

Crisis Management Through Behavioural Approach of Personality

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During any activity onboard ship there are different situations which can become rapidly a crisis. These situations are not always dangerous at the beginning, but they will become soon, in many cases, often in a short period of time. Under these circumstances, people react differently depending on each person's personality and also by the level of knowledge in using the equipments onboard. In order to manage a crisis situation it is important to be able to predict expected or unexpected reactions of the persons in charge and his or hers capability to operate correctly the equipments available.

Loss prevention involves dealing also with the human mistakes, and solution can be given by studying human reactions during training and evaluation, studying the use of technology which helps creating crisis situations and offers the chance to observe human reactions and interactions between human element and technology in a crisis condition.

Using simulation techniques, our university developed a study that analyzes different navigational situations with difficulties which has as main target the reaction of students at different levels of training compared with experienced seafarers, in the same scenarios. The methods used closed monitoring of changes in people's behaviour and interaction with different equipments in a potentially dangerous or crisis situation, types of personalities, changes in physiologic parameters due to stressful situations, capabilities to focus on important equipment for safety of ship and the way that all these will interfere with the understanding and management of particular situations. The target is to find the best way of reacting and managing a crisis situation, to understand the risks involved and properly solve them, taking into account reaction ability, behavioural personality and interaction with possible vital equipment.

This paper presents the data obtained in the study, and behavioural changes triggered by dangerous situations along with their impact on the final decision and action. The effect of experience appears to be the decrease of introverted actions with a plus into rationale and perceiving attitudes that is translated into better reactions under the pressure of events, without interfering with sensitivity reactions.

Keywords: crisis, personality, behavioural, management, study, safety of navigation

1. Introduction

Most of high-consequence but low-probability accidents involving complex systems such as ships are caused by human and organizational factors. The fundamental problem in most cases is not hardware but 'human ware'. [1] Most of these accidents could have been prevented even though they involve operating actions that contain fundamentally unpredictable combinations of events, which are unsettling. Many of these accidents consist of rapidly unfolding sequences of events in which the pace of operations is dramatically increased and the normal organization structure rendered ineffective.

We know that the human factor plays a significant part in maritime accidents, and that accident reports frequently highlight deficiencies in non-technical skills, such as communication, team-work and leadership. There appears to be a paucity of formal research within the maritime industry on behavioural markers which could underpin criteria for evaluating competence in non-technical skills, and STCW [5] itself provides only the broadest of measures.

Crisis situations onboard ships are not isolated incidents. Many of the usual activities, especially on the bridge, have the aspect of a crisis situation. These are situations when the seafarers have to take decisions in a short time, and, very probable, with little information.

Today, there are specialised training courses for the management of a crisis situation, where the trainees learn how to identify such a situation, how to analyse it and what decisions to make for a safe

result. But, none of these trainings have included the study of individual personality and how it affects the final decision.

People's personality is difficult to be defined, because it is a characteristic of each individual. For this reason, the definition of reaction in case of emergency or crisis is difficult to be given in a general format. A better understanding of the ways to manage a crisis situation is based on the understanding of involved persons' behavioural personality. Seafarers' behavioural personality must be treated as part of the safety concept onboard ship.

The study conducted by our university intended to analyse the impact of behavioural personality on ship's safety in different crisis situations. The analysis was made using students and experienced seafarers, two groups with completely different approaches to a well defined crisis situation.

The results of the study allow us to have a better image and understanding of how people react in a crisis situation according to their personality and experience.

2. The behavioural approach of personality

The way in which we interpret an event is critically linked to another type of cognition: our core beliefs. A complex blend of factors derived from both "nature" and "nurture" are thought to drive the formation of people's core beliefs. Cognitive theory assumes there are certain inherited dispositions such as temperament (nature), which interact with children's environments (nurture), to influence the ultimate shape of their personality, and their characteristic interpersonal strategies. Moreover, cognitive theory emphasizes the importance of social learning with respect to personality development. Childhood experiences, including childhood trauma and abuse, are seen as important factors that establish these core beliefs about the world. These core beliefs will later colour, and potentially distort, people's perceptions and interpretations of subsequent experiences. [6]

Thus, people appraisal of events is influenced not only by our immediate experience of the situation or event before, but also by preconceived ideas and beliefs formed in the past. When individual core beliefs are faulty, biased, or distorted, they may end up drawing incorrect, irrational conclusions about the meanings of events. Individuals may subsequently behave in ways that cause us unnecessary distress.

