

Safety Climate: A dimension of Safety Culture in Aviation

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19/05/2003

Safety - why measure

- Accidents in Aviation can have catastrophic results.
- Accidents are rare events and not a good indicator of safety performance

Safety - why measure

- “A low accident rate, even over a period of years, is no guarantee that risks are being effectively controlled...This is particularly true in organizations where there is a low probability of accidents but where major hazards are present. Here the historical record can be an unreliable or even deceptive indicator of safety performance”. (Thomas, 2001)

Safety - why measure

- In Aviation there is a need to proactively measure safety performance to avoid accidents.

Safety – what is it?

- Difficult to define and measure
- “Just make sure people don’t get hurt” (Hudson, 2001)
- Must include acceptability of risk (Wood, 1996)
- The quality of a system (Systems Safety Engineering & Management)
- A characteristic of a system?

Safety – A definition

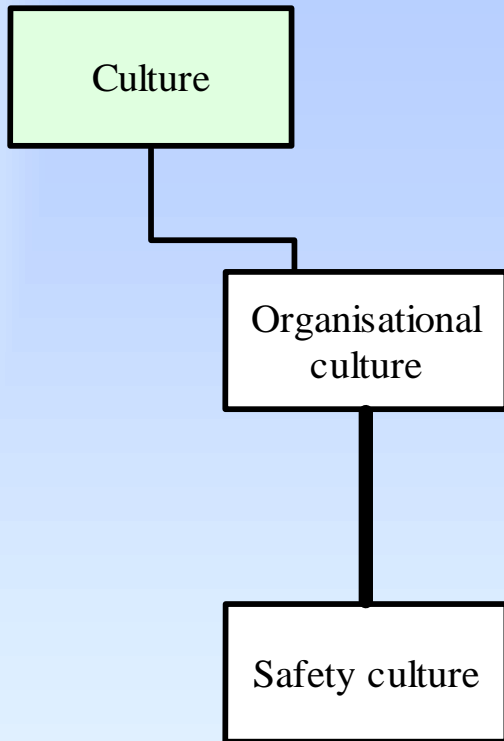
- A characteristic of a system with the goal of injury free operations that does not permit unacceptable risks to be undertaken.

Safety Culture - What is it

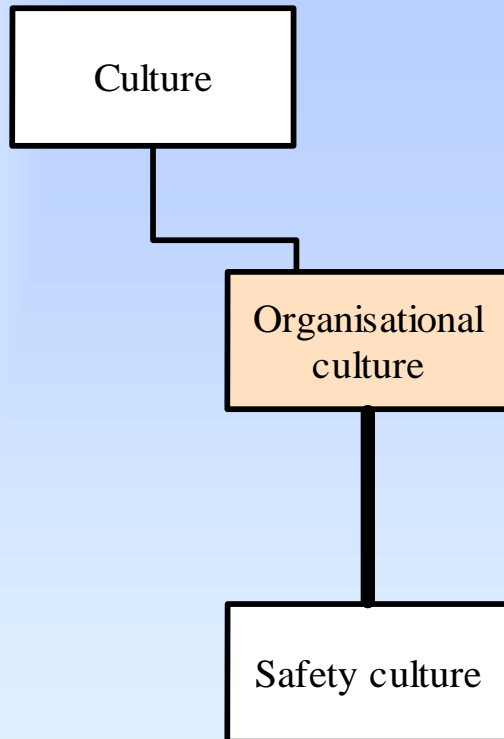
CULTURE

Values, beliefs, rituals, symbols and behaviours we share with others that help define us a group (Merrit & Helmreich, 1996)

The collective programming of the mind which distinguishes the members of one group from another (Hofstede, 1980)



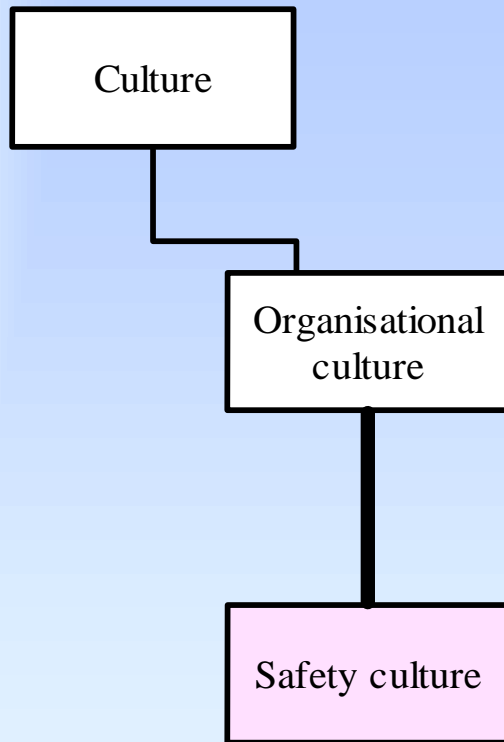
Safety Culture - What is it



ORGANISATIONAL CULTURE

A system of shared values, assumptions, beliefs and norms that join organisational members (Smircich, 1988)

