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**An Extended Dimensionality of Safety Behaviour Among
Specialists in High Reliability Organizations**

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Abstract: In previous safety research, two main categorizations of safety behaviour prevailed: *compliance*, concerning rule adherence, and *safety citizenship behaviour*, concerning various aspects of organizational participation. The aim of the present study was to expand on the dimensionality of safety behaviour and safety motivation among specialists in safety critical industries, defined as *high reliability organizations*. A qualitative method, using focus groups from three different occupations within the aviation industry, was utilized. In total, 13 informants participated. An alternating inductive/deductive approach using thematic analysis was selected. Besides *compliance* and *safety citizenship behaviour*, three further safety behaviours were identified and defined: *adaptive*, *proactive* and *self-directed* safety behaviour. Finally, the underlying motivational factors for each safety behaviour were discussed.

In high-risk industries, safety is one of the most fundamental prerequisites for attaining viability and public acceptance. In the last four decades, much emphasis and effort has been placed on establishing the relationship between organizational safety climate and the overall safety performance of an organization (Guldenmund, 2000; Neal, Griffin, & Hart, 2000; Zohar, 2010). While the conceptualization of a specific safety-related organizational climate, and its influence on overall organizational safety performance, is not completely without critique (Clarke, 2000), there have been several studies confirming a positive relationship between various organizational factors and individual safety behaviour (e.g. Cheyne, Cox, Oliver, & Tomás, 1998; Guo, Yiu, & González, 2016; Neal & Griffin, 2002; Neal et al., 2000). A wide range of conceptualizations and definitions concerning the safety climate construct has dominated much of the psychological safety research in the last decades (Guldenmund, 2000; Silbey, 2009). However, in said literature, a relatively homogenous and under-researched comprehension of the constitution of safety behaviour and its underlying motivational features is prominent.

For the majority of the pioneering research on safety behaviour, the prevailing categorization utilized for safety behaviour, was a two-dimensional distinction between behaviours that were either related to rule adherence, or participation in the organizational safety development (Ford & Tetrick, 2008). One of the most widely used examples of this, is *compliance* and *safety participation* (Griffin & Neal, 2000; Larsson, Pousette, & Törner, 2008; Neal et al., 2000). Compliance refers to the degree of adherence to rules and policies, while safety participation refers to individuals' participation in workplace safety. For example, participation in safety meetings, promoting safety programs, helping colleagues, or otherwise contributing to the improvement of the overall organizational safety level.

A more nuanced version of the safety participation dimension has emerged by deploying the term *safety citizenship behaviour* as a subcategory of *organizational citizenship behaviour* (Conchie, 2013; Curcuruto, Conchie, & Griffin, 2019; Hofmann, Morgeson, & Gerras, 2003). Safety citizenship behaviour (SCB) constitutes discretionary and pro-social behaviours, such as suggesting improvements, helping co-workers with safety issues, whistleblowing and voicing concerns (Hofmann et al., 2003). In the SCB model, the dimensionality of the safety behaviour was further categorized into two typologies; *affiliative-oriented* or *challenge-oriented* SCB (Conchie, 2013; Curcuruto, Conchie, et al., 2019). The affiliative-oriented

behaviours are pro-social and cooperative behaviours such as helping behaviour and civic behaviour, resulting in strengthened social relations (Curcuruto, Conchie, et al., 2019; Hofmann et al., 2003). Challenge-oriented behaviours are more directed towards change and improvement and are associated with innovation and problem solving, but also include behaviours such as voicing concerns and whistleblowing (Curcuruto, Conchie, et al., 2019).

A further categorisation between various types of safety behaviours was introduced by Pousette, Larsson, and Törner, (2008) while testing a model of safety climate dimensions. Based on previous work by Cheyne et al. (1998), three dimensions of safety behaviour were adopted; *structural safety behaviour*, *interactional safety behaviour* and *personal safety behaviour*. Structural safety behaviour refers to participation in various kinds of organized safety activities, such as taking the role as a safety representative or participating in organized risk assessments. Interactional safety behaviour refers to discretionary or casual behaviours carried out in interaction with others during daily work activities, such as discussing safety issues with colleagues or superiors. This construct, as pointed out by Pousette et al. (2008) is closely related to the concept of safety participation. Personal safety behaviour, a concept akin to compliance, was represented by the use of personal protection equipment and adherence to prescriptions and rules (Pousette et al., 2008).

Other notable examples, although with less impact on contemporary research, are Andriessen's (1978) distinction between *carefulness* versus *safety initiative*, or the four-factor model utilized by Burke, Sarpy, Tesluk, and Smith (2002). Although Andriessen's (1978) study has received comparatively little attention, it is noteworthy as it is one of very few studies that does not utilize compliance as a safety behaviour construct. Instead, the bi-dimensional categorization used here can be summarized as two variations of risk avoidance. The four-factor model utilized by Burke et al. (2002) comprises the four elements *using personal protective equipment*, *engaging in work practices to reduce risk*, *communicating health and safety information*, and *exercising employee rights and responsibilities*. However, the items in this scale reveal that the first two mentioned dimensions can be lumped into a compliance dimension, and the remaining two can be summarized as safety participation or safety citizenship behaviour.

Consequently, while the majority of the literature on safety behaviour focuses on aspects such as either rule adherence or on behaviours directed at safety contribution to the organization, there is still a paucity in empirical psychological research expanding the safety behaviour construct to a wider and more nuanced dimensionality. However, in other, non-psychological fields of safety science, behavioural attributes such as proactivity, adaption, risk identification, risk avoidance and resilience are implied. Dekker (2001) discusses how adaption is a critical attribute to avoid accidents amongst airline crews, and Perry and Wears (2012) describe adaptive behaviour to control workload pressure among health care practitioners. Resilience and adaptability have also been examined by several safety researchers, such as Hollnagel, Leveson and Woods (2006), Patterson and Wears (2015) and Woods and Hollnagel (2006). However, these contexts rather adopt a system perspective, with only minor attention to behavioural or psychological aspects. Other tacit suggestions that safety behaviour entails more than just the compliance and participation dimensions are raised by Törner (2008, 2010), who suggests that a positive safety climate empowers risk prevention. Similarly, Dekker (2002) points out that people not only fulfil safety obligations, but they also *create* safety when carrying out their daily work, in which they need to meet a multitude of simultaneous goals and demands.

The complexity of compliance. While compliance with rules, prescriptions or procedures may appear as an unequivocal construct, easy to either accomplish or abstain from, a number of studies have revealed that compliance may, quite the opposite, be of a rather complex nature. Work processes are often irregular and unpredictable. Demands and resources

may be incompatible and subject to conflicting goals (Hollnagel, 2004). These conflicts may comprise, for example, competing safety demands (Nilsson, Törner, & Pousette, 2018) or competing efficiency or performance goals (Hollnagel, 2004). The rules may also be perceived as too time-consuming, meaningless or bureaucratic to be useful (Haukelid, 2008). As a consequence, naturalistic work is constantly adapted to the multifaceted demands experienced by professionals; a process that Hollnagel (2004) denominates as the *Efficiency Thoroughness Trade Off* (ETTO) principle.

Hollnagel's (2004) account of the ETTO-principle suggests that, as long as the prescribed procedures and the conditions they were designed towards, matches, there is no need for deviations. That is, when demands are predictable, resources, such as time or capacity, are available, and other inputs, such as people or machines, behave as expected. However, the reality, as Hollnagel (2004) points out, is more complex and more dynamic than initially imagined during the procedure design stage, and that is when a continuous need for adaptations and compromises is prevalent. It should be noted, though, that Hollnagel specifically stresses that this behaviour is rarely due to negligence or laziness, but rather a measure to free up resources and avoid sub-optimization. Hence, the efficiency-thoroughness trade-off may require a procedure or rule (*thoroughness*) to be omitted in order to keep the overall performance (*efficiency*) maintained. As Dekker (2006) suggests, omitting a prescribed procedure may in fact be an example of resilience, and have a positive safety value in itself. Additionally, Dekker (2018) points to a survey, although semi-scientific, amongst health care practitioners, describing different features of situations that were either successful or led to failure. The results showed that there were in fact the very same behavioural features in both cases, namely: workarounds, shortcuts, violations, and non-compliance. This finding is also consistent with Vaughan's (1999) claim that there are rarely any apparent differences between organizations that had an accident and those who did not have an accident.

To conclude, safety behaviour emerges as an under-researched construct with a need for further scrutiny and a more nuanced conceptualization. Secondly, compliance, as an aggregated measure of safety behaviour, is a rather complex and perhaps problematic construct, subject to a multitude of local constraints, requiring adaptation and optimization. What can be seen as a non-compliant risk behaviour in one setting can just as easily be interpreted as a proactive safety measure in another.

Safety Motivation

The individual process by which a safety behaviour is instigated is widely referred to as *safety motivation* (Ford & Tetrick, 2008). Several motivational theories have been suggested as the driving force behind safety behaviour. A common approach in contemporary research regards safety motivation as a proximal mediator between safety climate and safety behaviour (Griffin & Neal, 2000; Guo et al., 2016; Neal, et al., 2000). In this approach, safety motivation is ultimately viewed as a result from the employees' perceptions of various organizational cultures and values (Guldenmund, 2000; Zohar, 1980). However, the conceptualizations of safety climate or safety culture have varied considerably (Silbey, 2009). A review by Griffin and Curcuruto (2016) lists a number of other possible motivational mechanisms as antecedents to safety behaviour; self-determination perspectives, normative influencing, empowerment and social exchange theories.

One of the most widely used motivation theories is the self-determination theory, developed by Deci and Ryan (1985). The self-determination theory (SDT) approaches human behaviour and self-regulation from a motivational perspective, in which the source of self-regulation can be located either internal or external to the human mind (Ryan & Deci, 2000).

