



A STUDY ON THE EFFECTS OF THE SHIP ENVIRONMENT ON HUMAN PSYCHOLOGY

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ABSTRACT

The human factor has a great impact on the ship environment and the maritime sector. Therefore, the psychological state of employees is important in terms of safety and efficiency. It is known that a large portion of maritime accidents occur due to human errors. Those working in maritime areas face many negative effects such as long working hours, being away from their families, social isolation, irregular sleep hours, fatigue and stress. In addition, the hierarchical structure and cultural diversity in the environment create negative effects psychologically. This article examines the psychological effects of the ship environment on seafarers. It addresses the negative effects of stress, prolonged isolation and burnout syndrome. It also highlights the role of loss of situational awareness in maritime operations, drawing attention to the cognitive and emotional challenges faced by seafarers. The importance of psychosocial support mechanisms was stated, and suggestions were given to improve the psychological state of seafarers and to cope with professional difficulties. It was concluded that the maritime sector should develop more comprehensive policies and strategies to improve the psychological state of employees.

Keywords: Maritime, Human Factor, Stress, Psychological Resilience, Job Satisfaction

1. INTRODUCTION

The psychological state of seafarers has been the subject of many studies due to the impact of the environment they work in. Being on a ship for long periods of time causes negative emotions such as loneliness, stress, fatigue and longing. Since maritime is a sector where safety and security are at the forefront, the psychological health of seafarers is an important issue. It is of great importance that their psychological state is good in order to increase work efficiency and prevent accidents. As a result of the studies conducted on seafarers who worked at sea for a long time, it was determined that people suffered physical as well as psychological damage. Fatigue and weakness were observed in seafarers who were exhausted and fed up. In addition to weakness, intense headaches, sleep disorders, loss of appetite, low body resistance and the risk of infection were also observed. While weight loss due to loss of appetite can be observed, sometimes excessive weight gain, difficulty breathing, eating disorders and various diseases in the stomach and intestines have been observed. These observations are important data showing how psychological problems in seafarers can have a great impact on people's lives. The differences between the state of



people who have worked as seafarers for a long time and the state of people who have worked for many years are clear and unfortunately quite large (Zorba, 2016).

It is a known fact that people working on ships have a high rate of depression and other mental illnesses. It is a reality that challenges human nature to leave the natural habitat and try to survive in a closed system where people work and sleep and then cannot escape. According to In Mccafferty and Baker (2006), it has been observed that 85% of human factor marine accidents occur as a result of faulty situational assessment and situational awareness. This shows that the psychological well-being of ship personnel as well as their ability to make the right decisions under stress and their crisis and anger management skills are extremely important.

When viewed from a broad perspective, it has been observed that seafarers had serious psychological problems in the past. It has been suggested that this situation is improving today and two hypotheses have been developed to support it. Firstly, the decrease in suicide cases and the lack of significant stress levels among today's seafarers and land-based workers are cited, and secondly, the lack of studies that definitively demonstrate the high rates of depression and suicide. That being the case, the same study found that assessments made during deep-sea voyages suggest that officers who have frequent shore visits and short but intense sea duties are more likely to experience long-term stress and loneliness than those who do not. Additionally, women have highlighted that they may experience seafaring differently than men, as they have to deal with gender discrimination among other challenges on the job. The same study also highlights that these issues need to be examined more closely to determine optimal policies to reduce mental health differences, depression and suicide risks related to rank and gender (Mellbye and Carter, 2017).

Stress is a feeling that can be experienced by sailors and ships at any time. As a concept, it was used in the 17th century with meanings such as disaster, trouble, calamity, trouble, grief, and sorrow. Later, in the 18th and 19th centuries, the meaning of this term changed and it began to be used for objects, individuals, organs and spiritual structures with meanings such as power, pressure and difficulty (Güçlü, 2001). In Britannica (2023), stress is defined in physics and engineering as the forces per unit area that cause permanent deformation. Stress, in psychology and biology, is any environmental or physical pressure that provokes a response in an organism. Stress increases the chances of survival of organisms as they adapt to rapidly changing environmental conditions. For example, in response to unusually hot or dry weather conditions, plants close microscopic pores on their leaves to prevent water loss. However, if an organism's response to stress is inadequate or the stress is too strong, the organism may become sick or die.

Burnout is a response to stress caused by long-term work and disrupts both personal and social functioning. It harms physical and psychological health by reducing the quality of work. This situation poses a risk not only for the employee but also for those around him. If the burnout of a watch officer is not noticed, the safety of the ship may also be at risk. Possible damages include human life, ship navigation, ship and cargo safety, environmental pollution, company reputation and financial losses (Leiter, Maslach and Frame, 2014). Individuals experiencing burnout first experience physical symptoms. Problems such as fatigue, headaches, and sleep disorders can eventually lead to weakened immune systems, weight changes, respiratory and digestive problems, high blood pressure, and heart palpitations. In addition, negative psychological conditions can develop. Emotional changes such as irritability, restlessness, impatience, lack of self-confidence, hopelessness, apathy



and depression may be observed. In addition, negative attitudes such as hostility towards the environment, family problems, paranoia and thoughts of quitting the job may also emerge in the individual (Zorba, 2016).

Situational awareness is the ability to accurately understand what is happening in one's environment and to combine this knowledge with experience to anticipate what might happen in the future. This is not limited to understanding the moment; it also includes constantly monitoring external factors in the environment and questioning our own thought patterns. In this way, our awareness can be kept alive. Being able to correctly assess the security situation and threats encountered in an environment is very important in terms of understanding risks and making predictions about the future. Situational awareness requires correctly perceiving the elements in the environment and seeing how they can be associated with possible future scenarios (CSRC, 2023). When situational awareness is lost, the environment cannot be assessed accurately and serious errors can occur. Realizing this is critical to avoiding dangers and making the right decisions. If there are communication problems, confusion and uncertainty, distraction, violation of rules, falling behind plans, and encountering conflicting information, it may be thought that the person does not have situational awareness.

