

CREW SAFETY REPORT



2026

Seafarer Personality:

**A Study of Crew Members
Across Vessel Types**



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Introduction

The present study was commissioned by a major Shipping Group in order to reveal the human-related parameters which affect safety aboard their ships, and based on these parameters, provide an assessment of the actual threat.

The importance of this assessment is weighty, as it is known from previous studies in the shipping industry that over 60% of the accidents happen due to human error. Erroneous and dangerous acting is a form of behavior. The study focused on a series of personality characteristics which affect behavior either in a positive or a negative manner. They were objectively measured using the Personality Evaluation Questionnaire, a computerized psychometric tool presenting high levels of validity (average Cronbach $\alpha > .8$), which was administered in the crew members' mother tongue.

Several statistical methods were employed in order to cross-examine the findings and come up with robust conclusions. Another aspect of the study referred to the collection of qualitative data from a carefully selected specimen of experienced masters, higher officers, and engineers, in order to fine-tune and benchmark the quantitative results, which were collected from over 90% of the total crew headcount of the Group over a three-year period.

The study concluded in a) detailed estimation of the safety propensity of each occupational category on all types of vessels (bulkers, reefers, tankers), and b) a list of composite personality characteristics which can act as accurate predictors of safe behavior onboard, as well as overall efficiency and work performance.



The PEQ Safety Assessment

The Personality Evaluation Questionnaire (PEQ)-Safety Assessment was specifically designed and developed to support the evaluation and selection of employees in work environments where safety is paramount. Such work environments include the maritime and shipping industries.

The PEQ Safety Assessment was conceptualized based on the *Big-Five Factor Model of Personality*, the most contemporary scientific system used for the classification of personality characteristics. The psychometric tool was developed to identify candidate behaviors and attitudes that may compromise safety in the workplace. Unsafe behaviors have long been associated with workplace accidents and other unfavorable work-related outcomes both historically and in the academic literature.

Personality Profile

The test assesses the big-five personality factors, as well as their respective subfactors. More specifically, the PEQ Safety Assessment examines:

1. Openness

Openness includes characteristics such as imagination, open-mindedness, and insight. People who score high on this trait also tend to have a broad range of interests. They are curious about the world and other people, and are eager to learn new things and live new experiences. People who score high on this trait also tend to be more adventurous and creative. People who score low on this trait are frequently more conventional and may struggle with abstract thinking. It comprises of two main factors and four sub-factors, as follows:

1.1. Open to Knowledge

- Reflectiveness
- Desire to learn

1.2. Open to Experiences

- Acceptance of change
- Open mindedness



2. Conscientiousness

Typical features of conscientiousness include high levels of thoughtfulness, good impulse control, and goal-directed behaviors. Highly conscientious people tend to be organized and pay attention to details. They plan ahead, think about how their behavior affects others, and tend to keep deadlines. This dimension is usually relied upon for decision-making in organizational settings, as it has been identified as the most potent noncognitive predictor of occupational performance. It comprises of two main factors and four sub-factors, as follows:

2.1. Fussiness

- Attention to details
- Procrastination

2.2. Perseverance

- Plan insistent
- Target insistent

3. Extraversion

Extraversion comprises of excitability, sociability, talkativeness, assertiveness, and high emotional expressiveness. People who score high in extraversion tend to be outgoing and are usually energized by social interactions. Being around others helps them experience positive emotions. People who score low on extraversion (or introverted individuals) tend to be more reserved, have a lower activity level and spend less time in social settings. Extraversion comprises of two main factors and four sub-factors, respectively:

3.1. Energy

- Social boldness
- Mobility

3.2. Dominance

- Forcefulness
- Competitiveness



4. Agreeableness

Agreeableness includes trait adjectives that are associated with trust, altruism, kindness, affection, and acquiescence. In essence, agreeableness describes individual differences in being pro-social and other-oriented, versus antisocial and self-oriented in social interactions. People who score high in agreeableness tend to be more cooperative, while those who score low on this trait tend to be more competitive and, sometimes, even manipulative. It comprises of two main factors and four sub-factors, namely:

4.1. Friendliness

- Social Trust
- Politeness

4.2. Cooperativeness

- Benevolence
- Empathy

5. Emotional Stability

The emotional stability dimension is most commonly found under the opposite term “*Neuroticism*” in literature. Emotional stability describes an individual’s mood volatility and overall emotional management. Individuals with high scores on this trait tend to be more stable and emotionally resilient. On the contrary, individuals with lower scores on emotional stability tend to experience mood swings more frequently, as well as heightened anxiety levels, increased irritability, and higher incidence of negative affect (e.g., sadness). Emotional stability comprises of two main factors and four sub-factors, as follows:

5.1. Emotion Control

- Mood stability
- Patience

5.2. Prudence

- Composure
- Behavioural control



Safety Profile

Besides measuring the examinee's personality higher-order and factors that comprise it, the PEQ Safety Assessment additionally examines **twelve (12) safety indices** that provide a comprehensive assessment of the candidate's propensity in exhibiting safety-fostering or safety-impeding behaviors. These are divided in the following six positive (6) and six negative (6) indices:

Negative Safety Indices	
Defiant	<i>Is likely to disobey rules and disregard procedures. Tend to be low in plan insistence and reflectiveness.</i>
Anxious	<i>Is likely to exhibit anxiety-related behaviors. Tend to be high in emotion-related stress and present high mood volatility.</i>
Irritable	<i>Is likely to get easily annoyed and frustrated. Tend to exhibit mood changes and impulsive behavior.</i>
Distractable	<i>Is likely to become distracted during work. Tend to be low in attention to detail and prudence. Tend to be high in emotion-related stress and impulsivity.</i>
Negligent	<i>Is likely to miss elements-steps of work procedures. Tend to lose their composure easier and tend to exhibit higher impulsivity.</i>
Overconfident	<i>Is not likely to invest in self-improvement and training. Tend to be low in their desire to learn and in accepting change.</i>
Positive Safety Indices	
Compliant	<i>Is likely to obey rules-orders and comply to procedures. Tend to be plan-insistent and target-insistent as individuals.</i>
Calm	<i>Is likely to remain calm and collected under stress. Tend to be low in emotion-related stress and impulsivity.</i>
Relaxed	<i>Is likely to maintain their composure intact. Tend to effectively control their behaviors and rarely present mood swings.</i>
Focused	<i>Is likely to keep their attention maintained to the task at-hand. Tend to pay high attention to detail, are plan-insistent, and high in self-reflectiveness.</i>
Conscientious	<i>Is likely to maintain a consistent work morale. Tend to be able to</i>



	<i>regulate their own behaviors and are highly attuned to paying attention to detail.</i>
Trainable	<i>Is likely to invest in self-development and training. Tend to be high in reflectiveness and a desire to learn.</i>

Overall Safety Index: Taking into account the examinee's scores on the positive and negative safety indices, as well as personality characteristics, a composite score is calculated termed "Overall Safety Index". This index is a quick marker of the examinee's propensity for safety.



Validity Profile

The assessment tool includes **6 validity scales that measure the reliability of the responses** (i.e., examinee attitudes while undertaking the assessment). These validity scales were created to inform the examiner the extent to which an examinee has intentionally attempted to alter their image or responded carelessly. The main aim of the scales is to help the examiner decide whether a psychometric profile is valid, and the extent to which it may be interpretable.

