

Much Ado about Safety Culture

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Summary

After more than twenty years of research the construct of safety culture has acquired a prominent place in discussions on the way large companies deal with occupational safety. Academics, practitioners, managers and policy makers all follow this debate with both interest and Argus eyes. Recently, safety culture has been linked up with the maturity of the safety management system, with the ‘better’ performing companies having a more ‘mature’ system. In this paper concepts such as these and several others that have been developed to study safety culture will be discussed critically. Afterwards the safety construct will be evaluated anew and implications for future research will be considered.

1. Introduction

The term safety culture apparently was first mentioned after the Post Accident Review Meeting following the Chernobyl accident in 1986 (International Nuclear Safety Advisory Group, 1986). In their updating of INSAG-1 the INSAG-7 (1992, pp. 23-24) asserts :

“The accident can be said to have flowed from deficient safety culture, not only at the Chernobyl plant, but throughout the Soviet design, operating and regulatory organizations for nuclear power that existed at the time. Safety culture [...] requires total dedication, which at nuclear power plants is primarily generated by attitudes of managers of organizations involved in their development and operation”.

Thereupon, many research projects started, yielding many definitions and operationalisations of safety culture (see Guldenmund, 2000, p. 227 ff. for an overview). In 1992 the INSAG came with a definition of the safety culture concept, which is quite often referred to in publications:

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“that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance” (International Safety Advisory Group (INSAG-4), 1991).

Here, safety culture is defined at two levels and in observable terms, or, rather, in terms that can be made observable easily. That is, if you have a clear understanding of the social scientific concepts lurking behind these terms.

However, what is it that researchers and users of the term safety culture actually refer to? Although much effort – academic or otherwise – has been poured over safety culture in the last twenty years, the consensus surrounding the concept is still small and the confusion considerable. Below, the most significant controversies are recapitulated first and some alternatives are discussed for their solution. Thereupon, the consequences for particular choices are worked out into several approaches, which are then taken up next.

2. Humans and culture

An important function of culture seems to be the reduction of uncertainty (e.g. see van Hoewijk, 1988), which, consequently, leads to more continuity, while less time is spent on various mutual adjustment. The fact that people know what to expect in a variety of situations – e.g. with regard to particular rituals (like celebrations, meetings, appointments and so on), the expression of emotions, dress codes, behaviours, *et cetera* – makes life more predictable and hence more easy. Culture also seems to be related to the mechanisms of adaptation (Schein, 1992) and habituation. Habituation is well-developed in all organisms that have a nervous system and the working of this mechanism has been described in as primitive a life form as the marine snail (Kandel & Schwartz, 1985, p. 817 ff.). For instance, Castellucci et al. (1978) have shown that repeated stimulation of a singular nerve cell results in this cell not responding to that stimulus anymore. Clearly, the habituation mechanism is important for learning, for continuity and therefore for survival and this can also be said for culture. Stretching the metaphor somewhat further, culture compares to the parasympathic nervous system in that it is (largely) unconscious in its execution and difficult to influence from within. Forces from outside the organism that demand its adaptation will be more successfulⁱ.

Hofstede defines culture as ‘the collective programming of the mind, which distinguishes the members of one group or category of people from another’ (Hofstede, 1991, p. 5) and considers culture ‘mental software’. He distinguishes three levels of such mental programming:

1. Human nature
2. Culture and
3. Personality

Where human nature is the programs that all humans around the world are instilled with, but this software can be mediated by both the culture and personality software. For instance, the way an individual expresses his or her anger will be determined both by this person’s personality and culture software (and situational conditions, but these are kept out of the discussion for the time being).

Culture is distinguished from human nature and personality in that it is shared by a *group* of people, whereas human nature and personality are notⁱⁱ. One person can belong to many groups and can therefore share several cultures with different people. Culture is sometimes considered the ‘collective memory’ of a group and it is, consequently, thoroughly intertwined with the history of that group. Or, put in other words, culture is software at several different levels of aggregation.