As a result, the psychological and physical well-being of seafarers is of critical importance not only for their individual health but also for ship safety and the smooth running of operations. Factors such as the difficulties of being at sea for long periods of time, isolation, intense workload and irregular living conditions can directly affect the mental state and physical endurance of seafarers. Therefore, improving working conditions and providing a supportive work environment not only allows employees to feel safe and valued, but also strengthens their commitment to their work. Therefore, improving working conditions and providing a supportive work environment not only allows employees to feel safe and valued, but also strengthens their commitment to their work. Such efforts not only improve the quality of life of personnel at sea, but also directly support the efficiency, safety and integrity of ship operations (Muslu, 2018).

2. SHIP ENVIRONMENT AND THE CONCEPT OF PSYCHOLOGICAL RESISTANCE

Psychological resilience can be defined as showing resistance in the face of difficulties and even achieving success by overcoming these difficulties. In this context, psychological resilience means being able to stand up again when you fall and having the strength to cope with difficulties. (Luthans, Avey, and Patera, 2008). Bergheim et al., (2015) also revealed that this concept is related to the understanding of safety. The study shows that job satisfaction is an important element in maritime organizations.

There are some powerful attitudes and strategies that can increase resilience in the face of adversity. These powerful attitudes include approaching events with a positive outlook, developing stress coping skills, and viewing challenges as learning opportunities (Maddi, 2013), these strong attitudes:

1. Commitment; believing that being involved in something, no matter how difficult life is, is important, as opposed to distancing and alienating.
2. Control; Even when life gets tough, taking an active stance to turn stressful situations into opportunities for personal development and growth before they turn into disasters.



3. Challenge: Recognize that stressful and challenging changes are actually opportunities.

Resilience is defined as the ability to function healthily in the face of stressful situations. This includes returning to full functioning after a challenging period (Stanley et al., 2011). The American Psychiatric Association (APA) recommends ten different methods for increasing resilience (MacLachlan, 2017), including, “Making connections, not seeing crises as insurmountable problems, accepting that change is a part of life, moving step by step towards your goals, taking determined steps, creating opportunities for self-discovery, developing a positive perspective on yourself, approaching events with the right perspective, staying hopeful and taking good care of yourself.”

Psychological resilience shows that people have the necessary knowledge to overcome the difficulties they encounter in their lives and that their experiences are useful in difficult times. Although training seafarers in these skills enables them to cope with difficult conditions, it does not provide permanent solutions. Research shows that seafarers generally maintain a positive attitude in difficult situations. However, shipowners and employers often focus on reactive measures (e.g. counselling) and resilience strategies to support seafarers' mental health. Many employers believe that it is not necessary to invest in proactive measures to reduce pressures on board, but some in the industry are actively working to recommend a holistic approach to improving seafarers' mental health (Sampson and Ellis, 2021).

A study of 100 Filipino seafarers found that the three most important factors affecting seafarers' mental health were stress, fatigue and being away from family and friends. Research shows that the three most common strategies Filipino seafarers use to maintain their mental health while on board are staying positive, socializing with crewmates and staying in touch with their families (Sarinias et al., 2022). Doyle et al. (2016) emphasize that in order for seafarers to cope with stress, not only their personal skills but also the support that will help them do their jobs better are important. In this case, the concept of psychological resilience comes to the fore. In Sampson and Ellis (2021) it is conducted with more than 1,500 seafarers, it was stated that many seafarers coped surprisingly well with difficult problems on board, but were happier in the home environment than on board. Most seafarers indicated that resources could be provided to support their mental health. These could be factors that would create a better work-life balance (e.g. shorter contracts), factors that would help them maintain good relationships with family and friends on shore (e.g. free internet access), factors that would improve relationships on board (e.g. larger crews and more social events), and opportunities that would lift their mood (e.g. going ashore, barbecues, and sports facilities).

Demir İ. H. (2020), in a study conducted through a survey, stated that having enough free time is a factor that allows seafarers to have higher life satisfaction and higher emotional intelligence. He states that this factor reduces the negative effects of social isolation that seafarers are exposed to and that sea accidents resulting from human errors that are the cause of social isolation can be reduced. Sampson et al. (2017), in their study, when the survey participants were asked what they usually do during their rest hours, the majority (42%) said that they go to their cabins to rest. Many people said that they go to their cabins to watch television (21%) and that they only go to their cabins to use the internet (13%). (9%) of the seafarers said that they only listen to music in their cabins and very few said that they spend their free time with group activities such as watching TV/DVDs (5%), chatting with



colleagues (3%), singing with others (2%), group sports (2%), using the gym with others (1%), using the ship's internet room (0.5%). Again, in the same study, the findings of the research on the known health conditions of seafarers show that there have been improvements in some cases in the five years between 2011 and 2016. Seafarers have reduced their smoking and alcohol consumption and adopted healthier eating habits, increased their consumption of vegetables and reduced their consumption of foods such as fried foods. However, according to the data collected in the study, consumption of fried foods at sea is much higher than consumption at home. Seafarers reported fewer conditions diagnosed by doctors and more self-diagnosed problems. Somewhat contradictory findings have been found regarding fatigue, mental health and general health among seafarers, with sleep quality decreasing between 2011 and 2016 and this being related to work and environmental factors, not to the anxiety levels reported by seafarers.

Although the Maritime Labour Convention (MLC 2006) contains important regulations on the living conditions of seafarers, these standards are actually quite low and the aim should be to improve these standards, not just comply with them. While research supports this, it is known that many seafarers are reluctant to seek their rights due to fear of losing their jobs and not being re-employed (MacLachlan, 2017).