Validity Scales	
Infrequency	<i>High scores indicate that the examinee has either responded inconsistently, or endorses unusual statements.</i>
Faking Bad	<i>High scores refer to the examinee's attempt in appearing "worse" or more morally flawed than actually is the case.</i>
Faking Good	<i>High scores indicate that the examinee has presented themselves in a favorable manner by endorsing desirable items or by rejecting undesirable ones.</i>
Naive Lying	<i>High scores indicate that the examinee has attempted to present a desirable and planned image to others.</i>
Faking Ability	<i>High scores indicate that the examinee has presented a highly desirable image in regard to their abilities.</i>
Faking Morality	<i>High scores indicate that the examinee has presented a highly desirable image in regard to their morality.</i>



Chapter 1: Methodology

The total assessed crew consisted of 2,550 crew members; 186 working on tankers, 1,599 working in bulkers, and 765 working in reefers. In order to ensure that the data would reflect valid and interpretable profiles, respondents who scored high on the infrequency (IF) and naive lying (NL) scales were excluded from the sample (high scores on these scales indicate responses infrequent in this population, and excessive denial of moral flaws and exaggerated abilities, respectively). As such, the final sample size ($N=2,550$) consisted of profiles that were valid and interpretable.

All crew members were assessed with the PEQ Safety Assessment in their native language (Russian) via a computer. Their scores were automatically produced thereby eliminating the possibility for human error. Regarding the tool's **psychometric reliability** and internal consistency estimates, Cronbach's alpha coefficient (α) was employed. All big-five personality factors yielded satisfactory reliability estimates: Neuroticism ($\alpha = .820$), Agreeableness ($\alpha = .797$), Extraversion ($\alpha = .742$), Openness ($\alpha = .787$), and Conscientiousness ($\alpha = .653$).

Demographic Information

Aside of information regarding respondents' scores on the PEQ Safety Assessment, demographic information pertaining to respondents' **age, occupational category, marital status, contract type, and vessel type** were collected. According to the relevant literature (e.g., Beus, McCord, & Zohar, 2016), this additional demographic information is important in order to examine the direction in which safety-related behaviors occur, and the depth these can be examined.

Regarding **marital status**, respondents were either married or unmarried. For **contract type**, respondents were either new hires (currently on their first contract with the company) or old hires (had already completed two or more contracts with the company). In the case of occupation, 28 distinct occupational categories were identified. In order to facilitate the analyses, these categories were reduced into nine higher-order categories, as follows:

1. Masters (including masters and trainee masters)
2. Engineers (including chief engineers, trainee chief engineers, and 2nd engineers)
3. Other Engineers (including 3rd engineers, 4th engineers, and electrical engineers)
4. Officers (including chief officers and trainee chief officers)
5. Other Officers (including 2nd officers and 3rd officers)
6. Deck ratings (including able seamen, ordinary seamen, pumpmen, bosuns, and boatswains)



7. Engine ratings (including oilers/welders, oilers, pumpmen, and oilers/turners)
8. Services-related (including cooks and catering boys)
9. Cadets

TANKERS: 15 respondents were masters, 23 were high-rank engineers, 21 were other types of engineers, 13 were high-rank officers, 23 were other types of officers, 55 were deck ratings, 18 were engine ratings, 16 were cooks and/or catering boys, and 2 were cadets. Sixty-four (64%) percent of the sample reported being married ($n=119$), while 54,80% ($n=102$) had had more than two contracts with AMC. The sub-sample of employees working in tankers had a mean age of 39,44 years ($SD=11,58$).

BULKERS: 84 were masters, 185 were high-rank engineers, 273 were other types of engineers, 91 were high-rank officers, 188 were other types of officers, 507 were deck ratings, 104 were engine ratings, 134 were cooks and/or catering boys, and 33 were cadets. Sixty-two (62,4%) percent of the sample reported being married ($n=997$), while 63,9% ($n=1022$) had had more than two contracts with the current shipping company. The sub-sample of employees working in bulkers had a mean age of 38,29 years ($SD=11,31$).

REEFERS: 32 were masters, 105 were high-rank engineers, 121 were other types of engineers, 43 were high-rank officers, 77 were other types of officers, 192 were deck ratings, 120 were engine ratings, 72 were cooks and/or catering boys, and 3 were cadets. Sixty-six (66,70%) percent of the sample reported being married ($n=510$), while 69,40% ($n=531$) had had more than two contracts with the company. The sub-sample of employees working in reefers had a mean age of 42,94 years ($SD=12,38$).



