



STRESSFULNESS ASSESSMENT OF THE SKIPPERS – A PILOT STUDY

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Abstract. Seafarers may be affected by many stressful environmental and psychological factors. The main aim of this study was to construct a *stressfulness assessment of job-related situations and circumstances questionnaire (SJRSQ)* for bareboat and crewed charter skippers. The initial questionnaire was filled out anonymously and online by a total of 47 male skippers who were engaged as yacht captains on weekly tourist voyages. 7 latent components of the stressfulness assessment were determined. 7 SJRSQ measures were constructed with *satisfactory* metric characteristics, and it is possible to use the *overall score* as general measure of the skipper's stress assessment. Average scores of measures of the SJRSQ questionnaire vary from *moderate* on the *lack of privacy* (3.09) to *very low* on the *communication with guests* (2.11). Generally, skippers consider the environment in which they operate to be *low* stressful. Skipper's SJRSQ assessments are independent of the *age of the skipper*, as no significant differences were found between younger and older skippers. SJRSQ assessments are independent of the *skipper's job experience*, as no significant differences were found between skippers with shorter and longer skipper job experience. However, the SJRSQ questionnaire measures significantly differentiate skippers with different *duration of skipper engagement* in the 2024 tourist season. Skippers who were engaged as skippers for longer periods of time (*11 or more weeks*) during the season compared to skippers who were engaged for shorter periods of time (*8 or less weeks*) had *higher* stress assessments in the *social characteristics* ($p=0.02$), *job characteristics* ($p=0.02$) measures, and a higher *SJRSQ overall score* measure ($p=0.049$). The results of the pilot study indicate the need for further research into the stress assessments of bareboat and crewed charter skippers on a larger sample size, but also the need for further development and validation of the SJRSQ questionnaire.

Keywords: Charter Skipper; Maritime Safety; Navigational Situations; Professional Stress; Stress Coping.

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1. INTRODUCTION

The state of disturbed mental and physical balance resulting from physical, psychological or social endangerment of an individual is usually defined as stress (Havelka, 1998). Levi, Sauter and Shimomitsu (1999) define professional stress as a series of harmful physiological, psychological and behavioral reactions of an individual to situations in which the demands of the job are not aligned with his abilities, possibilities and needs. Družić Ljubotina and Friščić (2014) state that the sources of professional stress can arise from the characteristics of the work environment, the organization of work and the way of communication in the organization, the characteristics of individuals, and from many other everyday factors that may be very specific in context and dependent on different mutual relationships. Johnson et al. (2005) state that research confirms that professional stress affects the mental and physical health and well-being of employees. Barlow and Iverson (2005) believe that the health and well-being of employees are particularly affected by professional stressors related to safety, the way of management in the organization and by the characteristics of the job and the organization itself. Pološki Vokić and Bogdanić (2008) state that unwanted consequences of professional stress are also possible in organizational outcomes such as efficiency, job satisfaction, loyalty and leaving the organization.

Song and Yeo (2015) claimed that 90 % of the world's trade is conducted by seaborne trade, and therefore thousands of seafarers perform their work tasks on ships around the world. Many stress factors affect seafarers: workplace noise, ship movement, vibration, and heat (e.g., Oldenburg, Hogan and Jensen, 2013), physical needs, recreation scarcity (Zhang and Zhao, 2017), lack of sleep (Hystad and Eid, 2016), fatigue (Carotenuto, Molino, Fasanaro and Amenta, 2012), and elevated leadership responsibilities, absence from family and isolation (Slišković and Penezić, 2016). Most (91.6%) of the seafarers are disturbed by the at least one environmental factor: ambient light during sleeping in cabins, poor bedding conditions, excessively cold or warm ambient temperatures, noise or odors (Kerkamm et al., 2021). Slišković and Penezić (2015) have concluded that stressors in seafaring may lead to different symptoms of stress: changes in eating habits, loss of concentration, anxiety, lower tolerance of frustration, insomnia, and psychosomatic symptoms and diseases, as well as, may lead to overall reduced productivity. Furthermore, extremely demanding seafaring occupation, may lead to a gradual loss of physical and mental fitness, which may ultimately lead to human error, illness, and disabilities related to seafarers' work

(Godinho, Ferreira, Greco, Teixeira and Teixeira, 2016). Senbursa (2024, p. 1) suggested that findings of the studies published "reveal that ship operators need to provide access to mental health resources and support services, such as counseling, to help seafarers cope with the stress and isolation of life at sea". Russo et al. (2023) found that the anthropometric statuses of the seafarers significantly changed during several weeks of continuous onboard service and concluded that these changes in anthropometric parameters could indicate deterioration of seafarers' health statuses. Because of the importance of these findings Russo et al. (2023) suggested to continue the research related to professional and occupational stress of other maritime engaged work specialties, as engineers, fishermen, skippers, seasonal workers, etc.

The term skipper covers a wide range of maritime occupations, and its meaning may vary depending on the country and type of maritime activity. In the context of *bareboat and crewed charter services*, a skipper represents the *captain of a yacht* who changes guests and ports of departure, and possibly vessels, on a weekly basis. Commanding a yacht as part of a tourist trip, which usually lasts seven days, includes a series of responsibilities: from safe handling of the vessel and navigation, through communication with guests and crew, to adjusting the route according to weather conditions and the wishes of the clients. The dynamics of a skipper's work, as well as frequent changes in working circumstances (both guests and vessels), further increase the potential for experiencing stress in the already demanding and intensive activities of a skipper. The sources of stress among *yacht skippers (bareboat and crewed charter skippers)* in the world and in Croatia have not been researched so far. Therefore, the main aim of this pilot study was to determine the occurrence and intensity of stressfulness of possible stressful situations and circumstances related to the skipper's job performing, and to determine the latent structure of possible sources of stress. Additionally, the aim of the pilot study was to determine the relationship between *skipper's stressfulness assessments* with *basic demographic and job characteristics* of the skippers.