Ship Environment and Stress

Stress is a feeling that can be experienced by anyone at any time, regardless of the ship or the sailors. As a concept, it was used in the 17th century with meanings such as disaster, trouble, calamity, trouble, grief, and sorrow. Later, in the 18th and 19th centuries, the meaning of this term changed and it began to be used with meanings such as power, pressure, and difficulty, directed at objects, individuals, organs, and the spiritual structure (Güçlü, 2001). In Britannica, (2023), stress is defined in physics and engineering as forces per unit area that cause permanent deformation. In psychology and biology, stress is any environmental or physical pressure that evokes a response in an organism. Stress increases the survival of organisms as they adapt to rapidly changing environmental conditions. For example, in response to unusually hot or dry weather, plants close microscopic pores on their leaves to prevent water loss. However, if the organism's response to stress is inadequate or the stress is too strong, the organism may become ill or die. Cüceloğlu (1993 and 1994) defined humans as beings that are constantly redefined within their relationships. He defines stress as efforts spent beyond physical and psychological limits due to adverse conditions in the physical and social environment. According to Güçlü (2001), in order for external stimuli to cause stress, they must exceed a predetermined sensory threshold and disrupt the system's equilibrium. Thanks to this stress response, the system initiates an adaptation process to return to equilibrium. Tension refers to the effect of stress on the system. The system perceives that it is in a stressful situation due to tension and enters the process of returning to equilibrium. Strain, on the other hand, refers to the amount of energy spent or the price paid by the system to return to balance. For example, the line between a child going to an amusement park crying or laughing on a roller coaster can be measured with this strain. In the same study, stress can be examined in two separate situations, inside and outside the workplace. Examples of stress situations in the workplace include intense workload, time constraints, tight and close supervision, inadequacy of authority, unclear role expectations, incompatibilities, obstacles, conflicting role expectations, responsibility concerns, work environment conditions, relationships between employees, and alienation from work. For the outside, it can be said that they also interact with the general society environment. There is also a mental dimension of workload, which refers to how much mental effort a person



puts in during a task. It includes the level of use of a person's attention, cognitive resources and decision-making skills. Mental workload can increase depending on the difficulty level of the tasks. For example, complex and attention-intensive tasks create a higher mental workload than those of lower difficulty. Özsever and Tavacioğlu (2021) examined the relationship between mental workload felt by seafarers during their duties and heart rate variability. This relationship shows that changes in heart rate increase as mental workload increases. It was noted that the mental workload levels of the participants and the heart rate variability changed significantly at different levels of different tasks and the values increased as the task difficulty increased. In addition, the relationship between the mental workload perceived by the participants and the heart rate variability was found to be statistically significant.

According to Carotenuto et al. (2012), stress can be examined in two ways: subjective and objective factors. In subjective factors, people's perceptions play an important role and therefore individual evaluations such as job satisfaction are at the forefront. However, it is difficult to determine the subjective factors and it is thought that most accidents at sea are caused by these subjective factors and that the desire to leave the job is also related to these factors. Objective factors are related to the conditions of the job, such as social factors such as responsibilities, sleeplessness, being away from family, monotony, low job satisfaction and career anxiety, and physical factors such as temperature changes, shaking and noise. These factors negatively affect the physical and psychological health of seafarers (McVeigh et al., 2019). Additionally, Demir İ. H. (2020) identified objective factors through various examinations in his study, these are:

- A study conducted through a survey with 1963 sailors in the Swedish fleet determined that personnel experiencing noise exposure, tinnitus or hearing impairment were 83% in the engine group, 71% in the service personnel and 70% in the deck group.
- It has been determined that ship-related vibrations are the most common cause of sleep disturbance for 63% of engineers.
- In a study conducted in the Royal Norwegian Navy, it was reported that 25% of 68 participants had sleep disorders.
- A cognitive test was conducted with 87 sailors to evaluate response time and it was discovered that exposure to noise greater than 77.1 dB (A) for at least four hours before the test significantly increased response time to the test.

(Özdemir, 2017) considers how stress can be reduced and provides suggestions, these are:

- To ensure that employees on the ship can get away from work stress, there are areas where they can relax and have recreational activities such as games rooms outside of work hours.
- Internet on ships should be either affordable or free. In addition, there should be a system that allows seafarers to easily communicate with their families. This way, seafarers who cannot reach their loved ones on land will not worry and this will not turn into stress. At the same time, the support they will receive from their families will boost their morale.
- The perception must be created that the work done will not cause any harm to the seafarer and that if something happens to him on the ship, the personnel on the ship



will take the seafarer to the health institutions in the most appropriate, fastest and proper way.

- Ship contract periods should be shortened as much as possible and the seafarer should not be disconnected from his/her life on land, and the work-life balance should be respected. In addition, systemic solutions should be found for the problems experienced by seafarers working on foreign-flagged ships, such as insurance problems and lack of job security. Employees should be given their rights despite their wear and tear.
- People who are new to seafaring or who come from a different company or ship type may have difficulty getting used to the job if they do not receive sufficient training and support. When the difficulties of the job and the lack of information are combined, this can lead to great stress. Therefore, new seafarers should be given training before and after embarking on the ship, their job information should be updated and reminders should be made.

According to the Seafarers' Good Mood Guide published by the Maritime Psychology Association, citing McVeigh et al. (2019), staying healthy and fit is very important for a seafaring career, but mental health is often overlooked. The three main ways to maintain physical health are regular exercise, a healthy diet and adequate rest. Similarly, psychological well-being positively affects our general health and can even extend life expectancy. While we seek help when we feel physically unwell, we often do not do so when it comes to our mood. Seafarers face extra challenges due to factors such as long working hours, monotony and limited social life, as well as being secretive. Therefore, taking care of our mental health positively affects our thoughts, feelings and behaviors.