While being mostly known for the intrinsic-extrinsic motivation dichotomy, the locus for self-regulation in the SDT is better reflected as a continuum between fully external and fully internal self-regulation (Ryan & Deci, 2000). In total, five levels of regulation are presented, each indicating a further step towards internalisation; *external*, *introjected*, *identified*, *integrated* and *intrinsic* regulation, where only the last mentioned is counted as internal motivation. External regulation is the least autonomous and generally serves only external demands or reward contingencies of generally none self-interest. Introjected regulation is described as one step towards self-regulation, and typically involves feelings of guilt, anxiety or pride. In identified regulation, a more personal value is reflected as the behaviour becomes more self-determined and personally important, while in integrated regulation, the behaviour is fully assimilated with one's values and the self. Only in the final, intrinsic regulatory style, the behaviour is performed solely for the pure satisfaction received from the activity itself (Ryan & Deci, 2000).

Several studies on safety motivation have examined the self-determination perspective as an antecedent to safety behaviour. Intrinsic motivation alone was found to play a mediating role in both challenge-oriented SCB (Conchie, 2013), and the related construct, safety participation (Scott, Fleming, & Kelloway, 2014). The strongest predictor for compliance was found to be identified motivation (Scott et al., 2014). Pure external forms of motivation or self-regulation have been more difficult to correlate to various safety behaviours, possibly, as suggested by Curcuruto, Parker and Griffin (2019), because compliance is a more complex and dynamic construct. Conchie (2013), on the other hand, proposed extrinsic motivation to predict compliance.

Other suggested motivational predictors of safety behaviour are safety motivation as a function of social interaction and normative influencing (Griffin & Curcuruto, 2016; Zohar, 2010). Griffin and Curcuruto (2016) suggest in their review that social norms are an important aspect of organizational safety climate. Social norms are generally characterized as either *descriptive*, merely indicating what others do, or *injunctive*, imposing a level of prescription (Cialdini, Reno, Kallgren, 1990), but do also bear an element of varying internalization similar to the self-determination theory (Thøgersen, 2006). The safety climate constitutes an organizational normative value to which humans relate, and when necessary, adapt their behaviour to (Cavazza & Serpe, 2009; Zohar, 2010). In other words, safety climate may influence safety motivation through the psychological mechanisms of conforming to norms, descriptive or injunctive, and humans' need for belongingness and recognition from relevant peers.

A related construct, suggested to be of importance for safety behaviour, is the social identity perspective, originally described by Tajfel (1978). The *social identity theory* differs between an individual's personal identity and the collective self that is shaped while being assimilated to a specific group belonging, such as a profession, social category, personal interests etc. The social identity theory has been used to explain how humans categorize themselves and others, how prejudice is formed and shaped and how human behaviour is a function of the social context (Hogg & Williams, 2000). That means, social identity can serve as a guideline for behaviour in a specific situation, directing a human to act in a certain way. Not because of individuality, but by priming the behaviour that he or she expects from members of the social category that the individual identifies with in the particular situation (Hogg & Williams, 2000). Social identity has been shown to be a factor in predicting both compliance and non-compliance in at least two previous studies (e.g. Andersen, Karlsen, Kines, Joensson, & Nielsen, 2015; Choi, Ahn, Lee, 2017).

The need for belongingness, relatedness and interpersonal bonds is a well-rooted concept within psychological concepts, such as Bowlby's (1969) *attachment theory* and Maslow's (1968) *motivational hierarchy*. Humans strive for achievements that are recognized and valued by other people, and thus, much of what humans do is said to be done to serve the

need for belongingness (Baumeister & Leary, 1995). In SDT, the need to be socially connected to others is also an important aspect of internalization (Ryan & Deci, 2000). This makes up the *relatedness* construct in the *cognitive evaluation theory* (Deci & Ryan, 1985), which is a further dimension of the SDT. The cognitive evaluation theory (CET) concerns the variability and persistence of intrinsic motivation. Here, three elementary needs are described to either enhance or suppress intrinsic motivation depending on their presence; *autonomy*, *competence* and *relatedness* (Ryan & Deci, 2000). The relatedness construct is, as mentioned, the human need to feel belongingness and connectedness to others. Autonomy refers to the degree of individual control and choice (deCharms, 1968; Deci, 1975; Grolnick & Ryan, 1989), and competence refers to the perceived sense of mastery and self-efficacy (Ryan & Deci, 2000).

For individuals to feel motivated to be compliant, prescribed procedures and rules also need to be appreciated as meaningful and sensible (Deci, Eghrari, Patrick, & Leone, 1994; Haukelid, 2008; Törner, 2010). If the employees view the implied procedure as bureaucratic, contradicting and meaningless, compliance and safety culture will suffer (Haukelid, 2008). This reasoning bears some resemblance with Wilde's (1982) *risk homeostasis theory*. In the risk homeostasis theory, safety behaviour is regulated through the discrepancy between the perceived risk and the acceptable risk. If the risk is perceived so low, that safety procedures are conceived as unnecessary, then behaviour may be adjusted accordingly, i.e. the safety behaviour will decrease. Safety motivation may also be influenced through feelings of empowerment and psychological ownership (Griffin & Curcuruto, 2016), a conceptualization that could also be compared with the autonomy-dimension of the SDT.

In summary, the majority of the research on safety behaviour and safety motivation are quantitative studies, aiming to establish relationships between either compliance or participative safety behaviour and various motivational constructs. Self-determination perspectives, various aspects of social influencing and organizational traits are the most frequently employed motivational perspectives.

The current study

The purpose of the present study is to expand and give further insights into the various dimensions, complexities and nuances of safety behaviour and its underlying motivational factors. Previous research on safety behaviour and safety motivation has been dominated by quantitative studies, attempting to establish relationships between a few predefined behavioural, motivational and organizational constructs. Such approaches, however, have failed to address the complexity and multidimensionality of safety behaviour and associated motivational features. Hitherto, no known qualitative studies have been conducted on these concepts, indicating a paucity of a more in-depth, comprehensive understanding of safety behaviour and safety motivation in a naturalistic environment. In the present study, a more nuanced and holistic approach towards safety behaviour and safety motivation is embraced using qualitative methods, by means of focus groups.

In previous research, safety behaviour was predominantly conceptualized as either compliance or safety participation/safety citizenship behaviour. Therefore, the primary purpose of this study aims to complement this conceptualisation by exploring what other dimensions of safety behaviour may be present amongst professionals in safety-critical, risk-sensitive, occupations and industries.

Furthermore, understanding the motivational aspect of various safety behaviours is essential in recognizing why professionals choose to conduct certain, but not other, safety-related behaviours (Conchie, 2013). As the dimensionality of safety behaviour has been somewhat limited, and because no previous qualitative studies were found, a further objective

of the current study is to qualitatively explore the prevailing motivational mechanisms and motivational factors that precede various safety behaviours.

An additional objective is to address the complex, multifaceted and conflicting safety demands professionals face in day-to-day work activities (see Hollnagel, 2004; Nilsson et al., 2018), with specific attention to priorities, strategies and motivation.

To conclude, the aim of this thesis can be condensed to three main objectives; (1) to expand upon and explore the dimensionality of safety behaviour, (2) to identify which underlying motivational factors that act as antecedents to different types of safety behaviours, and (3) to address how individuals' safety behaviour and safety priorities are affected by complex or conflicting safety demands.

Method

Participants

Most of the literature reviewed prior to this study deals with safety behaviour and safety motivation within the construction and building industry. The context of the present study was set to occupations in high risk, high stake industries, where a high degree of safety has been achieved, also referred to as *high reliability organizations* (Weick & Sutcliff, 2007). High reliability organizations (HRO) are organizations usually operating in business areas with substantial inherent risks and high complexity. A high level of safety has been achieved by the application of careful risk assessments, safety strategies and defined safety management systems (Weick & Sutcliff, 2007). Nuclear power and commercial aviation are cited as typical examples of HRO organizations. As a representative of the HRO business areas in the present study, the commercial aviation industry was chosen as the research context.

Three different occupational fields within the aviation industry were selected as the research setting; aircraft engineers, air traffic controllers and airline pilots. The common denominators between these three professional groups are that they have a partly shared industry environment, professional culture and similar safety standards. They also share a similar level of training and licensing requirements (Pädam, Börjesson, & Pyk, 2018). However, the groups also differ in several other aspects, such as physical working environment, task assignments and specific skills and knowledge domains. Consequently, it was deemed that this composition would entail comparable but somewhat overlapping data. It was also assumed that the findings in this study would be generalizable to other occupational fields sharing similar safety-related features. Maritime transport, rail transport and nuclear powerplant industry are a few examples, also involving skilled operators, controllers and technicians. In other words, businesses in which safety is assured by trained and specialized professionals, working in a safety-critical field of work and where various risk management measures are present.

Altogether, 13 participants took part in the study; 8 male and 5 females. The aim was to have approximately 4-6 participants in each focus group as recommended by Smith (2015). However, due to drop-outs and operational difficulties in collecting several staff members at the same time, the actual number of participants in each group was reduced to 4 in all but one of the three focus groups. Divided per occupation and focus groups, there were 4 engineers (1 female), 5 air traffic controllers, (3 females) and 4 airline pilots, (1 female). The gender distribution was representative for the average representation in each occupational group, in which females are represented by 5%, 41% and 7% respectively (Pädam et al., 2018). The work experience ranged from 1 to 45 years ($M = 20.9$, $SD = 13.7$) with a range of ages between 23 to 65 years ($M = 45.9$, $SD = 14.1$). The age and experience distributions were approximately similar in each focus group.

The participants were recruited by contacting their organisation through publicly available contact channels. This was in order to have their organizations' approval for participation, as information about safety procedures can occasionally be sensitive and confidential. Contact was established with the section chiefs, who, after an introductory explanation of the aim of the study, approved to participate in the project. The participants were subsequently recruited and the meetings organized by either the manager or the organization's scheduling officer.

Instrument

This research was conducted using a qualitative method utilizing focus groups. This was deemed suitable as qualitative methods are generally regarded as generating richer and more nuanced data than is accessible through quantitative methods, especially in under-researched areas (Braun & Clarke, 2013). Focus group discussions have several advantages over individual interviews that were deemed suitable for the current study. With focus groups, it is possible to collect a rather large group of people simultaneously, which also means that it is possible to gather much data in just a few sessions. However, the main advantage of focus groups is gained from the interaction between the participants. The participants can ask each other questions, they can agree or disagree and challenge each other about the topics discussed, and the discussions can reach a more natural level than individual interviews (Krueger & Casey, 2000). Furthermore, focus groups can facilitate participants in talking about sensitive topics (Kitzinger, 1994) and also decrease the role and the influence of the interviewer (Braun & Clarke, 2013). Focus groups are also a suitable method to survey new or under-researched topics (Braun & Clarke, 2013).