2. METHODS

As part of a broader research project, a newly constructed *stressfulness assessment of job-related situations and circumstances (SJRSQ) questionnaire* was filled out online and anonymously by 47 male skippers. The study included only skippers who had previously served as *captains on yachts* engaged in *bareboat or crewed charter services*. 55.3% of respondents were under 30 years of age, and 23.4% were between 31 and 40 years of age. 40.4% of respond-

ents had up to 5 years of *work experience* in bareboat or crewed charter skippering, and the same number (40.4%) had 6 – 10 years of *skippering experience*. In the 2024 tourist season, a total of 42.6% of respondents were engaged as bareboat or crewed charter skippers for *up to 8 working weeks*, and a total of 67.4% of respondents for *11 or more working weeks*.

The items (questions) of the questionnaire for assessing the stress of situations were constructed in collaboration with three independent experts who have been involved in bareboat or crewed charter skippering for more than 10 years. When constructing the questionnaire items, an effort was made to identify as many situations as possible that could be job related to the stress of the skipper performing. Respondents assessed how stressful the situation was to them if it had already happened to them or how stressful it was when they thought about the possibility of it happening. Respondents anonymously assessed the questionnaire items on a 5-point Likert scale (1 – not at all; 2 – very little; 3 – a little; 4 – quite a lot; 5 – very much, completely).

To determine the latent structure of the newly constructed questionnaire, exploratory *Principal Component Analysis (PCA)* with *Varimax* rotation was used and the *Guttman-Kaiser criterion* was used to determine the number of significant components. To determine the basic metric characteristics of the SJRSQ questionnaire measures, the following were used: *homogeneity*, PCA was applied to the scale items; *reliability*, the Cronbach alpha coefficient scale was calculated; *sensitivity* of the measures, the following indices were used: Kolmogorov-Smirnov *goodness-of-fit* test, *range of results* (minimum and maximum result), and *skewness* and *kurtosis* indices. The results on the scales of the constructed SJRSQ questionnaire were calculated by adding up all the results of the items of each scale, and then this sum was divided by the number of items of each scale. The *SJRSQ overall score* of the constructed questionnaire was calculated in the same way. Descriptive characteristics of the items and questionnaire measures are presented as: *mean*, *standard deviation*, *minimal*, and *maximal result*. Analyses of differences in assessments of the stressfulness between subgroups of respondents in the sample of respondents were determined by using the *student t-test* for independent samples. All results in the measures of the constructed questionnaire were interpreted using the scale of Bavčević, Milavić and Bavčević (2024).

3. RESULTS AND DISCUSSION

By applying explanatory PCA to all items of the questionnaire, it was determined that all 25 items were

projected onto 7 principal components, components that individually explain approximately from 20% to 5% of the total common variance (*note: the results of the PCA analysis are presented in Supplement table 1*). Given the low number of respondents in the sample, the information obtained from this analysis was used generally and “informatively” in the further process of constructing the scales and measures of the SJRSQ questionnaire. The aim of the questionnaire construction was to create measures (either *scales* or *single-item measures*) of the SJRSQ questionnaire with at least *satisfactory* measurement characteristics that “follow” the established latent structure of the questionnaire. After multiple trials, the SJRSQ questionnaire measures were constructed, which contain 4 *scales* and 3 *single-item variables*.

The **social characteristics scale** contains 6 items that refer to various unfavorable social circumstances associated with the work of a bareboat or crewed charter skipper, items such as: *social isolation*, *seasonal nature of the job*, *living conditions on board*, and *financial pressures and problems*. The scale is homogeneous because the scale items were projected onto a single component that explains 61.2% of the common variance, the reliability of the scale is *good* (0.87). In this scale, the most stressful item for skippers was related to *living conditions on board – bed, cramped conditions, limited space, ...*, assessed as *moderate* (3.06). Two items related to finances were *lowly* stressful for them – *pressure to earn money* (2.45) and *financial problems during sailing* (2.51).

The **navigation situations scale** contains 5 items that relate to difficulties and dangers associated with sailing or maneuvering the ship, items such as: *adverse or dangerous weather conditions for sailing*, *maneuvering the ship and anchoring*, and *responsibility for the safety of guests (and crew)*. The scale items projected onto a single component that explained 51.7% of the common variance, and the scale *reliability* was *satisfactory* (0.76). For skippers, the *highly* stressful item was related to *weather conditions for sailing and being at sea* (3.30), and the *moderately* stressful item was *responsibility for the safety of guests* (3.13). The *low* stressful items were related to the management of the ship – *navigation in demanding areas* (2.43), and *docking and maneuvering in ports* (2.53).