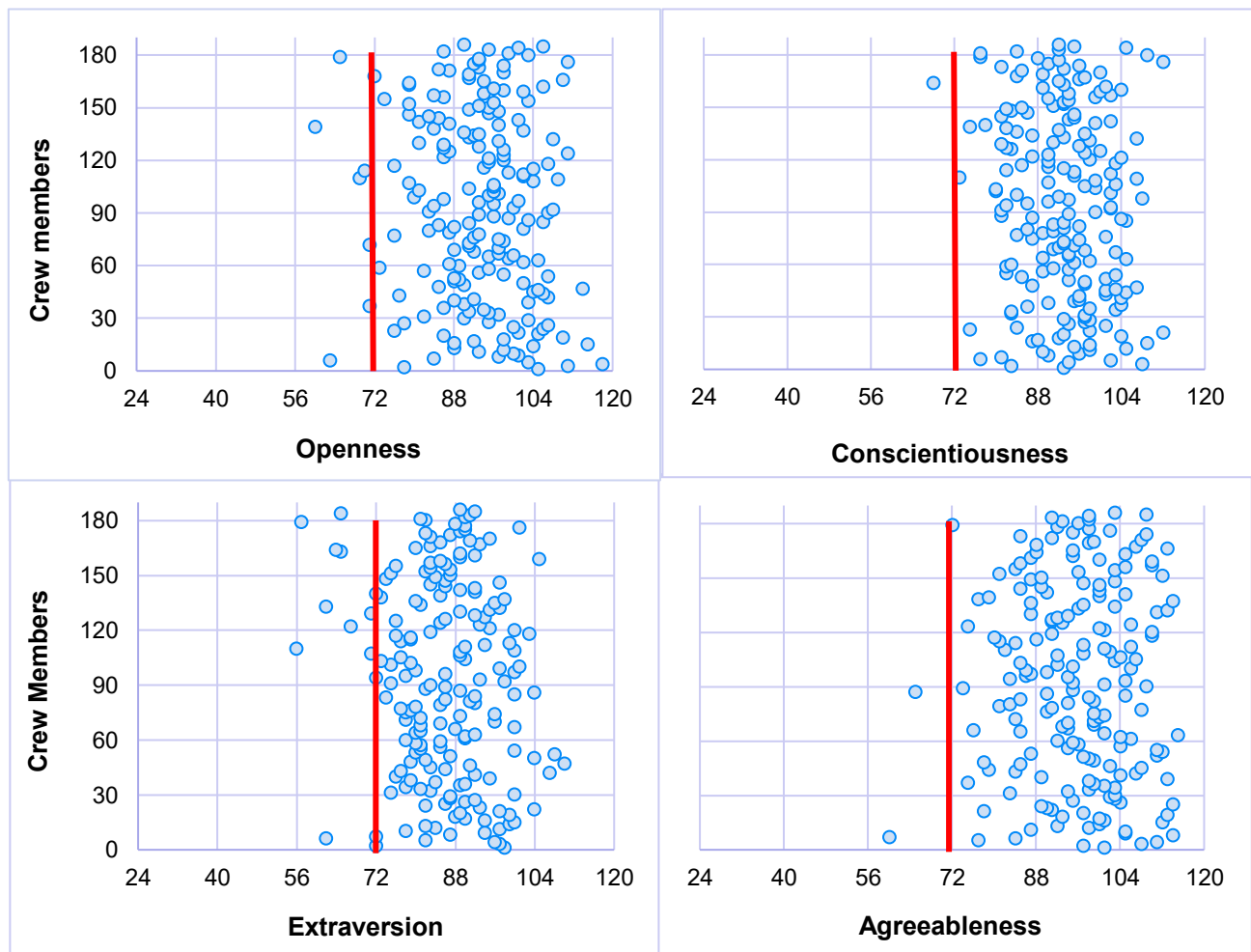
Chapter 2: Tankers

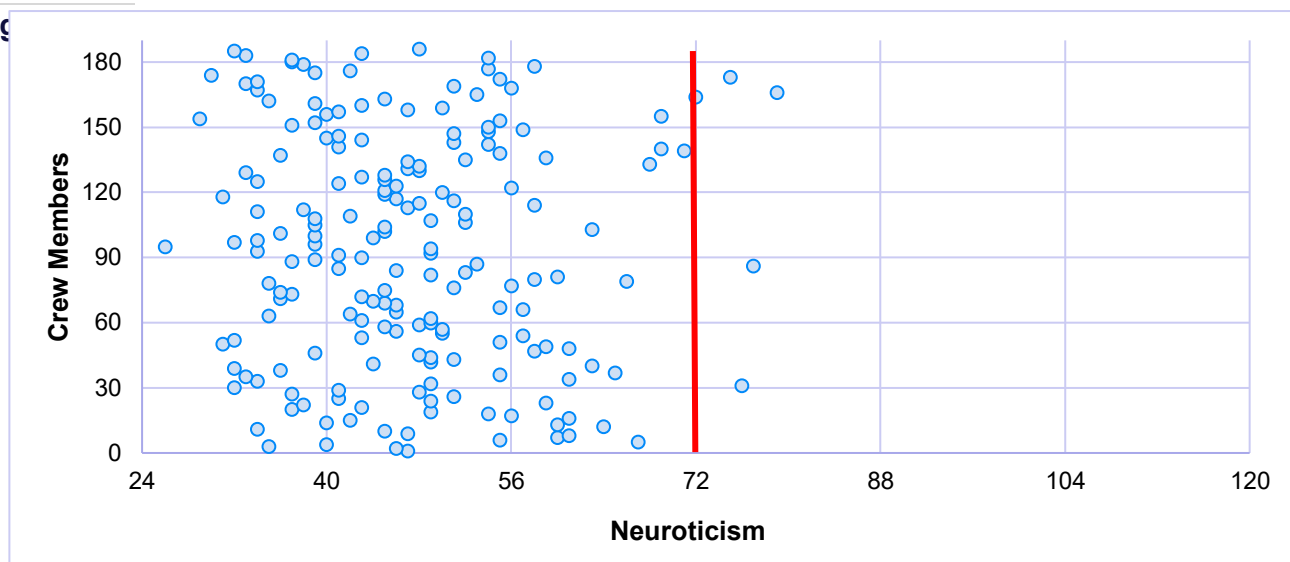
Section A: Examining The Impact of The Big-5 on Safety

This section's main aim is to unveil how each of the Big-Five factors impact seafarer propensity for safe behaviors. The importance of this section is twofold as it, firstly, sheds light into the crew's overall personality tendencies and, secondly, it informs the interested parties on which personality elements are most crucial to hone into during the recruitment process.

A1. Big-Five and Safety

Prior to presenting the results, it is important to underline that, in the PEQ Safety Assessment, the Big-Five personality factors can range from a score of "24" (minimum) to "120" (maximum). As such, a score of "72" is the average score for each factor. Scores above this cut-off point are considered to reflect individuals who exhibit the respective personality factor to a high degree. In the scatterplots below, tanker crew's scores on the Big-Five personality factors are displayed. Each crew member is represented by a blue dot, and the vertical red line pinpoints the mid-way point.





As is evident from the graphs above, **the vast majority of tanker crew members exhibit the desired scores on the Big-Five factors**, such as low Neuroticism, and high Conscientiousness and high Openness. The descriptive statistics for the total tanker sample can be found in Table 1.

Table 1

Big-Five Descriptive Statistics for Tanker Crew Members

	Minimum	Maximum	Mean	Std. Deviation ¹
Openness	60	118	93,16	10,45
Conscientiousness	68	112	93,07	8,32
Extraversion	56	110	86,29	9,8
Agreeableness	60	115	95,86	10,42
Neuroticism	26	75	47,08	10,48

A multiple linear regression was performed to assess the ability of age, marital status, contract type, and the Big-Five personality factors to predict safety scores among tanker crew members. A preliminary analysis was conducted to ensure there was no violation of assumptions of normality, linearity, multicollinearity, and homoscedasticity. The model predicted 94,2% of the variance of safety scores; $R^2 = .942$, $F(8,185) = 374,06$, $p < .001$. In the model, only Openness, Conscientiousness, Agreeableness, and Neuroticism contributed significantly to the prediction of safety scores (Table 2).

¹ A standard deviation is a measure of how dispersed the data is in relation to the mean (average score).



Table 2

Hierarchical Linear Regression Analysis Predicting Safety Scores from Age, Marital Status, Contract Type, and the Big-Five Factors

	t	B ²	β	F	df	p ³	R ²
Overall Model				374,06	(8, 185)	<,001	,896
Age	-,088	-,009	-,002			,93	
Marital Status	-,410	-,942	-,010			,693	
Contract Type	1,303	,2,31	,024			,194	
Openness	14,302	1,562	,342			<,001	
Conscientiousness	11,625	1,489	,260			<,001	
Extraversion	-,592	-,067	-,014			,554	
Agreeableness	-2,110	-,211	-,046			,036	
Neuroticism	-37,584	-3,283	-,721			<,001	

The aforementioned regression analysis suggests that **Neuroticism has the strongest effect on safety-related behaviors, followed by Conscientiousness and Openness**. It was deemed important to examine whether these traits exhibited the same strength across occupational categories. As such, a series of regressions were conducted to examine, between ranks in tankers, which of the Big-Five play the biggest role in predicting safety. All information are found in Table 3.

Table 3

Strength of Predictive Ability of the Big-Five Factors Regarding Safety (Across Occupational Categories)

		O*	C	E	A	N	p
Masters	Predictor**	NO	YES	YES	NO	YES	<,001
	Strength***	-	2 nd	3 rd	-	1 st	
Engineers	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	3 rd	2 nd	-	-	1 st	

² Unstandardized Beta scores (B) reflect the impact of the factor on predicting safety scores. Higher B values reflect a higher impact. In this case, the highest B value is that of Neuroticism, pinpointing as the strongest predictor of safety.

³ The p value inform us whether the analysis was significant or not. In statistical analysis, a p value of 0.05 or lower reflects statistical significance, thus interpretable results.



Other Engineers	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	2 nd	3 rd	-	-	1 st	
Officers	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	3 rd	2 nd	-	-	1 st	
Other Officers	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	2 nd	3 rd	-	-	1 st	
Deck Ratings	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	2 nd	3 rd	-	-	1 st	
Engine Ratings	Predictor	YES	NO	NO	NO	YES	<,001
	Strength	2 nd	-	-	-	1 st	
Services-related	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	2 nd	3 rd	-	-	1 st	
Cadets	Predictor	<i>Sample size did not allow for regression analysis (n=2)</i>					
	Strength						

*Openness (O), Conscientiousness (C), Extroversion (E), Agreeableness (A), and Neuroticism (N)
 ***"YES" indicates that the particular factor significantly predicts safety, "NO" indicates it does not
 ***This line indicates the hierarchy of strength with which the factors affect safety ("1st" indicates the strongest)

Table 3 clearly illustrates that **Neuroticism, Openness, and Conscientiousness consistently emerge as the most important predictors of overall safety, with Neuroticism exhibiting the strongest impact.**

A2. Exploring Big-5 Differences Among Occupational Categories

Section A1 focused on examining which personality factors seem to impact safety behaviors the most. The results revealed that Neuroticism, Conscientiousness and Openness seem to predict safety consistently and strongly, with Neuroticism having the greatest impact. Section A2 focuses on examining whether different occupations score differently on the Big-5 personality factors. This will not only provide insight about Alison Management Corporation (AMC) crew's current personality constellation, but will also indicate which personality traits seem to dominate each occupation.