Generally speaking, there are two interrelated factors that contribute to the development of people's personality.

These are:

- a. biological factors, meaning people's genetic make-up and temperament, and
- b. environmental factors, meaning people's life experiences, particularly early childhood experiences.

Although it is simpler to discuss these two factors separately, many experts believe they cannot be understood independently from one another.

Personality refers to a set of distinctive personal characteristics, including motives, emotions, values, interests, attitudes, and competencies. [8]

Trained and certified professionals generally assess personality in three ways:

1. **Personality inventories** require the person to answer questions that describe the respondent's personality;
2. **Projective tests** require the person to describe what she sees in a picture or relatively ambiguous stimuli, such as an inkblot. A detailed scoring protocol places the person along numerous personality dimensions;
3. **Simulations, role-playing exercises, and stress interviews** require the person to behave in specific situations. An observation and scoring protocol categorizes the person along dimensions such as adaptability, assertiveness, or dominance.

In our study, we applied the last procedure to obtain information about how cadets and experienced seafarers react in different conditions.

Also, psychological research has identified many traits and attributes, some measured by the previously mentioned instruments that compose a person's personality. In a special working environment, such as onboard ship, it can be useful to know how these dimensions might influence personnel behaviour. [6]

Describing and analysing a person's personality can suggest some issues that should be considered in managing the personnel.

Related to personality behaviour, in the present, there are different ways of classification. First, people can be classified according to their basic interaction with others. *Introverted* types tend to be shy; they like silence for concentration, dislike interruptions, and work contentedly alone. Having the ability to concentrate intensely and develop ideas, this type tends to be reflective and inwardly directed.

Extroverted types tend to be outgoing and sometimes aggressive. They like variety, enjoy functioning in a social environment, often act quickly without thinking, and may dominate situations or people. This type focuses on people and things.

Secondly, people acquire information by either sense or intuition. *Sensing* types like action and getting things done. They focus on facts, data, and details. Although they tend to be pragmatic, precise, and results-oriented, they can reject innovations. They work steadily and reach a conclusion step-by-step. *Intuitive* types dislike doing the same thing repeatedly and enjoy learning new skills. They may reach conclusions quickly and often follow their inspirations and hunches. They tend to be imaginative, creative, and idealistic, but can be unrealistic or scattered.

Third, people make decisions by thinking or feeling. *Thinking* types excel at putting things in logical order and respond more to people's ideas than to their feelings. Characterized as analytical, rational, logical, and impersonal, they can undervalue feelings or be overly critical. They need to be treated fairly and tend to be firm and tough-minded.

Feeling types like harmony and respond to individuals' values and feelings, as well as to their thoughts. They tend to be persuasive, sympathetic, sensitive, and loyal. They enjoy pleasing people, but can be overly sensitive or moody.

Fourth, people also differ in the way they evaluate information about the world. *Judging* types like to get things finished and work best with a plan. They are organized, settled, and structured, but dislike interrupting their tasks and can be closed-minded and inflexible.

Perceiving types adapt well to changing situations and do not mind last-minute changes. They tend to be open-minded, curious, and flexible. They may begin many projects but have difficulty finishing them, or they may postpone unpleasant tasks. [6]

2.1 Individual values and attitudes

A person's values and attitudes develop over time, beginning in early childhood. Values and attitudes are linked to personality and can influence behaviour. In the onboard ship activities, leaders understand how values and attitudes affect seafarers; they can diagnose the reasons for workplace problems more effectively. Once diagnosed, they can also prescribe ways to solve such problems.