The **job characteristics scale** contains 5 items that refer to the general characteristics and difficulties associated with performing the job of a bareboat or crewed charter skipper, items such as: *long and consecutive sailings without rest*, *fatigue and lack of sleep*, *exposure to the sun and dehydration*, and *uncertainty of employment as a skipper*. The scale items projected

Table 1. Skipper's Job Related Stressfulness Questionnaire (SJRSQ) measures

<i>Social characteristics scale</i>					
Item	FS	Mean	SD	Min	Max
Limited communication opportunities with loved ones (friends, family, etc.)	-0.87	2.77	1.16	1.00	5,00
Isolation from one's social environment	-0.81	2.87	1.28	1.00	5,00
Financial pressure – earning money	-0.81	2.45	1.18	1.00	5,00
Seasonal nature of the skipper's job	-0.77	2.70	1.28	1.00	5,00
Financial problems in sailing (repair costs, supplies, etc.)	-0.77	2.51	1.16	1.00	5,00
Living conditions on board (bed, cramped conditions, limited space, etc.)	-0.66	3.06	1.37	1.00	5,00
<i>Navigational situations scale</i>					
Item	FS	Mean	SD	Min	Max
Docking and maneuvering in ports (crowds, inexperienced crew, etc.)	-0.84	2.53	1.14	1.00	5,00
Anchoring in unregulated locations (bays, etc.)	-0.80	2.57	0.99	1.00	5,00
Navigation in unknown or demanding areas (heavy traffic, shallow passages, unmarked rocks, etc.)	-0.74	2.43	0.97	1.00	5,00
Weather conditions (storms, strong winds, large waves, etc.)	-0.61	3.30	0.81	1.00	5,00
Responsibility for the safety of guests (and crew)	-0.58	3.13	1.13	1.00	5,00
<i>Job characteristics scale</i>					
Item	FS	Mean	SD	Min	Max
Too short a time between sailings	-0.86	2.89	1.20	1.00	5,00
Large number of consecutive sailings (without rest)	-0.75	3.04	1.18	1.00	5,00
Prolonged sun exposure and dehydration	-0.74	2.51	1.21	1.00	5,00
Fatigue and lack of sleep (long sailings, night shifts, ...)	-0.71	2.74	0.94	1.00	5,00
Insecurity (uncertainty) of employment as a skipper	-0.65	2.51	1.21	1.00	5,00
<i>Unexpected situations scale</i>					
Item	FS	Mean	SD	Min	Max
Lack of available resources (water, food, fuel, ...)	-0.78	2.62	1.09	1.00	5,00
Misunderstandings with guests or crew	-0.75	2.34	0.98	1.00	5,00
Poor equipment or lack of equipment on board	-0.74	2.53	0.88	1.00	4,00
Technical failures (engine, electronics, sails or anchor problems)	-0.73	2.87	0.95	1.00	4,00
Administrative and legal problems (permits, inspections, insurance, ...)	-0.61	1.79	0.98	1.00	4,00
<i>Time pressure variable</i>					
Item	Mean	SD	Min	Max	
Schedule and itinerary (pressure to arrive at the destination, ...)	2.91	1.14	1.00	5.00	
<i>Communication with guests variable</i>					
Item	Mean	SD	Min	Max	
Communication with guests (different expectations, language barriers, ...)	2.11	0.76	1.00	4.00	
<i>Lack of privacy variable</i>					
Item	Mean	SD	Min	Max	
Lack of privacy on the ship	3.09	1.33	1.00	5.00	

Notes: FS – factor (component) saturation; SD – standard deviation; Min – minimal result; Max – maximal result.

onto a single component that explains 56.0% of the common variance, the *reliability* of the scale was *good* (0.80). Skippers found as *moderately* stressful item *a large number of weekly sailings in a row with only one day of rest between sailings* (3.04). Low stressful items were: *long-term exposure to the sun and dehydration* (2.51), and *uncertainty of employment as a skipper* (2.34).

The **unexpected situations scale** contains 5 items that refer to unexpected difficulties and/or conflict situations related to performing the skipper's job, items such as: technical failures, lack of resources and poor equipment, conflicts with guests (or crew), and administrative difficulties. The scale items projected onto a single component that explains 52.2% of the common variance, the *reliability* of the scale was *satisfactory* (0.77). Skippers found the item *technical failures* as *moderately* stressful (2.87). Very low stressful was item *administrative and legal problems* (1.79), and low was stressful item *misunderstandings with guests* (2.34).

Three single-item measures were constructed, and they were separated into independent measures as quality representatives of the last three latent dimensions of the SJRSQ questionnaire. The first single-item measure is **time pressure**, which refers to the schedule and itinerary that skippers have during a weekly tourist cruise. It is justified and reasonable to assume that tourists' goals for a weekly cruise are: to visit as many different places as possible, to experience as many interesting events as possible, and to pass through as many different areas as possible. Therefore, skippers, regardless of weather and sailing conditions, often have time "pressures" of "on time" arrival at temporary destinations (whether in ports, bays, towns, cities, national or natural parks, restaurants, ...), as well as the final time "pressure" of arrival at the home port (both due to the possible travel of tourists to their homes, and due to the

preparation of the ship for continuation of the next cruise with new guests). The time pressure item was *moderately* stressful for skippers (2.91). The second single-item measure was **communication with guests**, which refers to overall communication with guests, either regarding difficulties and language barriers in communication, or regarding possible different or unrealistic expectations on the part of guests. The item communication with guests was very low stressful for skippers (2.11). The third single-item measure was **lack of privacy on board**, which refers to the lack of privacy for skippers on board. Lack of privacy is manifested through limited social distancing and the inability to withdraw from the sight of others, resulting in a constant feeling of exposure. In addition, skippers often face inadequate rest conditions (such as extremely cramped cabins or sleeping in a common lounge), and sharing sanitary facilities with guests and crew. The item *lack of privacy on board* was *moderately* stressful for skippers (3.09).

By reviewing Table 1, it is possible to conclude that the skipper's stress assessments of all items vary from *high* (item *weather conditions of sailing and staying at sea* – 3.30) to *very low* (item *administrative and legal problems* – 1.79). However, by analyzing the maximum results in the table, it is noticeable that at least some skippers or a smaller part of the sample of respondents rated each item as either *quite a lot* stressful (Likert scale unit – 4) or *completely* (very much) stressful (Likert scale unit – 5).