National cultures cannot be compared normatively. However, within its bounds a culture provides norms for thoughts and action, perceptions and behaviour. Therefore, within a (national) culture actions and justifications for these actions can be compared to the norms that have developed within this culture. Indeed, such norms become part of the culture and define its core, alongside the values. Consequently, culture provides *one of* the anchors for behaviour.

3. Layers of culture

Most scholars conceive culture as something consisting of a core surrounded by one or more layers, not unlike the anatomy of an onion. Whereas the core is something (deeply) hidden, the culture manifests itself gradually through the outer layers. Moreover, the more remotely a layer is situated from the core, the more easily it can be observed but also the more abstract its relation with the core becomes. This simply means that it is not straightforward to understand a culture only from its outer layer(s). Regarding change, a

similar rule is sometimes put forward: the more deeply a layer is located, the more difficult it becomes to actually change it (Meijer, 1999).

In Guldenmund (2000) a similar table as the one below is presented.

Author	Central core	Layer 1	Layer 2	Layer 3
Deal & Kennedy (1982)	values	heroes	rites and rituals	communication network
Van Hoewijk	fixed convictions	norms and values	myths, heroes, symbols, stories	codes of conduct, rituals, procedures
Hofstede	values	rituals ⁱⁱⁱ	heroes ⁱⁱⁱ	symbols ⁱⁱⁱ
Meijer	fundamentals	practices		
Rousseau (1990)	fundamental assumptions	values	behavioural norms	patterns of behaviour and artefacts (= 4 th layer)
Sanders & Nuijen (1987)	values and principles	rituals	heroes	symbols
Schein	basic underlying assumptions	espoused values	artefacts	

Table 1 – The layers of culture according to several authors

All authors have something quite deep and profound positioned at the core – values, convictions, principles, basic assumptions – but beyond that they differ, not so much concerning the nature of the layers, but regarding their position in the onion. Importantly, it should be pointed out that in the list above, only Hofstede aims at *national* culture, whereas the other authors have *organisational* culture in mind.

Regarding organisational culture, Hofstede puts forward that the core is less relevant for organisations, while this is relatively fixed for the country where the organisation is situated. Hofstede therefore argues that the notion of (national) culture not so much applies to differences between organisations within a country. They only differ in what he calls ‘practices’, i.e. the outer three layers of the onion: rituals, heroes and symbols (Hofstede, 1991, pp. 182-183).

Schein distinguishes himself from the other authors shown in table 1 in that he makes no difference between rituals, heroes and symbols, which he all sweeps under the heading of artefacts. The core however, he splits into espoused values and basic assumptions, hereby

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indicating that he does not take the values for granted that members of an organisation espouse when asked about these. Schein makes a point of calling his basic assumptions ‘assumptions’ and not ‘values’. To him, basic values are still negotiable whereas basic assumptions are not (Schein, 1992, p. 16).

The previous discussion makes yet another point clear, which is that the labels allocated to the layers are typically assigned from a researcher’s point of view. It does not make much sense for a member of the organisation to mark his statements ‘espoused values’ or admit that he engages regularly in ‘rituals’ at the office. It is the researcher who labels these activities as such.

Author(s)	Definition of safety culture	Part ^a
Cox & Cox (1991)	Safety cultures reflect the attitudes, beliefs, perceptions, and values that employees share in relation to safety	Core+
INSAG (1991)	Safety culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance	Core+
Pidgeon (1991)	The set of beliefs, norms, attitudes, roles, and social and technical practices that are concerned with minimising the exposure of employees, managers, customers and members of the public to conditions considered dangerous or injurious	Whole
ACSNI (1993)	The safety culture of an organisation is the product of individual and group values, attitudes, perceptions, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation’s health and safety management. Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures	Whole
Ostrom, Wilhelmsen & Kaplan (1993)	The concept that the organisation’s beliefs and attitudes, manifested in actions, policies, and procedures, affects its safety performance	Whole
Geller, E.S. (1994)	In a total safety culture (TSC), everyone feels responsible for safety and pursues it on a daily basis	Outer layer(s)
Berends (1996)	The collective mental programming towards safety of a group of organisation members	Core
Guldenmund (2000)	Those aspects of the organisational culture which will impact on attitudes and behaviour related to increasing or decreasing risk	Core
Hale (2000)	The attitudes, beliefs and perceptions shared by natural groups as defining norms and values, which determine how they act and react in relation to risks and risk control systems	Core+