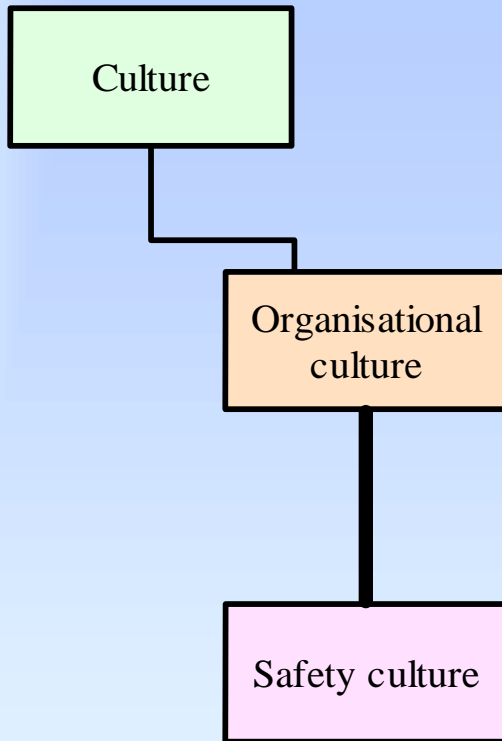
Safety Culture - What is it



SAFETY CULTURE

The product of individual and group values, attitudes, competencies, and patterns of behaviour that determine the commitment to, and the style and efficiency of an organisation's Health and Safety program (UK Health & Safety Commission, 1993)

Safety Culture - What is it



SAFETY CULTURE

Organisations with a positive safety culture are characterised by communication founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy

measures (UK Health & Safety Commission, 1993)