Table 2 presents the descriptive and *sensitivity* characteristics of the SJRSQ questionnaire constructed measures. Based on the results presented in Table 2, it is possible to conclude that the *sensitivity* of all measures of the SJRSQ questionnaire was at least *satisfactory*, if not *good*. Although two single-item measures had a significant deviation from the normal distribution (represented by the *goodness-of-fit* test), other indicators of the sensitivity of all measures were

Table 2. Descriptive and *sensitivity* characteristics of SJRSQ measures

Variable	Mean	SD	Min	Max	Max D	Skew	Kurt
Social characteristics	2.73	0.96	1.17	4.50	0.12	0.23	-0.95
Navigational situations	2.79	0.72	1.00	4.80	0.13	0.31	0.62
Job characteristics	2.74	0.86	1.20	4.80	0.14	0.46	-0.23
Unexpected situations	2.43	0.71	1.20	4.20	0.11	0.32	-0.38
Time pressure	2.91	1.14	1.00	5.00	0.24*	0.08	-1.10
Communication with guests	2.11	0.76	1.00	4.00	0.30*	0.44	0.20
Lack of privacy	3.09	1.33	1.00	5.00	0.14	-0.05	-1.07
SJRSQ Overall score	2.69	0.62	1.37	4.01	0.13	0.39	-0.50

Notes: SD – standard deviation; Min – minimal result; Max – maximal result; Max D – Kolmogorov-Smirnov *goodness-of-fit* test; * – significant Kolmogorov-Smirnov *goodness-of-fit* Max D test, $p < 0.05$; Skew – distribution skewness; Kurt – distribution kurtosis.

claimed at least as *satisfactory* by using the sensitivity evaluation criteria recommended of George and Mallery (2016).

The average scores of all measures of the SJRSQ questionnaire vary from *moderate* on the single-item measure of *lack of privacy for skippers* (3.09) to *very low* on the single-item measure of *communication with guests* (2.11). The scores of the scales were mostly assessed as *low*, with only one being at a *moderate* level, the *navigational (sailing) situations* scale (2.79). The maximum scores on the SJRSQ measures (that vary between 4.00 for the *communication with guests* measure up to maximal value of 5.00 for the *lack of privacy* and *time pressure* measures) show that there was at least one skipper in the sample who consider the situations and characteristics of skipper's job to be *quite a lot* or *completely (very much)* stressful.

The overall assessment of skipper stress, the overall measure of the SJRSQ questionnaire is the average of all 7 SJRSQ measures. Using PCA, it was determined that these measures projected onto two principal components that together explain 62.9% of the common variance (note: the PCA results of the overall SJRSQ measure are presented in Supplemental table 2). The first component of the overall SJRSQ measure is the **social environment** component, which consists of two scales of *social characteristics* and *job characteristics*, and a single-item measure *lack of privacy*. The second component is the **maritime environment**, which consists of a *navigational situations* scale and two single-item measures of *time pressure* and *communication with guests*. The unexpected situation scale projected equally onto both principal components. The reliability of the SJRSQ overall measure of job-related stressfulness for bareboat or crewed charter skippers was *satisfactory* (0.77), and the sensitivity of the overall stress measure was *good*.

Generally, skippers consider the circumstances and environment in which they operate to be *low stressful* on average. This is very positive fact because it shows that they are *well-educated, trained* and *prepared* for the activities and conditions that await them on the sailings. However, there are some items that, most often related to the *social characteristics* of skippering, are assessed as *moderately stressful*: *lack of privacy for the skipper on board*; *living conditions on board (bed, cramped conditions, limited space, ...)*; *isolation from their social environment*; *a large number of consecutive sailings without rest*; *too short a rest period between consecutive sailings*; *schedule and itinerary (pressure to arrive at the destination, ...)*. The stress of these items for skippers shows that the organization and preparation of weekly tourist sailings do not take enough care of the skipper's quality of life. Skippers who have many tourist sailings in a consecutive row could ac-

cumulate fatigue, and this may make them more susceptible to stressful situations and therefore less effective in quality performing their work assignments on board. Often, the engagement of an individual skipper is contractually temporary, and lasts only for one or a few weekly sailings. Skippers are therefore most often paid according to the number of completed, done weekly sailings, and therefore they try to complete as many weekly sailings as possible during the tourist season. In the future, it would be desirable to consider finding some solution to reduce the possible accumulation of fatigue and stress of tourist yacht skippers.

A smaller part of the *moderately* stressful items were: *weather conditions (storms, strong winds, large waves, etc.)*; *responsibility for the safety of guests (and crew)*; and *technical failures (engine, electronics, sails or anchor problems)*. These items are expectedly and reasonably more stressful than other items in the questionnaire because they truly represent the most important situations related to the skipper's job: *responsibility for the safety of people on board*, and *responsibility for the ship as the basic equipment for sailing*. Such events are not frequent and are "conditionally" beyond the skipper's control, but when they occur they can have very stressful consequences. An experienced skipper can prepare for possible *weather conditions* because the available meteorological forecasts are quite reliable, so the skipper can adjust the sailing route and secure a berth in a safe harbor in time. However, there is no prior "announcement" for possible *technical failures*, they can be a threat to both the quality of service to guests and the safety of sailing. Item *technical failures* are "completely" outside the actual control of the skipper, and do not depend on either the knowledge or the competence of the skipper himself.

