum to promote cooperation between the industry and authorities, and the 'working together on safety initiative', which introduced technological and organisational initiatives such as the 'Step Change' program and the 'Colleague Program'. Looking back over several decades Haukelid says that changes in culture are discernible across the industry with new values emerging, such as health and safety taking priority over efficiency. Clearly, however, this change occurred over a long period of time and was spurred by a series of major initiatives as well as a major disaster.

In their ethnographic study of culture, health and safety in three Danish organisations Richter and Koch found that culture developed and changed with variation in material conditions and social relations (Richter and Koch 2004, p 720). Beus et al's (2010) meta-analysis of safety climate research showed that work injuries are a strong predictor of organisational safety climate suggesting that when things go wrong they can influence culture adversely.

A Dutch evaluation of 298 interventions in 17 projects to improve work health and safety through changes to organisational and management factors sheds some light on the kinds of initiatives that may be necessary to successfully change work health and safety management and culture (Hale et al 2010, p 1033-1034). The evaluation found that a critical factor was implementing a series of interventions to generate a critical mass of input energy, overcome inertia against change and mobilise different groups. Also important was having an active, persistent and creative work health and safety professional and/or an active, participative and supportive senior management to provide an active motor for change. Targeting dialogue between the workforce and line management ensured that an organisation learned and changed, and that dangerous situations were reported. There was a need for strong encouragement to managers and workers to identify dangerous situations, analyse reports and take action, and training for top management fostered vision, motivation and knowledge of what to achieve and how to do it.

On balance there seems to be some evidence that culture may change although this may require very active programs or take some considerable time to be provoked by changes in structures, social relations and broader societal trends. Culture may also change regardless of what managers and workers think and do but initiatives built on greater manager and worker collaboration and consultation may be more successful (Hale et al 2010; Haukelid 2008).

6.3 The impact of culture on organisational management, behaviours and outcomes

Several studies have found that a wider organisational culture or climate influences a safety culture or climate and, in turn, either management of work health and safety or specific aspects of behaviour (for a review see Clarke 2010). For example, Neal et al (2000) and Neal and Griffin (2002) found a statistically significant relationship between organisational climate factors such as goal congruency, role clarity, supportive leadership, participative decision making, professional growth and professional interaction, and safety climate factors such as management values, communication and training. The research found that organisational climate influenced safety climate, which in turn influenced individual knowledge of safety practices and procedures, and individual motivation to perform safety-related activities. In turn, individual knowledge and motivation were found to influence compliance with safety procedures and participation in safety-related activities. In addition, safety climate directly influenced participation. These researchers suggest that to achieve worker compliance with safety procedures and participation, an organisation must first produce changes in knowledge and motivation.

Other studies using qualitative methodologies have explored various aspects of organisational cultures and their effects on work health and safety. For example, in case study research in 15 Victorian construction companies that had experienced an occupational fatality, Haines (1997) found that organisational culture shaped the premises underlying decisions in the companies and the quality of work health and safety management. A positive culture was one that highlighted communication, worker representation and increased transparency and accountability of management (Haines 1997, p 93). It was linked with senior management commitment to work health and safety, a program for work health and safety that was integrated into core activities, a focus on work health and safety systems within a company as opposed to the actions of individuals, a management system that addressed change, and a system that valued worker importance (Haines 1997, p 63). A negative culture was linked with a negative response in which the company only targeted the visible and specific factors to be dealt with, often the immediate precursors to deaths (Haines 1997, pp 68-69).

Haines found that organisational culture reflected an underlying business ideology or logic, rather than a discreet entity of itself, and this logic mediated the action taken or inaction in the company (Haines 1997, pp 32, 122, 158). Cultural influences could only have a positive effect on work health and safety if economic circumstances gave breathing space within which they could work. Where safety was seen as integral to future success, a positive culture flowered. Where safety and success were seen as ultimately in conflict, a negative culture emerged which placed a priority on getting the job done.

In a study in the New South Wales mining industry Shaw et al (2007) identified organisational cultural factors closely associated with good health and safety management. They collected data through a survey from 1,667 individuals at 53 mine sites, and qualitative data at 52 sites (from focus groups, interviews and documentation) collectively involving 585 people. The researchers differentiated proactive, transitional and reactive sites, reflecting differences in the effectiveness of work health and safety management at sites. A series of organisational factors underpinned effective health and safety management. The proactive sites were more positive for mindfulness, workgroup cohesion, trust in management, organisational justice, supervisor support and role clarity, as explained in the study (Shaw et al 2007, pp 166-181).

Gunningham and Sinclair (2009) also found that trust was a key influence on work health and safety management in a study in two Australian mining companies. Both companies utilised health and safety management systems, standards and audits but were not successful in improving health and safety outcomes. The authors identified a lack of trust between workers and management related to past incidents and a history of adversarial relationships affecting health and safety management in one company. In the other, a lack of trust in the relationships between corporate and mine site management, between workers and middle management and senior management, between two groups of workers, and between middle management and the mine manager all affected the quality of work health and safety management.

Some safety climate (psychometric survey) studies have found a relationship between safety climate factors and worker behaviour and/or outcomes measured as incident rates. Clarke's (2006, p 278) meta-analysis of the safety climate literature found strong support for a correlation between safety climate and worker behaviour, and a weaker correlation between worker behaviour and occupational accidents and injuries (see also Clarke 2000). Cavazza and Serpe (2009) administered a safety climate survey to 345 blue-collar workers in three companies in northern Italy (utility networks, knitted fabric production and beef processing). They found that when workers perceived that company, senior manager and supervisors' attitudes favoured safety, workers expressed less ambivalence towards using personal protective equipment.

However, a relationship between safety climate and behaviour or outcomes has not been confirmed in all safety climate studies. For example, Cooper (2004) distributed a safety climate survey to 540 manufacturing employees in British packaging production plant at the beginning of, and one year after, a behavioural safety initiative. He found that changes in safety climate perceptions were not reflected in worker behaviour, and vice versa. He concluded that the assumption that safety climate scores represent safety in worker behaviour must be questioned (p 509). Glendon and Litherland (2001) also failed to find a relationship between safety climate and worker behaviour.

Rather than a cluster of factors linked to worker behaviour, some studies have found that particular factors are linked with worker behaviour. A consistent finding is the relationship between worker perception of management commitment and worker behaviour (see for example Fogarty and Shaw 2010). Mearns et al (2001) measured safety climate across nine North Sea oil and gas installations in consecutive years and found that perceived management commitment to safety was linked with worker willingness to report accidents and changes in worker safety-related behaviour. Probst (2009) examined incident under-reporting with 426 workers in five industries and found that under-reporting was higher in workplaces with poorer safety climate scores and where supervisor safety enforcement was inconsistent. Beus et al's (2010) meta-analysis of safety climate studies found that perceived management commitment to safety was the safety climate dimension with the most robust association with future injuries.

The findings from the meta-analyses of psychometric survey studies are also important as they reveal that while there is some relationship between safety climate and injury rates, the direction of this relationship is not clear. Beus et al's (2010) analysis found that injury rates were a stronger predictor of organisational safety climate than organisational safety climate was of future injuries. For prospective studies measuring injury rates after assessing safety climate, the influence of safety

climate on future work injuries weakened as time passed, whereas the influence of past work injuries on future safety climate endured well after injury occurrences.

Clarke's (2006b) meta-analysis examined the relationship between safety climate, commitment and involvement in safety, adherence to procedures or rules, and occupational accidents and injuries. She found that safety climate showed a small correlation with occupational accidents and injuries but this was only valid for the studies that measured accidents and injuries occurring after the measurement of safety climate (for a similar finding see Clarke 2006a). The analysis also found a stronger relationship between worker involvement and accidents and injuries, than for adherence to procedures and accidents or injuries. In addition, safety performance variables did not fully mediate the relationship between safety climate and accident or injuries, suggesting that safety climate impacts upon accident involvement and injuries in ways other than impacting on worker behaviour, such as work design, physical environment and communications, which may improve risk control as well as perceptions of safety climate. In a second meta-analysis Clarke (2006a) also found that perceptions of preventive action better predicted accident rates. She suggests that safety climate may have been oversold as a primary indicator of an organisation's safety effort, as the evidence of a predictive relationship with accidents is not strong.

6.4 Summing up culture and climate

There is a vast literature concerning the related concepts of culture and climate as they affect work health and safety, and this literature presents various definitions and approaches to how these concepts can be studied or measured. It is helpful to distinguish ethnographic and case study approaches, psychometric climate surveys and a more pragmatic approach that assesses organisational structures and processes with a view to changing culture.

In work health and safety practice, it is common to hear claims being made about the benefits of a 'safety culture' or how 'improving the safety culture' in a workplace improved work health and safety performance. A suitable response when such claims are made might be to question what the proponent actually means by safety culture. Often the underlying meaning seems to be something more akin to a program or practice, even a focus on worker behavioural safety. As discussed, worker behaviour is centre stage in the psychometric safety climate research, an approach that is out of step with Australian work health and safety law and evidence about the most effective risk control measures. This line of research does not seem to have found a strong relationship between worker behaviour variables, injuries and incidents, suggesting that risk control strategies other than behavioural safety are important in preventing adverse outcomes. A safety climate factor with a more robust association with future injuries is perceived management commitment.