^a The part of the onion the author considers to be the actual culture; core = core of the onion, core+ = core + one or more layers, outer layer(s) = one or more outer layers but not the core, whole = the whole onion

Table 2 – Definitions of safety culture

This leaves the question as to what constitutes culture in the model above. Is it the whole onion, or is it only the core? It seems that some researchers consider culture the whole of the onion (see table 2). In that case *everything* is culture, it being behaviour, dress codes or logos. However, when culture is restricted to the core, we are left with the deeply hidden values, principles, fundamentals or assumptions that the members of the organisation share. In that case the layers just function as a starting-point for uncovering the core. In this paper the latter position is advocated.

Summarising, the whole idea behind the onion model seems to depict culture as something hidden deeply under a set of more or less visible layers upon which it exerts its influence. The layers then can function as a key to the nature of the culture.

Regarding research on organisational culture it is possible to distinguish two global viewpoints. One viewpoint considers organisational culture a *behavioural system*, whereas the other a *system of ideas* (van Hoewijk, 1988, pp. 6-7). The first perspective could be considered very pragmatic while it only focuses on the observable aspect of culture. The second perspective is much more theoretical but also more impractical in that culture now has to be deciphered from what can actually be observed. Again, looking at the layers above it is easy to see that the first perspective is aimed at the outer layers, the 'practices' whereas the other is pointed at the core.

This distinction between approaches is remindful of the debate that ran between the behaviourists and the cognitive psychologists a few decades ago. Without attempting to resuscitate the debate again it is, however, important to look a little deeper into what is meant by the core.

Several authors refer to the core as 'deep' (e.g. Schein, 1990, p. 109). This immediately triggers the question as to what deep exactly is, or means. Deep seems to refer to something basic or fundamental and pre-conscious. People become emotional when their fundamentals are questioned or under attack (cf. Hofstede, 1991, p. 5), often without being aware why this is so important to them. It is interesting to bring up the reason for Schein to consider organisational culture as something that goes beyond the notion of 'practices'. After the Korean War, Schein and his colleagues worked closely with prisoners of war (POWs) who had been brainwashed by the Chinese. Whereas some of them simply let go of the ideas being forced upon them, others had adopted a communist

world view and had even confessed to ‘crimes’ they did not commit, that is, not from a Western point of view. The process through which these POWs had been converted has been named later ‘coercive persuasion’ (Schein, 1992, pp. 327-329, 1999). Somewhat later, Schein began to see parallels between the beliefs of these POWs and the beliefs schools, private and public organisations try to establish with their pupils and personnel, albeit through a much milder process (Schein, 1990, 1999). According to Schein, it is indeed possible to provide people with such strong tacit beliefs, which are indeed much deeper than the more superficial ‘practices’ Hofstede has in mind regarding his distinction between organisations. This is not to say that Schein’s basic assumptions and Hofstede’s values coincide. Hofstede’s values are indeed acquired at a much earlier stage – Hofstede claims before the age of ten – and are therefore quite static and rather definite. Schein’s basic assumptions are more dynamic and subject to change, but changing these requires much effort and unleashes ‘large quantities of basic anxiety’ (Schein, 1992, p. 22) while members of the organisation indeed lose many of their certainties for a particular period of time. It is not surprising that this change process has been likened to the process of mourning (Kets de Vries, 1999).