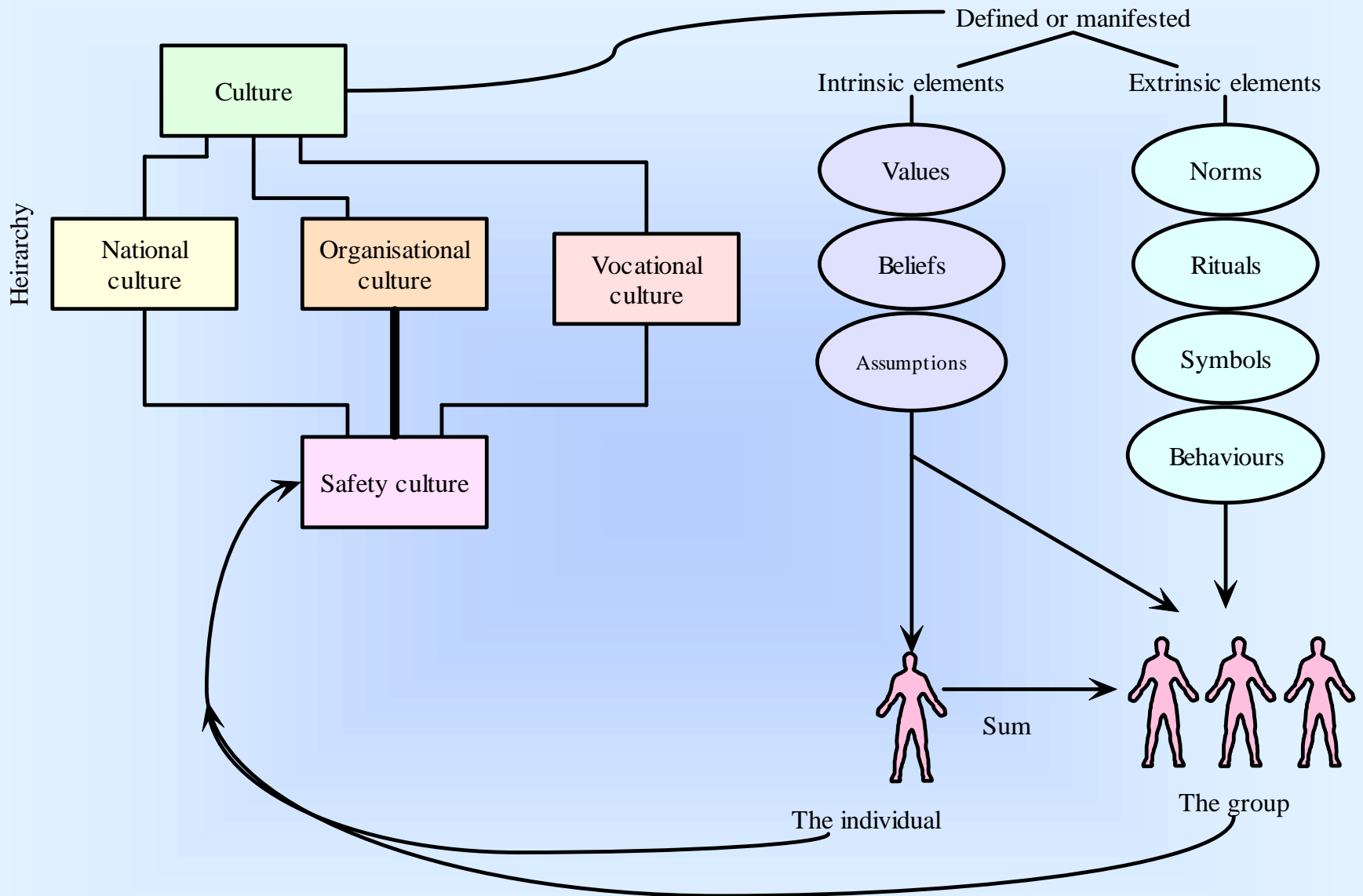


Figure 2: Traditional Concept of Safety Culture

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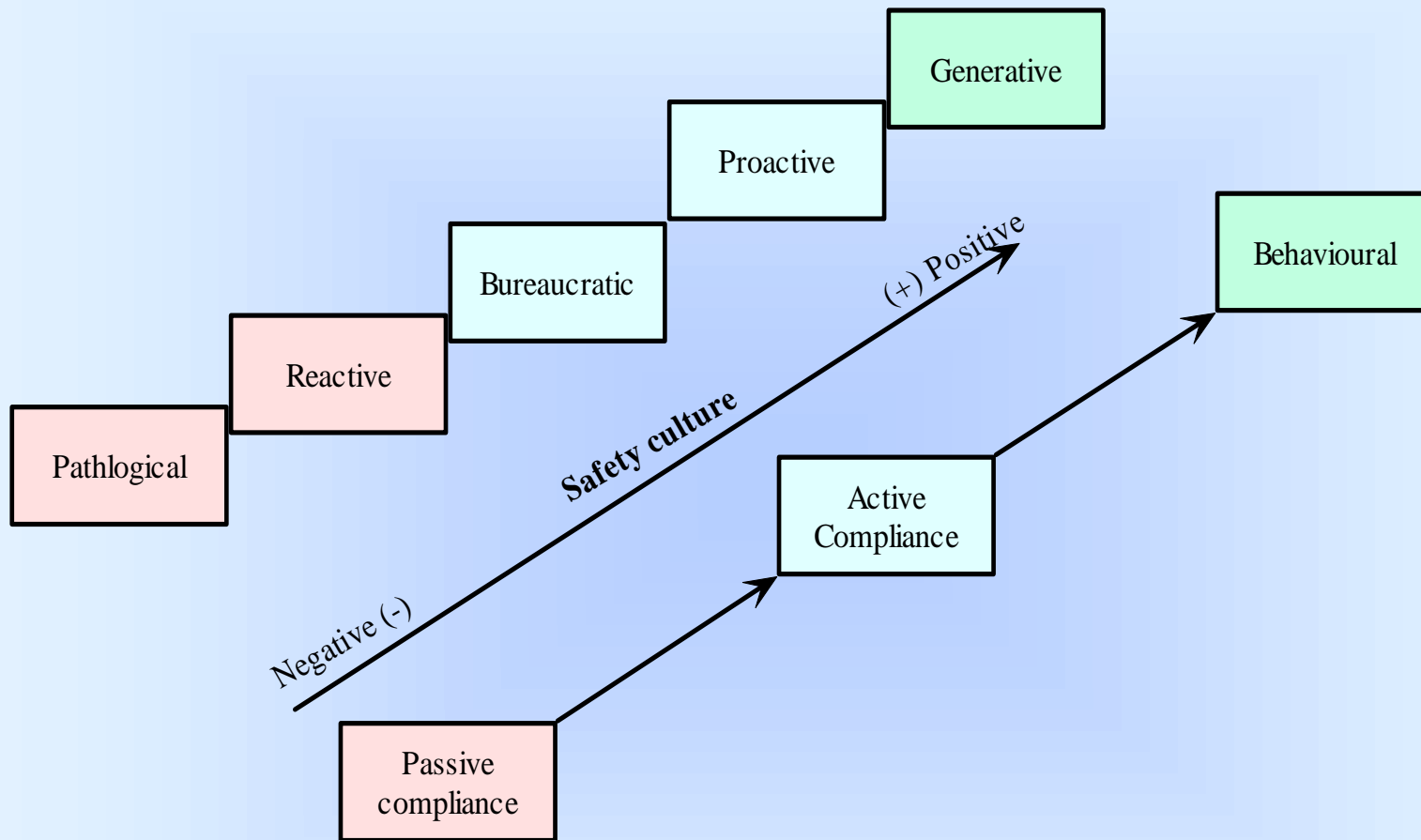
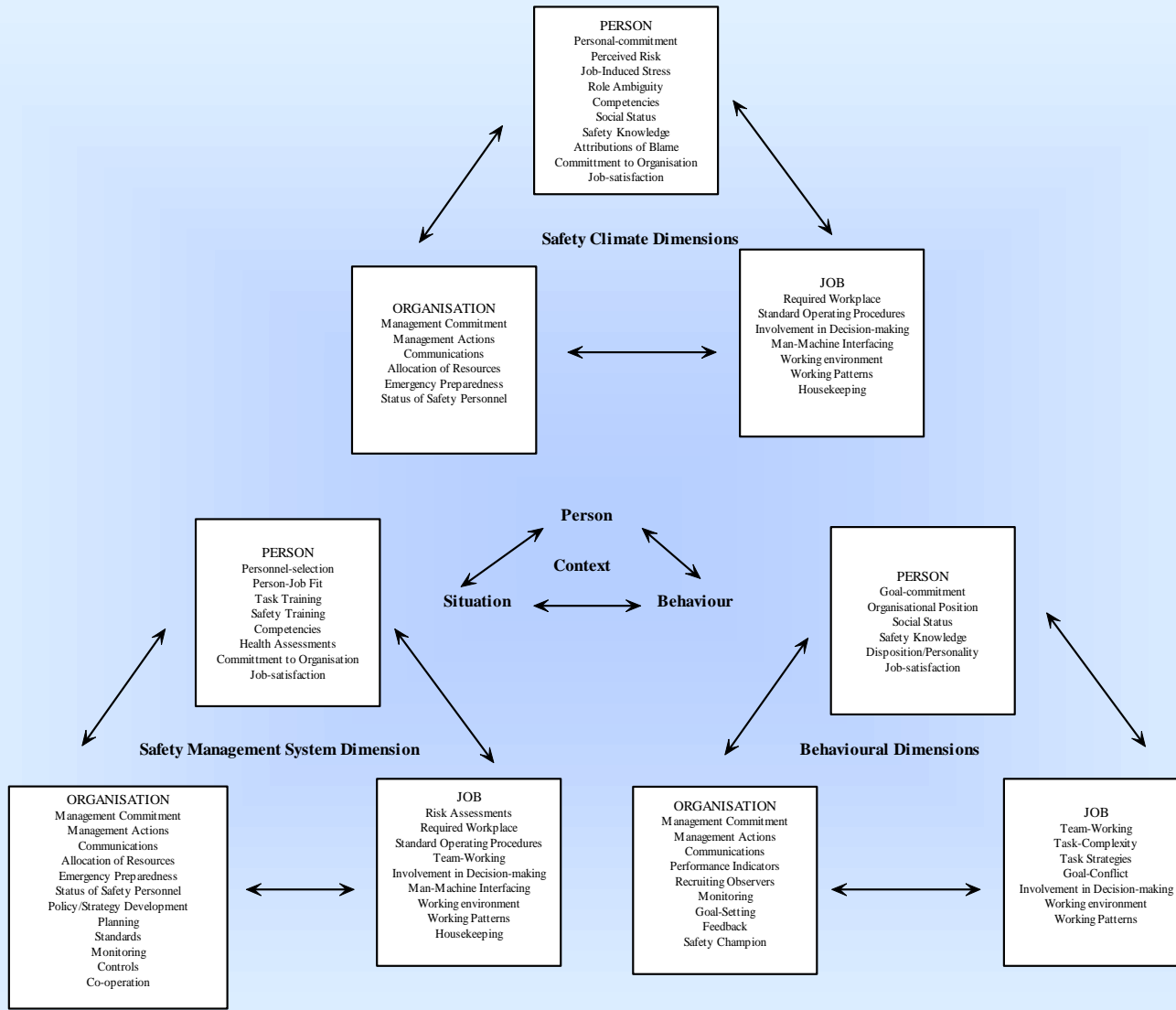