As a result of the study conducted by Thomas, Sampson and Zhao (2003), it was seen that the stress caused by seafaring is not limited to seafarers themselves. Due to long separations, psychological problems such as depression and anxiety are seen in their relatives and are more common than in the general population. Therefore, seafaring psychology affects not only seafarers but also their spouses, children and close circle, in short, everyone who touches the lives of seafarers.

A study conducted in China found that the law has negative effects on seafarers' compensation claims. Seafarers, their families, employers, insurers and lawyers were interviewed through semi-structured interviews. The study revealed that employer pressure makes it difficult for seafarers to understand their legal rights. In addition, it was determined that crew agencies and shipping companies harm seafarers in terms of compensation. Researchers state that seafarers give up on seeking their rights due to inadequate implementation of insurance rules and legal uncertainties. In addition, the fact that seafarers do not have strong unions like the labor groups working on land puts them at a disadvantage in protecting their rights (Shan, 2018).

Demir İ. H. (2020) conducted interviews with 34 people, including 15 seafarers, 15 seafarers' wives and 4 seafarers' children, and determined that when seafarers work on ships with long-term contracts, in addition to the loneliness experienced by the seafarer at sea, there is also a feeling of absence at home. He emphasized that this feeling experienced by seafarer families is a dead end and emphasized the importance of communication between couples. This study, which seeks a solution for the problems experienced by seafarers on ships and their spouses on land, stated that a special method should be developed for communication and that ship contract periods should be kept shorter than 4 months. He also



stated that 23 different stress factors were determined in 134 seafarers working on German-flagged ships and that the most important stress factor was being away from the family.

Another study conducted through interviews found that seafarers do not only see their spouses working at sea as a profession, but also think that it is a reason why their spouses, who are seafarers, are distant from them and the reason why they miss their relationships. It was also reported that the vast majority of seafarers' spouses do not take their spouses' profession into account at first and do not take into account that they will be separated due to the nature of the seafaring profession when making their choice. When it was investigated what the spouses of seafarers focus on during the time they are actively working on the ship, it was concluded that the vast majority focus on their families and children. When the difficulties faced by the seafarers' spouses participating in the study during the time they are separated from their seafarers, it was seen that the most experienced feeling was loneliness. In addition, seafarers' spouses stated that the difficulty of the situation increases due to the extra responsibilities placed on them while their spouses are actively working at sea (Dumlu, 2019).

It is a major problem for seafarers not to be with their families and loved ones in emergencies during their active working period, and this negatively affects their work performance (Taşdelen, 2015).

As a result of seafarers being separated from their family members for a long time, psychological deterioration and increased stress can also cause aggression. Due to the emotional tension that occurs in situations where aggression occurs, the individual health of seafarers and the health and safety of the workplace are at risk (Güvendiren, 2020).

Failure to take into account the negative effects that seafarers are exposed to during their work, such as social isolation, long and irregular working hours, mobbing in the work environment and stress resulting from pressure, negatively affects the individual well-being of seafarers in the long term. It is stated that the negative effects that seafarers are exposed to during their work also lead to burnout syndrome (Bergheim et al, 2015).

Seafaring has the second highest suicide rate of any profession in the UK over the last 30 years. Between 2003 and 2012 alone, the cost of mental health claims exceeded \$5.6 million. It is also known that accidents that cause permanent disability occur statistically at an average of three in a thousand seafarers each year. The data we have suggests that increasing the importance given to the individual well-being of seafarers will both reduce operating costs and enable a more efficient and safer operation (Hansen, Nielsen, and Frydenberg, 2002).

Ship Environment and Burnout

Burnout is a response to stress caused by long-term work and disrupts both personal and social functionality. It harms physical and psychological health by reducing the quality of work. This situation poses a risk not only for the employee but also for those around him. If the burnout of a watch officer is not noticed, the safety of the ship may also be at risk. Possible damages include human life, the navigation of the ship, the safety of the ship and cargo, environmental pollution, the reputation of the company and financial losses (Leiter, Maslach and Frame, 2014). Individuals experiencing burnout first experience physical symptoms. Problems such as fatigue, headaches, and sleep disorders can eventually lead to a weakening of the immune system, weight changes, respiratory and digestive problems, high blood pressure, and heart palpitations. In addition to these, negative psychological



conditions can develop. Emotional changes such as irritability, restlessness, impatience, lack of self-confidence, hopelessness, apathy, and depression can be observed. In addition, negative attitudes such as hostility towards the individual, family problems, paranoia, and thoughts of quitting the job can also emerge (Zorba, 2016). Emotional exhaustion is the most fundamental element of burnout and is usually caused by excessive work, job dissatisfaction and conflicts in the workplace. Exhausted individuals have difficulty in human relations and may exhibit distant, sarcastic or condescending behaviors towards their environment. This situation feeds on alienation and defense mechanisms. Over time, people experiencing emotional exhaustion limit their human relations and become more prone to negative self-evaluation. When the studies are examined, it is seen that the maritime sector contains high stress and serious risks. Work stress, fatigue and individual isolation can have negative consequences on seafarers and cause burnout. In addition, intense work pressure and being away from family are the most obvious factors affecting the emotional health of seafarers. Intense and long working hours increase personalization in employees. Working less than 6 months, low stress and quality sleep are factors that contribute to a decrease in burnout levels. In a study conducted among Croatian seafarers, it was found that salary and earned rights were the most satisfied issues, while the organization on the ship was the least satisfied issue. It is also stated that separation from family and working conditions on the ship are the main sources of job dissatisfaction (Tavacioğlu et al., 2019).

According to the study conducted by Lefkowitz and Slade (2019), 2 out of every 10 sailors have suicidal thoughts and 3 out of 10 sailors are depressed. Roberts et al. (2010) found that the total mortality rate in 1511 sailors in the British fleet between 1979-2005 was 4% and 57 out of 90 sailors lost at sea committed suicide. In addition, researchers believe that approximately 50% of the missing sailors committed suicide.