There is however clear evidence of the effects of organisational culture or sub-cultures on work health and safety. Qualitative research and cases studies have provided nuanced accounts of various aspects of organisational culture affecting health and safety. It is less clear whether efforts to change culture are worthwhile. The pragmatic approach to culture research proposes that a dedicated focus on organisational processes and structures can ultimately influence organisational culture (Guldenmund 2010, p 13). Research to examine whether and how culture or sub-cultures can be changed to better support work health and safety outcomes seems intuitively to be worthwhile.

7. Work Health and Safety Regulation and Socio-Psychological Factors

7.1 Overview of regulatory strategies, mechanisms and approaches

Work health and safety regulation, both law and its inspection and enforcement, as well as other compliance support activities of regulators are among the factors that may contribute to regulatees' willingness and capacity to comply (Lindblom and Hansson 2004, p 77**;** May 2005, p 318; Gray and Scholz 1993, p 200). There is good evidence that the achievement of social goals such as preventing work-related death, injury and illness is higher when law exists, is effectively communicated, and compliance is inspected and enforced.

Australian work health and safety regulators use a wide range of strategies and mechanisms to nurture regulatees' willingness and capacity to comply with work health and safety law. They communicate and provide information to regulatees through a wide variety of 'arms length' methods. These include guidance material which is accessible electronically at regulators' websites or in publications at regulators' metropolitan and regional offices, direct mail outs as part of targeted campaigns, telephone or online information services, media advertising, seminars and workshops, and participation in field days or other public events, among other methods. Regulators work with and through industry and trade associations, unions, work health and safety consultants and professional bodies, and training providers to widen access to work health and safety information and support the development of health and safety capacity. Regulators may also provide financial incentives for regulatees to implement particular risk control measures or engage consultants or, in conjunction with workers' compensation agencies, financial incentives for self-regulation to improve work health and safety performance.

Through inspection and enforcement the work health and safety regulators' inspectors engage directly with regulatees. Inspectors have broad powers to enter and inspect workplaces, investigate work health and safety matters, and receive information and assistance from those inspected (see generally Johnstone 2004a, pp 373-400; Johnstone 2004b, pp 146-178). They may provide advice and information and have statutory powers to issue improvement and prohibition notices (administrative enforcement), and initiate prosecutions for contraventions of work health and safety law (criminal enforcement). In some states and territories inspectors can issue infringement notices (on the spot fines) and accept enforceable undertakings (for general discussion of these mechanisms see Bluff and Johnstone 2004; Johnstone 2004b; Johnstone and King 2008). If the model WHS Act is enacted uniformly in all Australian states and territories all of these mechanisms will be available to work health and safety inspectorates in all Commonwealth, state and territory jurisdictions (model WHS Act, ss 156-222).

The types of sanctions imposed by a court if a regulatee is convicted or found guilty of an offence can also shape motivations and capacity in different ways. The model Act empowers a court to impose a substantial fine or gaol sentence (depending on the offence), or to make different types of orders (model WHS Act, ss 234 to 244). These include adverse publicity orders, orders for restoration to remedy matters, work health and safety project orders, court-ordered undertakings, injunctions and training orders. Fines and the different types of orders may shape compliance motivations in different ways, variously impacting on a regulatee's fear of adverse

economic consequences, reputational or other concerns, or addressing weaknesses that produced the non-compliance such as organisational capacity and arrangements to comply with work health and safety law (see also section 2).

In addition to different strategies or mechanisms, regulators may also use different approaches or styles in their communication and interaction with regulatees. They may be more or less cooperative, insistent or coercive and these different styles can also impact on how regulatees respond to regulation. There are, therefore, many variables in work health and safety regulators' compliance support, inspection and enforcement activities which may impact differently on regulatees' willingness and capacity of regulatees to comply with work health and safety law.

The next section examines some empirical evidence relating to strategies for informing regulatees and building their capacity. This is followed by a discussion of research relating to the impact of inspection and then of prosecution on regulatees' motivations and knowledge, or compliance outcomes. There is then a discussion of different regulatory styles or approaches and empirical research relating to these issues. The final section for regulation discusses some wider contextual issues.

7.2 Providing information and building capacity

As discussed, work health and safety regulators provide information in a variety of ways, and work with and through industry and trade associations, unions, work health and safety consultants and professional bodies, education and training providers and other third parties, to widen access to health and safety information and support. Health and safety regulators have limited resources and print or online information and third party sources can potentially widen access to information and training.

A small study conducted in Australia and New Zealand in 2007 provided qualitative information about the use of health and safety codes of practice and guidance materials from 32 people who used these in workplaces (26) or in advisory roles in industry associations, unions or as work health and safety consultants(6) (Bluff and Gunningham 2007, pp 96-101). The study provided illustrative examples of how codes and guidance materials are used in practice. The respondents commonly used these information materials to develop in-house policies, procedures, practices or systems of work, in risk management and in developing training materials. As regulator-provided information these resources were considered to be persuasive, helping to determine compliance and settle disputed matters. They provided a benchmark against which health and safety could be progressively improved through work and workplace redesign, risk management, training and safe work practices.

Regulator health and safety information is a valued resource for those with some knowledge of work health and safety. In organisations with work health and safety professionals or the resources to engage work health and safety consultants, these people can help build capacity and also provide a conduit between an organisation, and external regulatory and professional communities (Hale and Hovden 1998, pp 147-148; Nytrö et al 1998, p 299; Parker 2002, pp 57, 99; Vanderkruk 1999). However, empirical research suggests that additional and different strategies are needed if regulators, or other parties, are to contribute to building the work health and safety capacity of 'the uninitiated' and those not 'linked in' to the regulatory system through membership of industry or trade associations, unions, or otherwise.

In a series of studies, Mayhew found that Australian small business operators across various industry sectors operate from an oral rather than a written tradition, have a preference for face-to-face communication and are not responsive to postal mailouts (Mayhew 1997a,b; Mayhew and Young 1999; Mayhew et al 1997. See also Caple et al 1997). In a telephone survey of owner/managers in 1,000 small and medium businesses in Britain, in six industry sectors,[11] and 73 face-to-face interviews with a sample of these, James et al (2004) found that only one in three businesses had made use of external sources of information or advice about health and safety in the last five years but, to the extent that they did draw on external sources, they were more inclined to use inspectors or local authorities. Few of these businesses[12] had used the HSE's website or information line, and few had sought information from third parties such as consultants, insurance companies, other businesses, industry or trade associations or other publications.

In another British study, Hutter and Jones (2006) surveyed 2004 individuals across 31 food businesses and, in a second phase, asked managers of these businesses about their understandings of food safety and hygiene risks and their sources of information. They found that many firms relied on regulators for advice, albeit after they were found to be non-compliant in inspections.

There is promising evidence of the effectiveness of some alternative approaches. However, they require the allocation of resources for face-to-face interaction between regulators (or consultants working on their behalf) and regulated organisations or individuals.

Stave et al evaluated the effects, after four years, of an intervention based on regular group discussions and dialogue in social support networks among 88 farmers and farm workers in Sweden. The project set up nine groups which met monthly for six months and then once more after six months. A process consultant provided information to support perception of risks and their consequences. The groups discussed real injury examples which they were more receptive to than information about injury rates, types, effects and costs – they perceived injury data as concerning other people and not them. The groups analysed the examples through open and thorough discussion, and sought solutions through communication with others in the same work situation. They were the owners of problems and solutions, and the non-judgemental interaction fostered discussion and reflection (Stave et al 2008, pp 197-198, pp 204-205). Compared with a control group, the intervention group had significantly increased health and safety activity and reduced acceptance of risks.

Cowley (2006) provides an account of a social marketing approach that was successful in influencing small businesses. He tested the approach with business operators in three industry sectors in Victoria - commercial fishing, wall and ceiling plastering, and motor vehicle body repair. The intervention involved developing and delivering messages tailored to the business operators' readiness to change, strategies to reduce the cost, time and effort of adopting control measures and any undesirable side effects, and bringing to bear social pressure through opinion leaders and role models (tested in one case study). The approach was successful in increasing the demand by target business operators for particular risk controls, and increasing the availability, use and maintenance of these risk controls by employers within the target businesses. Features of the approach contributing to its success were listening to business operators, adjusting messages to align with what was

[11] The firms had less than 50 employees.

[12] Less than five.

important to them, using language and 'messengers' that they would pay attention to rather than a 'you need to change' and 'we have the knowledge to tell you how to change' approach. As such, the approach also forced questioning of the evidence base relating to the suitability and efficacy of a proposed intervention, and eliciting pros and cons in regard to the adoption of a risk control.

Research into the potential for regulators (or other parties) to use interventions that are more collaborative in nature, and prioritise dialogue and practical problem solving could be worthwhile. Such approaches appear to have potential for building willingness and capacity to comply, but is there any possibility of using them on a wider scale? Or, are they at least feasible to apply in targeted programs, rather than more 'arms length' approaches such as mail outs of information material, workshops or other 'knowledge transfer' approaches (see section 5) that are not conducive to identifying and resolving barriers to learning.

It is also noteworthy that in a national survey with 762 respondents, 36% identified vocational training and university education courses as key sources of work health and safety information for them (Safe Work Australia 2010). Little is known however about how information obtained in education and training translates into learning for practice, or the durability of this learning once a person is exposed to other influences in working life. As suggested above (see section 5) research could usefully track individual learning about work health and safety from the teaching curriculum in vocational or higher education, through to learning in individuals working lives with a view to exploring how learning about health and safety can best be supported.

Finally, how can the role of work health and safety 'leaders' or 'enthusiasts', as health and safety professionals or otherwise be optimised? How can they be supported so that they can be most effective in building willingness and capacity to comply? Guldenmund argues that the 'motor that drives the system to its desirable end will always be particular idealistic individuals, not the system alone or the convictions it promulgates' (Guldenmund 2010, p 13). We might ask whether we are doing enough to find and support these idealistic individuals.