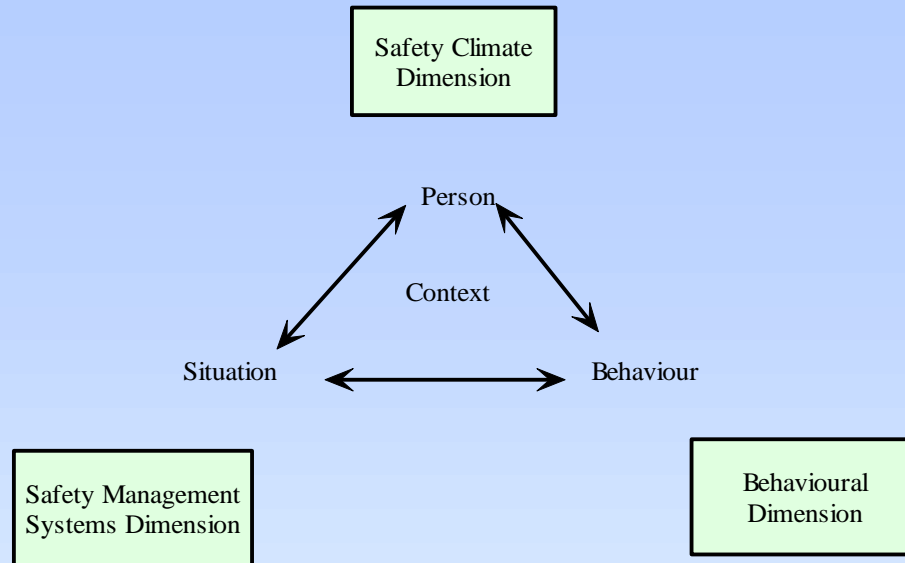
Figure 1: Organisational evolution tied to its Safety Culture, adapted from Hudson 2001, ShamRao 1999 & Westrum 1995.

Fleming (2000)	Zohar (1980)	INEEL (2001)	ICAO (1992)
Management commitment and visibility	Strong management commitment to Safety	Management commitment to Safety	Senior management placing a strong emphasis on safety
Communication	The existence of open communication links and frequent contacts between workers and management		Senior management's willingness to accept criticism and an openness to opposing views
			Emphasising the importance of communicating relevant safety information
Industrial relations and job satisfaction	A stable workforce and older workers	Job satisfaction	
Training	Emphasis on Safety training	Training, equipment, Physical environment	Ensuring staff are well educated and trained so that they understand the consequences of unsafe acts
	General environment control and good housekeeping		Staff having an understanding of hazards within the workplace.
Learning organisation	Distinctive ways of promoting Safety	Organisational commitment	Senior managements fostering a climate that encourages feedback.
Participation		Worker Involvement	
Shared perceptions about Safety		Co-worker support	
Safety resources		Performance management	
Trust		Personal accountability	
Productivity versus Safety			The promotion of realistic and workable safety rules.