To examine whether occupational categories within tankers exhibit significant differences on the Big-5 factors, a series of five one-way analyses of variance (ANOVA) were conducted. The aim was to examine whether there are any significant differences in (i) Openness, (ii) Conscientiousness, (iii) Extraversion, (iv) Agreeableness, and (v) Neuroticism among occupational categories. **The results revealed that, in tankers, there are no significant differences among occupational categories regarding their scores on the Big-5 factors.** Detailed information are exhibited in Table 4.

Table 4

ANOVA Examining Differences in the Big-Five Factors Among Occupational Categories in Tankers

	F	df	p
Openness	,606	(8, 185)	,772
Conscientiousness	,674	(8, 185)	,714
Extraversion	,665	(8, 185)	,722
Agreeableness	,699	(8, 185)	,692
Neuroticism	,435	(8, 185)	,899

A3. Exploring Big-5 Differences Among Vessel Types

The final section focuses on exploring whether certain personality characteristics are exhibited differently between vessel types. By using ANOVA analysis, these potential discrepancies can be uncovered. **Results suggest that Openness, Conscientiousness, and Extraversion seem to be exhibited differently between vessel types.** The ANOVA results are exhibited in Table 5.

Table 5

ANOVA Examining Differences in the Big-Five Factors Among Vessel Types

	F	df	p
Openness	4,248	(2, 2549)	,014
Conscientiousness	7,441	(2, 2549)	,001
Extraversion	8,069	(2, 2549)	<,001
Agreeableness	2,062	(2, 2549)	,127



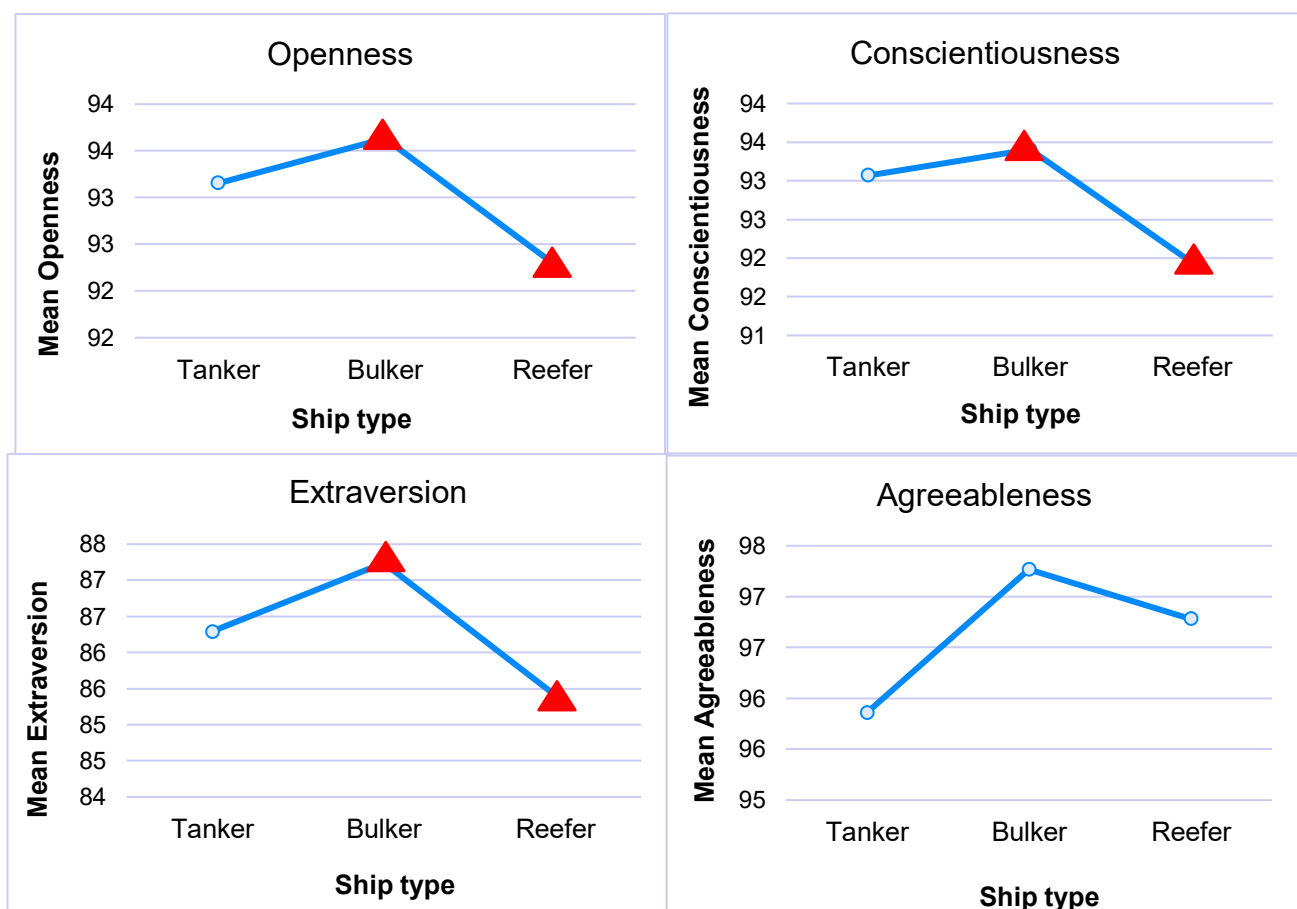
Neuroticism	1,922	(2, 2549)	,147
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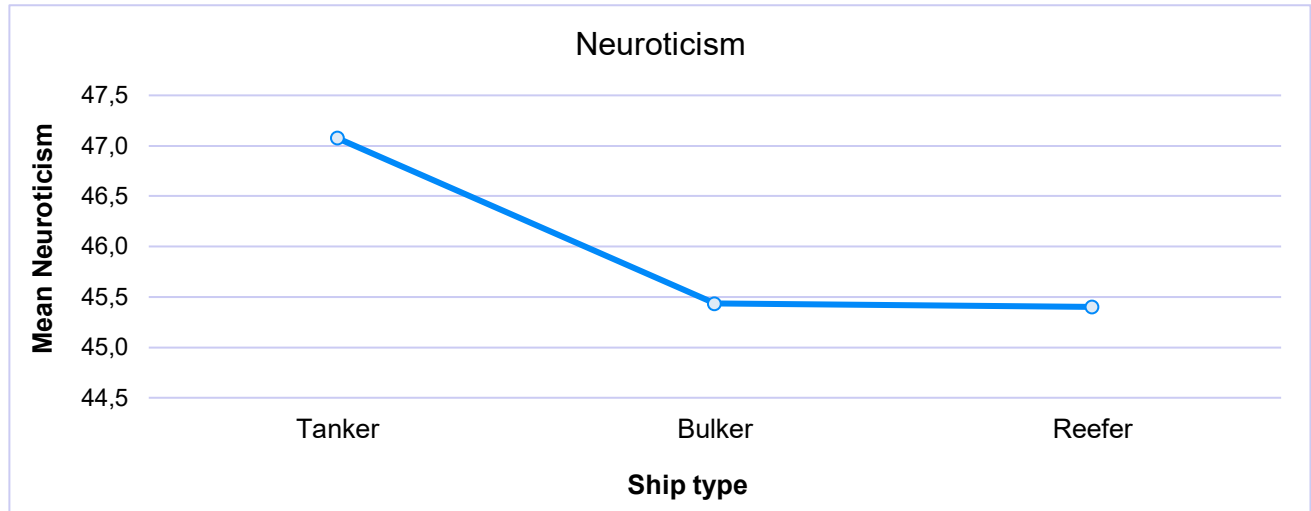
Openness. The analysis revealed that Openness levels in Bulkers ($M=93,63$, $SD=10,22$) are significantly higher than those in Reefers ($M=92,3$, $SD=10,68$, $p=.011$).