7.3 Inspection and notices

The practice of inspection and enforcement is informed by two distinct regulatory theories. The first is the theory of deterrence which is based on rational choice theory (Akers and Sellers 2009; Becker 1968). The second is the theory of bounded rationality (Cyert and March 1963; Simon 1955; Gigerenzer and Selten 2001). A consensus is building in the regulation literature that the decision making of organisations and individuals is characterised more by bounded rationality than it is by informed and rational decision-making.

Standard deterrence theory is based on a model of organisational and individual behaviour which is drawn from rational choice theory (Akers and Sellers 2009; Becker 1968). It conceptualises organisations and individuals as utility maximisers who rationally calculate the costs and benefits of compliance (and non-compliance), and choose to comply only if compliance will provide them with maximum benefits and involves minimal costs (Mendeloff and Gray 2005, p 219; Gray and Scholz 1993, p 199). Hence, the certainty, swiftness and severity of punishment are crucial to deterrence in order to offset the costs of compliance. Deterrence theory assumes that organisations and individuals actively seek out information about enforcement activity, that knowledge of penalties increases the perceived risk of non-compliance

and that perception of increased risk of non-compliance will result in changes to increase compliance.

General deterrence holds that organisations and individuals can be persuaded to comply if they believe that non-compliance will be detected and that punishment will be severe and swift (Thornton et al 2005, p 263; Weil 1996, p 619). *Specific deterrence* holds that if an organisation or individual is punished for non-compliance that they will be more likely to comply (TGK, p 263).

According to bounded rationality theory, organisations and individuals are not rational actors that calculate costs and benefits (Cyert and March 1963; Gigerenzer and Selten 2001; Simon 1955, pp 99, 104). They have limited capacity to process information in decision-making, conflicting motivations or preferences, and their less than rational decision making is the product of reconciling competing motivations within limited capacity. Even the best intentioned have difficulty learning of the multiple demands of different laws, especially if the law is ambiguous, and they may not know about or fully attend to enforcement and penalties imposed on other organisations (Gray and Scholz 1993, p 200). If they do learn of enforcement and penalties against others, they may not think that their own organisation, which may differ from the penalised one, faces an increased risk of being found in breach of the law and being punished (Thornton et al 2005, p 265).

Although regulatees are more likely boundedly rational than rational actors there is good evidence that they respond to inspections. Inspections can improve compliance with work health and safety and other social regulation, at least in particular contexts or in organisations with particular characteristics, as the series of studies reviewed below demonstrate. Direct experience of inspection and enforcement can capture the attention of management, trigger some action that advances compliance in ways that may be more far-reaching or quite limited. Regulatees may also be provoked to take action by inspection and enforcement of other organisations, provided that the message about that enforcement gets through. In that sense, a form of specific or general deterrence may enter into regulatees' willingness and capacity to comply, albeit one based on bounded rationality and inter-mixed with other motivations.

However, many of the studies of inspection and enforcement identify a relationship between these activities and risk control action by regulated entities or reductions in injury or workers' compensation claim rates. That is, the studies generally make a direct link between inspection and enforcement, and outcomes in some form. They do not elucidate *how* inspection and enforcement lead to these outcomes, and whether changes in motivations, attitudes, perceptions, knowledge and skills, or other socio-psychological factors are mediators of that process.

The most extensive studies of the impact of inspection have been conducted in the United States where unique databases have made it possible for researchers and regulators to track the effects of inspection on compliance with work health and safety law. These databases, maintained by federal or state agencies, record inspections conducted by the federal Occupational Safety and Health Administration (OSHA) or its state counterparts, including the violations cited, penalties imposed and characteristics of inspected organisations (Baggs et al 2003; Ko et al 2010, p 52; Nelson et al 1997). The federal Bureau of Labour Statistics Survey of Occupational Injuries and Illnesses collects data each year from a stratified sample of establishments and records injury and illness by lost workdays and total lost workdays per establishment (Gray and Scholz 1993, p 185; Mendeloff and Gray 2005, p 221). Other state-based systems record workers' compensation claims (Baggs et al 2003). In a series of studies conducted over several decades

researchers have variously examined formal inspections, with or without penalties, and consultancy visits, and the effects of these different types of inspections on risk control, injury rates or claims rates in the organisations inspected. They demonstrate an effect of specific deterrence where firms experiencing formal inspection had improved performance according to risk control, injury or claims rates criteria.

Gray and Scholz (1993) examined the impact of federal OSHA inspections on changes in workplace injury rates at 6,842 large, intensively inspected manufacturing plants for the period 1979 to 1985. The policy of OSHA at the time was to penalise specific kinds of serious violations and about one inspection in three resulted in a penalty. The researchers found that inspections with a penalty had a significant relationship with a reduction in both the frequency and severity of injury at the inspected plants. A plant that was inspected and penalised in a given year experienced a 22% decline in injuries over the following three years and a 20% decline in lost work days. The effect of inspection continued for up to three years after the inspection and the reduction in injuries occurred for injury types not related to cited violations (p 197). The authors explain the wider and lasting effect of inspection as due to inspection capturing management attention and triggering preventive action beyond the matters cited and penalised. Scholz and Gray (1990) found a general deterrent effect as well as an additional specific deterrent effect in the firms actually inspected and penalised.

Mendeloff and Gray (2005) examined lost time injury data for 16 036 manufacturing plants with fewer than 250 employees, for three or more consecutive years for each plant. All plants had experienced formal inspections with citation for serious violations and penalties imposed, during the period 1992 and 1998. As in Gray and Scholz's (1993) study of large manufacturing plants, Mendeloff and Gray (2005) found that inspections in these medium or smaller plants were linked with reduction in a wider range of injuries, including over-exertion injuries for which there were no OSHA standards. They suggest that inspection with a penalty leads to management paying more attention to safety, reducing a wider range of injuries as well as those relevant to the particular standards cited in the inspection.

A study by Scholz and Gray (1997) suggests that it is possible to achieve reductions in work injuries through inspection without a penalty if other conditions are met. Analysing the same dataset as Gray and Scholz (1993), Scholz and Gray (1997) found that inspections requested by workers at a plant were associated with subsequent reductions in injuries, regardless of a penalty being imposed. The authors suggest that in the context of employer/worker negotiation on work health and safety matters, information supplied by an inspector facilitates cooperative solutions to work health and safety problems.

Gray and Mendeloff (2002) found that the impact of federal OSHA inspections on injury rates declined from 15% in the early 1980s, to 8% in the late 1980s, and to 1% in the 1990s. The authors do not conclusively determine reasons for the declining impact but suggest that over time repeated inspections of the same workplace may have less impact or that inspections may focus on matters that are not the enduring causes of injury and hence have less preventive effect. Also changes in the way OSHA conducted inspections from the mid-1990s might have had an effect, with less emphasis on citing violations and more emphasis on encouraging firms to problem solve to reduce workplace hazards.

Ko et al (2010) further examined whether there was a decline in the effect of federal OSHA inspections using data from inspections from 1972 to 2006 in manufacturing plants in 29 states in the United States. Their aim was to identify the effects of

repeated inspections and the time between inspections on non-compliance. They found that the number of total violations cited fell by 28-48% from the first to the second inspection. After that the number of citations declined more slowly and also increased about 3% with each additional year since the previous inspection. The authors took account of changes in OSHA citation policy by examining the effects of inspection within four periods (1972-76, 1977-86, 1987-95 and 1996-2006). They conclude that higher priority could be given to first time inspections over repeat inspections, and that the time between planned inspections could be extended. These changes should be coupled with greater breadth in first time inspections and in repeat inspections conducted after a long time.

Weil (1996) analysed compliance with specific OSHA standards over the period 1972 to 1991, using a longitudinal sample of establishments in the custom wood working industry. This was an industry of small to medium enterprises and, as SMEs, these firms had a relatively low chance of inspection (5% in any given year) and low average fine per violation (average of $300 in 1987). Weil assessed compliance with reference to the number and severity of cited violations of OSHA standards for machine guarding and hand held tools. Among firms receiving their first OSHA inspection, 42% complied with the machine guarding standards (no citations for violations), and for plants receiving a second inspection 65.7% complied. Even with the low probability of inspection and low fines resulting, inspection had a deterrent effect.

In another study, Weil (2001) analysed inspection of large-scale construction companies operating nationally from 1987 to 1993. He examined compliance with a sub-set of 100 OSHA standards relating to physical hazards and found that compliance increased between the first and second inspection received by a contractor at a site, and inspections instigated by an incident or fatality were associated with a higher probability of compliance.

With regard to state enforcement of work health and safety standards Baggs et al (2003) examined changes in lost time workers' compensation claims rates for large, medium and small employers[13] in Washington State over a four year period from 1997 to 2000. Some employers had experienced formal inspection by state OSHA inspectors – an inspector had visited the workplace and issued a formal notice stating the inspection results, which might also include citations for violations of work health and safety law and penalties imposed. These formal inspections were significantly associated with decreasing claims rates. The claims rates for employers experiencing formal inspection, with or without a penalty, declined 22.5% in fixed sites and 12.8% for non-fixed sites (for example construction). This compared with a claims rate reduction of only 7% for employers that were not inspected, and a claims rate reduction of only 3.5% for non-fixed sites receiving consultation[14] visits and an increase in the claims rate of 2.3% for fixed sites. The greater decline in claims rates associated with formal inspections continued in subsequent studies for 2001 to 2005 (Shah et al 2003; Fan et al 2003; Fan et al 2006).