Reciprocal Model of Safety Culture (Cooper 1999)

Reciprocal Model of Safety Culture (Cooper, 1999)



Comparison of Cooper (1999) and Zohar (2000) regarding the three major dimensions of Safety Culture.

Cooper (1999)		Zohar (2000)
Safety Climate (broad definition)	↔	Safety Climate (narrow definition)
Behaviours	↔	Assumption that perceptions translate into behaviours
Safety Management Systems	↔	Acknowledged in the paper noting the work by James and Jones (1994) but not the focus of the paper

Comparison of Cooper (1999) and UK HSE Safety Climate Measurement User Guide and Toolkit regarding the three major dimensions of Safety Culture .

Cooper (1999)		Safety Climate Measurement User Guide and Toolkit
Safety Climate	↔	<i>Manifestation:</i> Employee, Contractor and External perceptions.
Behaviours	↔	<i>Manifestation:</i> Employee commitment, attitudes, responsibility, behaviour etc.
Safety Management Systems	↔	<i>Manifestation:</i> Safety Policy, Systems and Processes, Structures, Reports.

Safety Climate - what is it?

- The general attitude and prevailing opinions of a group of people (Macquarie Dictionary)
- A summary of molar perceptions that employees share about their work environments (Zohar, 1980)

Perception – is it important?

- Academics are impractical fools that wouldn't know how to apply butter to bread.
- Perception is reality for the individual and will influence their behaviour.

Are employees perceptions regarding how their organisation views safety, important?

YES

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Is an organisation's safety climate shaped by its policies, practices and procedures?



YES

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Glenn Alderton Photography

Can organisational policy, practices & procedures get one bent out of shape?



YES

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The distinction - climate v culture

- Safety Climate encompasses the perceptions of employees about the safety management of their organisation.
- Safety Culture encompasses not only perceptions but the behaviours and the physical systems of the organisation

Safety Climate is an element of Safety Culture

- Recall that we want to measure Safety Culture as a predictive indicator of potential safety performance.
- The best Safety Culture measurement would be multi-modal and assess organisations systems, behaviours and perceptions.

Safety Climate is an element of Safety Culture

- Practicalities dictate that multi-modal measurement will not readily occur.
- A resource efficient measurement is the Safety Climate survey.

Who uses Safety Climate surveys?

UK Health and Safety Executive Safety Climate Measurement User Guide and Tool kit.

NASA's Safety Performance Survey (management and employee).
(NASA, 1998)

Johns Hopkins University Safety-Climate Questionnaire (Moore, 2000).

USA Nuclear Regulatory Commission Safety Culture and Climate Survey (NRC, 1998).

Operators Flight Safety Handbook Safety Surveys (GAIN, 2000).

National Safety Council of Australia Safety Climate survey (NSCA, 1997).

Airline Safety Culture Index (Edkins, 1999).

What sort of questions do climate surveys ask?

- Employees are given enough training to do their work tasks safely.
- Safety within this company is generally well controlled.
- Employees usually report any dangerous work practices they notice.

Airline Safety Culture Index (Edkins, 1999)

Summary so far

- Safety Culture is an important predictor of potential safety performance.
- Safety Culture has 3 key dimensions:
 - Systems
 - Behaviours
 - Perceptions

Summary so far

- Best measurement of Safety Culture is multi-modal.
- Safety Climate measures employees (and managements) perceptions regarding organisational safety.
- Perceptions are important and influence behaviour.
- Safety Climate is a dimension of Safety Culture

Summary so far

- Safety Climate measurement will give an indication of Safety Culture
- Safety Climate is measurable by survey
- Safety Climate Surveys are relatively resource efficient.

From Theory to research

- **Developed a Safety Climate Survey**
 - Management Commitment
 - Training
 - Communication
 - Safety rules and procedures
 - Hazard Identification and analysis
 - Personal responsibility/employee commitment

From Theory to research

- Weighted the factors in the Aviation Safety Climate Survey
 - Using a panel of industry experts.
 - Using the Delphi technique
 - Over three rounds

From Theory to research

- Invited organisations to participate
 - 5 orgs participated.
 - A organisation using the BASI indicate system supplied a previous survey that was normalised to fit into the set.