In a study conducted using the Maslach Burnout Inventory and Personal Information Assessment Form, the finding that being away from family increases the feeling of personal failure is noteworthy. In addition, when the effect of burnout syndrome on seafarers is examined, emotional exhaustion and desensitization are found to be high in half of the employees. When the decrease in personal success dimension is examined among the findings, it is determined that the majority experience a high level of burnout. According to the research, the group most affected by seafarers is the group between the ages of 25-29 with 1-5 years of experience (Zorba, 2016).

3. SHIP ENVIRONMENT AND THE CONCEPT OF SITUATIONAL AWARENESS

Situational awareness means that a person has the knowledge and experience to accurately understand what is happening in their environment at that moment and to predict how this situation will develop in the future. This includes not only understanding the current situation but also questioning our beliefs by constantly observing external factors. In this way, awareness can be maintained continuously. In an environment, it is important to understand the security status of the organization and the threats it faces, to be able to understand the risks by evaluating these two factors together and to make predictions about the future. Situational awareness requires correctly perceiving the elements in the environment and seeing how they relate to future situations (CSRC, 2023) Queensland has listed the following points to consider to ensure situational awareness (Queensland Government, 2023):

- To have a good understanding of what is happening around you.
- To understand how this information will affect your boat.



- To monitor the status of the systems on your boat (e.g. autopilot, radar, GPS, etc.).
- To monitor other boats, weather and sea conditions, water depth, currents
- To manage time well, always allocating a planned time for emergencies.

In short, situational awareness means being aware of everything around you and having an accurate forecast of what may happen in the future. Also, poor communication, situations where there are too many or too few recipients, can have a detrimental effect on situational awareness. When there are too many recipients, the information conveyed can be confusing and not understood correctly. When there are too few recipients, necessary information may be missing, increasing the risk of not being able to correctly assess environmental situations. Tavacioğlu, et al. (2020) in an online survey conducted with 400 seafarers, it was found that increased leadership contributed to communication, safe operation decisions and effective teamwork. The study shows that as teamwork skills develop, workload sharing, leadership, personal attitudes and communication improve. It was emphasized that increasing safe operation decisions will further strengthen communication. (Koyuncu and Tavacioğlu, 2017) In their study with 344 seafarers, it was suggested that sign language could be used as an alternative to traditional communication methods to minimize the harm that loud noises and cultural differences can have on communication during operations. The study showed that it can help overcome some cultural barriers and such studies are of great importance for the future of maritime.

Loss of Situational Awareness

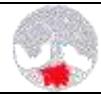
Situational awareness is the ability to notice and understand what is happening in an environment and make the right decisions accordingly. This awareness is lost in complex and stressful situations and mistakes can be made. Situational awareness is a three-stage process: perception, understanding and foresight, and there can be problems in each of these stages. The first stage is perception, which is noticing what is happening in the environment. Perception can be weakened for some reasons, these are:

- Passive and disinterested behaviors
- excessive workload
- distractions and interruptions
- task-irrelevant reason
- optical illusions
- a task-related but misleading event (for example, a warning light starts flashing.)

The second stage is the level of understanding, factors that make understanding difficult:

- Incomplete knowledge or observation
- Lack of experience
- Relying on a wrong thought pattern (mental picture)
- Misinterpreting what you see

The third stage is foresight, foresight is generally seen as a positive trait, but it can sometimes cause problems. Especially in situational awareness, if the mental picture created in the brain is overly relied upon, changes in the environment cannot be noticed. For



example, someone who is used to docking a boat in the same way may make a mistake if they try to apply the same method without realizing that the conditions in the environment have changed. A risky situation can occur that will harm both property and life because the plan in their mind does not match the real situation (Queensland Government, 2023).

Detecting Loss of Situational Awareness

When situational awareness is lost, the environment cannot be evaluated correctly and serious errors can occur. Realizing this is critical to preventing dangers and making the right decisions. If there are communication problems, confusion and uncertainty, distraction, violation of rules, falling behind plans and encountering conflicting information, it can be considered that the person does not have situational awareness.

Jensen and Oldenburg, (2019) in a study conducted on 323 people on 22 German ships, it is emphasized that leaders should be able to recognize and support signs of psychological stress, shock, and imbalance that may occur in the crew. Therefore, it is recommended that leaders receive psychoeducation, especially to cope with intense stress. Today, various applications have begun to be developed to measure the cognitive skills of seafarers. For example, the study developed by (Zorluoğlu et al., 2014) is the first mobile cognitive test prototype designed to be used in seafarer selection and has been prepared to be used on tablets. In the future, with the increase in such applications, it will be possible to test the human factor more frequently and in detail. Özsever and Tavacioğlu, 2022) showed in his study that as the task load of the participants increased, their mental workload increased, while their performance decreased. When eye reactions were examined, the participants were divided into “safe” and “risky” groups in terms of safe navigation. While such studies help us better understand the human factor, they can also prevent possible human errors. (Man et al., 2018) emphasize that interdisciplinary work is no longer an option but a necessity to understand human-machine interaction. Research shows that human factors and human-computer interaction issues in maritime are rapidly developing at the intersection of fields such as computer science, social sciences, engineering and psychology, and the boundaries between these fields are gradually disappearing.

When situational awareness is lost, the first thing to do is to find the simplest and safest solution. No matter how complex or stressful the situation is, there is always a safe path that can be easily implemented. At this point, it is very important to follow the rules and established standards because they are patient and reliable guides that keep the person on the path when situational awareness is lost. When the rules and procedures are followed, the surrounding situation can be perceived more clearly and the right steps can be taken. In addition, regularly performed tasks and well-learned tasks become more durable in stressful moments. Being resistant to the effects of stress is possible with constant preparation and developing the right habits. When situational awareness is lost, the first step to take is to find the simplest and safest solution. No matter how stressful or complex the environment is, there is always a safe way out that can be applied. At this point, it is very important to stick to the established rules and standards because these rules are like reliable guides that keep the person on the right path even when awareness is reduced. Sticking to the procedures makes it easier for us to see the developments in the environment more clearly and make the right decisions. At the same time, regularly performed tasks and well-internalized tasks make us more resilient in challenging moments. The way to be resilient in the face of stress is to be constantly prepared and develop healthy habits (Köseoğlu, 2018).