The SJRSQ questionnaire determined that some situations and circumstances are *very low* or *low* stressful for skippers, and they can be classified into three groups of items: first group, *sailing, docking, maneuvering and anchoring*; second, *communication and possible misunderstandings with guests*; third, *administrative tasks* of the skipper. *Sailing, docking, maneuvering and anchoring* are activities of the skipper's routine and everyday life, and which can be stressful only for skippers with less sailing experience. *Communicating with guests* and *resolving various "misunderstandings"* with them is also a routine activity. It is possible that this item (*communication with guests*) represents a "selective" skipper variable. Namely, if a skipper does not want or is not able to communicate with guests' well, he will probably seek some other business engagement in the maritime sector. Skippers generally do not have larger or more extensive *administrative tasks*, and if they do have

Table 3. Correlations between SJRSQ measures

Variable	Social characteristics	Navigational situations	Job characteristics	Unexpected situations	Time pressure	Communication with guests	Lack of privacy
<i>Social characteristics</i>	1.00	0.36*	0.77***	0.55***	0.37*	0.21	0.70***
<i>Navigational situations</i>	0.36*	1.00	0.36*	0.44**	0.32*	0.11	0.10
<i>Job characteristics</i>	0.77***	0.36*	1.00	0.51***	0.40**	0.04	0.60***
<i>Unexpected situations</i>	0.55***	0.44**	0.51***	1.00	0.32*	0.18	0.28
<i>Time pressure</i>	0.37*	0.32*	0.40**	0.32*	1.00	0.29	0.18
<i>Communication with guests</i>	0.21	0.11	0.04	0.18	0.29	1.00	0.08
<i>Lack of privacy</i>	0.70***	0.10	0.60***	0.28	0.18	0.08	1.00
<i>SJRSQ Overall score</i>	0.88***	0.52***	0.81***	0.66***	0.63***	0.38**	0.71***

Notes: *** – significant correlation at the level of $p < 0.001$; ** – significant correlation at the level of $p < 0.01$; * – significant correlation at the level of $p < 0.05$.

them, they are low stressful for them because they do them mainly when they are tied to a safe berth. However, such tasks could still be burdensome or “boring” for them because they most often perform them at the end of the daily sailing or before the start of the sailing, when they should be resting the most, or possibly, when they do not have access to a desk, computers and the Internet, or do not have sufficient social distance for uninterrupted administrative work.

Since many items were projected onto multiple latent components, it was reasonable to expect that significant levels of correlation would be found between the manifest measures of the SJRSQ questionnaire. Given that correlation coefficients up to 0.40 are considered a *low degree* of correlation between variables, only those correlation coefficients that exceed this “borderline” value were interpreted. The measures of *social characteristics*, *job characteristics*

and *lack of privacy* of skippers on board were *highly positively* intercorrelated with each other, which was expected.

The measures of unexpected situations are *moderately* and *positively* correlated with the measures of *social characteristics*, *navigational situations* and *job characteristics*. Those who assess the basic elements of performing the skipper’s job as more stressful also assess *unexpected situations* as more stressful. In other words, those who more easily and better accept the general circumstances of the bareboat and crewed charter skippers assignments are more willing to accept possible *unexpected situations* than other skippers. The *overall SJRSQ measure* was *moderately* to *highly positively* correlate with all other questionnaire measures. Therefore it can be used as a good *general representation* and *indicator* of the stressfulness assessment of bareboat and crewed charter skippers.

Table 4. Differences of the SJRSQ measures by the skipper’s age

Variable	Skipper's age				T-test	p
	40 or less years (N=26)		41 or more years (N=21)			
	Mean	SD	Mean	SD		
<i>Social characteristics</i>	2.73	0.92	2.72	1.04	0.03	0.98
<i>Navigational situations</i>	2.79	0.74	2.79	0.72	0.01	0.99
<i>Job characteristics</i>	2.69	0.73	2.80	1.02	0.42	0.67
<i>Unexpected situations</i>	2.46	0.75	2.39	0.66	0.34	0.74
<i>Time pressure</i>	2.85	1.16	3.00	1.14	0.46	0.65
<i>Communication with guests</i>	2.27	0.83	1.90	0.62	1.67	0.10
<i>Lack of privacy</i>	3.04	1.48	3.14	1.15	0.26	0.79
<i>SJRSQ Overall score</i>	2.69	0.60	2.68	0.66	0.06	0.95

Notes: SD – standard deviation; T-test – student T-test coefficient; p – level of the T-test significance.

Table 5. Differences of the SJRSQ measures by the *skipper's job experience*

Variable	Skipper's job experience				T-test	p
	5 or less years (N=19)		6 or more years (N=28)			
	Mean	SD	Mean	SD		
<i>Social characteristics</i>	2.43	0.92	2.93	0.96	1.78	0.08
<i>Navigational situations</i>	2.94	0.76	2.69	0.70	1.14	0.26
<i>Job characteristics</i>	2.53	0.62	2.89	0.97	1.42	0.16
<i>Unexpected situations</i>	2.44	0.76	2.42	0.68	0.10	0.92
<i>Time pressure</i>	2.63	1.12	3.11	1.13	1.42	0.16
<i>Communication with guests</i>	2.05	0.85	2.14	0.71	0.40	0.69
<i>Lack of privacy</i>	2.84	1.50	3.25	1.21	1.03	0.31
<i>SJRSQ Overall score</i>	2.55	0.54	2.78	0.66	1.22	0.23

Notes: SD – standard deviation; T-test – student T-test coefficient; p – level of the T-test significance.