Conscientiousness. A finding similar to openness emerged for conscientiousness. More specifically, Bulkers ($M=93,41$, $SD=8,53$) seem to score significantly higher than those in Reefers ($M=91,94$, $SD=8,938$, $p<.001$).

Extraversion. Bulkers and Reefers produced similar results for extraversion. As evidenced by the previous two factors, Extraversion levels in Bulkers ($M= 87,24$, $SD= 10,21$) are significantly higher than those in Reefers ($M= 85,41$, $SD= 11,06$, $p<.001$).

In summary, the vessels do not differ in terms of Agreeableness and Neuroticism. More specifically, Tankers are not significantly different from neither Bulkers nor Reefers. On the contrary, Bulkers seem to consistently present higher levels of Openness, Conscientiousness and Extraversion compared to those in Reefers. The differences in the average scores among vessel types is also visually represented in the graphs below. The red triangles indicate the aforementioned significant differences.





Section A: Conclusions

- ✓ Tanker crew members exhibit satisfactory scores on the Big-Five indicators.
- ✓ Among the Big-Five, Neuroticism is the strongest predictor regarding the exhibition of safety-related behaviors, followed by Openness and Conscientiousness.
- ✓ For all occupational categories, Neuroticism remains the strongest predictor regarding safety, followed by Openness and Conscientiousness.
- ✓ Demographic information do not significantly impact safety scores in tankers.
- ✓ Occupational Categories do not produce differences in their expression of the Big-Five personality traits, suggesting crew personality consistency and robust recruitment methods.
- ✓ Tankers, despite their smaller crew size, do not express any of the Big-Five indicators differently compared to the other two types of vessels.



Section B: Analyzing The Safety Indicators

Section B focuses on the twelve safety indices provided by the PEQ Safety Assessment. More specifically, the aim of this section is to explore whether tanker crew members differ significantly on the positive and negative safety indices. This is crucial, as it provides a snapshot of the crew's safety propensity and can provide valuable insight to the parties in charge of these processes.

At this point, it is important to underline the following. As indicated in the safety report, **AMC's crew exhibits high levels of safety**. As such, in the case where certain occupational groups score lower on a safety indicator, this does not necessarily reflect actual problems concerning safety.

In order to obtain a clear and simple picture of how safety is exhibited within AMC's crew, the following table was constructed. Table 6 compares the average scores (means) of each occupational group on the six positive and six negative safety indicators. Although—as will be shown in the following section—most occupational groups do not differ significantly from each other, there seems to be **a consistent trend of Cadets scoring the best in all indicators**.

Table 6

Average Scores of Occupational Groups on Each of the Twelve Safety Indicators

	Masters	Engineers	Other Engineers	Officers	Other Officers	Deck Ratings	Engine Ratings	Services-related	Cadets
Defiant	15,46	16,21	16,14	15,3	14,97	17,4*	17,03	17,35	13,58**
Compliant	46,25	45,96	46,67	47,25	47,29	46,44	46,37	46,62	48,37
Anxious	20,44	21,22	21,57	20,79	21,78	20,72	20,46	20,93	19,24
Calm	36,73	36,73	36,33	36,51	35,87	37,56	38,1	37,36	38,66
Irritable	22,53	23,03	23,29	23,14	23,36	22,66	21,92	22,71	21,32
Relaxed	37,59	37,25	37,19	37,54	37,04	37,55	37,86	37,49	38,74
Distractible	57,05	56,59	56,79	56,46	56,94	55,41	55,07	55,97	53,76
Focused	66,44	65,57	65,63	66,78	67,32	63,98	64,08	63,66	69,21
Negligent	25,24	24,8	24,91	25,16	25,31	24,17	23,59	24,22	23,37
Conscientious	39,33	39,51	39,57	39,84	39,83	39,4	39,21	39	41,13