Values refer to the basic principles and tenets that guide a person's beliefs, attitudes, and behaviours. Values tend to be relatively stable characteristics. They become evident in working and non-working settings throughout adulthood. People's values can influence their beliefs about money, social interactions, the importance of work, and other aspects of their professional and non-professional lives. [6]

Core values are more susceptible to change, and *peripheral values* are less susceptible. A research study indicated that organizational influences affect peripheral values, and non-professional influences affect core values. Leaders would have difficulty changing a seafarer's core values through training or other interventions, but a parent, spouse, or friend can alter them. [8]

Diagnosing the impact of core values on working situations helps leaders place seafarers in appropriate situations.

An *attitude* refers to a person's tendency to consistently respond to various aspects related to people, situations, or objects. We infer attitude from a person's statements about their beliefs and feelings. We infer people's attitude from what they say, what they do, and how they react. It is possible, for example, to determine a person's professional satisfaction by inferring it from the general demeanour on the job or by asking for a description of satisfaction. It is also possible to use attitude surveys or other attitude scales to assess seafarers' attitudes towards their activity, co-workers, senior officers, or the shipping company in general. [6]

Diverse workforces include people with varying attitudes. People have an array of beliefs, formed in large part from their socioeconomic and cultural backgrounds and other experiences. These varying beliefs likely result in different attitudes.

Once we understand particular attitudes and their impact on specific work situations, we can prescribe ways of changing either the attitudes or the situation to result in more productive outcomes.

Attitudes have a cognitive, affective, and behavioural component.

Cognitive – Individuals have beliefs about a certain person, object, or situation that they accept as true based on their values and experiences. These learned beliefs, such as “you need to work long time to get ahead in this job”, lead to specific attitudes.

Regarding seafarers, although they have many beliefs, only some lead to attitudes that have an impact on their behaviour at the workplace.

Affective – People have feelings that result from their beliefs about a person, object, or situation. A person who believes extra effort deserves praise may feel angry or frustrated when one puts in extra effort but one’s manager doesn’t acknowledge it. The affective component becomes stronger as a person has more frequent and direct experience with a focal object, person, or situation and as the person expresses one’s feelings about that object, person, or situation more frequently.

Behavioural – Behaviour appears as a result of a person’s feeling about a focal person, object, or situation. A person may complain, request a transfer, or be less productive because one feels dissatisfied with work.

Attitudes can also result from a person’s experiences. How easily a person can call on an attitude, affects its impact. Personal experience with the object and the repeated expression of the attitude increase its accessibility, and the attitude more frequently affects behaviour.

Seafarers may experience *cognitive dissonance*, which describes their attempts to deal with situations in which they have contradictory knowledge, information, attitudes, or beliefs. In this situation, the seafarer tries to reduce the contradictions by redefining the situation. Theorists argue that dissonance is short-lived. People reduce dissonance by changing their attitudes, forgetting about the inconsistency, reaffirming their core values, trivializing the dissonant elements, or misattributing the cause of the dissonant events. [6]

3. Onboard ship crises and crisis management

A crisis is defined as a rapidly developing sequence of events in which the risks associated with the system rapidly increase to a hazardous state. The crisis begins with a surprise warning of some type that the system is moving from a safe to an unsafe state. Crises involve potentially grave life and property threats.

In some of the specialized papers, crises are described as “events that do not play by the rules”. [1] These destabilizing breakdowns seem to feed on themselves and overwhelm normal problem solving resources. Crises are characterized by a threat to normal values and goals, pressures to decide quickly, short time to act, unexpected events that shock, confusion, pressures to innovate in solving the crisis, development of limited options, developments in which inaction produces undesirable consequences, incomprehensible developments, information overload, ambiguity and uncertainty, increased numbers of important demands, conflicts, limited resources, problems lumped together, exaggerated deviations, intense scrutiny, and loss of critical functions. Crises are traumatic affairs.

Also, it was observed, that the ability to deal with a crisis situation is largely dependent on the structures developed before chaos arrives. [1] The event can in some ways be considered as an abrupt and brutal audit: at a moment’s notice, everything that was left unprepared becomes a complex problem, and every weakness comes rushing to the forefront.