[13] All had more than 10 FTEs.

[14] In the consultation visits a consultant visited the workplace, explained the employer's obligations, conducted a walk-through survey to evaluate hazards and work practices, evaluated the company's prevention program, discussed problems identified, made recommendations and provided a written report. The employer could not be fined as a result of a consultation visit but was required to correct serious hazards identified during the visit.

Also in Washington State, Nelson et al (1997) examined the effect of inspecting and citing violations of the vertical fall protection standard on workers' compensation claim rates for falls in the construction industry in the period 1991 to 1992. They found that the claim rate for 784 employers visited by state OSHA inspectors and cited for violations of the standard decreased from 1.78 per 200 000 hours worked to 1.39. The researchers compared the claim rate for the cited employers with the claim rate for a control group of 8 301 employers who had been exposed to the same regulator information campaigns and education programs but were not inspected and cited. The injury rate for the control group decreased from 1.04 to 0.95 per 200,000 hours worked which was not a statistically significant reduction. Cited employers were 2.3 times more likely to experience a claim rate reduction. As there was no statistically significant reduction in claims for employers not inspected, the study also suggests that the effect was one of specific deterrence and not general deterrence due to inspection and citation of others.

Going beyond the studies of work health and safety inspection in the United States, some studies of compliance with environmental and safety-related regulation more generally, in the United States and some European countries, provide some additional insights about the effect of inspections, and in some cases how inspection influences motivations or knowledge. These wider studies also illustrate the influence of regulatory context and the characteristics of organisations on the nature and impact of inspection.

Gray and Shadbegian's (2005) study of the effectiveness of enforcement on plant level compliance with air pollution regulations in 116 pulp and paper mills in the United States found a significant relationship between inspection and compliance with regulations. The study drew on longitudinal research data including plant characteristics, technology and pollution abatement expenditures, and data about compliance and enforcement from several regulatory data sets including the EPA's compliance data system. The effect of inspection on compliance was greater at sites without pulping facilities than at those with such facilities. Also the larger organisations (as distinct from sites) were less sensitive to inspection, monitoring and stack testing, but more sensitive to notices of violations, penalties and inspector phone calls.

Through in-depth interviews with managers of 17 small or medium electroplating facilities in two states in the United States, Gunningham et al (2005, pp 295-296) found that electroplaters unequivocally attributed the markedly improved environmental performance of their industry to the effects of regular inspection coupled with regulatory requirements. They were inspected at least once a year and, once regulations were in place, they believed they would be inspected, that infractions would be detected, and that legal sanctions could well be imposed (Gunningham et al 2005, pp 295- 296). In contrast the managers of 18 large chemical facilities, also in the two states in the United States, stated that inspectors and inspections had relatively little impact on the behaviour of their companies. Only one manager out of 18 mentioned that inspections played a role in why the company had implemented specific actions (Gunningham et al 2005, p 302).

May's (2005) research brings together the findings from three studies that investigated the role of differing regulatory regimes and contexts in shaping firms' compliance motivations and knowledge. The first study surveyed 1562 Danish farmers in 1999, about their motivations for compliance with agro-environmental regulation. The second study surveyed 260 homebuilders in the state of Washington in 2000, about their motivations for compliance with the building code. The third study

surveyed 61 boat builders in the states of California and Washington in 2002, about their motivations for compliance with water quality regulation.

The Danish farmers had a relatively high sense of duty or moral obligation to comply and relatively low deterrent fear of adverse consequences as Danish agro-environmental regulation was framed as a societal contract that emphasised the obligations of farmers to fulfil their responsibility in return for an accommodating approach to enforcement (May 2005, p 337). Central to this societal contract was a set of shared norms and understandings about acceptable behaviours of farmers and of regulators. Shared norms and understandings across the farm sector were reinforced by the extensive involvement of farming organisations and unions in setting requirements and negotiating their implementation. Farmers' motivations to comply were enhanced by their greater sense of a problem, perceptions of inspector competence and that other farmers were doing their part, and increased concern about reputation.

The regulatory context for the Washington state homebuilders was quite different. They were highly regulated through frequent inspections which established a social contract between inspectors and home builders which led to shared expectations about what constituted compliance with building code provisions in particular situations (May 2005, pp 337-338). Inspectors and homebuilders both viewed the inspection process as a form of shared problem solving, and home builders awareness of rules and concern for reputation reinforced the social contract and enhanced their sense of duty to comply. Fines or warnings served as a specific deterrent to bring non-compliers into compliance.

The regulatory context for the California and Washington state boat builders was different again. Regulators and regulatees operated at arm's length with very little interaction or occasion for negotiation over compliance. Regulation was more coercive with regulatory rules constituting standardised requirements, occasional on-site inspections, inspectors issuing fines for violations and publicising notable violations (May 2005, pp 338-339). Specific deterrence provided the motivation for compliance.

For small and medium enterprises in Fairman and Yapp's (2005a,b) studies in Britain, firm characteristics and the type of interaction with inspectors again influenced their compliance response. In one study Fairman and Yapp (2005a) examined educative and formal inspection by food safety enforcement agencies with 81 SMEs,[15] and the impact of these different approaches on firm's implementation of prescriptive requirements, and process-based hazard analysis and control requirements. Local authorities responsible for food safety inspection visited the highest risk premises every six months and the lowest risk every five years. Some local authority inspectors were more educative, supporting compliance by explaining legal requirements and devising methods of implementation relevant to businesses. Others used more formal inspection, making more frequent use of warning letters and notices, and providing limited explanation and advice. The authors examined the local authority case history for each SME, interviewed the proprietor or manager and made a professional judgement of compliance at the premises.

Fairman and Yapp (2005a, pp 506-508, 510, 515) found that many of the SME proprietor/managers did not did not know what the legal requirements were, had no notion of compliance as requiring ongoing action and only took action when they

[15] All had less than 250 employees.

were told to do so by an inspector. Some negotiated with the inspector about the means to comply but there was no evidence that inspections changed proprietors'/managers' motivations or knowledge about food safety. However, SMEs in areas where the local authority was more educative were better able to identify and implement the method of compliance for both prescriptive and hazard analysis requirements.

In a second study with small hairdressing firms,[16] Fairman and Yapp (2005b) examined the impact of inspection on firm compliance with risk assessment, hazardous substances assessment and electrical safety requirements. Like the food premises, the hairdressers had no notion of compliance as requiring ongoing action but took action when told to by an inspector. Face-to-face interaction was the most effective way of making these businesses recognise the gap between how they were operating and levels of illness in their businesses, and what they should be doing for compliance (Fairman and Yapp 2005b, pp 2-3).

In her study of plant designer-manufacturers in the Australian states of Victoria and South Australia, Bluff (2010, ch 4) found that 15 of the 66 firms had experienced inspection of the plant they produced. Of these, ten firms had taken some preventive action attributable wholly or in part to the inspection. Although inspection was rare, it had captured some managers' attention and prompted them to take some action, including making changes to guarding or other risk control measures, conducting a form of plant risk assessment or analysis or improving plant safety information. As well as direct experience of inspection, some plant designer-manufacturers were aware of the potential for inspection and enforcement concerning their plant through their interactions with customers or distributors. Messages about inspection and enforcement relayed through these parties reinforced with some firms the need to take action as customers or distributors might not accept plant if it could be deemed unsafe and subject to enforcement in end use. However, there were limits to the action that firms were willing to take in response to inspection, especially if they perceived that particular action would impede or conflict with their commercial goals relating to the marketability of their plant and firm profitability. Such conflicting motivations provided firms with justifications for limiting or not taking action, even in the context of negotiations with or directions by inspectors.

In summary, there is good evidence that inspections can improve compliance with work health and safety and other social regulation although how regulatees respond to inspection differs according to the nature of inspection, the regulatory context and characteristics of the inspected organisation. The research reviewed here suggests there is a need to understand how these factors impact on organisations' responses to inspection and regulation generally. It is likely that the type and frequency of engagement between inspectors and regulated organisations impacts on regulatees' motivations and knowledge, but that their pre-existing motivations and knowledge also impact on the efficacy of inspection. Other research concerning enforcement style also sheds light on these issues, as discussed below (see 7.5).

7.4 Prosecution

Work health and safety regulators can enforce the law by prosecuting a duty holder for a contravention of an obligation(s) in a statute or regulations made under that statute. As Johnstone (2004a, p 426) explains, prosecution has functions that are instrumental as well as symbolic. In line with the instrumental function, a regulator

[16] 85% of firms in this study employed less than 10 people.

might prosecute to deter further non-compliance by an organisation that has a history of non-compliance and disregard for legal obligations (specific deterrence), or to send a message about the risk of non-compliance to other organisations (general deterrence). A regulator might also want to highlight the importance of particular obligations such as the obligation of an employer not to discriminate against a worker for pursuing the resolution of a health and safety issue, again sending a message to other potential non-compliers. With regard to the symbolic function, a regulator might prosecute to make a moral statement in response to an organisation exposing workers or members of the public to very serious risks. In the latter case, prosecution may be for political reasons in view of the level of public outrage and to protect the regulator's legitimacy.[17] A regulator might also use prosecution to construct employers as the principal bearers of responsibility for preventing workplace injuries and deaths (Jamieson et al 2001, p 227).