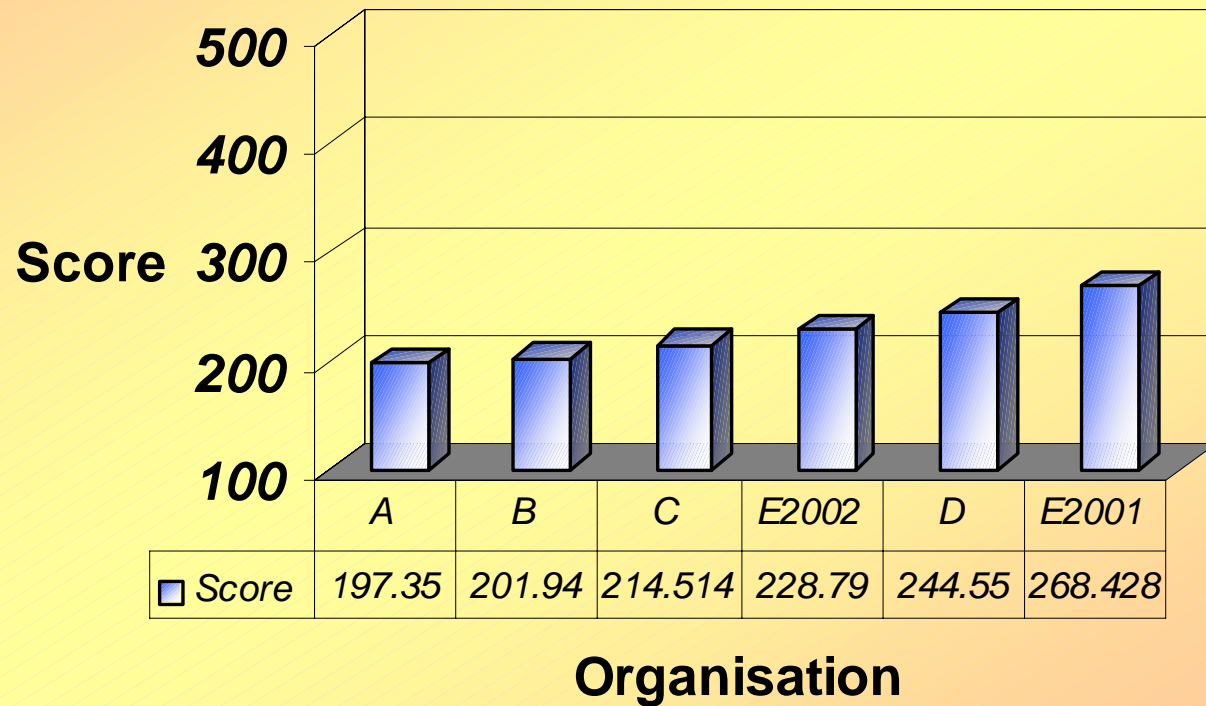
What were we testing

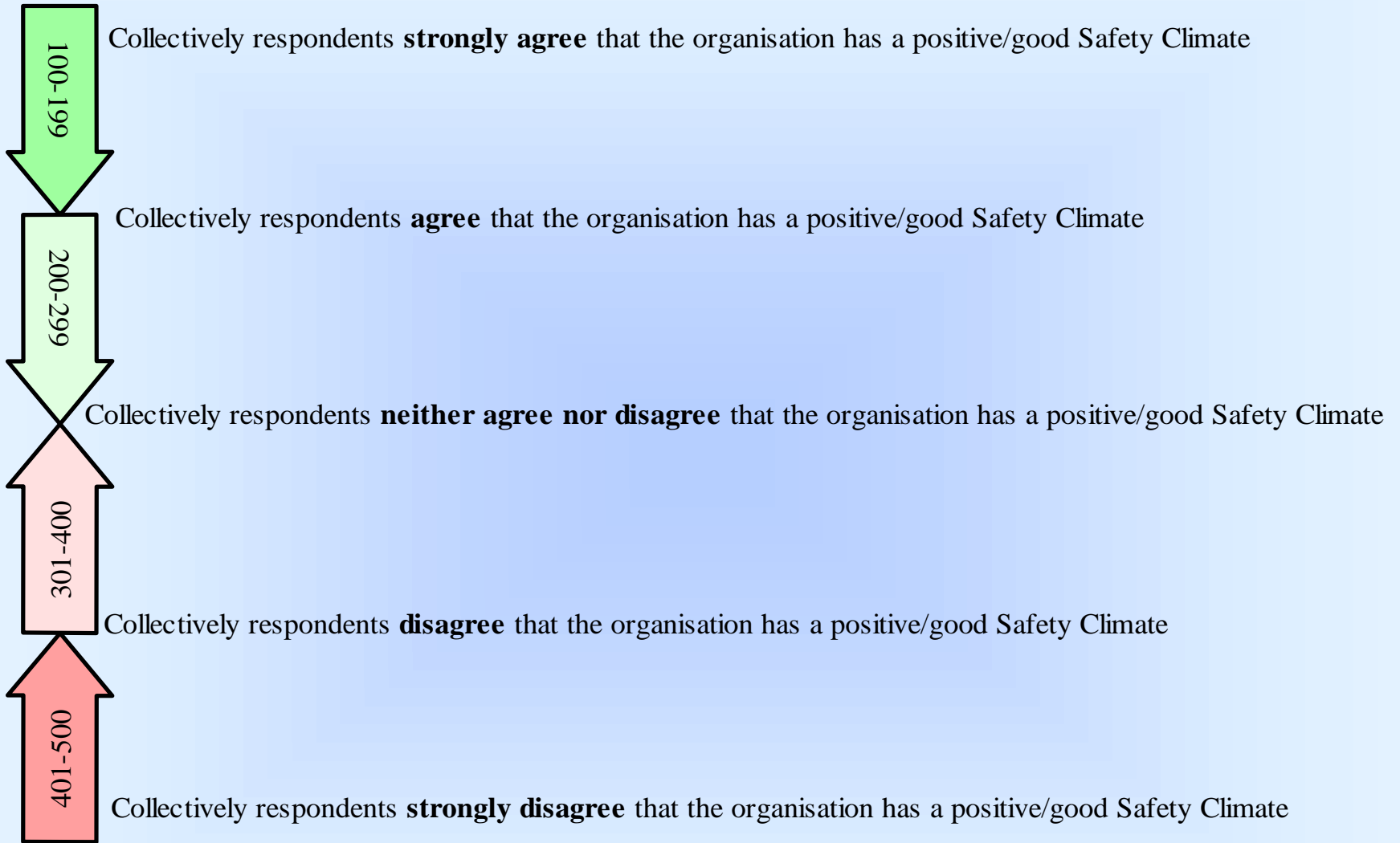
- Hypothesis 1 – The organisations having a strong safety culture would have scores lower (better Safety Climate) than the average safety climate