So, whether it is sufficient to observe the practices and not understand their underlying rationale is much more a matter of choice and personal interest than something that can be resolved through scientific inquiry. Researchers observing only practices might be sometimes bothered by their inconsistency, their irrationality or their incongruence. On the other hand, researchers focussing on the core have a hard time deciphering it.

In addition, some researchers employ safety culture as a qualifier, as something an organisation either has or has not. Reason indeed holds such a view (1997, p. 220): “like a state of grace, a safety culture is something that is striven for but rarely attained”. Davies et al. (2003, p. 14) discern a ‘Calvinistic vapour’ that permeates an organisation when they actually have attained a safety culture. Clearly, safety culture is then used normatively and related to a particular level of overall safety development. This view is associated with the experience-based approach, which is outlined below. Firstly however, culture is discussed within its organisational context.

4. The organisational context of culture

According to Schein, culture develops in organisations that have existed for some time and that have experienced significant internal or external difficulties. Apart from the influence of the founder(s) of a company or from important leaders (heroes), the solution for problems that are effectively withstood, might become part of the leading but tacit assumptions a company entertains. Such internal difficulties could be (major) safety problems, like fatal accidents, explosions or releases of dangerous chemicals. External problems are often of an economic nature, like pending closure or loss of customers. Culture then is the by-product of the adaptation that follows upon these difficulties.

Within organisations three major influences are operating at the same time on (the behaviour of) the people that work there. These generic forces are structure, culture and processes and they are dynamically interrelated (e.g. see van Hoewijk, 1988), which means that they all influence and are influenced by each other. Together they provide the context in which behaviour, and hence also safety related behaviour, takes place.

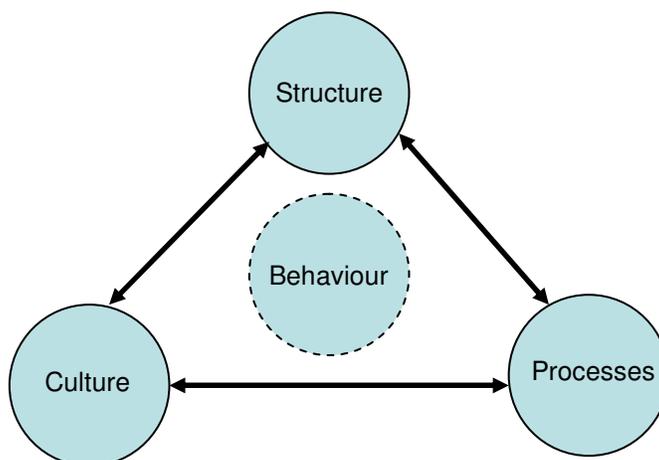


Figure 1 - The organisational triangle

Organisational structure can be defined as ‘the division of authority, responsibility, and duties among members of an organization’ (Whittington & Pany, 2004). The structure primarily outlines the formal organisation – i.e. how the work should be done and by whom. From the point of view of management an efficient structure facilitates both effective coordination and communication. With regard to the structure of organisations

several scholars have proposed taxonomies of which Mintzberg's is perhaps the most well-known (Mintzberg, 1979, 1980, 1983). These taxonomies generally offer solutions for structuring organisations in relation to their mission, main output(s) and environment. The culture is the basic assumptions, the underlying tacit convictions. For instance – 'We need a lot of supervisors because our people need to be watched constantly'. Such a conviction you will find back in the structure of the organisation and therefore also on the work floor.

The processes are the actual primary and supporting processes going on in the entire organisation. Traditionally, the processes are divided into three levels; the primary processes, which deal with the main output(s) of the organisation; the secondary processes, which support the primary processes, like all management processes and, for instance, quality control; and the policy processes, which support both the primary and secondary processes. Often, these three levels are also defined as the operational, tactical and strategic levels.