Whether conducted for instrumental or symbolic reasons, prosecution can impact on regulatees' compliance motivations. As shown above (see section 2) these motivations stem from a complex mixture of legal, economic and social pressures which in turn instil fear of adverse consequences, a sense of duty or moral obligation, or a sense of opportunity that can be realised through complying. It may contribute to motivations grounded in fear of adverse consequences, whether these are financial penalties, the reputational damage of a publicised prosecution, or otherwise. Prosecution can also reassure those whose principal motivation is moral obligation that their efforts are worthwhile as non-compliers are being penalised (Gunningham et al 2005, p 296). As with inspection, the impact of prosecution is also influenced by context and organisational characteristics, as the following studies show.

In an Australian study Schofield et al (2009) investigated the responses of 32 employers prosecuted for serious injuries and deaths at work in Victoria and New South Wales. They found evidence of specific deterrence as all of the prosecuted organisations had taken preventive action following the prosecution. For large employers the action included systematic risk management and increased resources and a sharper focus on work health and safety at senior levels of management. The small employers did not have health and safety management systems before the prosecution but all made sure they had such arrangements in place before going to court.

In Gunningham et al's (2005, p 294, 297-298) study of 17 small electroplating firms, most of the managers interviewed believed that fines and gaol sentences were powerful motivators of environmental action, and about half stated that their firm had previously been the subject of fines, gaol sentences or threats of closure. Among these firms half ascribed their firm's environmental action to fines or gaol sentences at their company (specific deterrence). Also, hearing of enforcement actions against other electroplaters focused the attention of some of these firms, prompting them to check their compliance – a reminder effect which was a form of general deterrence. However, electroplaters often heard about enforcement actions and penalties second or third hand, through word of mouth, and lacked sufficiently reliable details to know what action they should take. They also perceived differences between their own and the other firms which made comparison difficult or perceived the other firms as 'bad guys' who flagrantly ignored the law, with the result that the general deterrent effect was limited.

The motivations of the managers of the largest of the chemical facilities in Gunningham et al's (2005, p 301, 304) study were economic or social ones, primarily

[17] The belief by regulatees that an authority does its job well and is entitled to be obeyed.

related to reputational concerns, although the potential for personal liability reinforced the commitment to compliance of senior managers. In the chemical facilities with less than 1000 employees, the managers stated that fines or gaol sentences to their own firm or more usually to others were a motivation for action, particularly if the penalised firm was like their own. Again the effect was more one of reminding them to review their operations and check compliance. Gunningham et al (2005, p 309) invoke the concept of implicit general deterrence to explain the motivation engendered by the companies' perception of the general history of a regulatory regime, the inevitability that serious violations would be penalised and that regulations must be complied with.

In a second study based on a survey of over 233 firms, Thornton et al (2005, pp 215, 265-267, 272-275) found that only 42% could identify a 'signal case' involving significant penalties recently imposed on firms in their industry, but many could identify enforcement actions against other firms. They could not recall specific details except where very high penalties were involved. General deterrence messages principally served as a reminder to check their compliance programs and provided symbolic reassurance to companies that making compliance related investments was worthwhile. Factors significantly and positively associated with taking environmental action were company size, the number of enforcement actions respondents could describe and the perception that penalties might lead to facility closure (particularly among electroplaters).

Three Australian studies have found weak and limited general deterrent effects. Hopkins (2007, pp 439-442) interviewed 13 mine managers from coal mines in several geographical regions in New South Wales approximately nine months after the Gretley prosecutions were announced. All 13 managers were aware of this 'signal case', key details of the event, and that two managers had been convicted and fined many thousands of dollars. The eight managers from mines operated by large companies considered that corporate leadership was their primary motivation but some observed that the corporate focus on safety was in part a concern about personal liability at higher levels in the company. Among the managers in autonomous mines, three were motivated by fear of prosecution but the other two had other motivations.

When asked if the prosecution had made them more likely to take certain actions, the only action mine managers' were markedly more likely to take was to write down the action they had taken, and to discipline violators of safety requirements. The general deterrent effect was therefore quite limited. As in Haine's (1997, p 171, 183) study of construction firms' responses to workplace deaths, the main response to concern about legal liability was one of 'damage control'. In Haine's study the company strategy was to control written information emanating from accident investigations to protect against liability.

The general deterrent effect was also found to be limited in a study by Jamieson et al (2010, pp 214, 219-222). They examined whether non-prosecuted employers have any knowledge of prosecutions of other organisations, how they find out about prosecutions and what effect knowledge of prosecutions against other employers had on their own health and safety practices and procedures. The study was conducted in 2008 and 2009, in New South Wales and Victoria, through 19 interviews with specialists in safety management positions (11), another manager (1) or company owners (7). They found that 17 were aware of at least one prosecution in any industry. In the 12 large organisations health and safety specialist staff monitored prosecutions through various sources, used prosecution information to revise procedures or check the organisation's systems and risk controls, but prosecutions

did not provoke significant changes. In small companies, the owners had heard about high profile cases through the media, personal contacts or, less frequently, employer association newsletters. They tended not to recall details, referred to emotionally disturbing aspects or the punitive effects of a prosecution and their response was one of disempowerment or helplessness that they could face criminal conviction for something they perceived to be caused by others.

This study highlights the key role played by work health and safety specialists in harnessing information about prosecutions for preventive purposes in organisations. In his study of senior managers' motivations in the 1990s, Hopkins (1995, pp 159-160) recommended that work health and safety specialists could reinforce managers' fear of legal consequences by passing on information about prosecutions to senior managers. Parker (2002, p 68) noted that a similar role is played by self-regulation specialists more generally in her work on corporate self-regulation. These officers made a 'business case' for corporate self-regulation by appealing to different motivations of senior executives in order to secure their commitment. One stream of their argument was that the corporation could face a major regulatory investigation or end up in court with major penalties imposed.

In her study with 66 Victorian and South Australian plant designer-manufacturers, Bluff (2010, ch 4) found little evidence of general deterrence. None of the key individuals in these firms were aware of prosecutions involving upstream duty holders other than the New South Wales' *Arbor Products*[18] case and the Western Australian *Viticulture Technologies*[19] case. The key individuals in seven firms had heard of the New South Wales' *Arbor Products* case, one had heard of the Western Australian *Viticulture Technologies* case, and one had heard of both of these cases. This last person was the only one who had an accurate understanding of the key findings in the two cases and the implications for the design of the plant his firm produced. In the other eight firms in which the key individuals knew of one of these cases, they knew of them through industry sources and either knew nothing about the findings in the cases or had misconceptions about them. They had either taken no action or had taken action inconsistent with the findings in the cases – for example, providing and relying on an operator manual rather than producing plant to be inherently safe. These findings are consistent with Thornton et al's (2005) finding that general deterrence does not occur if firms are not aware of enforcement against others in their industry because it is too infrequent, or if they hear about enforcement second or third hand and do not have sufficiently reliable details to know what action they should take.

These United States and Australian studies suggest that the potential for specific or general deterrence through prosecution is quite limited, both in the extent to which it occurs and in the response of organisations and individuals to prosecutions. If messages about prosecution do get through, which may be most likely if they are actively sought, interpreted and channelled by specialists, then this information is most likely to serve as a reminder to check compliance or reassurance that the organisation's pre-existing efforts are worthwhile. On the other hand, if a prosecution message gets through to a manager who does not have any particular work health and safety know how, it may only be a cause for anxiety or prompt measures to minimise liability without controlling risks. These studies signal the need, if the

[18] *WorkCover Authority of New South Wales (Inspector Mulder) v Arbor Products International (Australia) Pty Ltd* (2001) 105 IR 81.

[19] *Shepherd v Viticulture Technologies (Aust) Pty Ltd* (unreported, Court of Petty Sessions, Albany (WA), Malone SM, charge no 1941/01, 15 May 2003).

instrumental and symbolic functions of prosecution are to be realised, for work health and safety regulators to clearly and succinctly set out the implications of particular cases for preventive action, and determine ways to ensure that the key findings of prosecutions are effectively communicated to duty holders.

7.5 Regulatory approaches and styles

It is not only the types of strategies or mechanisms that work health and safety regulators use that may impact on regulatees' responses to regulation. How regulators and their inspectors communicate and interact with regulatees may also influence their response; that is their styles or approaches. Within broad parameters established by agency procedures and guidelines inspectors typically have considerable autonomy and discretion in how they go about inspecting and enforcing the law, and how they interact with regulatees (Black 2001; Lehmann Nielsen 2007; May and Wood 2003, p 117). We also know (see sections 2 &5) that regulatees have different motivations and capacities and, in principle, inspection and enforcement will be more effective if it takes this diversity into account.

The regulation literature distinguishes between two broad approaches to inspection and enforcement (Black 2001, p 97; Hutter 1997, pp 15-16). The first is the *cooperative* or accommodative approach in which an inspector advises, persuades or negotiates with the regulatee. (This is sometimes called the compliance approach). The second is the *coercive* or sanctioning approach in which the inspector uses or initiates some form of penalty or sanction. For example an inspector issuing an infringement notice would be using a form of coercion. The broad distinction between the cooperative and the coercive approaches has been further refined. Hutter (1997, p 16) suggests that within the cooperative approach a distinction can be made between pure persuasion and *insistence* in which inspectors are less flexible and expect a prompt response to their requests rather than spending time persuading regulatees to comply. For example, by issuing an improvement or prohibition notice under work health and safety law an inspector could be more insistent and increase the pressure to comply. May and Wood (2003, p 19) propose a further distinction between *facilitation*, how helpful and supportive inspectors are, and *formalism* which is how rigid they are in interpreting and applying the rules and setting clear expectations. Facilitation is essentially the same as the cooperative approach but formalism is something different from the other approaches as it embraces the application and interpretation of requirements.