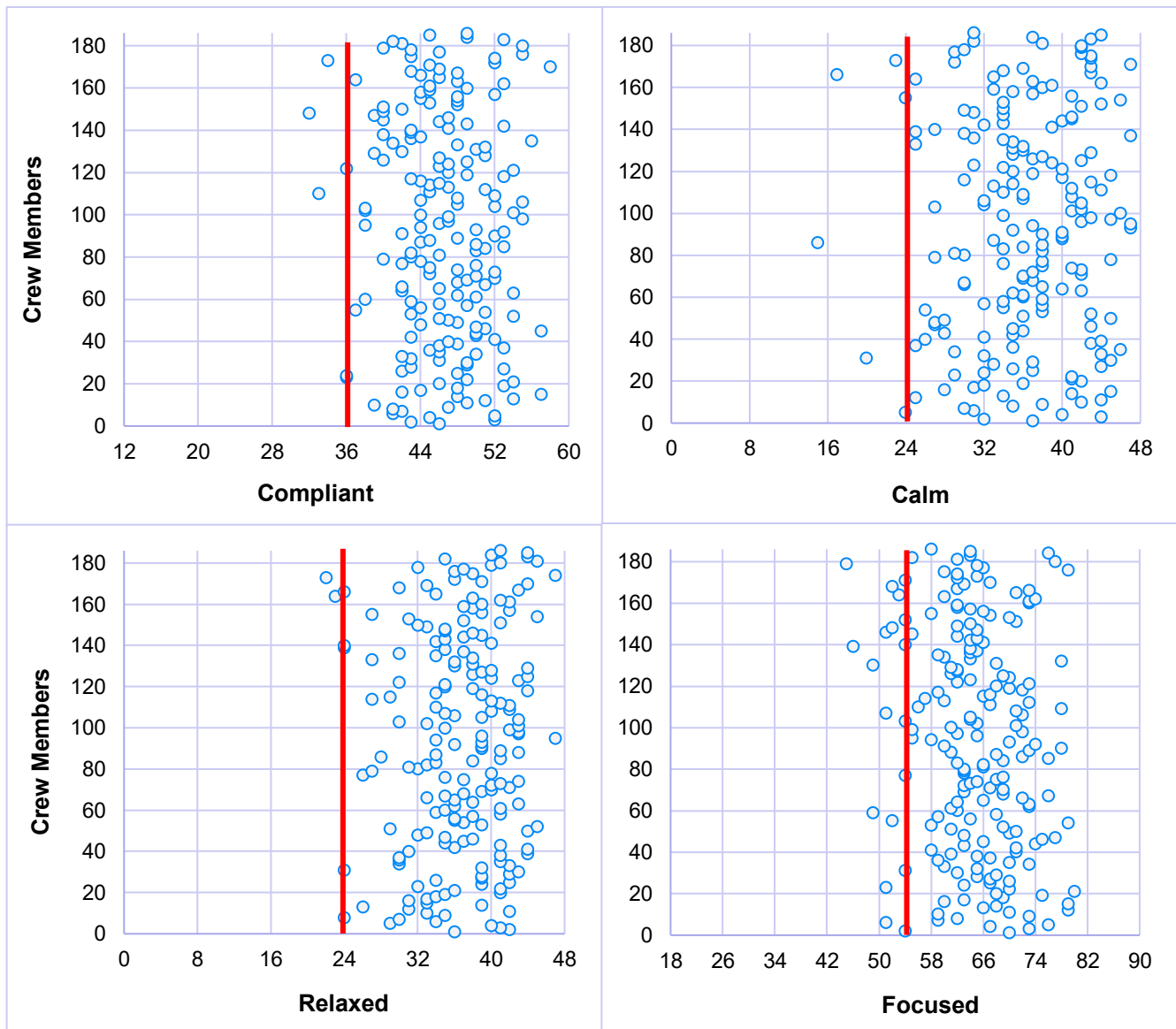


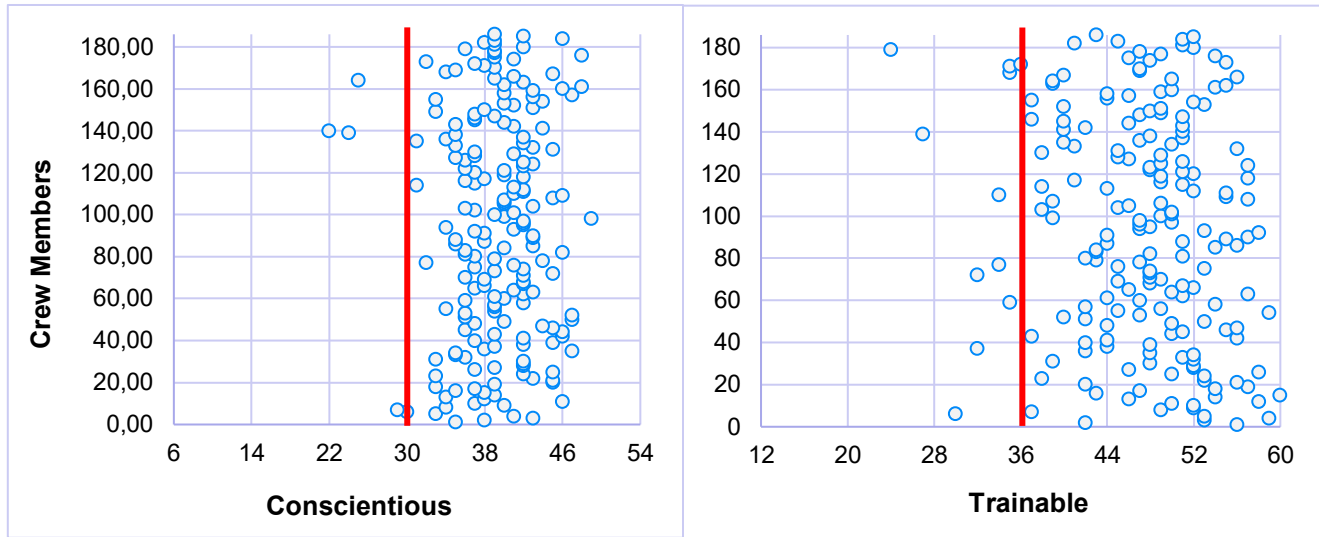
Overconfident	12,44	12,76	12,69	12,85	12,29	12,44	12,24	12,84	11,89
Trainable	49,65	48,97	48,03	48,62	49,02	46,96	47,61	45,91	49,82

*The red square indicates the occupational group with the worst score.

**The green square indicates the occupational group with the best score.

B1. Positive Safety Indicators





As evident in the scatterplots presented above, **the vast majority of the crew exhibits satisfactory levels in the positive safety indices. With very few exceptions, tanker crew members present above par safety-related scores.**

A series of six ANOVA analyses were conducted to examine whether occupational groups would exhibit significantly different scores in the positive safety indices. **All ANOVAs failed to reach significance, indicating that all ranks, in tankers, score similarly on the positive safety indices.** The overall ANOVA results are exhibited in Table 7.

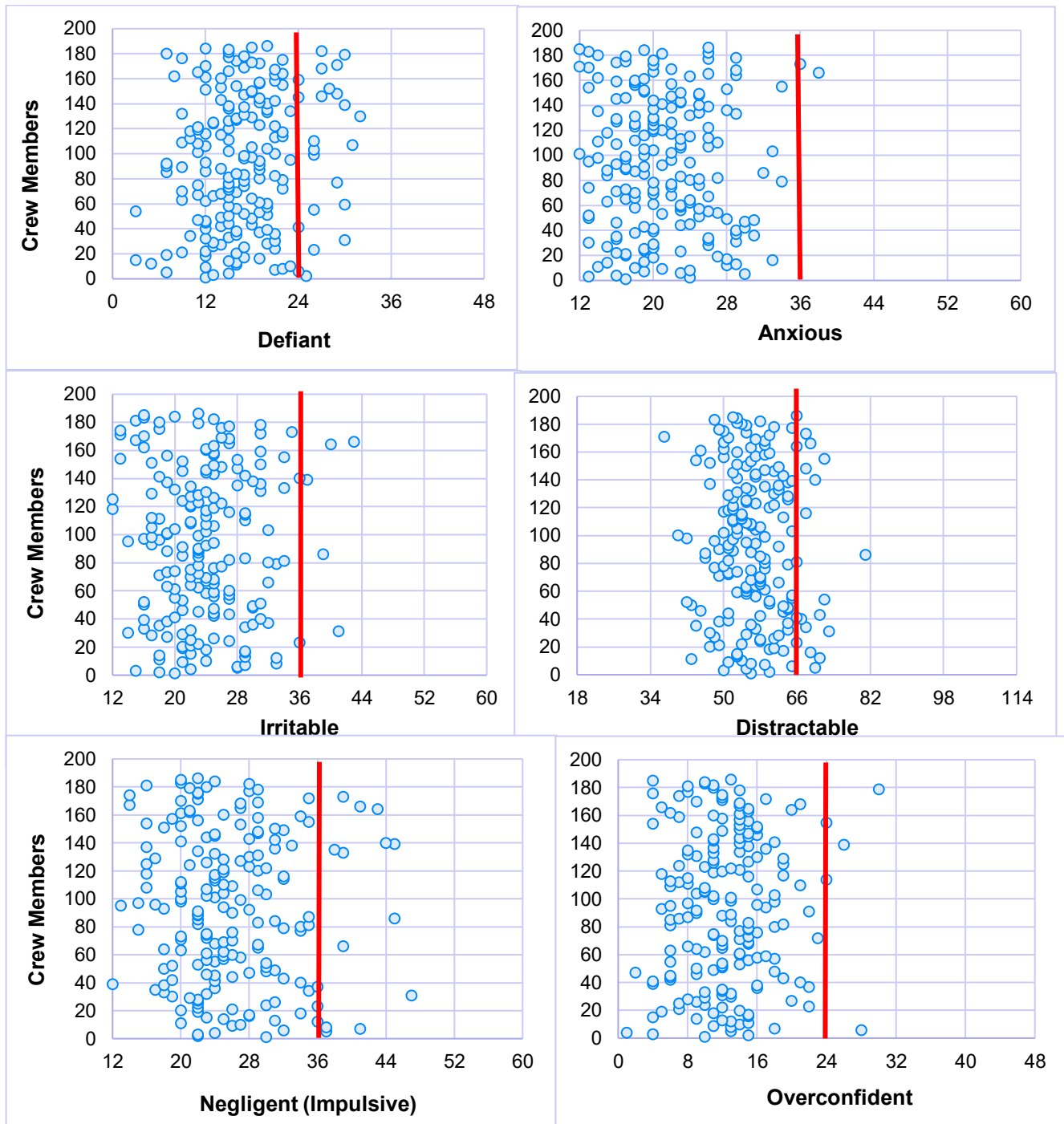
Table 7

ANOVA Examining Differences in the Positive Safety Indicators Among Occupational Groups

	<i>F</i>	<i>df</i>	<i>p</i>
Compliant	,428	(8, 185)	,903
Calm	,344	(8, 185)	,948
Relaxed	1,015	(8, 185)	,427
Focused	,959	(8, 185)	,47
Conscientious	1,232	(8, 185)	,283
Trainable	,709	(8, 185)	,683



B2. Negative Safety Indicators



As evident in the scatterplots presented above, the vast majority of the crew exhibits satisfactory levels in the negative safety indices. With very few exceptions, tanker crew members do not present worrisome results regarding safety.



A series of six ANOVA analyses were conducted to examine whether occupational groups would exhibit significantly different scores in the negative safety indices. **All ANOVAs failed to reach significance, indicating that all ranks, in tankers, seem to score similarly on the negative safety indices.** The overall ANOVA results are exhibited in Table 8.