Task execution at all levels might be according to what has been laid down in the structure, but this does not have to be the case. For instance, (some) supervisors do not watch constantly, or do not correct workers, although they see them make mistakes or violations. The reason for this might be structural – the wrong man in the right place – or cultural – the convictions of a group of people do not match up to the structure. Figure 1 depicts these three major forces.

One important implication of the figure seems to be that an organisation's culture cannot be isolated from its structure or its processes. Harrison & Stokes (1992) actually take structural characteristics (high vs. low formalisation and high vs. low centralisation) to construct four quadrants that define a similar amount of culture types ('archetypes') – i.e. the role, achievement, support and power culture. Comparable taxonomies can be found with Handy (Zeus, Apollo, Athena and Dionysus culture) (1995) and Cameron & Quinn (Hierarchy, Market, Clan and Adhocracy culture) (1999). This makes a strong case for a holistic exploration of culture, i.e. research that also includes structure information and data from various organisational processes.

Figure 1 brings yet another issue to the fore, namely that of how to position culture within an organisation. This subject will be taken up in the next paragraph.

5. The position of culture in an organisation

Looking at figure 1 again, one could conclude that an organizational culture can be isolated quite easily from the organizational structure and processes. Regarding the position of culture in an organisation four approaches can be distinguished (Frissen, 1986):

1. Culture as contingency factor
2. Culture as subsystem of an organisation
3. Culture as an aspect system of an organisation
4. The organisation as a cultural phenomenon

A somewhat similar classification has been proposed by Smircich (1983) who states that an organisational culture can be viewed as either an independent or external variable; as an internal variable within an organisation; or as a root metaphor for conceptualising organisations.

Hofstede can be considered a proponent of the first approach, in that he considers an organisational culture primarily a product of national culture. Organisations within a country only differ in their 'practices', i.e. the layers of the onion, not so much in their values.

When culture is considered a subsystem it functions relatively independently next to other sub-systems and can therefore simply be separated for analysis. When culture is regarded as an aspect system, culture cannot be segregated so easily. Let's take an automobile as an example. A car consist of several subsystems – like the motor, the chassis or the body of the car – that can be impaired and separated easily from the rest. Although it is tailored to the rest of an automobile, any subsystem exists on its own and has its own influence and contribution to the whole of the car. With an aspect-system things are a bit different. For instance, speed or luxury could be considered aspect-systems of the car. When it is a speedy car, you will find this speediness back in many subsystems, like the motor, the wheels, the body and the chassis. You cannot isolate the speediness of a car easily while it is an aspect of all of its subsystems, not a system *per se*.

Paper to the 3rd International Conference on Working on Safety (WoS), the Netherlands, at the Eemhof on 12-15 September 2006

Ultimately, when digging very deeply into an organisation, one will probably get the impression that the organisation not so much *has* a culture but actually *is* a culture. In this view culture is considered a root metaphor. Here we have reached the fourth approach.

Frissen (1986) presents his approaches not as mutually exclusive but rather as successive stages. When starting a research project, culture is considered as something influencing an organisation (culture as a contingency factor). One then tries to isolate culture and study it in more detail (culture as a subsystem) and then explore much broader in its manifestations (culture as an aspect-system). When the investigation is both deep and broad culture would manifest itself not so much as a part or aspect but as something the organisation constantly is – culture as a root metaphor.

In the next paragraph this exploration of organisational culture will be examined further, looking from three different perspectives, which currently dominate safety culture research.

6. Safety culture research strategies

6.1. Anthropological, ‘academic’ approach

The primary paradigm of anthropology is field research and it is qualitative in nature. The purpose here is to describe and understand a culture rather than evaluate it, i.e. the description is principally value free. Culture is often considered something an organisation *is*, rather than *has*. This approach could also be labelled ‘academic’ because it is used only by academics and is hardly ever applied outside the scientific realm (see Hofstede, 1991, p. 180).