May and Wood (2003) studied how building inspectors in the United States varied in their day-to-day style of interaction with builders, with respect to facilitation and formalism. They found that a facilitative style fostered cooperation, mutual respect and trust between the inspector and builder. Also compliance was highest when cooperation was high and the builder's knowledge of the building code was also high (pp 130-131). However, facilitation and cooperation did not enhance compliance if a builder's knowledge was low. For less knowledgeable builders, a formal enforcement style had a more positive effect on compliance, which May and Wood interpret as being due to the inspector setting forth clear expectations and providing certainty in inspection. In addition, when builders perceived inconsistency in inspector behaviour cooperation decreased, suggesting that builders viewed inconsistency as undermining mutual trust. May and Wood's (2003, p 135) findings have implications for regulatory strategies such as responsive regulation in which an inspector changes his/her enforcement style (see below), as such inconsistency may undermine trust and the development of shared expectations concerning compliance. Formalism is

helpful for clarifying expectations but raises the challenge of how these benefits can be achieved without undermining cooperative relationships.

Research into procedural fairness suggests that unfair treatment by a regulator can affect a regulatee's perception of the regulator's legitimacy, and influence the regulatee's cooperation and compliance (Murphy 2005; Tyler 2006; see also Bardach and Kagan 2002). Also, according to the constitutional values of liberal, democratic legal systems the activities of inspectorates and inspectors working within them should not be arbitrary, inconsistent, procedurally unfair or lacking in transparency (Yeung 2004, pp 36-43).

Murphy (2005) investigated Australian tax scheme investors' perceptions of procedural fairness, legitimacy, attitudes to compliance, economic self-interest, prior conflict with the Australian Tax Office (ATO), and self-reported compliance behaviour through a survey questionnaire. The participants had been accused by the ATO of engaging in illegal forms of aggressive tax planning. The survey asked whether they engaged in acts of tax evasion, worked for cash-in-hand payments, exaggerated deductions or rebates, and whether they were certain that the deductions they claimed were legitimate. The research suggested that people who perceived that they had been treated unfairly by the ATO were more likely to question the legitimacy of the ATO and had lower self-reported compliance. A follow up survey after 2.5 years with 659 respondents was broadly supportive in that over time individuals' perceptions of procedural fairness predicted changes in their perceptions of regulatory legitimacy, and their views about compliance.

Murphy et al (2009) further examined these issues through postal questionnaires relating to taxation (652 offenders), social security (110 recipients of benefits), and law enforcement (views on crime and policing). The surveys found that procedural fairness was more important for compliance intentions when respondents questioned the legitimacy of the law. The authors propose that in face-to-face encounters, regulators should treat regulatees fairly and with respect and dignity, and give them the opportunity to present their side of the story before reaching a decision (Murphy et al 2009, p 21).

Gunningham and Sinclair (2009) provide an account of how mining industry parties' perceptions of unfair treatment in the Gretley prosecution in New South Wales influenced industry cooperation with the mining inspectorate. The authors conducted 151 interviews at 13 mine sites in three companies in New South Wales about what happened in the relationship between the inspectorate and mining industry parties following the Gretley prosecution. Industry parties perceived the inspectorate's approach to prosecution in the Gretley case as being harsh in prosecuting an individual they perceived to have a low degree of culpability. The authors conclude that the approach to prosecution in this case was counterproductive as it damaged relations and dialogue between industry and the inspectorate, led to information being withheld and in-firm incident investigation and action being inhibited, and adversarialism which undermined effectiveness of inspection and enforcement.

Research on response to regulation suggests that a further consideration is what regulatees' bring to the interaction with regulators. In the same way that the underlying values, assumptions and beliefs embedded in an organisation can impact on work health and safety (see section 6), an individual's underlying values, beliefs and assumptions can impact on their response to a regulatory system. In a study of Australian nursing homes in the late 1980s examining inspectors' and nursing home directors' perceptions of their regulatory encounters, Braithwaite et al (1994) found that the nursing home directors displayed different postures or stances towards the

regulatory process. They called these 'motivational postures' and defined them as individuals' consciously expressed and personally acceptable face of their underlying motives, priorities and goals which, in some instances, the nursing home directors used to justify non-compliance to themselves and others (Braithwaite et al 1994, p 386). The study was conducted in 410 nursing homes with data from the inspectors' ratings of nursing home compliance with 31 standards, a questionnaire with inspection teams and interviews with directors of nursing.

Braithwaite et al (1994, p 379) found that a posture of *resistance* was associated with a more confrontational response to the regulator. A posture of *disengagement* signalled mistrust of government and minimal cooperation. A posture of *accommodation* was more cooperative and accepting of responsibility, reflected in a management plan for implementing the standards. A posture of *capture* signalled cooperation and identification with the standards, and no enduring tension between the regulator and regulatee. The motivational postures of disengagement and resistance were stronger in low compliers, while managerial accommodation and capture were stronger in high compliers. Moreover, compliance by those strong on disengagement was more likely to have worsened when reassessed, while those stronger on resistance had improved if the director perceived the inspection team was cooperative or judged that intervention was not needed. On the other hand, the compliance of resistors did not improve if the inspection team was perceived to be coercive or recommended intervention (Braithwaite et al 1994, pp 384-386).

Braithwaite (1995, p 253) argues that trust and respect, and shared understandings are important for maintaining a positive and strong relationship between the regulator and regulatee and that through trust, respect and shared understandings regulators can shift regulatory postures and strengthen compliance. Braithwaite et al (2007, pp 137-138) have developed empirical findings from the nursing homes study and later taxation research into a theory of motivational posturing as one explanation of how regulatees may place social distance between themselves and a regulatory authority so that they do not hear, understand or fear the consequences of non-compliance. The concept of motivational postures has been refined as "conglomerates of beliefs, attitudes, preferences, interests, and feelings that together communicate the degree to which an individual accepts the agenda of a regulator, in principle, and endorses the way in which the regulator functions and carries out duties on a daily basis" (Braithwaite et al 2007, p 138). The researchers have refined the differentiation of the postures as being commitment or accommodation to the agenda of the authority, capitulation or capture by the authority, resistance or fighting against the authority, disengagement or detachment from the authority, and game playing (Braithwaite et al 2007, p 139; see also Braithwaite 2009).

The motivational postures research suggests that a regulator can influence a regulatee's stance towards the regulatory system by developing trust, respect and shared understandings in communications and interactions with regulatees (Braithwaite 2009, pp 82-84. On the other hand, the perception of unfair treatment or abuse of power by a regulator can engender a more dismissive or defiant response. What is less clear is to what extent an individual's perception of and stance towards a regulator is enduring due to a regulatee's underlying values, beliefs and assumptions, or is shaped by sources other than direct regulator-regulatee interactions.

Walls et al (2004) studied public perceptions of and trust in the British regulator, the Health and Safety Executive (HSE) and the Railways Inspectorate which is a division of the HSE (the study is also reported by Pidgeon et al 2003). In 2000-2001, the researchers' studied perceptions using 30 focus groups involving 201 voting age

members of the public, and including a cross-section by age, gender and social class, and across six areas of Britain. The study found that while most participants were aware of the HSE, their knowledge of its role was slight, and few had direct experience of or contact with the HSE. Their awareness derived from the media and social or family contacts. Although their knowledge of the HSE was slight they rated the HSE highly in terms of trust in the agency (similar to their rating of consumer and environmental organisations). The study explored the basis for perceptions of trust in the HSE finding they were related primarily to perceptions that the HSE is motivated to act in the public interest, performs a fundamentally altruistic role in raising awareness of safety issues and demonstrates care for ordinary people in the workplace. The authors conclude that trust in the context of little knowledge and experience of the HSE was an outcome of a presumption and hope in effective regulatory action by the HSE in the public interest, a perception of improvement in work health and safety in specific industries, and the sentiment that state regulation of workplace health and safety could be regarded as a good thing.

The members of the public rated their trust in the Rail Inspectorate much lower (it was lowest after government ministers). This much lower trust rating arose from the invisibility of the inspectorate to the public coupled with community concerns of rail safety in the face of a series of major rail accidents with multiple deaths, poor quality of service and infrastructure, overcrowding, delays and cost of travel, and an overall negative perception of the British rail system and the various organisations that comprise it. Perceptions of this inspectorate suffered by association with the myriad problems in the rail system as members of the public made inferences about the agency based on their experiences of and beliefs about the rail system. The key finding from this research is that people make presumptions about the behaviour of risk regulators based on inference in the absence of firm knowledge.

Almond (2009) also identifies wider influences that shape perceptions of regulators. He discusses the role of media initiated social discourses about the desirability of limiting systems of regulation. Also a health and safety regulator can be the most visible and recognisable public face for a health and safety system that is interpreted and enforced by a plethora of organisational actors, including commercial insurers, industry associations and unions, other industry sources and governmental departments, and so on. Almond argues that the wider actors in the field in which a regulator works can be highly influential in shaping perceptions of that agency but these perceptions are based upon an incomplete public understanding of the agency's role.

Also unclear is to what extent it is possible for a regulator (and its inspectors) to communicate trust, respect, cooperation or another approach in its interactions with a regulatee, in a way that ensures that the regulatee perceives the regulator's approach as the regulator intended. Research into responsive regulation sheds some light on this and shows how challenging it may be to operationalise different approaches to inspection and enforcement.