Table 8

ANOVA Examining Differences in the Negative Safety Indicators Among Occupational Groups

	<i>F</i>	<i>df</i>	<i>p</i>
Defiant	,969	(8, 185)	,462
Anxious	,715	(8, 185)	,678
Irritable	,487	(8, 185)	,865
Distractable	,613	(8, 185)	,766
Negligent	,652	(8, 185)	,733
Overconfident	,497	(8, 185)	,857

B3. Safety Indices—Differences Among Vessel Types

The final analysis regarding the twelve safety indices focused on their emergence between vessel types. Simply put, the aim of this section is to examine whether certain safety indicators are more prominent or inconspicuous in specific vessel types.

In order to examine this, a series of twelve ANOVA analyses were conducted—one for each safety indicator—in order to examine differences between vessel types. Results indicated that, among the twelve indicators, only **“Compliant”, “Irritable”, “Negligent” and “Overconfident” yielded discrepancies among vessels.** The overall ANOVA results are exhibited in Table 9.

Table 9

ANOVA Examining Differences in the Safety Indicators Among Vessel Types

	<i>F</i>	<i>df</i>	<i>p</i>
Defiant	2,203	(2, 2547)	,111
Compliant	5,175	(2, 2547)	,006
Anxious	,274	(2, 2547)	,761



Calm	1,642	(2, 2547)	,194
Irritable	3,138	(2, 2547)	,044
Relaxed	1,661	(2, 2547)	,190
Distractible	,922	(2, 2547)	,398
Focused	2,692	(2, 2547)	,068
Negligent	3,593	(2, 2547)	,028
Conscientious	1,142	(2, 2547)	,319
Overconfident	5,204	(2, 2547)	,006
Trainable	1,245	(2, 2547)	,288

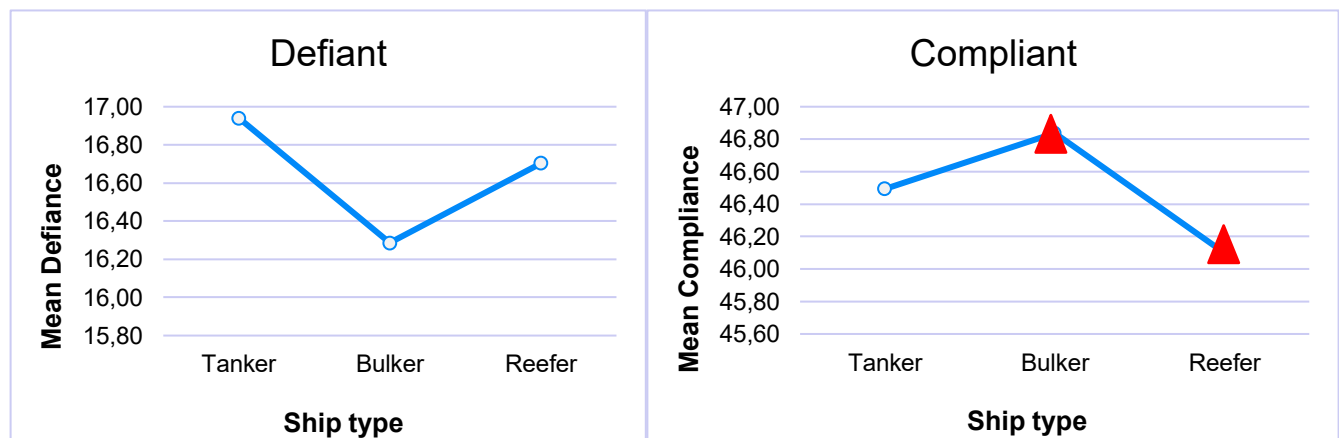
Compliant. The post-hoc comparisons revealed that, across vessel types, Bulklers ($M=46,84$, $SD=5,18$) score significantly higher on compliance compared to Reefers ($M=46,1$, $SD=5,41$; $p=,004$).

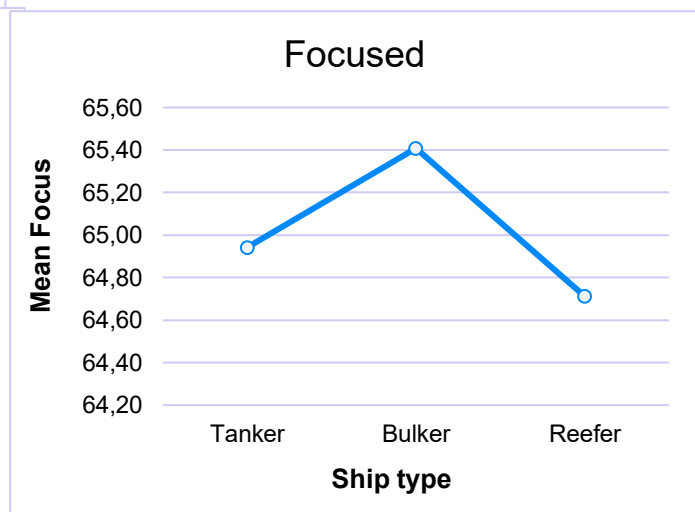
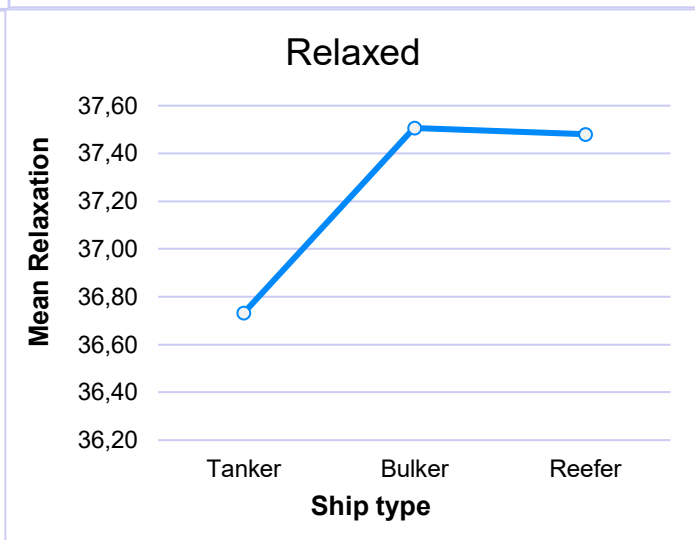
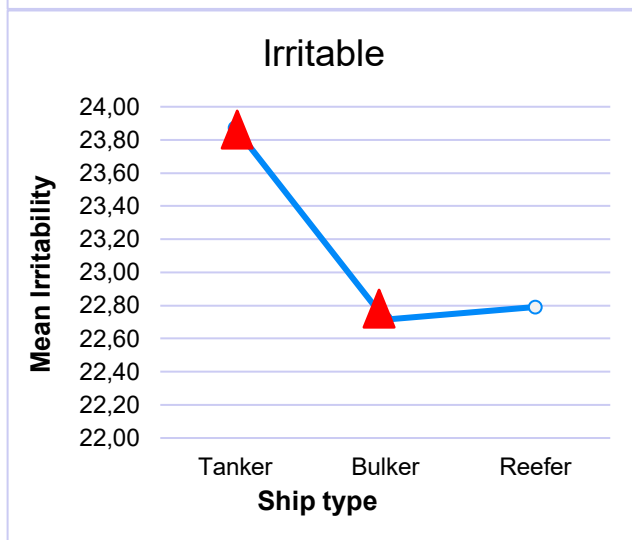
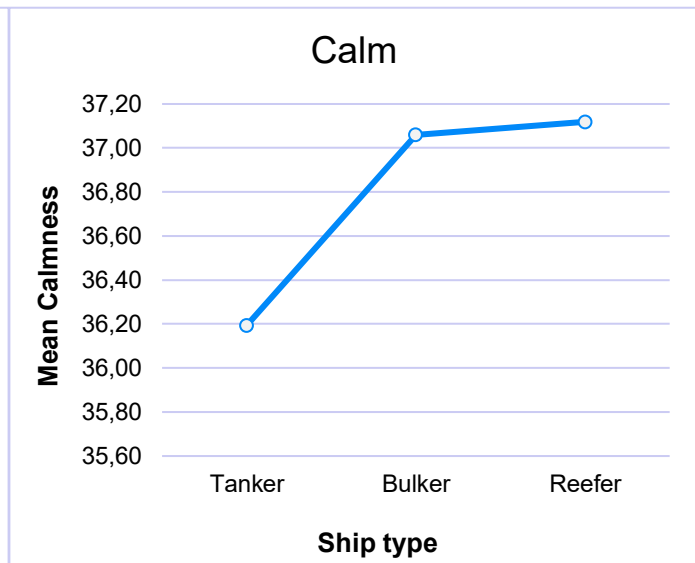
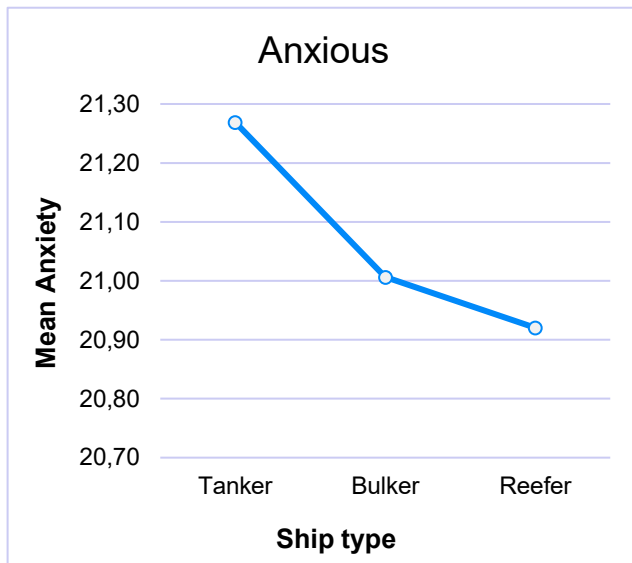
Irritable. The finding that emerged was that Tankers ($M=23,87$, $SD=5,88$) seem to score higher on irritability compared to Bulklers ($M=22,71$, $SD=5,98$; $p=,038$).