What were we testing

- Hypothesis 2 – As safety climate scores move away from a positive\good Safety Climate the gap between the scores of management and employees would increase
- Hypothesis 2a - As Safety Climate scores move away from a positive/good Safety Climate score the gap between the factors of Management Commitment and Personal Responsibility, as viewed from the perspective of the employee, increases.

Total weighted scores by organisation





Total scores

Figure 8. Difference between Management Commitment and Personal Responsibility scores (Gap) from the employee perspective.

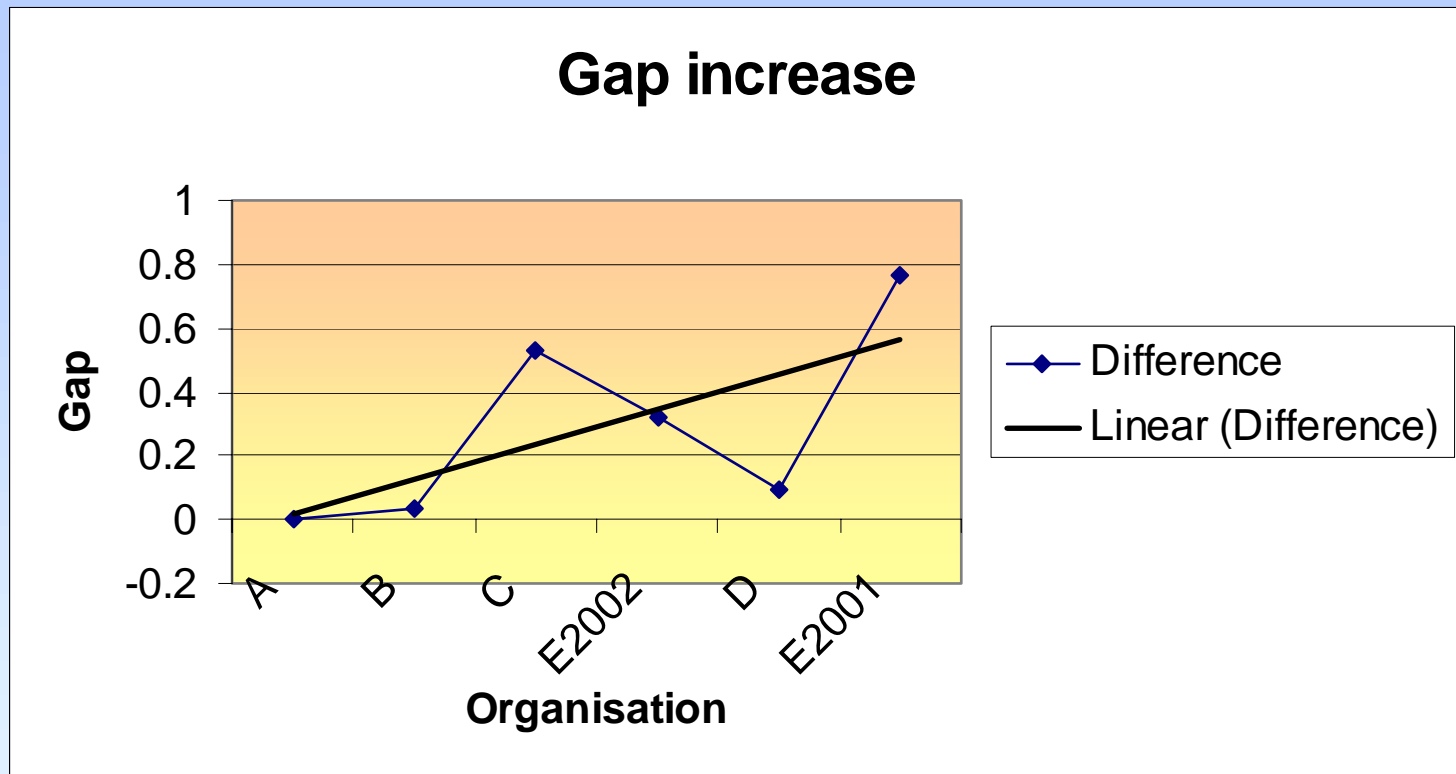
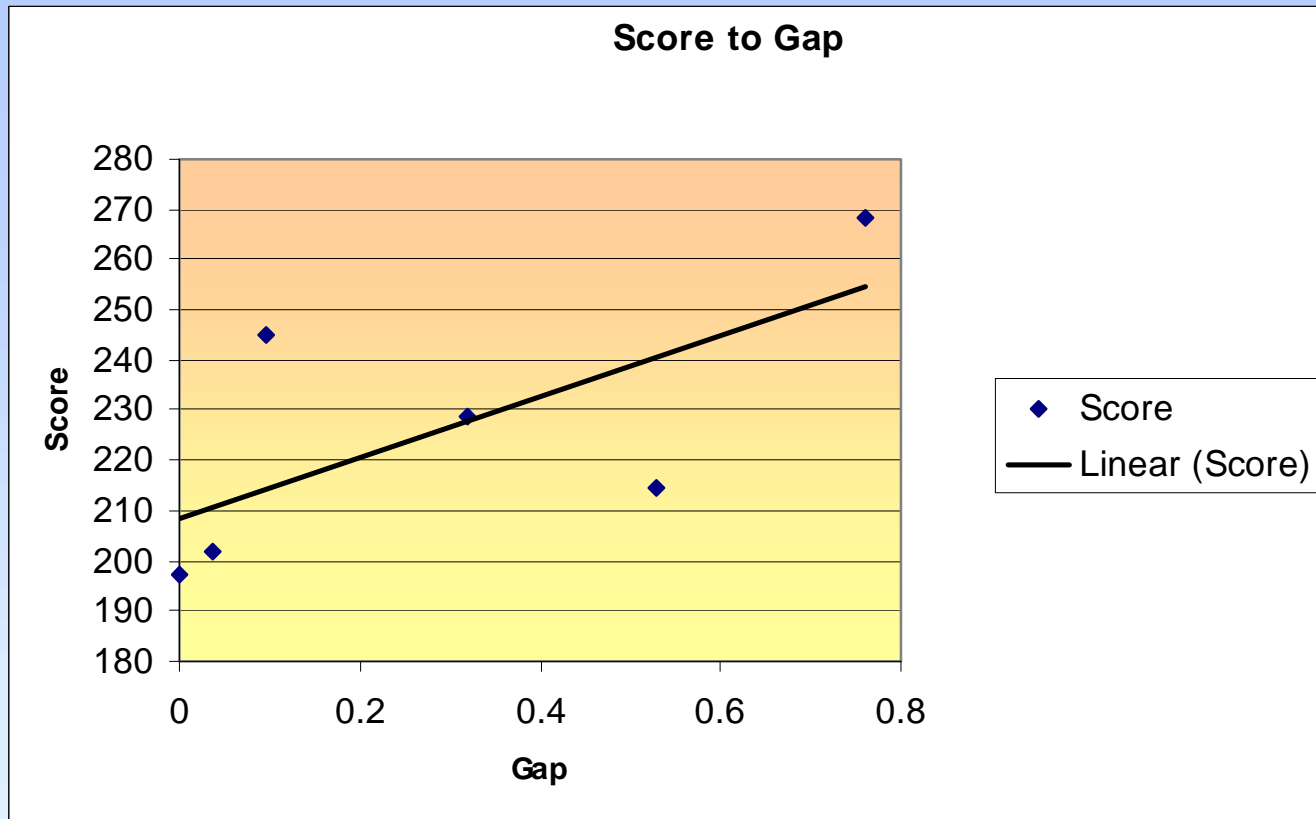