In its simplest terms, a crisis can be divided into three general stages: perception, evaluation, and, action. The first stage requires individuals to perceive and recognize warning signs of the evolving crisis. The second stage involves processing information to identify problems and causes, alternatives that might bring the system back into a safe state, consequences associated with each alternative, evaluation of alternatives, and the choice of alternative or alternatives to be implemented. The third stage involves implementing the alternative, and observing the results. If the observation indicates that the alternative is not working, the process must be repeated selecting a different alternative. If the system cannot be brought back to a safe state, an accident happens. If the system can be brought back to a safe state, then a ‘near-miss’ or ‘incident’ occurs.

Applying in maritime transport activities, this characterization of crisis raises issues about strategies that can more frequently bring engineering or navigation systems back to safe states and to understand how to have more 'near-miss' than 'direct hits' (accidents).

Perhaps no stage in a crisis is as important as the first stage: recognition or perception. Because the crisis is just unfolding, if the situation can be quickly and correctly recognized, there will be more opportunities and time to bring it under control.

Humans seem to have a fundamental difficulty accepting the potential danger of a situation under development. In a study of crew reactions to accidents onboard passenger vessels or ferries, it was found that 60% of the people ignored or misjudged the hazards, 30% investigated, and 10% accepted that hazards existed and initiated action. Once the hazard was recognized, something of the order of 10% to 25% panicked or went into shock, so called crisis paralysis, 50% to 75% behaved in confused helpless ways, and 10% to 30% made realistic evaluations and started positive corrective actions. During the study it was observed that people who have generally accepted the risks associated with an activity are not usually motivated to study or practice safety procedures or recognize early warning signs of a developing crisis. [4] They have become 'risk habituated'.

Three classes of cognitive factors seem to govern how well people perceive a crisis:

1. Knowledge – background that can be accessed when solving problems,
2. Attention dynamics – control and management of mental workload, maintenance of situation awareness, and avoidance of fixations,
3. Strategy development – successful trade-off between conflicting goals, dealing with uncertainty and ambiguity, avoidance of organizational double binds, and development of good priorities and decisions. [2]

Developing and maintaining an awareness of potentially hazardous situations involves a constant process of detecting anomalies; things that are not right or don't fit. [1] Reporting this concept to bridge activities means to have all the time a control of developing activities and to be aware about what can go wrong in the present or future activities. Not only on the bridge, this principle can be applied, it can be used in all ship departments. The development and maintenance of awareness of potentially hazardous situations have to be the first concern of all seafarers. This is the first principle in the development of a safety culture onboard.

The usual approach to investigating crises in the interests of improving crisis preventions is to look for maintenance and design failures to equipment. If the human element is considered at all, this is the hands-on operator. A rapidly developing sequence of events onboard ship implies the contribution of more than a single or a few seafarers to the outcome.

In order to reduce risk or improve crisis prevention we need to look at two aspects of sense making, how individuals make sense of things and how groups and organizations make sense of things.

People support strategies including such things as selecting personnel well suited to address crises, and then training them so they possess the required skills and knowledge. Re-training is important to maintain skills and achieve vigilance. The cognitive skills developed for crisis management degrade rapidly if they are not maintained and used.

Crisis management teams should be developed having the requisite variety to manage the crisis and having developed teamwork processes so the necessary awareness, skills, and knowledge would be mobilized when they are needed. Auditing, training and re-training are needed to help maintaining and honing skills, improving knowledge, and maintaining readiness. [3] Crisis management teams need to be trained in problem 'divide and conquer' strategies that preserve situational awareness through organization of strategic and tactical commands and utilization of expert task performance' teams. [7] Crisis management teams need to be provided with practical and adaptable strategies and plans that can serve as useful 'templates' in helping them to manage each unique crisis. These templates help reducing the amount and intensity of cognitive processing that is required to manage the crisis.