In order to avoid imposing own pre-defined conceptions of safety behaviour or safety motivation, derived from the initial literature research, an openly structured topic guide was created. A topic guide, as defined by Krueger and Casey (2000), is more openly structured than an interview guide and does not have predefined questions, but rather a number of topics to be introduced by the moderator during the focus group sessions. Largely based on the content of the literature review, seven main topics were defined: (1) Safety behaviour and rules, (2) how safety is created, (3) perceived risks, (4) characteristics of a good engineer/controller/pilot, (5) goal conflicts, (6) participation, and (7) organizational support.

In the first topic the participants were encouraged to share their views on safety behaviour in general and rule adherence in particular. In the second topic the participants were asked about the various ways they assure safety in their daily work activities. The third topic concerned perceived risks and how they manage various hazards. The underlying assumptions behind this topic progression were that introducing a well-known concept such as rule adherence would stimulate the participants' own perceptions of safety behaviour. Furthermore, directing attention to risks was expected to help participants recall *how*, i.e., what behaviour they displayed, to avoid accidents and incidents. In topic four, the participants were asked to discuss personal characteristics they deemed important for their respective occupations. This was partly to direct the conversation towards social structures such as norms and social identity, but also to invoke thoughts about either desirable or implicit behaviours that may not necessarily be part of their daily work. The fifth topic covered the experience of goal conflicts and how these are managed. In the sixth topic the participants were asked to discuss how they can participate and contribute to the overall safety work and safety awareness in their organizations. The seventh, and final, topic was dedicated to their perceptions of management commitment and perceived organizational support. These final three topics were derived directly from the concept of the ETTO-principle (see Hollnagel, 2004), safety

participation/safety citizenship behaviour (e.g. Conchie, 2013; Curcuruto, Conchie, et al., 2019; Griffin & Neal, 2000) and the correlation between organizational climate and safety behaviour (e.g. Cheyne et al., 1998; Neal et al., 2000)

Each of the seven topics was complimented by a number of sub-topics, serving as reminders for the moderator to include them as questions, if not spontaneously covered by the participants. Examples of these sub-topics concern complimentary questions regarding perceived incentives, motivation, feelings, satisfaction etc. in order to discover underlying associated motives, emotions and the locus of motivation.

Apart from the introductory topic, the topics were not treated in exactly the same order and not necessarily under their assigned headline. In all focus groups, the conversation spontaneously drifted over to adjacent topics, giving the discussions a natural progress. The role of the moderator could therefore be focused on facilitating the discussion, steering the discussions back on track, asking complimentary questions and asking for confirmation or clarification when needed.

Procedure

Due to the ongoing 2021 Covid-19 pandemic, there were some difficulties in gathering the participants physically in a homogenous and standardized method. To comply with the restrictions this entailed, both physical and online meetings through video conference was offered as applicable means for the sessions. All focus group sessions took place at the participants' workplaces and during their paid working hours. This was deemed as a strength in order to avoid that only individuals with a high degree of personal safety interest would participate, as could have been the case if only off-duty volunteers had been recruited.

The first session to be conducted was the aircraft engineers. Due to company policy during the Covid-19 pandemic, no visitors were allowed in the company buildings. Hence, the interviewer had to interact through online video conference. The four staff members were gathered in one of the company's conference rooms, sharing the same Teams user account on a single video channel.

The second session to be conducted was the airline pilots. This group was contacted through an aviation training organization in which the participants were working as flight instructors. All participants in this group had extensive experience from various commercial flight operations including leisure charter, scheduled air transport and military aviation. This focus group was held via online video conference with all but one participant in a private room at their workplace, and the remaining one participated from home. The third focus group consisted of the air traffic controllers and was the only session to be conducted in a wholly physical environment. This session took place in a conference room at the airport where they usually serve, just after a staff meeting.

All focus group sessions were introduced by giving some general information regarding the topic and purpose of the study as well as a general briefing on the impending focus group discussion. Thereafter, the ethical considerations were covered by informing the participants about their right to confidentiality, how the data would be handled and that participation was completely voluntary. The participants were informed that at any stage, even after the interview had been completed, they were free to withdraw their participation without further explanation. The participants were also informed that the discussions would be recorded, transcribed, de-identified, and that the audio recording would be deleted afterwards. Subsequently, the participants' approval and concession to participation were obtained – in writing for the physical meeting, and verbally for the online meetings.

All sessions were scheduled for a 90-minute session, and the recording started once the initial introduction was completed. All three recordings lasted between 79 and 89 minutes, which implied that the duration of the meetings was slightly longer than the 90 minutes reserved. The recordings were transcribed verbatim, with all pauses, hesitations, emphasis and laughs marked in the transcript. To ensure the participants' anonymity and confidentiality, all personal data, including information about geographic locations, organizations, names and other identifying information was de-identified during the transcription process. Additionally, after the transcription process, the audio files were deleted to assure that only de-identified data remained.

The transcription process started more or less immediately after each session, which made it possible to do a brief analysis and highlight the main findings. This was particularly useful due to the author's prior lack of familiarity with the focus group format, as it also gave the opportunity to make slight changes in both the moderating style and the topic guide prior to the next session.

Analysis

The analysis method chosen for this study was *thematic analysis* as described by Braun and Clarke (2006). Thematic analysis aims to categorize and analyse large qualitative data sets in a structured method. The data is analysed through a six-step method (Braun & Clarke, 2006): The first step entails familiarizing oneself with the data. This includes the transcript process and reading through the transcripts several times. The second step involves coding. Here, all data items are given one or several codes capturing their content. The codes are then collected and categorized as themes and sub-themes capturing the essence of all the included codes. In step four, all themes and codes are reviewed and, if necessary, re-categorized, combined or split apart. As a fifth step, the themes are further defined and named in such a way that their essence is captured using a word, strophe or a sentence. The final step involves writing the report, and during this step, representative extracts and quotes are selected.

Thematic analysis as a method is flexible and independent from specific theoretical and epistemological framework, meaning that the researcher needs to make a number of decisions on how to approach the data (Braun & Clarke, 2006). The coding process, as described under step two above, was done in two stages. In the first stage, the data was analysed at a semantic level. This meant that the data was analysed at an explicit, surface level, focusing on the actual spoken content (Braun & Clarke, 2006). In the second coding stage, the data was once again coded and annotated in a separate column, but this time at a latent level. That is, looking beyond what was actually spoken, on a deeper level, and interpreting underlying assumptions, ideas and implicit meanings (Braun & Clarke, 2006). As the epistemological approach, a phenomenological perspective was chosen. Using a phenomenological perspective means that the researcher is trying to understand people's subjective experiences (Braun & Clarke, 2006). Smith (2015) describes this process as: "The researcher is trying to make sense of the participants trying to make sense of their world" (p. 26). In the current study, this approach was accomplished by focussing on the participants' descriptions of their motives and feelings, and by paying attention to specific wordings and emphases.

When analysing the content, an alternating inductive and deductive method was used. Initially, a deductive approach was adopted in order to search for patterns consistent with previous research as presented in the introduction chapter. In parallel, an inductive approach was used to identify behaviours and motivational patterns not fitting in to the previously reported conceptualisations. More specifically, as motivational theories are a well-researched area, data relating to safety motivation was predominantly assessed with a deductive approach.

Data related to safety behaviour, on the other hand, was mostly viewed from an inductive standpoint, searching for patterns in the dataset and testing various categorizations for the best consistency

Following the process, a number of different thematizations were tested and checked for their representability of both the associated coding, and also their relevance for the research questions. To further visualize and scrutinize the thematization, a theme and code map were created

Originally, a few follow-up interviews were planned in order to validate the analysis and gain complimentary data. Unfortunately, the Covid-19 pandemic imposed restrictions on physical meetings which caused considerable delays in conducting the main focus groups, whereupon this extra validation process had to be abolished due to time constraints. As a substitute, a shorter conversation, in which the main findings were presented and discussed concerning representability, was conducted with one representative from each occupational group. These individuals were a convenience sample from the authors professional network. However, no major issues were raised from this, nor did it alter the interpretations or the overall findings in the study.

Ethical considerations

Researching safety behaviours using qualitative methods amongst professionals in a safety-critical industry such as aviation does raise a number of ethical considerations. First, the participants are obliged to follow strict safety policies, and, considering the topic of this research, it was deemed likely that sensitive information would be revealed. Secondly, the aviation industry is a rather small occupational community, and the participants do not only represent themselves as individuals, but also their respective, both past and present organizations. Care was taken to obtain informed consent and satisfy the ethical requirements for humanistic research (Vetenskapsrådet, 2002). The participants were informed about the purpose of the research, how their personal details would be handled, and that participation is completely voluntary. This information was given in both verbal and in writing. For the online video sessions, the written information was shown using screen sharing. The participants were then asked for their consent, which was done either by signing an agreement or, for the online meetings, verbally during the audio recording. Confidentiality of the participants was assured by de-identifying or removing all personal data from the transcript. This concerned, for example, information about geographical locations, names and organizations. The purpose of de-identification was to protect both the identities of the individuals and the organizations they represented. In order to further restrict the possibility of identifying individuals or organizations, the quotes cited in this paper were left without epithets. This was because each occupational group engaged in this study is a rather small community, in which individuals could easily be identified by utilizing a process of elimination.

Reflexivity

With a previous professional background of nearly two decades within the aviation industry, the author of this paper has had his own experience with the safety considerations discussed in the focus groups. Naturally, this increases the risk for adding own, personal assumptions and pre-understanding to the participants' conceptualizations, both during the focus group sessions but also during the analysis process. Even though this risk cannot be completely eliminated, great care was taken to avoid steering the participants' conversations or

putting words in their mouths. In general, though, the author’s familiarity with the professional culture, working environment and specialized language was deemed an asset as it significantly facilitated the discussions.