Edgar Schein has adopted this approach in what he calls his clinical research. The term clinical already betrays the fact that some evaluation is taking place, but this is more in terms of a discrepancy between a given organisation’s ambitions and what they actually accomplish. In terms of safety this can become pregnant when a company claims to put safety as its number one priority, but has many accidents nevertheless.

When starting the research the company can be considered a *tabula rasa*, or the existence of some aspect(s) can be hypothetical, rather than assumed, and the organisation is never fitted onto some researcher’s Procrustes bed. Ideally, the research starts with a problem

definition or an issue turned into a problem, for instance the discrepancy from above, to focus the investigation.

Data come from several sources like interviews, observations, document studies and whatever else the company brings forth that may hold clues for its underlying culture. What seems to be important however is that information is collected with sufficient context, so that it does not stand on its own.

Sometimes all data are collected in a large matrix for reduction and to obtain an overview (e.g. see Guldenmund, 2006). Pieces of information are highlighted by keywords, without losing sight of the context it came from. The structure of this matrix is then determined by the source of the data (interview, observation) and an aspect it refers to. Schein puts forward several aspects which are so fundamental that they always play a role in organisational life; with regard to safety however, this does not have to be the case. These aspects or 'dimensions' are:

- The nature of reality and truth
- The nature of time
- The nature of space
- The nature of human nature
- The nature of human relationships
- The nature of human activity

By organising the data according to these dimensions the researcher gets an impression which dimensions play a significant role in the organisation and what role they play. When the matrix has empty cells the researcher should wonder whether his data collection is complete or has been selective or even biased.

Finally, the results are almost never quantified because it is meaning and interpretation and not some high abstractions or calculations that drive the research.

6.2. Psychological, 'analytical' approach

I call this the psychological approach because safety culture is studied through the use of questionnaires. This is the primary research strategy of (social and organisational) psychologists. This approach could be considered 'analytical' in that it considers safety culture an attribute of an organisation, i.e. something an organisation *has*, rather than *is* (cf. Hofstede, 1991, but see also section 5 above).

The field of safety culture is very much dominated by questionnaire studies; possibly because surveys are deceptively simple; probably also, because questionnaires are so popular with organisational psychologists.

Surveys generally follow this routine. First, potential concepts or facets of interest are identified that together make up the construct. Thereupon, a questionnaire is compiled, composed of questions that cover the concepts of interest best. This is at first an assumption, which is tested in a subsequent survey where the questionnaires are put to the relevant population. The data analysis performed on the results of the survey should reveal whether the assumed concepts are actually present in the answers. Such concepts are often depicted as dimensions in a multidimensional space; cultures then become positions in that space. In addition, structural methods could reveal causal relationships between the concepts that make up the culture construct. This way culture is caught in a web of concepts.

It is a rather well-known and straightforward approach. The final results reveal the common denominator of the population. When this population is large, the random noise that is always present in such research will be averaged out. It is assumed that the trait or characteristic is normally distributed and in that case the mean is the best descriptor of such populations. Obviously, this approach is particularly applicable to large populations where the largest common denominator is of interest.

A much less obvious assumption with this type of research is that the trait is assumed to be present in the population and the (only) purpose of the analysis is to find its significance. Considering culture at the level of nations this assumption is more than reasonable. However, when populations become small and heterogeneous the assumption of existence of a particular culture other than a national one becomes open to question and not the mean but the variance might be of primary interest^{iv}. As has been stated above, culture is something that is learned and shared between people and their common variance could function as an indication of their attachment. This issue becomes pertinent with the study of organisations and different sub-cultures within these. So, when the issue of a shared culture is still under consideration and the population of interest is rather small, the standard questionnaire approach has severe drawbacks, primarily because the analysis methods only work well with relatively large amounts of data^v. In addition,

while correlations between variables function as input to the analysis methods another issue can arise. For instance, when there are two tight groups with very opposed points of view – this is not an uncommon situation in some organisations – the overall correlation (i.e. aggregated correlation) between some variables will be low, while the within group correlations will be high. These variables will also have a bimodal distribution. Again, the analysis methods will not work well with these variables and they will not contribute much to the final solution.