Responsive regulation is a leading theory and account of how and why to combine cooperative and deterrent approaches in enforcement (Ayres and Braithwaite 1992; Braithwaite 2002). The theory recognises that organisations or individuals have different motivations for complying or not complying with the law, and that the same organisation or individual can have multiple, potentially conflicting, compliance motivations (Ayres and Braithwaite 1992, pp 30-35; Braithwaite 2002, p 41). It proposes that these plural motivations for compliance will respond to plural cooperative and deterrent mechanisms.

Responsive regulation theory arranges different enforcement mechanisms in a hierarchy (or pyramid). The regulator is to deploy cooperative mechanisms in the first instance (the base of the pyramid) and progressively more deterrent approaches are used only if and when cooperation and dialogue fail. Whether the regulatee cooperates with the regulator by admitting responsibility for the non-compliance, correcting it, and preventing it recurring is the key to whether the regulator escalates the enforcement response, rather than the seriousness of the non-compliance (Ayres and Braithwaite 1992, p 36; Braithwaite 2002, p 30). The strongest deterrent mechanisms such as prosecution are only to be used when more modest mechanisms (such as improvement or prohibition notices) fail to elicit compliance. If regulatees are then willing to cooperate, regulators should de-escalate down the hierarchy to less harsh mechanisms.

Responsive regulation has been interpreted in two ways. One is the 'tit for tat' (TFT) strategy outlined above. The second, 'restorative justice' (RJ) responsive regulation is a more recent interpretation. In the RJ responsive regulation strategy the individual inspector should avoid formalism and coercion in all his/her communications and interactions with regulatees, and not issue threats to escalate enforcement. The rationale is that cooperation breeds cooperation, and that treating people with trust and respect makes them more willing to listen and cooperate (Braithwaite 2002, p 41). The regulator may escalate the enforcement response, but the approach requires the individual inspector to communicate that s/he is trying to help stop escalation of enforcement if the regulatee cooperates and complies (Braithwaite 2002, p 33-119). This approach is influenced by research into procedural fairness which emphasises that the enforcer must be fair, open-minded, respectful, persuasive and cooperative rather than coercive whenever possible (Tyler 2006).

Several studies have examined responsive regulation in practice. Lehmann Nielsen (2006) investigated how inspectors responded to the conduct of regulatees, using data about 2,535 breaches of regulation in four areas of regulation in Denmark. The regulatory areas were environmental (municipal and county), work health and safety (national) and fire safety regulation (municipal). Data were gathered from agency files and through questionnaires to inspectors about the 174 companies that committed the breaches, and the inspectors' reactions to the breaches. The study found that inspectors only acted responsibly to a small degree and not necessarily in the way envisaged by theories of responsive regulation.

The study distinguished five types of responsiveness. The first was responsiveness to the gravity of the individual breach or the number of breaches identified by the inspector at the same inspection (short memory responsiveness). The second is responsiveness to regulatee performance history with regard to the frequency and seriousness of non-compliance (long memory responsiveness). The third is responsiveness to the broader cooperative or non-cooperative attitude and behaviour of the regulatee (attitude responsiveness, as in 'tit for tat' responsive regulation). The fourth is responsiveness to the average number of meetings about changes and planning (dialogue responsiveness). The fifth is responsiveness to the inspector's overall evaluation of an organisation's standard of compliance on a scale (subjective performance responsiveness).

The study found a small degree of responsiveness among some of the inspectors but the different kinds of responsiveness were not the main factors explaining variation in the regulator's response. Personal liking for a regulatee or fear of their power were also factors in choosing to be cooperative. The author concludes that research is needed to examine factors specific to particular areas of regulation, the factors

influencing inspectors' behaviour and variables in the relationship between the regulator and the regulatee.

In another study, Mascini and Van Wijk (2009) examined how food safety inspectors in the Netherlands interacted with those responsible for making decisions about food safety in their firms, including food hygiene, temperature and storage, and food preparation processes. The inspectors had received six months training in how to inspect before being trained on the job with experienced inspectors for at least six months. They then worked alone and had considerable discretion in how to perform their work. The inspectors had also received social skills training before the introduction of responsive regulation. They were empowered to give warnings, issue fines when a previous warning had not been dealt with properly, and could temporarily close a business when they observed continuing and serious non-compliance after past visits in which problems were identified. They also carried a document explaining which actions to take under which circumstances.

During 2007 and 2008, the researchers observed inspectors (2 shifts for each of 36 inspectors in 269 inspections), interviewed inspectors before and after each visit, and surveyed the firms visited on their perceptions of the inspector's behaviour, reaction to the inspector's visit and their views on the rules and regulations they had to comply with (115 completed surveys). The study found that inspectors differed in their views on the correct approach and most effective enforcement style, tendency to regard companies as 'good' or 'bad', the focus of their attention and actual enforcement action (Mascini and Van Wijk 2009, pp 33-38). They did not always opt for the enforcement style they considered most suitable if they anticipated unwelcome reactions by other parties along the decision chain. For example, they might use a sanction because they felt compelled to, or not use a sanction if they believed it would not stand up to scrutiny by the fines unit.

Language barriers were a major impediment in many visits as they limited dialogue and the possibility of providing advice, persuasion, and assisting with compliance. With or without language barriers, inspectors were not always successful in communicating their intentions to firms as a regulatee did not always perceive an inspector's conduct as the inspector intended. The style as perceived rather than the style as intended could produce negative, unintended consequences.

Job and Honaker (2003) also found a number of factors obstructing implementation of responsive regulation in the ATO, including training and leadership deficiencies, local units ignoring the responsive regulation policy, officers' fear of losing status, and misperception and distrust of academic theories. Waller (2007) also found that officers of the ATO conducting inspections in car dealerships were directed to follow a checklist which precluded them from applying responsive regulation. Although these officers consistently presented themselves as friendly and non-threatening, dealers exhibited defiant behaviour in more than half of the 29 visits. Mascini and Van Wijk (2009) cite a study by Van de Blunt et al (2007)[20] who found that several Dutch inspectorates that have incorporated an enforcement pyramid, in practice determine their response based on severity, duration and damage caused by non-compliance without taking account of a regulatee's cooperation. Johnstone (2004a, p 158) has observed a similar practice in Australian enforcement of work health and safety law.

[20] The original study is only available in Dutch.

Research by Lehmann Nielsen and Parker (2009) also found issues in implementation of responsive regulation by the Australian Competition and Consumer Commission but their research also questions whether responsive regulation can achieve the desired cooperation and compliance behaviour. The authors empirically measured 'tit for tat' (TFT) responsive regulation and 'restorative justice' (RJ) responsive regulation. They measured business firms' perceptions of the reactions and counter-reactions of a regulatory enforcement agency throughout an investigation and enforcement process, using self-report survey data from 141 Australian businesses[21] that experienced official investigation of alleged breaches of the federal competition and consumer protection legislation. To the extent that TFT responsiveness occurred in practice, they found a small amount of evidence that it led to improved compliance behaviour but not a more cooperative and compliant attitude. For RJ restorative justice they found evidence that it led to a more cooperative and compliant attitude but not improved compliance behavior.

Lehmann Nielsen and Parker (2009, pp 394-395) observe that responsive regulation is difficult to implement in practice, with both forms requiring regulatory staff to have excellent communication and relational skills. There is also the complication of how regulatees perceive a regulator's behavior. This study and other studies by Waller (2007) and Mascini and Wijk (2009) have shown that an inspector's interactions may be interpreted suspiciously by regulatees, even if this is not the inspector's intention. A further challenge arises when different inspectorate staff are involved with a regulatee at different times or in relation to different matters, and vice versa when the regulated entity has different people, with different reactions involved. Lehmann Nielsen and Parker (2009, p 396) propose that research is needed into the language regulators use to communicate and how regulatees 'hear' those messages, taking into account what else they know of the regulator and the regulatory system and how those messages are translated in organisations.

The various studies indicate that there are considerable problems operationalising, implementing and realising the regulatory objectives of using different inspection and enforcement styles and approaches. Key issues are how inspectors determine which approach to use, how regulatees perceive (and misperceive) inspectors' communications and intentions and why, and what can be done about these impediments.

7.6 The wider context and third party actors

The previous section has focused on the interactions between regulators and regulatees, but it is simplistic to consider the actions of a single organisation in isolation as each organisation is part of a web of influences. Multiple external actors may influence the operations of an organisation and, in turn, that organisation may influence others. These actors may include customers, clients, suppliers, contractors, franchisors, insurers, as well as industry associations, unions, work health and safety or other professionals (Black 2001; Bluff 2010; Gunningham et al 2003, 2005; Haines 1997; Hutter 2006; Hutter and Jones 2006; Thornton et al 2005). However, the relevant actors differ according to organisational size, the nature of operations, the industry sector and other factors.

An organisation's interactions with and position in relation to external actors and, in particular, the distribution of responsibilities, resources and power between them, can critically affect that organisation's willingness and capacity to comply with work health

[21] With more than 100 employees.

and safety regulation. For example, when the profitability of a small business is determined by its ability to gain contracts from other organisations it is likely to consider that a good relationship with those parties is as important, if not more important, than its relationship with a regulator. Third party actors may set agendas, influence an organisation's decisions, and encourage attention to or conversely limit its room to move on work health and safety. The influence of third party actors extends to shaping understandings of regulation and compliance, and an organisation's perceptions of and reactions to a regulatory system. Third parties may pass on information (or misinformation) about the law and other aspects of work health and safety, as well offering viewpoints and sharing experience of inspection and enforcement or other dealings with work health and safety regulators.