No significant differences were found between the two groups of skippers of different ages in the SJRSQ questionnaire measures. The closest possible difference to the significance level is noticeable in the variable of *communication with guests* ($p=0.10$), where older skippers assess the stress of communication somewhat lower than the group of younger skippers. It can be concluded that bareboat and crewed charter skippers' assessments of the stress of the situation are independent of their chronological age.

No significant differences were found between the two groups of skippers with different *skipper's job experience* in the SJRSQ questionnaire measures. However, noticeable differences are visible in several variables, but they did not reach the level of statistical significance. Given that the sample of respondents in this study is small, the authors of the study believe

that these visible, although not statistically significant, differences need to be mentioned and interpreted. It is possible that in a future study with a much larger number of respondents (e.g., 150 or more skippers), these currently noticeable differences could reach the level of statistical significance. *Less experienced skippers*, unlike the group of *more experienced skippers*, have slightly lower stress assessments in 5 out of 8 measures: *social characteristics*, *job characteristics*, *time pressure*, *lack of privacy*, as well as in the *SJRSQ overall score*. *More experienced skippers*, unlike the group of *less experienced skippers*, have slightly lower stress assessments in the measure of *communication with guests*.

However, based solely on the results of this pilot study, it is possible to conclude that bareboat and crewed charter skippers' assessments of the stress levels of situations are independent of their *job experience*.

Table 6. Differences of the SJRSQ measures by the weeks of skippering in season 2024

Variable	Weeks of skippering in 2024 season				T-test	p
	8 weeks or less (N=20)		11 or more weeks (N=27)			
	Mean	SD	Mean	SD		
<i>Social characteristics</i>	2.35	0.90	3.01	0.93	2.43*	0.02
<i>Navigational situations</i>	2.77	0.88	2.81	0.60	0.17	0.86
<i>Job characteristics</i>	2.40	0.72	2.99	0.88	2.46*	0.02
<i>Unexpected situations</i>	2.24	0.67	2.57	0.71	1.62	0.11
<i>Time pressure</i>	2.55	1.00	3.19	1.18	1.95	0.06
<i>Communication with guests</i>	2.35	0.88	1.93	0.62	1.95	0.06
<i>Lack of privacy</i>	2.70	1.38	3.37	1.24	1.74	0.09
<i>SJRSQ Overall score</i>	2.48	0.58	2.84	0.61	2.02*	0.049

Notes: SD – standard deviation; T-test – student T-test coefficient; p – level of the T-test significance; * – significant coefficient at level of $p<0.05$.

Significant differences were found for three variables between two subgroups of skippers with different levels of *work engagement (number of weekly sailings) during the 2024 tourist season*, namely in the variables: *job characteristics, social characteristics*, as well as in the *SJRSQ overall score* measure. Those skippers who were engaged for *8 or fewer weeks* during 2024 had lower stressfulness assessments in all three variables than those skippers who were then engaged for a longer period of time (*11 weeks or more*). Also, in three other measures (*time pressure, lack of privacy, and unexpected situations*) a similar direction of differences is noticeable, but the aforementioned differences did not reach the level of statistical significance. In one variable (*communication with guests*), there is a noticeable difference in the “benefit” of long-term engaged skippers, but even that visible difference did not reach the level of statistical significance. As previously stated, it is possible that in future research with a much larger number of skipper respondents, these visible and noticeable differences could reach the level of statistical significance.

Analyzing these two groups of skippers with different levels of engagement in the tourist season, the authors of the study are of the opinion that it is possible that the group of *highly engaged* skippers represents a group of *professional skippers* for whom this is the main and perhaps only source of financial income. In contrast, those with *low or lower engagement* may represent *occasional skippers* for whom this is perhaps an additional or supplementary business engagement in addition to some other or different core job. The authors are of the opinion that lower or low stressfulness assessments of situations are reasonable and expected if you are engaged in the skipper's job for only 3 – 4 weeks in one season, and they would be expected to be higher if you are engaged in the same skipper's job for 14 – 15 weeks in one tourist season (whereas it is known that the “peak season” lasts approximately 3 – 4 calendar months). It is only possible to conclude that *long-term skipper engagement* is different from *short-term* considering stressfulness assessments, but it is not possible to determine why such findings were established: is it perhaps a consequence of the “accumulation” of stress in long-term engaged skippers or is it perhaps a consequence of the “rest” and change from the regular business activities of those skippers who are engaged for a short period or occasionally during the season. If the accumulation of stress is truly “in effect”, then it is possible that it may cause the enthusiasm, creativity, helpfulness and optimism of long-term engaged skippers to decline, and thus the quality of the overall efficiency of the skipper's work to decline, as well as, with possible effect on maritime safety. This is certainly one of the

questions that should be raised as a separate and important research problem in some future research on the skipper population.

This pilot study has certain shortcomings that limit the broader generalizability of the findings. The first shortcomings is the very small sample of skipper respondents for making more precise interpretations and conclusions. The second shortcomings relates to the time of the research. The research was conducted during March 2025, approximately 5 months after the skipper and tourist season ended. The third shortcomings relates to the quality of the measures of the constructed questionnaire, where single-item measures were used instead of multi-item scales. In order to improve the quality of research on stressfulness assessment by skippers, the authors of the study recommend continuing research in this area, but with the correction of the observed limitations: by increasing the number of respondents in the skipper sample, by conducting the research on skippers immediately after the end of the tourist season, and by supplementing the SJRSQ questionnaire with several items related to particular components of the questionnaire and to single-item measures.