4. MARITIME PSYCHOLOGY AND HUMAN FACTORS AT SEA

Maritime psychology is a broad discipline that examines the interaction of human behavior in the marine environment and applies it to this subject. However, maritime psychology should determine fair working conditions that take into account not only the professional life of seafarers, but also their leisure time, private life, opportunities for socialization, and the need for adequate rest periods. Studies on maritime accidents have grouped the common problems encountered by seafarers under five main headings. These headings are; workload, situational awareness, work environment, workplace order, and intolerant system MacLachlan, (2017).

Seafarers often live alone and away from their families on ships. While this loneliness has negative psychological effects, social activities on ships improve the mood of seafarers. These activities strengthen the bonds between seafarers and distract them from the anxiety of work. In addition, such activities support seafarers psychologically and keep them away from drugs. Considering the need for socialization and entertainment, these activities are of great importance (Taşdelen, 2015). Yalıtılmış bir ortamda çalışmak, denizcilerin psikolojik olarak zorlanmasına neden olabilir. Aylarca, hatta yıllarca ailelerinden uzak, kapalı bir ortamda çalışmak zorlayıcıdır. (Vlachos et al, 2022) found that the onboard work environment has a low impact on burnout, but a greater sense of belonging. Among the biggest stressors, more than 50% of the seafarers who participated indicated that their "home" was what motivated them to leave their job, along with factors such as having to do a lot of work in a limited time and long working hours. In a study conducted by McVeigh et al. (2019) with 6461 seafarers, most seafarers reported working every day of the week, averaging 67–70 hours per week. Additionally, seafarers from Southeast Asia stayed on board longer and worked with fewer officers, indicating differences between low-income and high-income countries. Being away from family and friends negatively affects seafarers' mental health and leads to a feeling of social isolation and loneliness (Mellbye and Carter, 2017). In a study conducted by Hetherington et al., the effects of factors such as fatigue, stress, health, situational awareness, teamwork, decision-making, communication, automation and safety culture on maritime safety were examined. The study revealed that these factors affect ship safety and that there are still some gaps in the maritime literature. It was also emphasized that research in this area is insufficient because seafarers are a difficult and expensive group to reach (Hetherington et al., 2006). Seafaring is an isolated profession and seafarers are at greater risk of psychological disorders than other occupational groups (Hemmingsson et al., 1997). While only 30% of maritime accidents were attributed to human factors in the 1960s, today the role of human factors in accidents is being investigated more and the annual cost of human-related accidents is estimated at approximately \$541 million (Etman and Halawa, 2007).

Activities that seafarers perform in their free time for rest, entertainment and social interaction are referred to as recreation. These activities improve the psychological and physical health of seafarers, reduce their stress and increase their work efficiency. Making good use of their free time increases the morale and motivation of seafarers, thus enabling them to be more effective in challenging sea duties. Social activities help seafarers establish strong bonds with each other and cope with emotional difficulties such as loneliness. Muslu (2018) examined the free time of seafarers and reached the results that 41.60% go to the cabin to sleep and rest, 20.90% go to the cabin to watch DVDs and TV, 13.20% use internet and wifi in the cabin, 9.10% go to the cabin to listen to music, 5.40% watch DVDs in social media areas and 2.80% chat in social media areas. In a similar study by Sampson et al.



(2017), 42% preferred to rest in their cabins, 21% watched TV, and 13% used the internet. A smaller number said they engaged in activities such as listening to music (9%), engaging in group activities (5%), or chatting with colleagues (3%). Other social activities were rarely preferred. The rapid development of technology has also had an impact on the maritime sector. For example, while the comfort of cars and airplanes has increased, technological developments in the maritime sector have not always improved the comfort of sailors. Although automation on ships has increased, become faster and safer, this has led to ships being allowed to be managed with fewer employees. As a result, the workload on sailors remaining on ships has increased, causing problems such as overwork, fatigue and insomnia (Asyalı and Kızkapan, 2012). The development of technology used on ships has caused work to become more monotonous and fatigue to increase. It has been determined that the number of bridge personnel has decreased thanks to automation, and as a result, workload has increased and rest periods have shortened. It is also known that such negative factors can lead to maritime accidents. For example, the acceleration of ships causes pilots to work more intensively (Özsever, 2015).

Seafarers and Mobbing

Mobbing is a set of intentional behaviors aimed at systematically suppressing, excluding, and intimidating an employee at work. The maritime sector, with its structure that prioritizes safety and is based on the human element, clearly demonstrates the importance of employees. Therefore, it should not be forgotten that the problems experienced by seafarers can have serious consequences not only for individuals but also for maritime safety. The risk of the experienced problems turning into accidents requires these problems to be addressed seriously. On the other hand, in addition to its structural difficulties, the maritime profession is one of the areas where the phenomenon defined as "mobbing", which means psychological harassment at work, is frequently seen. According to Leymann, (1996), mobbing is the systematic application of pressure, harassment, and psychological violence against a person. Although it has been a phenomenon for a long time, it was not scientifically defined and researched until the 1980s. Mobbing is a serious problem that threatens organizational health and negatively affects employees' job satisfaction and peace at work – and in the maritime sector, peace in the living space. This problem starts with loss of interest in work, boredom, discouragement and poor performance and can eventually lead to resignation. In a study between seafarers' job performance and job stress, it was observed that mobbing increased job stress and decreased personal performance, and it was also stated that maritime is a sector where mobbing is frequently encountered (Yıldırım and Tavacıoğlu, 2017).