4. Study of behavioural personality's impact on ship's safety

As mentioned before, there are no or very few studies about how seafarers' personality affects the safety of ship and personnel. At the same time, the entire maritime industry, including education and training institutions, is focused on increasing safety and reducing accidents or 'near-miss' events

which may occur. Maybe, it can be considered that behavioural personality is the 'missing link' in completely understanding accidents' development. Anyway, even if it is not the 'missing link', it is an important aspect to analyse in an accident development.

Aims of the study. In an effort to understand how the individual personality and knowledge can affect the safety of the ship, we decided to realize a study in this field, using as research method, simulation techniques combined with role-playing and interviews, for a clear explanation of decisions. The study was realized using Constanta Maritime University's facilities and with the support of our students and graduates in management positions. It involved a number of twenty students from the third and fourth year of study and five graduates.

For the study of behavioural personality and psychological classification, we received support from medicine faculty lecturers.

One of the purposes of the study was to understand the changes in a person's behaviour and interaction with different equipments in a potentially dangerous or crisis situation, types of personality, changes in physiological parameters due to stressful situations, capabilities to focus on equipments important for the safety of the ship and the way in which all these will interfere with understanding and managing particular situations.

Another target of the study was to find the best reacting way and managing a crisis situation to understand the risks involved and properly solve them, taking into account reaction ability, behavioural personality and interaction with possible vital equipment.

Methods. 20 students of Constanta Maritime University were included in the study after giving written consent about data resulted. The simulation scenarios were created according to situations reported as high generators of dangerous situations, like sailing in bad weather conditions, failure of different equipments, entrance or leaving port manoeuvres, passing through a heavy traffic area or confined waters. In scenarios' preparation there were taken into account indications and advices given by the experienced graduates involved in the study. These advices were given based on their own experiences during years of service at sea.

For a better image of students' reactions and decisions in a crisis situation, we decided to enrol in study both students with cadet practice, and students without it. In this way it was possible to analyse how a little experience, as onboard cadet practice, can influence decisions during uncommon navigation situations. 10 students were presenting no experience on board ships, and 10 were having cadet practice for 6 months and the 5 graduates were having practice for more than 5 years.

Also, during the study, the chosen team was mixed, meaning that in the same team it was possible to have students from both categories and, where we considered necessary, together with an experienced graduate. This kind of team, allowed for the behavioural personality to be observed during subordination relations, in respect with the normal arrangement on the ship bridge.

As a role play, students have taken position as senior officers and helmsmen, graduates have taken, in most of the cases, senior officer positions or Master position. Through this arrangement, it was also intended to study the flow of information during a crisis situation and the effect of stress and pressure on communication and following actions.

Results and discussion. Analysing the behaviour, according to a person's personality classification, described before, the participants were grouped in types of personality, as: introverted, extroverted, sensing, intuitive, thinking, feeling, judging and perceiving.

Analysing the behavioural personality of the students with or without cadet experience, in the considered navigation situations, we got the following results about personality classification (Table 1).

The effect of experience as it's visible in figure 1 appears to be the decrease of introverted actions with a plus into rationale and perceiving attitudes. This is expressed also in time of reaction (decrease into thinking and increase in judgement decision. The sensitive figures were not affected by experience, facing the fact that in both groups the level of sensing and intuitive figures was similar).

Personality type	Students without experience No. = 15	Students with experience No. = 20	p (<0.05)
Introverted	20%	10%	0.28
Extroverted	$\approx 5\%$	10%	0.32
Sensing	10%	10%	NS
Intuitive	20%	20%	NS
Thinking	15%	$\approx 5\%$	0.24
Feeling	10%	10%	NS
Judging	15%	20%	0.73
Perceiving	$\approx 5\%$	15%	0.11

Percentages are evaluating the distribution of personality figures, not defining the personality type as individual.