4. CONCLUSIONS

The main aim of this study was successfully achieved because the *SJRSQ questionnaire* was constructed to assess the stressfulness of job-related circumstances and situations of bareboat and crewed charter skippers. 7 latent components of the stressfulness assessment of skippers were identified, and then 7 measures – variables with at least *satisfactory* metric characteristics were constructed. Four measures are in the form of *scales*, and three have the form of *single-item* measures. It was also determined that it is possible to use the *SJRSQ overall score* as an overall and quality measure of the job-related stressfulness assessment of skippers. Average scores of measures of the SJRSQ questionnaire vary from *moderate* on the *lack of privacy* to *very low* on the *communication with guests*. Scores of the SJRSQ scales were mostly assessed as *low*, with only one being at a *moderate* level. Generally, skippers consider the environment in which they operate to be *low* stressful. It was determined that the job-related stressfulness assessments are independent of the *chronological age* of the skipper and the *skipper's job experience* (measured in the number of years of job experience as a skipper). However, job-related stressfulness assessments significantly differed among skippers with different amounts of *skipper engagement in the 2024 tourist season*. Skippers who were engaged as skippers for longer periods of time (*11 or more weeks*) during the season compared to skippers who were engaged for

shorter periods of time (8 or less weeks) had higher stressfulness assessments in the *social characteristics* and *job characteristics* measures, and a *higher SJRSQ overall score* measure. The results of this study indicate the need for further research into the stressfulness assessments of bareboat and crewed charter skippers on a larger sample of respondents, the need for further development and validation of the SJRSQ questionnaire, and the need to include other, possibly related and important variables for the quality of skipper's job performance (e.g., skipper's ways of coping with stress; skipper's perceived job demands; skipper's anxiety, depression, and stress variables).

Conflict of interest: The authors declare no conflict of interest.

REFERENCES

- Barlow, L., & Iverson, R. D., 2005. Workplace safety. In J. Barling, E. K. Kelloway, & M. Frone (Eds.), *Handbook of work stress* (pp. 247–266). Thousand Oaks, California: Sage Publications.
- Bavčević, T., Milavić, B. & Bavčević, D., 2024. Motivation for Physical Education in Students Aged 12 to 15 – Structure Analysis. *Sport Mont*, 22(3), pp. 31–36. <https://doi.org/10.26773/smj.241005>
- Carotenuto, A., Molino, I., Fasanaro, A. M., & Amenta, F., 2012. Psychological stress in seafarers: a review. *International maritime health*, 63(4), 188–194. https://journals.viamedica.pl/international_maritime_health/article/download/26129/20923
- Družić Ljubotina, O., & Friščić, L., 2014. Profesionalni stres kod socijalnih radnika: Izvori stresa i sagorijevanje na poslu. *Ljetopis socijalnog rada*, 21(1), pp. 5–32. <https://doi.org/10.3935/ljsr.v21i1.10>
- George, D., & Mallery, P., 2016. *IBM SPSS Statistics 23 Step by Step: A Simple Guide and Reference*. Routledge: New York, NY, USA.
- Godinho, M. R., Ferreira, A. P., Greco, R. M., Teixeira, L. R., & Teixeira, M. T. B., 2016. Work ability and health of security guards at a public University: a cross-sectional study. *Revista Latino-Americana de Enfermagem*, 24, e2725. <https://doi.org/10.1590/1518-8345.0616.2725>
- Havelka, M., 1998. Stres i tjelesno zdravlje. In: Havelka, M. (ed.), *Zdravstvena psihologija*, pp. 53–88. Jastrebarsko: Naklada Slap.
- Hystad, S. W. and Eid, J., 2016. Sleep and fatigue among seafarers: the role of environmental stressors, duration at sea and psychological capital. *Safety and Health at Work*, 7(4), pp. 363–371. <https://doi.org/10.1016/j.shaw.2016.05.006>
- Johnson, S., Cooper, C., Cartwright, S., Donald, I., Taylor, P. J., & Millet, C., 2005. The experience of work-related across occupations. *Journal of Managerial Psychology*, 20(2), pp. 178–187. <https://doi.org/10.1108/02683940510579803>
- Kerkamm, F., Dengler, D., Eichler, M., Materzok-Köppen, D., Belz, L., Neumann, F. A., ... & Oldenburg, M., 2021. Measurement methods of fatigue, sleepiness, and sleep behaviour aboard ships: A systematic review. *International Journal of Environmental Research and Public Health*, 19(1), 120. <https://doi.org/10.3390/ijerph19010120>
- Levi, L., Sauter, S. L., & Shimomitsu, T., 1999. Work-related stress – it's time to act. *Journal of Occupational Health Psychology*, 4(4), pp. 394–396. <https://doi.org/10.1037/1076-8998.4.4.394>
- Oldenburg, M., Hogan, B., and Jensen, H. J., 2013. Systematic review of maritime field studies about stress and strain in seafaring. *International Archives of Occupational and Environmental Health*, 86(1), pp. 1–15. <https://doi.org/10.1007/s00420-012-0801-5>
- Pološki Vokić, N., & Bogdanić, A., 2008. Individual differences and occupational stress perceived: a Croatian survey. *Zagreb International Review of Economics & Business*, 11(1), pp. 61–79. <https://hrcak.srce.hr/file/116806>
- Russo, A., Mulić, R., Kolčić, I., Maleš, M., Jerončić Tomić, I., & Pezelj, L., 2023. Longitudinal Study on the Effect of On-board Service on Seafarers' Health Statuses. *International Journal of Environmental Research and Public Health*, 20(5), 4497. <https://doi.org/10.3390/ijerph20054497>
- Şenbursa, N., 2024. Seafarers' Wellbeing on Board: Scoping Review. *Transactions on Maritime Science*, 13(1), pp. 1–27. <https://doi.org/10.7225/toms.v13.n01.w04>
- Slišković, A., Penezić, Z. Occupational stressors, risks and health in the seafaring population. *Review of psychology*, 22(1-2), pp. 29–39. <https://hrcak.srce.hr/file/238879>
- Slišković, A. and Penezić, Z., 2016. Testing the associations between different aspects of seafarers' employment contract and on-board internet access and their job and life satisfaction and health. *Arhiv za higijenu rada i toksikologiju*, 67(4), pp. 351–360. <https://doi.org/10.1515/aiht-2016-67-2785>
- Song, D. W. & Yeo, G. T., 2015. A competitive analysis of Chinese container ports using the analytic hierarchy process. In H. E. Haralambides (Ed.), *Port Management – Seminal papers from Maritime Economics and Logistics* (pp. 339–358). Palgrave Macmillan Ltd. https://doi.org/10.1057/9781137475770_16
- Zhang, P. and Zhao, M., 2017. Maritime health of Chinese seafarers. *Marine Policy*, 83, pp. 259–267. <https://doi.org/10.1016/j.marpol.2017.06.028>