Results

Three research objectives were defined in this study. The first objective concerned what different kinds of safety behaviours that could be identified based on the informants’ discussions. The second research objective concerned underlying motives, predictors and what motivational factors the informants describe as determinant for their behaviour. The final objective concerns the priorities and decision making involved in situations with complex and conflicting demands affecting safety.

Altogether, the combined length of the audio recordings was approximately 4 hours and 15 minutes, resulting in a 50-page transcript. Once all the codes were consolidated, four distinct themes were defined, each with associated sub-themes: *maintaining safety in the daily activities*, *being conscientious & considerate*, *work satisfaction & task commitment*, and *social and organizational influence*.

The first theme, titled *maintaining safety in the daily activities*, covers the participants’ perceptions of how they safely perform their regular, day-to-day work duties. Under the second theme, *being conscientious & considerate*, other, non-task-related behaviours, are examined. The third theme, titled *work satisfaction and task commitment*, captures the participants’ job motivation and how their sense of loyalty and commitment to colleagues and the organization plays a key role in safety behaviour. The final theme, *social and organizational influence*, illustrates how individuals’ decision making and behaviours are affected by social and organizational interaction.

Table 1 gives a brief presentation of each theme and sub-theme, which are further presented in detail in this chapter. While each theme and sub-theme is illustrated by a number of quotes, it is important to address that the full comprehension of each theme and underlying assumptions is an aggregate of the conversation and the participants’ reactions to each other’s comments. The quotes presented in this paper are translated from the Swedish language and somewhat edited to either make them more intelligible, to protect the participant’s identity or to circumvent the use of slang or profession-specific vocabulary.

Table 1

Main themes and sub-themes

Main theme	Sub-theme
1. Maintaining safety in the daily activities	1.1 Application of rules and procedures 1.2 Proactivity & risk management
2. Being conscientious & considerate	2.1 Self-supervision 2.2 Continuous learning & information seeking 2.3 Responsibility & safety contribution
3. Work satisfaction & task commitment	3.1 Task perfection 3.2 Desire to meet multiple targets
4. Social & organizational influence	4.1 Organizational attributes 4.2 Trust & participation 4.3 Normative influencing

Maintaining safety in the daily activities

The purpose of this theme is to capture the participants' descriptions of what they actually do, in a concrete and tangible way, in order to maintain safety in their daily activities, carrying out their regular tasks.

Application of rules and procedures. Participants from all three professions expressed a genuine and far-reaching aspiration to comply with rules and prescribed procedures. Discussions around the topic of compliance generally revealed a very close relation to the compliance concept, which appeared as an internalized part of their work role.

"I think, in our industry, we are very, very much structured. It's all about following standard operating procedures. And really, the rules we follow... everything we do, constantly need to be referred to the regulations before we do something."

The overall attitudes towards rules and procedures as a conceptual structure were very positive among the participants. The general consensus is that industry safety has greatly improved as a result of long-term regulatory efforts. *"After all, it's a set of rules that have been added up for a very long time. As you said, we've been doing this for over 100 years. It's best practice in some way"*. One pilot described how he perceives *standard operating procedures*, or SOP's, as a successful tool for pilots who had not previously worked together, to more or less immediately find a safe and unambiguous cooperation in a complex airline cockpit.

"...you noticed that these SOP things worked so fantastically well, especially when it comes to safety. You could just go out and fly with basically anyone. Yeah, you might have seen the face once or twice, but never worked together. /.../ It just worked right away. It's pretty amazing. It is a cornerstone of safety, at least when it comes to flight safety."

An air traffic controller describes the rules and regulations as a tool for simplifying and alleviating decision making and responsibility:

"It feels nice to have a set of rules to lean on. I, myself, did not make this decision, it's a decision I have to make. Do you understand... I think it feels great. I do not have to invent things all the time because this is what applies. If it's within these limits, then sure, absolutely, but if it's outside or in the grey area, then 'No I'm sorry, I can't'. I have to say no."

Other comments regarding compliance concern the liability aspect, in which the participants express a need to protect themselves from critique or repercussions in the event of a mishap; *"One reason to be compliant is to make sure that you are really confident about what you are doing"*. However, while the participants all agreed that compliance is an important factor for determining safety, it was also evident that they see compliance as something complex that they must approach with care and wariness. Some of the participants refer to regulations as a framework of minimum standards, which they need to apply conscientiously and make necessary adjustments to in order to achieve the intended safety level; *"It's something we refer to, which works in most cases, but then we still need to think, and think a little freely"*. Several participants stated that while following the rules is important, it is even more important to understand when they are not applicable, or, more precisely, how to work in the spirit of the rules rather than the letter of the rules. As one of the engineers put it; *"The rules are there to be interpreted"*, and further pointed out that strict adherence to rules and procedures may be counterproductive. To obtain the best safety level, one has to read between the lines and

understand what implicit purposes and objectives the rules are supposed to achieve in each particular situation. The main critique towards the sort of strict compliance, often demanded by authorities and management, comes down to operational applicability and the perception that many of the regulations are rigid, non-flexible, theoretical directives, that are, more often than not, in conflict with real-world complexity. This misalignment between theoretical and practical rule application is characterized by a number of distinct problems. The first concerns problems arising when trying to apply a prescribed procedure to a real-life scenario, in which the real-world complexity exceeds the beforehand imagined complexity. One of the engineers describes how the maintenance checklist can sometimes become a trap if followed without thoughtfulness:

“You can’t just blindly read something from A to Z, because if you do that, something will go wrong. But we all have a responsibility to prevent things, so you should use it as a guide and, together with your experience, make sure that it is safe.”

In the quote above, the participant also points out the awareness of the responsibility to adapt the procedures in order to avoid failure.

A second problem the participants regularly meet, arises when there are conflicting demands and considerations of operational or commercial nature that go into direct conflict with the regulations they are expected to adhere to; *“If you were to stick to all the rules and everything that is written... Then I’m not sure if we would have gotten up in the air at all”*. These situations differ somewhat from the first scenario in that the situation here engenders a temptation to cut corners and reduce safety margins for the benefit of efficiency or simplicity. In these situations, the participants describe their objective as trying their best to evaluate and balance risks. Subsequently, they modify the procedures so that the main goal, usually a commercial one, is met while still attempting to maintain the intended safety level; *“You have to understand the purpose and try to interpret and understand what they want you to achieve /.../ and then use whatever is applicable in that procedure”*. This flexibility is often referred to by the participants as a competence in itself that only comes with experience and good knowledge.

“I usually think it’s simple to always be compliant. And it’s easy to never be compliant. But it’s the things in between, all the things we do on a daily basis, that’s what’s difficult. Then I need to make an assessment...”

Some participants also point out the dangers of relying too heavily on rules and procedures; *“I feel somewhat that the danger with compliance is that you stop thinking. You simply think, ‘I’ll do as it says,’ without giving any thought to why it says so”*.

A third obstacle, highlighted by the participants, is when the rules and procedures themselves cause a problem. This is typically experienced when the procedures are perceived to lack applicability, either due to being generally ill thought out from the beginning, or are perceived as obstructive, counterproductive, too redundant or otherwise too rigid or illogical. The participants’ accounts regarding this, third problem, differ significantly from the previous two. Firstly, in the previously mentioned dilemmas, the main aspiration of the regulation is not questioned. In those situations, the participants describe how they try their best to apply and adapt to the essence of the regulation in question, revealing their ambitions to comply. However, in this final scenario, the individuals’ motivation to comply is generally low, as they don’t appreciate the value of the implied rule. This usually results in frustration and resignation; *“Then every now and then, you get these rules that just make you wonder, ‘What were they thinking?’ And those are a little harder to embrace and come to terms with”*. In many of these situations, the participants express how they comply, as they see no other option; *“...we*

understand we must follow our rules. We can yell as much as we can, but we still do as we are told. That's how it is". In other situations, the rules can be perceived as so out of touch that the participants simply can't see any way to apply them.

"There are many, many such examples where you simply have to disregard the rules and think for yourself, and just do what you think is best."

Others talked about a perceived hierarchy in terms of which rules need to be applied and which rules are more subordinate, indicating different levels of compliance depending on the specific circumstances. In all these situations, the participants still testify to how they try to act with a safety-minded approach and they refute the notion that non-compliance by necessity equates to risk behaviour:

"This is a fairly rigid set of rules and sometimes you may need to blend the corners slightly. But it's never that you compromise on safety, never /.../ And then I would say that I would never do it if I had a bad gut feeling."

To sum up this sub-theme, it can be concluded that the participants' account of compliance is more complex and nuanced than simply being a matter of compliance or non-compliance. A range of other behaviours are also reported, such as balancing risks with efficiency, managing goal conflicts and making situational safety judgements and adjustments to procedures in order to meet multiple objectives.

Proactivity & risk management. A common feature of the participants' recount about safety is their inclination to talk about risks, risk identification and proactivity. They explain that a large part of their everyday work is about finding ways to identify possible risks and situations that could go wrong, and to come up with strategies for dealing with these situations if they eventually arise. Part of this behaviour comprises, for example, vigilance, thinking critically and being alert. As one of the airline pilots puts it:

"It's all about vigilance, and alertness, and, as you say it: To do what you can to maintain the ability to assess the situation correctly. Not to sit back and relax, but constantly be on your toes and give yourself an honest chance. And look, keep looking, for things that could affect the outcome.."

Many participants describe this proactivity as understanding the situation as a whole, keeping "the big picture," avoiding fixation, and maintaining a critical approach to whether standard procedures and regulations are applicable in each specific situation; *"Try to include thinking for yourself /.../ Before you do something, ask yourself whether this will really give you the results you want"*.