In regulatory theory, third party actors are recognised in the concept of regulatory space in which major and minor actors are conceived as participating in the regulatory process, influencing organisations' responses to regulation (Hancher and Moran 1998). Third parties are also identified in de-centred conceptions of regulation that extend to actors other than state regulators (Baldwin and Cave 1999, p 2; Black 2001, pp 133-136; Hutter 2006, pp 2-10). Empirical studies suggest that the influence of third parties may be only weakly positive (favouring compliance) or may be negative (not supporting compliance).

Lehmann Nielsen and Parker (2008) studied the influence of third parties on firms' management of compliance with competition and consumer protection law, through a mailout survey of 999 large Australian firms. They found that firm's perception of the risk of complaints from third parties influenced their compliance management behaviour. That is, they were more influenced when they perceived that stakeholders were keeping an eye on them or they had experienced criticism of their compliance. There was little evidence that they were influenced by the potential for economic or social losses through third parties. That is, the mere existence of stakeholder relationships did not in itself drive compliance management behaviour.

Hutter and Jones (2006) explored the external pressures on business risk management of food safety and hygiene. They surveyed 2 004 individuals across 31 businesses in Britain and, in a second phase, asked managers of food businesses about their understandings of food safety and hygiene risks, their sources of information about these risks, risk controls and external influences on their risk management sources. These influences were environmental health officers, the food standards agency, consumers, the media, insurance companies, private consultancy firms and (rarely) trade associations. The researchers found that despite a wider group of actors most were background influences. The principal direct influences were state regulators and many firms relied on them for education and advice, albeit after they were found to be non-compliant. (See also Fairman and Yapp's (2005a) study in section 7.3 which had similar findings about food premises, inspection and education).

The constraints of an organisation's relationships with external actors are well illustrated by Haines' research with 15 Victorian construction companies that had experienced workplace fatalities. She found that the wider context and everyday pressures, such as a firm's strength or weakness in its market place, limited companies' choices, directions and behaviour (Haines 1997, ch 7). How a company was positioned in the broader industry and in relation to other parties on a construction project determined the degree to which work health and safety was incorporated into business operations.

Bluff's (2010) study with plant designer-manufacturers also provided evidence of the influence of third parties. She found that firms' interactions with their customers, other producers of workplace plant, component suppliers and industry contacts were key bases from which they learned (or 'mis-learned') about work health and safety regulation, risks and solutions, and methods for plant risk assessment (Bluff 2010, ch 9). Also, large customers or distributors contributed to some smaller firms' motivations for taking action to address health and safety, and some firms were motivated by messages about inspection and enforcement relayed by their customers or distributors. However, Bluff's research also found that the influence of third parties was as likely to be negative as positive. What firms learned from or were prompted to do by third parties did not equip them well for achieving substantive health and safety outcomes, or to conduct timely, logical and thorough risk assessments. In the business relationship between some small firms and large customers, the large firms took charge, set the health and safety standards the designer-manufacturer was required to meet and the small firms only took action within the limits of particular customer requirements.

Haines proposes mapping the dynamics within, outside and between organisations which influence their decisions and actions, as a necessary starting point for regulation (Haines 1997, p 224). Understanding how organisations see their situation provides essential insight into what regulatory strategies might be effective and how organisations might respond to attempts to influence organisational behaviour. Rather than 'one organisation at a time enforcement' different types of regulatory strategies may be needed, such as inspecting and enforcing among all players in a market or supply chain through coordinated, networked interventions to overcome constraints to compliance. A useful line of research might be to examine how the dynamics within, outside and between organisations that influence their decisions and actions can be mapped, and what types of regulatory strategies and intervention can engage third party influences in order to interact or intervene more effectively with all players**.**

7.7 Summing up regulatory strategies, mechanisms and approaches

We can confidently say that work health and safety regulation and compliance support activities of regulators are among the factors that contribute to regulatees' willingness and capacity to comply. However, there is much more we could learn about how particular strategies, mechanisms and approaches can be best used to effectively elicit compliance in terms of organisations' action and arrangements to self-regulate and achieve substantive reduction in work deaths, injuries and illness.

With regard to compliance support, the research points to the potential benefits of strategies that are more collaborative, prioritise dialogue and engage regulatees in practical problem solving, and there is value in investigating how and when they can feasibly be used. There is also now an established infrastructure in Australia which integrates work health and safety into the curricula of vocational and some university level education. We could usefully know more about how this education is translating into practice, and how work health and safety knowledge is shaped through working life. And how we can ensure that we effectively support the health and safety enthusiasts to play the most effective role.

Prosecution is the most coercive mechanism in the work health and safety regulators' enforcement toolkit. It is believed to have instrumental and symbolic functions but it is

costly. There is some evidence for specific deterrence through prosecution but general deterrence effects appear to be more limited. Health and safety specialists in workplaces play an important role in seeking out and applying the motivational and knowledge elements of prosecutions, but misinformation through the media and industry sources may cause anxiety without productive response by organisations. The key learnings from prosecutions need to be clearly and succinctly channelled and communicated to regulatees.

For inspection and notices, empirical evidence suggests that the type and frequency of engagement between inspectors and regulatees impacts on the latter's motivations and knowledge differently, and that regulatees' pre-existing motivations and knowledge as well as the wider context of their operations impact on the efficacy of inspection. Regulatory approach and style seems to matter, but it may be difficult for inspectors to operationalise and communicate different approaches to regulatees. Inspectors' actions are also likely to be interpreted and responded to differently depending on the wider web of influences, including economic and social pressures, that structure or constrain an organisation's room to move on work health and safety. It may be necessary to map the dynamics within, outside and between organisations that influence their decisions and actions, and contemplate more networked interventions to inspect and enforce across markets or supply chains in a coordinated way.

It is a continuing refrain in work health and safety regulation in Australia that we need research and evaluation to better understand what works, for who, how, in what circumstances and under what conditions. For some mechanisms such as enforceable undertakings we have barely begun to understand their use (Johnstone and King 2008; Parker 2004).

This section of the report has suggested some possible directions for research but undoubtedly there are many more. Better research and evaluation will require better and long term data about the type of mechanisms and approaches used with each organisation, as well as outcome data. It will also require that research or evaluation studies are built in from the planning stage of regulatory strategies or interventions. The most reliable data on the effects of different mechanisms and approaches can be obtained in controlled comparative studies in which different mechanisms and approaches are used in different workplaces (Lindblom and Hansson 2004, p 77).

8. Conclusion

This review has covered a diverse range of literature with the common theme that it all concerns socio-psychological factors and their potential relevance to understanding organisations' and individuals' willingness and capacity to comply. The empirical studies discussed have been conducted by researchers working in quite different disciplines including psychology, sociology, anthropology, education and regulation. Different areas of the literature provide different insights about organisations and the individuals in them, and their interactions with external regulators, and with actors in their wider environment.

The challenge is to consider whether and how this jigsaw fits together. Is there a relationship between particular socio-psychological factors, organisations' actions (including processes and arrangements), individuals' behaviours and the substantive outcome of preventing work-related death, injury and disease. The aim of this review has been to provoke discussion by providing an overview of the literature in each area.

In addition, some possible research questions have been suggested. To summarise, the suggestions for research are as follows.

For motivations

- How do particular regulatory strategies, mechanisms or approaches influence motivations?
- How do motivations influence compliance action and achievement of substantive outcomes?
- How can regulators or practitioners analyse and understand compliance motivations, in order to take them into account in designing their communications and interactions with particular organisations, individuals, industry sectors or other groups?

For attitudes and perceptions

- How can the prevalent unsafe worker attitude be shifted in order to enhance decision-making for risk control?
- How can perceptual processes that impede recognition of hazardously deviant events be challenged by unsettling organisational routines in order to make the unthinkable recognisable and the invisible apparent?
- Can critical self-reflection through open discussion of the most minor variations or mishaps facilitate self-scrutiny and sensitivity to mishaps?

For knowledge and learning

- How is work health and safety knowledge constructed from the teaching curriculum in vocational or higher education, and learning through working lives?
- How can learning about work health and safety best be supported?
- Is it feasible to use approaches to capacity building that are more collaborative in nature, and which prioritise dialogue and practical problem solving feasible in targeted programs, rather than 'arm's length' methods which have been shown to be less effective?
- How does education and training in work health and safety translate into practice, and how is it transformed once a person is exposed to other influences in working life?

For culture

- Can organisational culture (or sub-cultures) be changed to better support work health and safety outcomes and, if so, how?

For work health and safety **professionals and advisers**

- How can the role of work health and safety 'leaders' or 'enthusiasts', as health and safety professionals or otherwise, be optimised?
- How can they be supported so that they can be effective in building willingness and capacity to comply?

For regulation

- How do the nature of the inspection process, the regulatory context and characteristics of an inspected organisation influence inspection outcomes?
- How do inspectors determine which approach to use?
- How do regulatees perceive (and mis-perceive) inspectors' communications and intentions and why?
- How can the dynamics within, outside and between organisations that influence their decisions and actions be mapped?
- What types of regulatory strategies and intervention can engage third party influences in order to interact or intervene more effectively with all players?
- Do existing databases record sufficient information about the inspection and enforcement with each organisation, including the mechanisms and approaches used and outcome data?
- How can research or evaluation studies be built into regulatory strategies and interventions at the planning stage?

These questions are not exhaustive but are designed to generate discussion about what we want to understand better and what research would be beneficial.

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