Mobbing can be defined as degrading behaviors intended to cause emotional pain to vulnerable people, arbitrary punishments by superior authorities, or malicious actions intended to force a person or group of employees to resign. In a study conducted with 178 Turkish seafarers, Tavacıoğlu et al. (2018) found that seafarers' perceptions of mobbing varied according to factors such as age, experience on board, and position. According to this study, as age and experience on board increased, seafarers were less exposed to mobbing. In (Ertürk, 2020) in order to examine interpersonal conflicts on ships, officers were interviewed and the causes of conflicts were determined. Among the causes of conflict, issues such as ethnicity, religion, hierarchy, food and working hours were prominent. The researcher drew attention to the deficiencies in maritime literature regarding conflicts and emphasized that conflicts lead to health problems, fatigue and deaths of sailors. In addition, it was stated that there is a relationship between grudge and resentment due to the hierarchical structure on ships.



Uğurlu et al. (2022) study reveals the prevalence and effects of mobbing in the maritime sector. In the study, Leymann's Psychological Terror Inventory (LIPT) was adapted to the maritime context and the psychological harassment behaviors that Turkish seafarers were exposed to were examined. According to the findings, the rate of seafarers being exposed to mobbing decreases as they get older; the most common types of mobbing were observed as constantly assigning new tasks, restricting the right to expression by superiors, and spreading false rumors on board. Sexual harassment, especially for female seafarers, has been stated as an important risk factor in the context of occupational health and safety; however, the low reporting rates of such behaviors are explained by the hesitations of the victims. The study also states that mobbing is not only caused by individual conflicts, but also by the personality traits of the person and psychosocial factors in the work environment. It was stated that mid-level managers can apply mobbing to their subordinates due to pressure from their superiors, and in some cases, subordinates can also exhibit psychological harassment behavior towards their superiors. According to the study findings; women, young (between the ages of 20-40) and single seafarers are more exposed to mobbing, high school and associate degree graduates experience mobbing at a higher level, and the type of ship does not show a significant effect. In addition, it was determined that those with 0-5 years of maritime experience experience mobbing more than their colleagues with 10 years or more of experience. The fact that officers are subjected to more psychological harassment than captains is associated with the fact that those who apply mobbing are mostly captains.

Mobbing has serious consequences at individual, institutional and societal levels. While individual social relations may deteriorate, depression and loss of self-esteem may occur; From an institutional perspective, work efficiency decreases, the environment of trust is damaged and the corporate culture is damaged. Mobbing is seen as one of the reasons why especially young and inexperienced seafarers leave the profession early. Therefore, it is of great importance for seafarers to be made aware of mobbing, experienced personnel to take responsibility in this regard and companies to develop clear policies and provide a healthy working environment. It should not be forgotten that mobbing is not a fate but a preventable problem. When the effect of mobbing on seafarers is considered, it is seen as a result of the studies conducted that the psychological well-being of the seafarer is affected and damages the safety environment and culture on the ship. Since the maritime sector is a sector that prioritizes safety and relies heavily on the human factor, the well-being of seafarers is of critical importance. Mobbing seems to impose pressure, stress and many other problems on seafarers. It is obvious that ship environments that may cause mobbing should be reduced for the safety of seas and ships (McVeigh et al., 2019).

Job Satisfaction of Seafarers

Nielsen et al. (2013) conducted a study with 541 seafarers working on ships belonging to maritime logistics companies in Norway, and examined the effects of physical and psychosocial work environment conditions on seafarers' job satisfaction and intention to quit. The results show that these factors are significantly related to both job satisfaction and the desire to quit. In particular, factors such as perception of security, job demands and team harmony play an important role in this relationship. The study emphasizes that situational factors affect job satisfaction in maritime, but it also reveals that individual differences—such as stress coping skills, psychological resilience and personality traits—need further investigation. Indeed, it is seen that these individual factors are increasingly important in the maritime sector today.



Papachristou et al.'s (2015) study emphasized that the availability and accessibility of communication facilities on board (e-mail, satellite phone, internet, radio, etc.) played an important role in seafarers' decisions to stay in the profession. According to the results of the study, when seafarers were away from their families and could not establish healthy communication with them, their motivation to continue in the profession decreased. Although they stated that they were generally satisfied with their profession, when asked about the reasons for quitting, the most frequently mentioned reason was insufficient communication with family and loved ones. This situation is a clear indication that seafarers experience a long-term sense of isolation and that lack of communication deepens this loneliness. Although the concept of loneliness was not directly addressed, restrictions on communication stand out as a significant factor that increases the psychological burden of seafarers.

According to Demir M. (2020), factors such as poor relationships with managers and coworkers, low wages, and limited promotion opportunities increase employees' intention to leave their jobs. In particular, a negative perception of organizational justice weakens employees' commitment to the organization and strengthens their intention to leave. Unfair practices among employees or different treatment among people in similar positions trigger this situation. On the other hand, it has been observed that individuals with high commitment to the organization have a lower tendency to leave their jobs. In environments where work performance is appreciated and employees have the opportunity to develop their skills, the tendency to leave decreases significantly. In addition, while the individual's level of education, abilities, and behavioral tendencies can increase the intention to leave; factors such as long tenure, the number of dependents, and age can reduce this intention. When evaluated according to gender and marital status, it was determined that women have a higher tendency to leave their jobs compared to men, and single employees have a higher tendency to leave their jobs compared to married employees.