In many instances, this behaviour is not necessarily a conscious process, but rather an internalized way of being that is a natural part of the job; *"Isn't that something you do all the time, that you identify risks? /.../ You are exposed to risks all the time and it's something that happens continuously"*. Many of the participants agree that the behaviour is an integral part of their work, however in general, they still had difficulties explaining in a concrete manner what they actually do and how they do it. Effective risk management is attributed as an abstract craftsmanship, heavily reliant on experience, dedication and imagination; *"How do we really do that? I have to say that I think experience plays a significant role"*. However, some specific behaviours that emerged from the group discussions included, to name a few, making contingency plans, planning ahead, evaluating conflicting information, and balancing risks, to mention a few.

While proactivity and risk management are viewed upon as an intrinsic and elementary part of their job description, it still appears to be a collective apprehension among the participants that it, to a certain degree, is a discretionary behaviour. That is, something that cannot be described in rules and manuals, and an effort that cannot be expected to reach the same level for all employees. Based on the participants' descriptions, and the prominent role this conduct is given in their accounts, this behaviour comes out as a distinguishing safety behaviour on its own.

Being conscientious & considerate

The three occupational categories interviewed for this study all reported a high level of work codex as well as a sense of being conscientious and professional. This codex is manifested through three overarching self-reported behaviours forming the subthemes in this theme.

Self-supervision. Much of the discussion in the three focus groups revolved around different kinds of safety behaviour and what measures they take to ensure a high degree of safety. During these discussions, several participants expressed the importance of taking care of oneself. This could include behaviours such as making sure they are fit and well rested before starting a work shift, or living healthy and balanced in general. One of the pilots emphasises the bidirectional impact the work life and domestic life have upon each other:

“you need to know how to balance those pieces... It is not an easy profession to take on, considering how it affects other parts of your life. And there is a lot of what we do beside the work that affect how safely we can carry out our job.”

Other aspects mentioned are that one needs to keep a degree of soul-searching and self-contemplation about one's own performance; *“And after every decision we make, we sit at home contemplating whether that was good or not. How do I do better next time? /.../ It's a constant process”*. Work related self-discipline, such as avoiding complacency or falling into bad work habits and paying attention to one's own performance and weaknesses, was also mentioned; *“...the only thing I can do is try to sense my own capacity and performance level, or how I feel...”*.

Continuous learning & information seeking. A central part of the participants' safety awareness is their desire to maintain proficiency as well as seek the best possible information, either from peers or from formal sources, before executing a task. Several participants reveal how they try to stay informed and competent by aiming towards continuous learning, brushing up on previous knowledge and keeping up to date with new information.

“And that includes being up to date and having the latest documents, reading the last notice, and constantly keeping yourself up to date. That's risk awareness, to constantly update oneself and ask ‘now did I read up on this, do I remember about that’, and then you have to pick it up from there.”

Keeping proficient appears to be a continuous process, and one pilot describes how he tries to keep up to date and learn from recent incidents as well as regularly practice his manual flying skills in order not to fall into overreliance on the autopilot system.

“It's about never stopping to update yourself/.../ don't live in your own little bubble. What have people been through lately? Keep that knowledge alive. We finish our training but that's not it.. it's something that continues. And, naturally you'll start to forget things. You get rusty if you never fly with a manual throttle. Whatever you

let go, you'll lose it. You have to continuously brush up on these pieces in order to function as a crew member, have knowledge of the system and stay sharp in your ability to actually fly the aircraft."

Other means of getting the best out of one's own performance are learning from peers and asking for colleagues' opinions before making a decision or executing an unfamiliar task. The importance of open communication between colleagues is emphasised by this air traffic controller:

"I believe we frequently ask each other, 'what would you have done?' /.../ even if you're in charge; and, even though it's your decision and you're accountable, you can still elaborate and talk to the person behind you and ask, 'what would you have done?' or 'what do you think, can I do that?"

Collective decision making is a strategy that was emphasised by all three participating occupational groups. An engineer stated that; *"We rarely make individual decisions. If there's something unusual in an instruction, it's normally a discussion between at least two engineers"*, and a senior airline captain describes the ideal aircrew commander in the following means:

"Listen to people. Don't just say 'now we'll do it like this', but listen to others. Because everyone usually has a good idea. I think that my job as captain here is that; if I have time, I'll take in as much information as I possibly can. From the cabin attendants, the co-pilot and as many as possible."

Responsibility & safety contribution. The focus group discussions in this study revealed a number of various behaviours intended to contribute to the organizational safety work and collective learning. The most frequent contributory behaviour mentioned by the participants concerned various methods of informing each other about occurrences, hazards or sharing ideas about good practice. This is normally done through established reporting systems, but also via more informal channels such as private forums, casual chats, but also through mentorship to younger, less experienced colleagues. The participants explain their motives for this behaviour, most often in terms of a desire to help colleagues avoid risks, often by sharing small mistakes that could have developed into something more serious, and as a means of contributing to collective learning.

"...so your colleagues doesn't have to be through it as well. So it stops right there, you stop the chain of event."

"...to learn from each other. And avoid making the same mistakes again. And to prevent something. Something that could've developed into a scary situation. So, yes, it's to learn."

While the collegial perspective is predominant, several of the participants also mention the larger organizational perspective in which they see their participatory behaviour as part of the overall efficiency of their organization.

"Somehow it's because.. You want to make it smoother, better, faster and prevent injury or damage. If you can do that, it will benefit everyone, for everyone's sake really... Injuries and such also cost a lot of money. So, if you can contribute, you help both yourself, your colleagues, the company, the customers and, eventually, you deliver a better product."

The majority of the discussions about safety participation concern pro-social behaviours and motivations, such as a desire to contribute to the overall safety, helping colleagues and facilitating collective learning. However, some participants also mention some more instrumental motives for reporting occurrences or perceived hazards. Exerting pressure to change or simply adding a further piece to the statistics are a few examples of such things.

“...when I think there’s something that needs attention, that someone should take a look at it, or that my superior should respond. /.../ Some things I report just for it to be reported, and for it to be entered into the statistics.”

The use of a formal report system is generally very well met by the participants. Several participants claim that this is one of the primary reasons for the aviation industry's high safety level; *“I think it's really great that we are open and write reports. I think that's great. It's most likely one of those things that truly creates safety”*. However, several participants also mention more informal channels, such as private forums, for sharing experiences and discussing safety issues. This behaviour appears to fill a slightly different role as the participants also address a need for more interactive exchange of ideas and experiences or simply talk through something they've experienced; *“...when something happens to me, then I feel I just have to tell someone about it”*. This could possibly also indicate a rather under-utilized use of interactive safety communication or safety meetings amongst the organizations represented. One of the engineers mentions how he regularly has difficulties finding the time to write formal reports, and thus prefers to speak directly to superiors, although acknowledging that this rarely fills the purpose; *“However, when you choose that route, normally nothing happens as you don't have it in print”*.

Conclusively, this theme illustrates behaviours more associated with the participants' perceived work role and sense of being a conscientious professional, rather than behaviours that are directly associated with the job function or the execution of tasks. The behaviours identified herein are by many participants described as part of what they see as core attributes of their associated occupational category, indicating a level of idealisation. A central theme was also their sense of responsibility on behalf of themselves, colleagues and the organization.

Work satisfaction & task commitment

Task perfection. The participants' talk about the various behaviours they conduct uncovers a deeply-rooted desire to perform and live up to perceived demands and expectations. Often, this is attributed to professional pride and work satisfaction; *“As an engineer, you probably take a pretty high pride in doing a good job”*. Work satisfaction comes out as imperative for several safety behaviours, such as compliance; *“I think much of it has to do with the pride of doing the right thing. It says we should do it like this, and so we do...”*, or risk mitigation and adjustments to rules;

“...of course, it might not be compliance like that, but, it's more about wanting to get a safer result /.../ And everyone in the industry is trying to help... To trap errors.”

Many participants find work satisfaction in setting higher demands on themselves than required:

“...it's more about how far above that I should set the bar, personally. This is good enough, because the requirement says that it can slack by .5, but I want it down to .3 or so.”

Some underlying motives that could be identified from the participants' accounts are relatedness; "...you achieve something together, as a group. That sort of... feels good", or a sense of a higher purpose; "You feel that you are fulfilling a higher purpose in some way. That you are passionate about this, do the best you can".

Desire to meet multiple targets. The aspirations the participants display during the conversations reveal a high degree of goal-orientation. The commercial environment in which they operate is described as complex with multifaceted, and at times contradicting, demands. As previously presented under theme 1, *maintaining safety in the daily activities*, the professionals in this study endeavour to accommodate these targets by adapting and adjusting accordingly, while at the same time maintaining the required safety level. This accommodation appears grounded in a desire to perform according to their sense of commitment, professionalism and work satisfaction, as described in the preceding sub-theme. An air traffic controller describes her discretionary effort to keep a safe separation between aircraft and commercial drone operators in a control zone even though it increases the complexity:

"I would say that it's really due to a very high level of ambition. And if we didn't have that, we would just keep them [the drones] down and tell them to wait. However, they do it for living so we want them to be able to work, even though we have the regulatory framework to say stop."

Balancing risks and making trade-offs is not seen as risk behaviour, but rather a balancing act in deciding how much safety integrity is required in each situation. These two engineers discuss lively and in agreement how they adjust the thoroughness of their safety work:

A: "No, you live in it constantly."

B: "Yeah, you're balancing..."

A: "...we're not talking about safety or no safety..."

B: "No, it's more, the level of safety..."

A: "...but rather how much above that level should you set the bar"

The participants regularly discuss various operational priorities and trade-off decisions they need to make. However, even if there is an element of decision making included, most of these considerations appear more as a natural part of their work to which they pay little attention. This is illustrated by the continued conversation between the two engineers from the previous example:

B: "It's more everyday life, you have to prioritize which rule to take precedence. It's nothing you get anxious over each time..."

A: "Most of the time you just take the decision you're most comfortable with"

B: "But it's... every day at work it's... considerations, decisions, compromises. All the time, /.../ ...you don't think about it, but it's there all the time, so you don't think 'now I made a trade-off'. You elaborate on these various inputs all the time."

Concludingly, this theme seeks to capture the participants' manifest for their commitment, eagerness and loyalty to their task and the work satisfaction brought about when delivering a qualitative service or product. For these professionals, safety is one of their main work duties, and therefore, it appears natural for them to include safety as a goal. When met with conflicting tasks, they seek to satisfy each specific task as can be accommodated within the safety framework available and when needed they adapt their application of the rules as they deem fit for the purpose.