Table 1. Classification of test students according to personality type figures

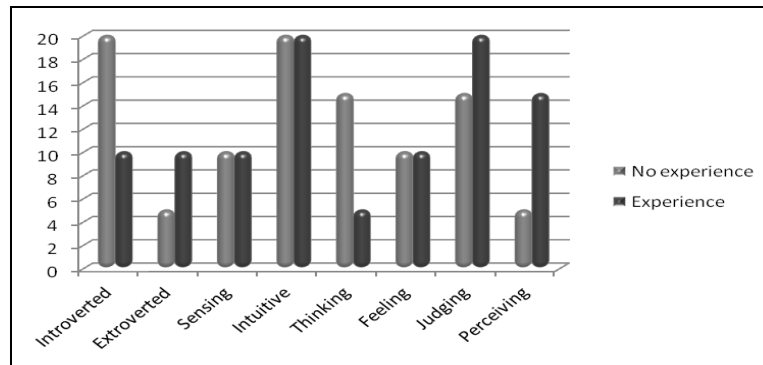


Figure 1. Comparison between categories of students as personality type during study

Analysing the way of reaction and interrelation with the team and leaders, it was noticed that most of the students with practice onboard, have better reactions under the pressure of events and in the presence of a superior rank. The students without onboard practice, felt less comfortable in the presence of an experienced seafarer, and reacted slowly or blocked when receiving orders from them. In relation with equipments, especially those important for the safety of navigation, the study revealed that students with experience on real equipments or with simulators practice react better to different crisis situations generated by the equipment malfunctions.

The report of dangerous situations for ship after a decided manoeuvre was quite equal for both groups, the difference between situations was given by the reaction of the leader in those conditions, or, how the leader could communicate with the team and the clearness of the messages.

Simulation - 2h	Length of reaction (mean +/- SD)	Refractory period (mean +/- SD)	No. errors
No experience	70 ^{''} (+/- 16.57)	54 ^{''} (+/-26.32)	>10
Experience	27 ^{''} (+/-6.48)	22 ^{''} (+/- 4.21)	< 5

Table 2. Capability of reaction during simulation of crisis situations

At the end of the simulated situations, during the interviews with the participants, the research team tried to explain the decisions for different navigation situations and in this way to understand what role played the persons' personality in these.

According to the opinion of the specialized interviewers, many of the students tried in the first stage to deny their mistakes or to minimize the impact of their faults. This behaviour is considered to be normal and in accordance with personality expression.

Considering that one of the final interviews's meaning was to help students to understand their mistakes and how it was correct to react in particular crisis situations, the evaluators advised students

to try to be as much frank as possible in their answers, and in this way, the evaluators to be able to offer the risk conclusion about it.

Analysing all results reached after the study resulted in the fact that it is true that the personality influences the decision making process in crisis situations and the decisions are examples of each decider's personality.

Following the study, the research team intends to initiate a new study about how the psychological behaviours or personal feelings influence decisions in a dangerous or crisis situation. This study can be applied to all seafarers, disregarding the decision level or ship department.

5. Conclusions

As long as safety will be considered the most important part of the maritime activities and humans will be in charge of managing this, there will always develop crisis situations. For this reason it will be important to improve the crisis management procedures for covering new possible situations.

Another important thing is the importance of selecting, training and organising the 'right personnel' for the 'right activity'. This is much more than an activity design; it is selecting those able to perform the tasks within the required performance for that activity. Taking in consideration the future trend in technological improvement of ship activities, it will be necessary to improve the team work concept and group decision also.

The systems must provide adequate support and security for crisis management teams to accomplish their tasks. They must provide adequate warning of approaching danger and important data that do not overload cognitive resources. Most important, the future ship systems must be tolerant of human errors through the incorporation of adequate measures, including behavioural personality of the operators, and stability.

Summarizing the targeted goals of the study, the research team considered that they were fulfilled and the results allowed them to better understand how personality problems can be managed in relation with onboard ship activities.

For the future it is considered as important to consider more seriously the behavioural personality and its impact on ship safety. In this sense, it is recommended for training institutions to generate applications able to reveal each individuals personality and his behaviour during a crisis situation. These applications will allow defining better how to model the individual training for a better performance later at sea.

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