In a study conducted by Vlachos et al. (2022) with 1612 seafarers, it was found that 39% of job satisfaction was due to general job satisfaction, 18.1% to salary, and 16.3% to burnout. The study reveals that shipping companies can increase seafarers' job satisfaction by creating a supportive culture, prioritizing social activities, and paying attention to the ship environment (hygiene, commitment, functionality). The results of the model show strong positive effects on job satisfaction, while salary was also found to have significant effects on satisfaction and burnout. It was found that the supportive culture of the companies had the highest effect, and there was also a strong negative relationship between work-family stress and job satisfaction. These findings show that seafarers' job satisfaction is important in terms of retaining qualified personnel and productivity and safety in the workplace.

Well Being of Seafarers

The well-being of seafarers plays a critical role in the sustainability of human-centered safety systems, especially on ships. Although there is a transition to automation on ships, safety systems that are performed by humans are still intensively operated. Therefore, it is extremely important to support the psychological and physical health of seafarers in order to reduce the risk of making mistakes and increase their work efficiency. Research shows that the biggest sources of stress faced by seafarers are factors such as "personnel relations" and "longing for family", Arslan and Er (2007) ve Kurt (2010). In addition, other stress factors such as routine and boring life on the ship, being away from social life, environmental difficulties and the decrease in sleep quality due to continuous work can be added to this list.



One study found that one-third of seafarers showed signs of depression and 35% did not seek help, let alone professional help (Lefkowitz and Slade, 2019). This often leads seafarers to ignore their mental health problems due to fear of stigma (Rathi, 2017). In addition, shipboard workers also face personal health problems such as excessive smoking, alcohol consumption, and unhealthy diet. In one study, hypertension was observed in all seafarers aged 25-55 in Pakistan, which caused serious health concerns (Zakaria et al., 2018).

Shift work causes circadian rhythm disorders and constant fatigue. Most seafarers working on ships experience sleep deprivation and mental fatigue due to irregular working hours. This can negatively affect both their personal health and ship operations (Özsever and Tavacioğlu, 2018). Fatigue is felt more during shifts, especially at the end of the shift, and this reduces the cognitive performance of seafarers. A study has shown that different shift times and working conditions on ships lead to a significant decrease in cognitive test results (Taç et al., 2013). In addition, environmental factors such as light, temperature, and noise can also negatively affect cognitive performance.

Many studies show that circadian rhythm changes have negative effects on the psychological and physical health of seafarers. Lack of sleep and long working hours increase these negative effects Özsever, (2015), Sampson et al., (2017). In particular, frequent changes in the circadian rhythms of ship personnel cause more insomnia and physical fatigue. This negatively affects the general psychophysiological state of seafarers. It has been determined that the change in the circadian rhythm has a great effect on the psychological state of seafarers (Özsever and Tavacioğlu, 2018).

Fatigue also directly affects the cognitive performance of ship personnel. Studies have found that sailors' success rates decrease and their reaction speeds slow down at the end of a 4-hour cruise shift (Taç, 2012). In addition, while an increase in sailors' arousal levels is observed at the beginning of the shifts, this level decreases towards the end of the shift (Özsever and Tavacioğlu, 2018). Kurt (2010) revealed in his research that seafarers experience a feeling of burnout due to long working hours, poor environmental conditions and insufficient sleep. According to the study, seafarers working on ships may feel desensitized and may think that they have lost their personal achievements. In particular, the length of working hours and the decrease in sleep quality are the most important reasons for the feeling of burnout.

Finally, another study shows that before Covid-19, between 24% and 36% of seafarers experienced "severe fatigue" and this fatigue was mostly due to long working hours (Sampson et al., 2017). The study found that working hours, environmental conditions and anxiety are factors associated with sleep disorders. In addition, factors such as movement and noise in the ship environment increase fatigue and deepen sleep deprivation.

In summary, the psychological and physical well-being of seafarers is extremely important for ship safety and operational efficiency. Improving the working conditions of seafarers both increases safety and strengthens the commitment of employees to their profession. Therefore, research and improvement efforts on the mental and physical health of seafarers not only increase the quality of life of seafarers, but also contribute to the maintenance of safety in the maritime sector (Muslu, 2018).

5. CONCLUSIONS

The maritime sector, by its nature, offers a challenging work environment that can have significant effects on human psychology. Factors such as being away from family for



long periods, social isolation, intense work tempo, irregular sleep hours and limited personal space negatively affect both the physical and mental health of seafarers. Individuals working under these conditions may experience serious psychological problems such as stress, burnout syndrome, depression, anxiety disorders and even suicidal tendencies.

Another important issue emphasized in the article is the loss of situational awareness. Factors such as cognitive difficulties experienced by seafarers in decision-making processes, inattention and lack of communication carry risks that can lead to serious maritime accidents. For this reason, seafarers need to be equipped not only with vocational training but also with training and support that will provide psychological resilience.

In addition, it is observed that factors such as job satisfaction, social support and healthy communication increase the psychological resilience of seafarers, thus making them more committed to their profession, motivated and productive. However, it is clear that current practices are generally reactive (e.g. post-crisis consulting), whereas the sector needs to move towards proactive strategies (e.g. better living conditions, shorter contract periods, free internet).

As a result, the maritime sector needs to be addressed not only with technical safety measures but also with a holistic and sustainable approach that focuses on the human factor. Increasing the psychological well-being of seafarers not only protects their individual health; it also directly positively affects the safety of ship operations, work efficiency and the overall performance of the sector. In this context, improving living conditions on ships, shortening contract periods, increasing internet and communication opportunities, strengthening psychological support mechanisms and encouraging collective social activities are of great importance.

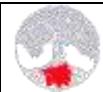
It is recommended that future studies be supported with more quantitative data, comparative analyses with seafarers from different countries and cultures and focusing on the experiences of special groups such as women seafarers. In addition, empirical research should be conducted on the effectiveness of training programs aimed at developing psychological resilience, stress management and decision-making skills in times of crisis for personnel working in maritime. Such studies will not only contribute to the development of human-centered policies in the sector and increase the quality of life of seafarers, but will also play an important role in reducing maritime accidents.

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