Social & organizational influence

Organizational attributes. Some of the most frequently mentioned pre-conditions for safety behaviour perceived by the participants concern organizational and structural properties such as commercial pressure, management commitment and implementation practices. Commercial pressure is described by one of the engineers as one of the main causal factors for rushing and taking shortcuts, which in turn increases the likelihood of errors.

“It’s the economy, money versus flight safety, and money equals time... /.../ that’s really one of those big dilemmas you always have. Although you say you should never be affected by cost or time pressure or whatever... but it’s always there anyway, in reality. /.../ And that’s when it goes wrong. When you start to compromise on things, /.../ And then you easily get tunnel vision, miss a lot of stuff and things doesn’t get properly assembled.”

The implementation practices of new rules and procedures are also determinant for safety behaviour, for example when existing rules and procedures are not harmonized with the new add-ons, or when sufficient time or resources to carry out the new procedures are not allocated.

“That’s one of the problems with compliance, when you’ve implemented a rule for something /.../ and you expect everyone to follow it, but without correcting check-in times or anything around it. And then it starts, ‘should we follow this rule or that rule’, and that’s when we, the operating staff, get problems.”

Apart from creating plain difficulties in application and adherence to the rules, it causes frustration and, as indicated by the wording “*thrown in*” in the following quote, it also hollows the overall trust to the thoroughness and accuracy of rulemaking; “*They’ve thrown in things we’re expected to handle, but without any framework that works towards our other duties. It’s been a lot of frustration*”. One participant also points out the impact of commitment, priorities and examples set by the management, indicating that there may be a gap between the behaviour as stipulated and behaviour as desired. In this case, the lack of management commitment is suggested to influence the individual’s safety behaviour:

“If you notice that the management prioritizes things differently than you do yourself. That affects you, and you start to wonder ‘what do I prioritize, and what do I set first, and what will they [the managers] think about this decision.’”

A similar demotivating effect was also described by several participants with regards to occurrence reporting. The level of feedback and the diligence with which the deficiencies are addressed, has an impact on reporting willingness.

“When you report things and nothing happens...If I’ve reported 10 times about some problem and it doesn’t result in any change at all, then the 11th time won’t feel as meaningful.”

An additional consideration concerning occurrence reporting is the psychological climate, within the group or organization, in which the individuals can feel safe and comfortable in admitting and revealing own mistakes; “*If you don’t feel that security in the group, I think it’s more difficult to report some mistake you did*”.

Trust and participation. The participants’ experiences from various organizations reveal that their attitudes and trust towards the organizations’ safety work are dependent on the

degree of participation and influence they can contribute with. A pilot who had been part of a group outlining new operating procedures describes:

“We actually sat down together and sketched this up. It went on for a couple of years, and eventually, the procedures were so well put together, so there was a really good framework to follow. It was great fun...”

Another participant describes how there may be several hierarchical layers between those who draw up the rules and the end users. This, as explained, typically results in dubious and unapt rules, ending up with resignation, disapproval and antagonism.

“It is directives not only from the executive management team, but also from, for example, national authorities or even transnational authorities. /.../ And when someone, somewhere, dreams up something, and they’re a little bit too far away from those who are supposed to effectuate this... then we start to challenge. This ranting is really not rare...”

The perceived importance of having front line staff in the management department is also emphasized with regards to information exchange between different departments. A few participants describe how lack of cross-sectional representation causes the exchange of information to get hampered, resulting in departments working more in isolation from each other, and the overall ability to address issues is reduced.

“When we had people with engineering backgrounds in all departments, then it was easier to have a really broad discussion throughout the whole organization. /.../ Now It’s more up to each one, as there’s no other experience or support to get, so the exchange isn’t great. /.../ It doesn’t really pay off to raise it to a higher level either... we just solve it ourselves, because we’re the only ones who know.”

Several participants talked about mutual trust between management and frontline staff and the importance of empowerment and trustworthiness. Unreasonable demands or too much management involvement in operational safety decisions with unfavourable financial impact may cause individuals to push the boundaries and normalize lowered margins.

“It’s important that the organization doesn’t exert unreasonable or strange demands. /.../ And that they really let the crew and captain make the decisions.... /.../ If that trust is lost, the individual will face an unconceivable pressure. And then it’s easy to push and even break that envelope.”

A somewhat different aspect of empowerment and trust was pointed out by a few participants, who revealed a perception of management alienation when it comes to safety-related decision making. The following quote by one airline captain describes a sense of single sided transfer of responsibility and accountability from the organization to the individual, with the purpose of protecting upper level management from liability. The same quote also reveals a distrust of manuals and handbooks as being a tool for apportioning blame rather than a guidance material.

“You, as an individual, who sit there and need to make these decisions. You’ll always be the one to be found accountable. Because the rules are written in such a way, that there’s always, somewhere, a small text that says ‘you did wrong’. That’s a feeling I have, and I know many, many others also have.”

Normative influencing. Some participants describe how they perceive that certain social norms are formed when it comes to how they apply rules and regulations. This conforming is described as two folded: Normative influencing can serve as a mutual standard for rule compliance and suppress too individualized behaviours; *“You have the same values, background and somehow strive in the same direction”*. However, norms can also cause deviant behaviour to become normalized, as the behaviour is spread and gradually accepted; *“you’d say it’s wrong. But we would still quite agree that this is how we do it”*.

Conforming and perceived peer pressure was also attributed as a suppressant of sound decision making and critical thinking. Especially in situations where an atypical decision is called for due to unusual circumstances. For example, when a crew member decides to decline or stand down from a flight due to discomfort with the weather conditions; *“Instead of thinking that ‘Everyone else flies in this wind but I feel it’s not the right thing to do today’”*. Others suggest that these sorts of decisions should be better facilitated and encouraged by management in order to alleviate less experienced professionals from such pressure.

“The organization has a great influence, absolutely. /.../ It depends on experience. You have to stand up for your own decisions; ‘No, I’m not happy with this, so I stand down’. /.../ But for the organization, it’s definitely a question.”

Discussion

The purpose of this study was to explore the nature and variety of safety behaviours among employees in safety-critical industries, and how these behaviours can be categorized. Furthermore, the intention was also to examine which motives and motivational factors can be associated with different types of safety behaviours. An additional objective was to deepen the understanding of how professionals in safety-critical industries reason and cope with conflicting goals and safety demands. These three research objectives formed the basis for the four different themes created during the data analysis. The first two themes address the variety of safety behaviours reported by the participants. The third theme is focused on the participants’ sense of commitment and work satisfaction, and how this influences their efforts to perform both qualitatively and quantitatively. In the fourth theme, the organizational and social impact on safety behaviour and safety motivation is illustrated.

Proposal of an extended dimensionality of safety behaviour

As previously presented in the introduction chapter of this thesis, earlier research has employed a rather limited dimensionality of safety behaviour, commonly characterized by two generally recognized dimensions; the compliance dimension and safety participation or safety citizenship behaviour (e.g. Conchie, 2013; Griffin & Neal, 2000). The results from the present study provide evidence for a considerably more nuanced conceptualization of safety behaviour, which can complement the existing categorization.

The first theme, titled *maintaining safety in the daily activities*, is focused on the safety behaviours conducted during the participants’ regular work activities. Whether this consists in operating a heavy jet, directing air traffic or servicing aircrafts, they all still need to consider the operational safety at all times while carrying out their tasks. This includes, as described by the participants, observing rules and regulations, following practices and guidelines, but also taking proactive measures such as identifying and mitigating potential hazards. Historically, in

safety research, the principal construct used to represent regular work-related safety behaviour, was the compliance dimension (Griffin & Neal, 2000; Neal et al., 2000). However, in the current study, the participants describe compliance as only one out of several possible safety behaviours, and they also elaborate on various associated problems. Firstly, they point out that there is a frequent disparity between rules as theoretically constructed measures and the real-world application; a concept known as the gap between “work as imagined and work as done” (Clay-Williams, Hounsgaard, & Hollnagel, 2015). Secondly, they also point to the often complex, and occasionally conflicting, operational demands, present in daily operations. These operational demands occasionally complicate or impede strict compliance to rules, as this may result in sub-optimizing one goal on the behalf of another, as well as resulting in inappropriate allocation of resources. Accordingly, the participants describe how they regularly need to adapt, make necessary amendments to, and adjust the way they approach a specific rule or predefined procedure. Deliberate non-compliance could indeed be unsafe. However, the difference between adaption and non-compliance appears to lie in the participants’ efforts to maintain the same degree of safety as originally intended. Similar to Hollnagel’s (2004) Efficiency Thoroughness Trade-Off principle, they accordingly alter the rule application to what they perceive is a more suitable method to achieve the purpose. Hence, I would argue that this behaviour – making safety adaptations in the absence of a perceived suitable predefined procedure – is indeed a safety behaviour in itself.

Furthermore, a fundamental behaviour in the participants’ accounts of how they create safety at work, is the way they approach all those hazards that are not a priori addressed by pre-established rules or procedures. The participants describe how they put effort into continuously identifying risks and hazards by keeping themselves vigilant and imaginative. They critically assess situations as they develop, and they take precautionary countermeasures, trying to anticipate unexpected hazards. The operating environment is described as complex and dynamic, with several interactional threats. Consequently, they also balance these different risks against each other and evaluate various outcomes. Subsequently, the above explication suggests that the compliance dimension should be complemented by two further, task related, behavioural constructs; the first indicating a safety-minded, adaptive behaviour, and the second signifying anticipatory and risk mitigating behaviour.

Hitherto, the safety behaviours discussed all concern behaviours exercised in conjunction with the participants’ regular, day-to-day work activities. However, under theme number two, *being conscientious & considerate*, the participants also describe a somewhat different behaviour, which has a more self-directed focus. Examples of this are their efforts to stay competent, knowledgeable and informed, keeping fit and well rested for duty, and being attentive to their own performance and limitations. This theme also comprises activities such as asking colleagues for advice, consulting and reading up on manuals and rule books, as well as displaying some self-critique and humbleness. The way the participants talk about this behaviour signifies that it is not only an objectively observable behaviour, displayed now and then, but can also be described as a general attitude, a professional posture and a continuous state of being. Where the previous paragraph primarily concerned task related, on-the-job behaviours, this self-directed behaviour is not limited to the workplace but could just as much be performed off-duty.