Summarising, viewed from the psychological perspective culture is a multidimensional construct and different cultures are positioned at diverse positions in that space. The space itself is given and only the positions are to be determined in a cultural assessment. The mean functions as an overall descriptor of a culture.

6.3. Experience-based, ‘applied’ approach

While the first two approaches could be considered descriptive, the approach that is called experience based in this paper is primarily normative. From a scientific point of view a culture can be neither ‘good’ nor ‘bad’, because cultures are always functional and have meaning in relation to their context and history. However, organisational culture can be dysfunctional in relation to its future, for instance in relation to particular ambitions or goals. Such ambitions can be about many things, and therefore also about safety. For instance, an organisation’s ambition might be to have no or ‘zero’ accidents but serious accidents might still occur occasionally.

The experience-based approach in effect aims at both the structure and processes of an organisation, which, because of their dynamic interplay, influence the culture as well. Relying strongly on expert opinion and not so much concerned with theory it is very much an applied approach. Often it is prescribed in detail what an organisation should do to obtain an advanced or mature status. The emphasis then is on structure. Geller’s Total Safety Culture (Geller, 1994) is a prime example of this approach, and the IAEA requirements and characteristics for nuclear power plants are of a similar nature (International Safety Advisory Group (INSAG-4), 1991). Descriptive approaches as the ones already discussed are less interesting here, because it is not the current status but deviations from a predefined norm which are assessed and considered. However, a

current status might be helpful in providing the organisation a sense of urgency to change.

Applied approaches concentrating on processes often focus on desired behaviour and, again, the correction of deviations. Once more it is thought that a change in behaviour will result in subsequent cultural adjustments. According to cognitive dissonance theory attitudes and thoughts about particular behaviours will change in the long run when the two are incongruent and the behaviour is rewarded.

Lately, stages or levels of organisational maturity with regard to safety management have become fashionable (e.g. see Energy Institute, undated; Lardner, 2004; Parker, Lawrie, & Hudson, 2006). Each level describes common local attitudes and behaviours in relation to safety, especially in relation to incident and accident prevention, reporting, investigation and solutions. Once more, a diagnosis of the current organisational status in relation to these attitudes and behaviours might be prepared. However, the main objective is to ascend the safety maturity hierarchy. This might be accomplished by following the behavioural approach above, i.e. an emphasis on processes, or with more or less structural adaptations. It is again assumed that culture will follow in the wake of these interventions. This approach purports, rather implicitly, that safety culture something is an organisation has, or hasn't (much like the title of the book by Hemingway). That is, mature organisations have 'it', whereas 'pathological' (Westrum, 1991) or 'emerging' (Lardner, 2004) organisations do not. Other researchers would contend that a safety culture is always there, but with a plus or minus sign. Obviously, this is rather a matter of definition than of empiricism.

With regard to the organisational approach a descriptive style could still be considered, much in the vein of the signs of the zodiac. That is, an organisation is typified according to a few characteristics. Within the organisational culture literature this is not uncommon, as described above. Several authors have characterised cultures by their positions on a (limited) set of dimensions. Schein is rather strict on this issue and states that typologies typically describe only one or two dimensions (Schein, 1992, chapters 6 & 7). For safety culture this has been done by Westrum (1991) and Parker et al. (2006). Interestingly, while the organisational types are characterisations much in the vein of astrological signs,

the safety culture types are hierarchically ordered with types being less safe and therefore less developed than others.

7. Conclusion

When embarking on a quest for safety culture researchers are well-advised to pose themselves a few important questions before starting this enquiry. Key questions are:

1. Is safety culture a system of ideas or a behavioural system?
2. Is safety culture something an organisation always has or is it only for the happy few?
3. How is safety culture related to organisational culture?