APPENDIX

Supplement table 1. SJRSQ questionnaire latent structure

Variable	Component (factor) saturation						
	1	2	3	4	5	6	7
Weather conditions (storms, strong winds, large waves, etc.)	0.01	0.40	0.45	0.44	-0.26	-0.22	0.00
Technical failures (engine, electronics, sails or anchor problems)	0.16	0.38	0.05	0.63	-0.37	-0.05	0.20
Responsibility for the safety of guests (and crew)	0.34	0.51	-0.21	0.07	-0.28	0.10	-0.23
Fatigue and lack of sleep (long sailings, night shifts, ...)	0.09	-0.00	0.53	0.55	0.11	0.07	0.06
Communication with guests (different expectations, language barriers, ...)	0.11	0.12	-0.12	0.12	0.12	0.90	-0.02
Docking and maneuvering in ports (crowds, inexperienced crew, etc.)	0.07	0.82	0.25	-0.01	0.01	0.15	-0.02
Anchoring in unregulated locations (bays, etc.)	0.08	0.78	0.14	0.12	0.05	0.15	0.19
Navigation in unknown or demanding areas (heavy traffic, shallow passages, unmarked rocks, etc.)	0.05	0.75	-0.11	0.22	0.19	-0.35	-0.21
Schedule and itinerary (pressure to arrive at the destination, ...)	0.26	0.27	0.18	0.27	0.55	0.15	-0.21
Poor equipment or lack of equipment on board	0.48	0.15	0.17	0.57	0.23	-0.14	-0.03
Living conditions on board (bed, cramped conditions, limited space, etc.)	0.46	0.07	0.34	0.32	0.35	0.15	0.38
Lack of available resources (water, food, fuel, ...)	0.56	0.14	0.01	0.60	-0.05	0.03	0.18
Misunderstandings with guests or crew	0.06	0.07	-0.12	0.80	0.07	0.24	-0.20
Administrative and legal problems (permits, inspections, insurance, ...)	0.03	-0.04	0.46	0.49	-0.26	0.14	-0.50
Prolonged sun exposure and dehydration	0.53	-0.20	0.50	0.36	0.22	-0.02	0.06
Lack of privacy on the ship	0.64	-0.03	0.36	0.04	0.06	0.10	0.51
Isolation from one's social environment	0.83	0.01	0.06	0.05	0.02	0.04	-0.09
Limited communication opportunities with loved ones (friends, family, etc.)	0.77	0.19	0.31	0.11	-0.14	0.01	0.05
Financial pressure – earning money	0.59	0.21	0.56	0.06	-0.04	0.29	0.01
Financial problems in sailing (repair costs, supplies, etc.)	0.79	0.10	0.10	0.20	-0.21	-0.03	0.14
Emergency and crisis situations (medical situations, fire, accidents, ...)	0.20	0.05	0.08	0.10	-0.79	-0.03	-0.14
Seasonal nature of the skipper's job	0.70	0.18	0.27	0.06	0.14	0.11	-0.38
Insecurity (uncertainty) of employment as a skipper	0.51	0.43	0.31	0.15	-0.10	0.34	0.10
Too short a time between sailings	0.35	0.06	0.81	0.01	0.08	-0.03	0.01
Large number of consecutive sailings (without rest)	0.28	0.28	0.77	-0.09	-0.09	-0.25	-0.01
Explained Variance	4.95	2.98	3.28	2.94	1.69	1.48	1.16
Percent of Total Variance (approx.)	20	12	13	12	7	6	5

Component No.	Component name
1	<i>Social characteristics</i>
2	<i>Navigational situations</i>
3	<i>Job characteristics</i>
4	<i>Unexpected situations</i>
5	<i>Time pressure</i>
6	<i>Communication with guests</i>
7	<i>Lack of privacy</i>

Supplement table 2. *SJRSQ overall score latent structure*

Variable	Component saturation	
	1	2
<i>Social characteristics scale</i>	0.87	0.30
<i>Navigational situations scale</i>	0.26	0.61
<i>Job characteristics scale</i>	0.86	0.24
<i>Unexpected situations scale</i>	0.52	0.52
<i>Time pressure variable</i>	0.23	0.70
<i>Communication with guests variable</i>	-0.10	0.69
<i>Lack of privacy variable</i>	0.86	-0.07
Explained Variance	2.63	1.77
Percent of Total Variance	37.6%	25.3%

Component No.	Component name
1	<i>Social environment</i>
2	<i>Maritime environment</i>