Congruent with previous conceptualizations of safety participation (e.g. Griffin & Neal, 2000) and safety citizenship behaviour, (or SCB) (e.g. Hofmann et al., 2003), the participants reveal a number of various behaviours intended to contribute to both the organization’s safety work and the facilitation of collective learning amongst colleagues, (see sub-theme 2.3 *Responsibility & safety contribution*). As the SCB construct is a somewhat more holistic conceptualization, including the subordinate conceptualizations affiliative and challenge-oriented SCB, this terminology is hereafter the preferred and adopted term in this thesis.

Although, in the present study, a clear distinction between the affiliative and the challenge-oriented behaviour was not always explicit. The participants frequently described their motives as several-folded, often filling more than one purpose. For example, filing an occurrence report may be done both in order to highlight a hazard to one’s colleagues, but also to suggest an improvement or change to a procedure to the managers.

Conclusively, the results from this study suggest evidence for a total of five distinct safety behaviours. Of these, two have been extensively examined in earlier research, i.e. compliance and safety citizenship behaviour. The latter being further dissected into affiliative versus challenge-oriented SCB (Curcuruto, Conchie, et al., 2019). Additionally, within the scope of the present study, three further safety behaviours were identified; (1) safety minded adaption in dynamic and complex situations, (2) taking proactive, anticipatory measures and risk management, and (3) managing own proficiency and performance. In the current study, these three constructs are hereafter referred to as (1) *adaptive safety behaviour*, (2) *proactive safety behaviour* and (3) *self-directed safety behaviour*. In the proposed taxonomy, compliance, adaptive and proactive safety behaviour are grouped together as *task related*, as these are specific “on-the-job” behaviours, while self-directed safety behaviour and safety citizenship behaviour are generic behaviours not associated with a specific work situation. Table 2 illustrates the extended dimensionality of safety behaviours as proposed in the current study. The five safety behaviour categories are listed with associated, but non-exhaustive, examples of specific behaviours.

Table 2

The proposed extended dimensionality of safety behaviour categories (SB) and associated specific behaviours. Adaptive, proactive and self-directed SB’s are behaviour categories proposed within the current study.

Task Related Safety Behaviours				SCB**
Compliance*	Adaptive SB	Proactive SB	Self-directed SB	Affiliative/Challenge
Adherence to rules and procedures	Applying rules & procedures in non-pre-defined situations, Situational adjustments to rules & procedures, Safe management of goal conflicts,	Risk identification, Risk mitigation, Balancing and evaluating risks, Being vigilant, Preparing for the unexpected,	Maintain & develop own competencies, Learning from peers, Asking for advice, Self-assessment, Keeping fit for work,	Reporting occurrences, Helping colleagues with safety issues, Mentoring, Voicing concern, Suggesting improvements to safety,

* (Griffin & Neal, 2000; Neal et al., 2000)

** (Conchie, 2013; Curcuruto, Conchie, et al., 2019; Hofmann et al., 2003)

Expanding on safety motivation

The second research objective formulated in this study concerned the motivational factors and motivational processes involved when conducting various safety behaviours. In the current research, safety motivation emerges, not surprisingly, as a complex and multifaceted construct. At face value, the focus group data supports several of the most common motivational theories previously tested in safety research, albeit pointing to a highly complex interaction of several motivational mechanisms. The focal perspectives emphasized in the current research were the self-determination perspective, normative influencing, social identity theory, various organizational traits, and, as identified during the analysis, Ajzen’s (1991) *theory of planned behaviour*.

In general, the safety behaviours described in the present study are to a large extent attributed to a genuine interest in performing a solid and safe job, work satisfaction and being professional. From a self-determination perspective, this is congruent with both the competency and relatedness dimensions of Ryan and Deci's (2000) self-determination theory. Also, much of the motivational content in the participants' accounts harmonizes with identity constructs such as social identity (Tajfel, 1978; see also Hogg & Williams, 2000) or role-identity (Callero, 1985, Terry, Hogg, & White, 1999). The former pertains to identifying with the social group belonging, while the latter refers to identification with a specific social role, in this case, a professional identity. To some degree, social norms, descriptive and injunctive, also have some relevance, although somewhat less emphasized. To more precisely dissect the motivational factors per safety behaviour may be a rather precarious attempt in a qualitative study. Hence, the following discussion should merely be regarded as a suggestion for further research. Nevertheless, the participants' accounts give some insight into what could possibly reveal some motivational structures.

Starting with the conceptualization of compliance, the participants generally display positive attitudes towards rule making and regulatory processes. They describe how they see a need for strict rules and how these have improved safety in the aviation industry. Also, they point out several advantages in having defined procedures, practices and policies within their respective occupations. However, there was also a consensus among the participants that many rules and procedures are difficult to apply in a dynamic and complex working environment and that they need to make many alterations and adjustments in order to meet both the safety objectives as well as the operational or commercial demands. In previous research, safety motivation for compliance has been suggested to have a rather more complex structure than other forms of safety behaviour (Curcuruto, Parker, et al. 2019). The findings in this study reveal that motivation for compliance may be both externally regulated, such as in "I do it as I have to", or introjected/identified, as in "I do it as it fits my purpose", to integrated or intrinsic, as in "I do it as I believe in it". Professional identity, job satisfaction, and pride in doing the right thing are also evident in the motivation for compliance. Whether or not the behaviour is performed appears to be less related to motivational constructs and more dependent on attitudes toward the specific rule in combination with the actual circumstances in which it applies. Given these findings, the degree of compliance may be more appropriately explained by the *theory of planned behaviour*, rather than by motivational theories. In theory of planned behaviour, or TPB, (Ajzen, 1991), the intention to perform a specific behaviour is one of the most proximate predictors of actual behaviour. This intention, in turn, is determined by the interaction of the person's attitudes to the behaviour, subjective norms and perceived behavioural control. Attitudes, in this sense, refer to whether the person has a positive or negative stance towards the specific behaviour, and subjective norms refer to the perceived social pressure to conduct the behaviour (Ajzen, 1991). The third determinant, "perceived behavioural control", refers to an individual's estimate of how easy or difficult it will be to control their actual behaviour in a given situation. This may, for example, be influenced by the presence of other factors perceived to either facilitate or hinder the behaviour. Here, even past experiences of performing the behaviour are factored in (Ajzen, 1991). Hence, in the present context, perceived behavioural control can be represented by the participants' perceptions of the applicability of the rules, and the discrepancy between the theoretical and the actual reality. Attitudes towards the behaviour may be represented by the individual's belief that the rule will be fit for its purpose and achieve what is intended, and subjective norms may be represented by the perceived strength with which peers and management exert pressure to comply.

Despite general support for the theory of planned behaviour (e.g. Chatzisarantis & Hagger, 2008; van Ryn, Lytle, & Kirscht, 1996), relatively few studies have applied TPB within safety research (Fugas, Silva, & Meliá, 2012). Among the most notable is the research by Fugas

et al. (2012), in which TPB was predicting compliance and a construct akin to challenge-oriented SCB. Recently, in safety research, TPB has also been attributed to personal safety behaviour such as helmet use among habitual bicyclists (Forward, Linderholm, & Henriksson, 2020).

Additionally, with regards to compliance, a prominent feature in the participants' accounts, was their sense of professionalism and work ethics. As an example of this, many participants attributed their self-discipline to their professional affiliation, giving further credit to the identity perspective, in which role congruence, role salience and group norms have shown to have a significant impact on behavioural intention (Terry et al., 1999).

Adaptive, proactive, and self-directed safety behaviour appear to largely share the same motivational features. The first two, adaptive and proactive safety behaviours, are described as competencies that can only be mastered through experience and dedication. Participants consider their efforts to provide a safe and high-quality service, meeting targets, and contributing to safety work to be rewarding. They also feel a sense of professional pride in being competent and doing a solid job, which they attribute to being a feature of their professional role. To a large extent, these three behaviour categories can be described as non-quantifiable, discretionary behaviours as the individuals themselves autonomously decide what, when and how to perform the behaviour. Conclusively, much points towards intrinsic motivation, which can be comprehended through the competence, relatedness and autonomy dimensions of Ryan and Deci's (2000) self-determination theory. That is, the competence dimension is satisfied by their sense of being proficient and skilled when performing a safe job, the relatedness dimension is a function of their professional belongingness and role identity, and the autonomy dimension is satisfied as they, themselves, are in charge of the situation in which they act. That said, the self-directed safety behaviour also bears an element of role-congruent behaviour induced by conscientiousness and perhaps injunctive norms.

The final safety behaviour construct, safety citizenship behaviour, carries some similarity to the compliance construct, in that it bears a somewhat complex motivational structure. Admittedly, this comes as no surprise as the SCB construct itself includes the two second order constructs, affiliative and challenge-oriented SCB (Curcuruto, Conchie, et al., 2019). Generally, in the present study, SCB was characterized by helping or co-operation motives such as care for peers and the well-being of the organization. Motives such as these could initially be assumed to be of an intrinsic nature, however in previous research, (e.g. Conchie, 2013) only challenge-oriented SCB could be positively related to intrinsic motivation. The explanation for this may lie in value theory and research on pro-social behaviour. Schwartz (2010) attributes helping behaviour to the activation of personal values, which in turn could have various external/internal loci. Among the 10 values listed by Schwartz (2010), *benevolence* (welfare of related people) and *universalism* (welfare of all people and nature) could be applicable as motivators for SCB. Both these are socially focused values related to self-transcendence and intrinsic motivation. Although, as Schwartz points out, other, more extrinsically motivated values could also activate helping behaviours. For example, *tradition*, or *conformity* which aim towards self-protection, and *stimulation* or *achievement*, which are aimed towards self-enhancement or personal attainment (Schwartz, 2010). As a matter of fact, these conceptualizations are indeed congruent with several underlying motives for SCB, such as conscientiousness and a sense of responsibility, as indicated in theme two, *being conscientious and considerate*.