Figure 9. Scatter diagram depicting the relationship between Safety Climate score and the gap between the factors of Management Commitment and Personal Responsibility.



Research conclusions

- There is support for the position from the literature review that Safety Climate is a dimension of Safety Culture and a measure of Safety Climate, that via a survey, will give an indication of an organisation's Safety Culture and therefore have predictive value in avoiding organisational mishaps. The support however is not conclusive.
- There is support for the hypothesis that as Safety Climate scores move away from a positive/good Safety Climate score the gap between the factors of Management Commitment and Personal Responsibility, as viewed from the perspective of the employee, increases. Again the support is not conclusive.

Research Conclusions

- There were two significant negative findings in the survey. They were that employees perceived:
 - Managers do not often praise employees they see working safely (2.9), and
 - Managers fail to recognise when employees are working unsafely (3.0).

Research Conclusions

- There were significant positive findings in the survey. They were that employees perceived:
 - Employees do all they can to prevent accidents (1.74).
 - Everyone is given sufficient opportunities to make suggestions regarding safety issues (1.79).
 - After an accident has occurred, appropriate actions are usually taken to reduce the chances that a similar event will occur in the future (1.86).
 - In my work area, there are mechanisms in place for me to report safety deficiencies (1.89).
 - Employees often encourage each other to work safely (1.94).
 - In my work area, there are procedures to follow in the event of an emergency (1.96).

Overall conclusion

- The positive findings in the survey suggest that organisations are adopting safety mechanisms such as reporting systems and are taking positive actions after events. Additionally employees perceive they have a proactive safety approach. The negative findings suggest that managers may need to do more to reinforce safety practices and improve their organisation's Safety Culture.

Take Home Chiasmus

- Don't ask how your organisation defines safety but rather how safety defines your organisation.