The answers to these questions drastically shape the ensuing approach. The first question has been discussed in section 3 and is really important because its answer determines the focus of the research; whether it is on the practices of the outer layers^{vi} or on the invisible tacit assumptions of the core. This question triggers yet another question – What then should be considered the culture? The core, the layers or both layers and core? As we have seen, deciphering the core is not an easy task and besides much analysis it requires an equal lot of synthesis.

The second question has been considered in both sections 3 and 6.3 and is rather unique to the safety culture field, because not many researchers, for instance, really question the existence of an organisational culture. It seems both a definitional and a normative issue whether one considers a safety culture somewhere present or not.

The third question has been explored in sections 4 and 5 and it deliberates the relationship between organisational and safety culture. Some researchers consider safety culture much more a separate entity, a subsystem even, of organisational culture, i.e. something an organisation *has* and which can be *replaced* by a different, better thing. Currently, there is no empirical evidence supporting one or the other view. Also, the proposal put forward by Frissen might apply here also. That is, some research might start studying safety culture in relative isolation, but might end up with the organisation and its safety culture thoroughly intertwined like a Gordian knot.

In answering these questions the researcher gradually finds herself following a particular research strategy and achieving a certain amount of involvement with the organisation. If the research time is short and the research question merely practical, the researcher will

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end up distributing questionnaires and reporting bar charts, diagrams and various statistics. However practical, this approach itself has not relieved the controversies and confusion surrounding the safety culture construct (e.g. see Guldenmund, 2004, 2006). If research time is not so limited, case studies might be constructed and in due time the researcher might find herself formulating root metaphors and patterns of basic assumptions. However academic, it still remains to be seen what practical use such research findings have – especially in the short run – for safety, which often demands quite immediate action and solutions.

Returning to the question about safety culture and what it refers to posed at the start of this paper one can wonder whether the concept has fulfilled its initial promise. Looking closely again at the quote from INSAG-7, it seems that safety culture has been coined to denote a universe of meanings and implications. Indeed, safety culture is expressed very much like a sensitising concept (see e.g. van den Hoonaard, 1997) and much less as an end or research object in itself. Put in other words, the term safety culture it seems, is just meant to draw attention to a (potentially) large field of possible problems with safety at various organisational and even national levels, including (but not limited to) those concerning behaviour, attitudes, assumptions, supervision, risk perception, accident and incident investigation, policies, strategies, regulation, inspections, *et cetera*. Whether it is possible to synthesise these multiple sources into an index or summary indeed remains to be seen. Up to now, nobody has succeeded yet in pulling such diverse sources together into a meaningful whole, which also might replace its constituent parts.

Taken together, the INSAG's sensitising concept of safety culture seems very attractive and has appealed to academics, practitioners, managers and policy makers for two decades now, evidently for quite different reasons. Whereas academics want to understand it, practitioners and managers want to change it and policy makers want to influence it. Consequently, their interpretations of the concept and their motives for studying safety culture are also different. Up to now, the quest for it has been largely unsuccessful in scientific terms and more applied approaches can be questioned for their validity. Whether safety culture remains elusive and will ultimately disappear from the research agenda is yet hard to tell. Meanwhile however, safety culture has acquired a permanent place in the vocabularies of both safety practitioners and researchers alike.

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ⁱ Please note that Schein (1992, p. 298 ff.) follows a similar reasoning about culture change.

ⁱⁱ Human nature is shared by everybody and a personality is held by only one person.

ⁱⁱⁱ Hofstede has labeled these layers 'practices'.

^{iv} Actually, it is not the variance but the intraclass correlation (ICC). This coefficient should be sufficiently high to be able to speak of something that is shared within groups.

^v The amount of data is dependent on the amount of questions (variables) in the questionnaire. As a rule of thumb there should be five times more respondents than there are variables in the data set (Tabachnick & Fidell, 1989).

^{vi} I agree with Hopkins (Hopkins, in press) that when researchers focus on practices it does not necessarily mean that they do not acknowledge the existence and value of a deeper located core.