Furthermore, much in the participant's accounts on SCB could be attributed to the participants affiliation with their colleagues. This identification and sense of belonging could point in the direction of Tajfel's (1978) social identity theory. In this context, pro-social values and group identity may serve as the idealized, integrated norm (see Thøgersen, 2006) to conform to, corresponding more to what Ryan and Deci (2000) calls *congruence* or *synthesis*

with one's self, rather than inherent work satisfaction. In other words, with the above perspectives in mind, the motivational locus for SCB can be assumed to be partially, rather than fully, internalized. That is, it may be determined by either the *identified* or *integrated* regulatory styles, i.e. the two more internalized regulatory styles of extrinsic motivation.

Organizational influence. In all three focus groups, the participants directed a significant amount of attention to their experiences of various organizational characteristics. The tendency in many organizations to have decision makers at too far distance from the actual end users was discussed. Many participants called for a higher degree of participation and employee influence when determining rules and procedures. The main issue raised was the problems that occur when the rules are theoretically thought out beforehand, by managers who do not take part in the daily work activities. Essentially, this results in rules that are difficult to apply in operational conditions and typically lead to unfavourable attitudes towards the behaviour in question. One of the participants spoke warmly about a working group she had participated in, with the objective of outlining new operating procedures. This notion is supported by previous research in which participative leadership and collaborative rule making had a positive effect on both compliance and safety participation within the construction industry (Grill, Pousette, Nielsen, Grytnes, & Törner, 2017). Furthermore, it can be assumed that involvement in rule and procedure design not only engenders rules that are more attuned to the context, but also, possibly through a process of psychological ownership (see Pierce, Kostova, & Dirks, 2001), generates more positive attitudes towards the behaviour. Again, these are features that may have a positive impact on both the attitude and the behavioural control elements of theory of planned behaviour.

Mutual trust, empowerment and organizational support for own operational decisions, free from unnecessary management interference, were also perceived as important for safety motivation. Illustrating examples of this are the participants' accounts of how they could lose trust in the organization's safety work after being criticized for a safety decision with commercially unfavourable consequences, or after being non-compliant with a rule they deemed as inapplicable or inappropriate for the situation.

A final aspect of the organizational influence on motivation concerns safety citizenship behaviour, and especially the reporting of occurrences and hazards. How reports are addressed, for example, by a subsequent change in procedures and practices, or the level of feedback given to the reporter, was described as important, not only for reporting willingness, but also for trust in the organization's safety management system in general. The presence of a "blame culture" in which one could expect retrospective criticism in the case of reporting an event, was especially damaging to the reporting willingness and overall organizational climate. These findings together could be aggregated into the concept of safety climate or safety culture, as covered in previous research (Cheyne et al., 1998; Guldenmund, 2000; Neal et al., 2000). Organizational features such as communication (Neal et al., 2000), employee involvement and management commitment to safety (Cheyne et al., 1998), were all found to correlate with safety performance in previous research. In other words, these features are noticeably similar to the participants' accounts in the current study.

In summary, safety motivation comes out as not being a single construct, but rather a multidimensional interaction of several influential and determining factors. Although a qualitative study cannot claim to correctly represent the magnitude or strength of each motivational factor, some motives are more frequently mentioned and emphasized than others. Work satisfaction, professional identity, professional pride and affiliation with colleagues are regularly mentioned as motivators for most of the identified safety behaviours. For compliance, perceived feasibility and applicability of the rule, together with perceived behavioural control, come out as the most determining factors. Among the most significant de-motivating factors

mentioned are various organizational features, such as the lack of opportunities for employee involvement and low management commitment.

Complex and conflicting safety demands. The third research objective formulated in this thesis concerned how goal conflicts can be understood based on the previous findings regarding safety behaviour and safety motivation. The findings suggest that these sorts of considerations are often seen as an inherent part of the job and have much in common with adaptive safety behaviour. After all, this is very much what the participants describe; they balance risks and make continuous assessments as they meet multiple and often conflicting demands in their daily work life. The participants had to think hard to come up with specific examples of experienced dilemmas, and therefore, it was also problematic to gain deeper understanding of their reasoning. What was evident, though, was that the underlying motivational objective was to dutifully complete their task by making necessary trade-offs and assessing what level of safety was needed in each specific situation. At the same time, it was also acknowledged by several participants that the pressure to perform could be both externally imposed, e.g. by managers, or self-imposed through perceived social pressure from peers. Regardless of the source, this was deemed to pose a hazard, potentially negatively affecting individual decision making and judgment.

Limitations

There are several limitations and weaknesses in the present study that need to be addressed. The most obvious and significant disadvantages concern the methodology by which this study was performed. Firstly, the ongoing Covid-19 pandemic imposed restrictions on how the participants could meet for the focus group sessions. Only one of the focus groups could meet entirely physically, sharing the same room. Of the other two groups, one session was conducted as a pure video conference, while the remaining session was partially physical/digital, meaning that the participants met in a conference room and the moderator participated through video conference. Although it is not desirable to have different arrangements for each group, no major differences in the data could be observed. It should be mentioned, though, that the participants in the wholly digitally based session were all very much used to the video conference format, which likely reduced the overall impact of this disparity. Likewise, the participants in the semi-physical session were all encouraged to direct their conversations towards each other, rather than towards the interviewer. Nevertheless, the full impact of these methodological differences cannot be fully estimated, which is why this disparity still needs to be acknowledged as an obvious disadvantage.

The second methodological disadvantage concerns the reliability of the method used to conduct the analysis. To enhance the validity of a qualitative study, it is recommended to include either one more researcher, a complimentary method, or an additional data source; a methodology referred to as *triangulation* (Braun & Clarke, 2013). As the study was conducted by just one sole author and researcher, all planning, interviews, coding and analyses were completed by one single individual. As a consequence, there was no opportunity to crosscheck and compare codes and interpretations during the coding and analysis-process. Therefore, there is a risk that the author's own assumptions and preunderstanding were given too much room. In order to add an element of triangulation, it was originally intended to include a complimentary follow-up interview with one additional independent, non-focus group participant from each occupational group. However, as the time frame available to complete this thesis was limited, no such follow-up interview could be completed as initially planned. As a substitute, a mere presentation of the main result was given to these representatives, who were

given opportunities to object. Obviously, this method has its limitations as the full width of this paper could not be conveyed in a brief presentation.

Another important aspect regards the preunderstanding and reflexivity, due to the author's previous work background. With nearly two decades in the commercial aviation sector, it is difficult not to be biased by own experiences and presumptions. However, this personal attachment can also be considered a strength as it was possible to interact with the participants at a more equal level. Sharing the same professional culture and specialized language meant that the researcher's position in the focus group was at a peer level rather than as a bystander. Most likely, this led to a more relaxed and casual dialogue than what otherwise would have been achieved.

While the ambition of this study was to generalize safety behaviours among specialists in high reliability organizations, it should be pointed out that the sample of 13 participants representing three different occupational groups is relatively small. It was, however, deemed that the job assignments are disparate enough to be generalizable to other safety-critical occupational sectors, such as maritime transport, rail transport and nuclear plants, among others.

As the aim of the present study was to gain a nuanced overview of both safety behaviour and safety motivation, a broad perspective had to be taken. This rather broad approach meant that the depth of each construct could not be fully dissected, neither in the focus group sessions nor in the analysis. As a result, some of the analyses in this study were somewhat bound to be slightly more superficial than originally intended. Nevertheless, the strength of the present research is that it is the first known qualitative study that takes a holistic approach to safety behaviour and its related motivational mechanisms and factors. The study highlights the complexity and multidimensionality of these constructs and can serve as a foundation for future safety research.

Conclusion, implications and directions for future research

The purpose of this study was to examine the variety of safety behaviours and to determine which types of motivational factors and psychological mechanisms that can be associated with various safety behaviours. Furthermore, the study sought to investigate the reasoning and strategies used when managing conflicting operational and safety related demands. A total of five distinguished safety behaviours were identified through qualitative research using focus groups. Compliance and safety citizenship behaviour are recognized, existent designations. In addition, three more safety behaviours were designated in the present study: adaptive, proactive and self-directed safety behaviours.

Safety motivation was emphasized as a complex and multidimensional construct. Motivational factors such as work satisfaction, work ethics, professional pride and collegial affiliation were stressed as general motivators. The relevance of organizational characteristics such as management commitment, trust, empowerment, participative leadership and employee involvement was further supported by the findings in the present study. Rule compliance is facilitated if the rules and procedures are sensible, applicable and easy to carry out in the real-world work environment. Ajzen's (1991) theory of planned behaviour was further supported as an applicable model for predicting compliance.

The findings in this study have a number of implications, both for practical safety work, but also for future research. In practice, some of the more effective ways of enhancing compliance in an organization are to promote positive attitudes toward the applicable rules and to improve employees' perceived control over complying with those rules. This can be facilitated by non-rigid, flexible rules and procedures that are compatible with the dynamic

nature of the work environment. As both this study and previous research have found, employee participation and involvement are essential tools in realizing this accomplishment.

For future research, whether the utilization of a full five-factor model of safety behaviour is of value or not may be debatable, as, for example, its discriminant validity may be questioned. Nevertheless, I would like to argue for the importance of this categorization in order to fully comprehend the architecture of safety behaviour. Furthermore, in much of the previous research, task related safety behaviour has been synonymous with compliance without addressing parallel safety behaviours such as adaptive or proactive safety behaviours. The current study emphasizes the complexity and limitations of compliance as the sole construct for task related safety behaviour. Therefore, in future research on concepts such as organizational safety climate and safety motivation, I suggest this extended dimensionality of safety behaviour to be considered.

Naturally, utilizing the extended safety behaviour dimensions, as suggested in this paper, would entail a further validation process. This would need to involve verifying the ecological validity by extending the sample to other occupational groups, such as construction or health care workers. To establish the validity of the motivational relationships discussed herein, additional research, both qualitative and quantitative, would be required.

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