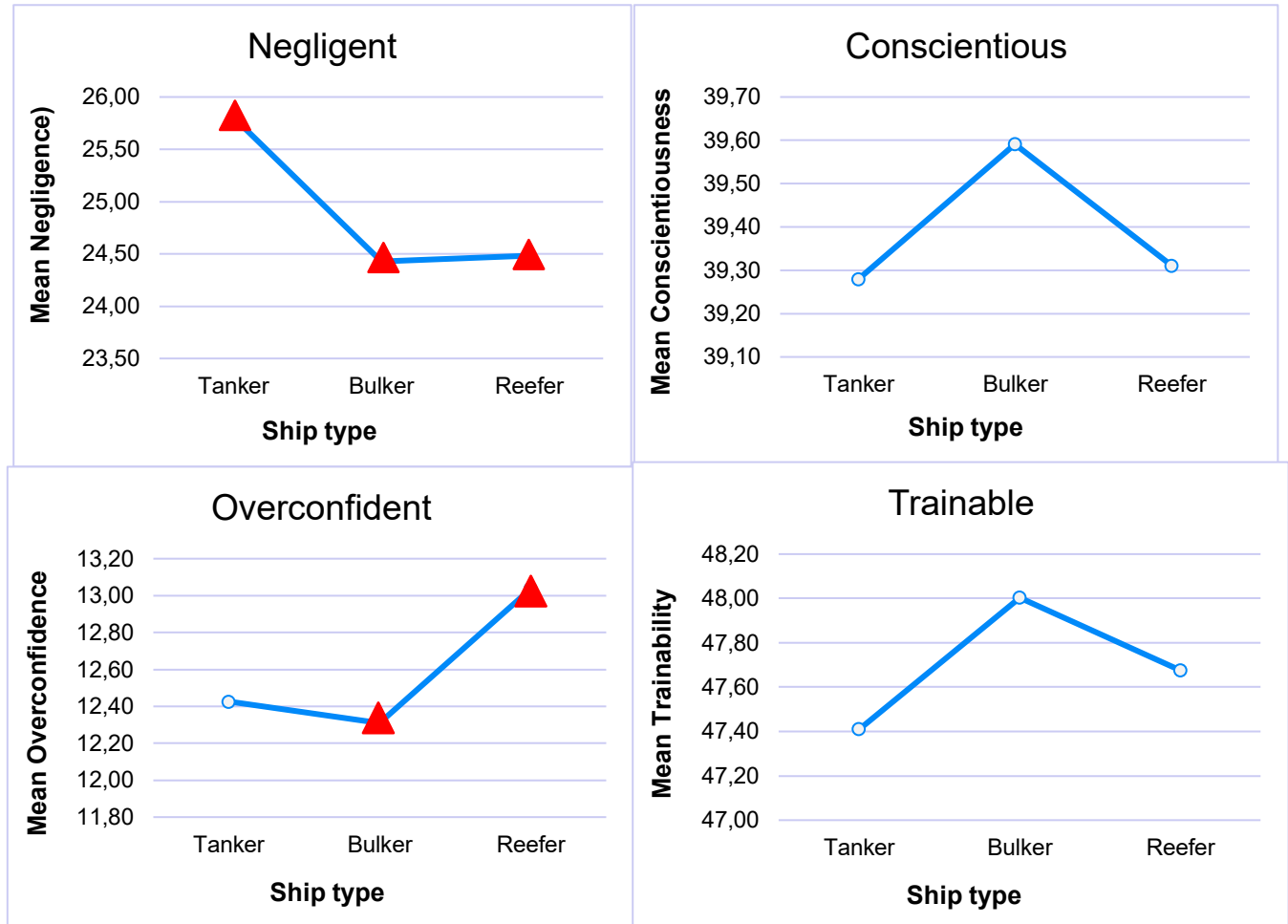
Negligent. Regarding negligence, post-hoc comparisons reveal that Tankers ($M=25,81$, $SD=6,71$) score higher than Bulklers ($M=24,43$, $SD=6,65$; $p=,023$) and Reefers ($M=24,48$, $SD=6,74$; $p=,046$).

Overconfident. Lastly, it was indicated that crew members on Reefers ($M=13,04$, $SD=5,27$) show higher levels of overconfidence compared to those working in Bulklers ($M=12,31$, $SD=5,11$; $p=,004$).

The differences in the average scores on the twelve safety indicators—among vessel types—is also visually represented in the graphs below. The red triangles indicate the aforementioned significant differences between vessel types.







Further analysis was conducted to examine which occupational categories created those discrepancies. Regarding Tankers, results suggest that the **difference in the irritability factor levels is created by Engine Ratings who, in Tankers, seem to score higher than those working in Bulkers. Regarding the negligence factor, no noteworthy discrepancies could be detected regarding Tankers.**



Section B: Conclusions

- ✓ Among occupational categories, **cadets produce the best results regarding the twelve safety indicators**. This finding is important, as cadets represent AMC's next generation of crew members.
- ✓ Regarding the positive safety indices, tanker crew members exhibit satisfactory scores.
- ✓ Regarding the positive safety indices, no significant differences were found between occupational categories, suggesting consistency in behavior.
- ✓ Regarding the negative safety indices, tanker crew members exhibit satisfactory scores.
- ✓ Regarding the negative safety indices, no significant differences were found between occupational categories, suggesting consistency in behavior.
- ✓ When comparing vessel types, tankers did not significantly differ from bulkers or reefers.
 - The only difference that emerged for the irritability indicator, with tanker Engine Ratings scoring higher than their Bulker counterparts.



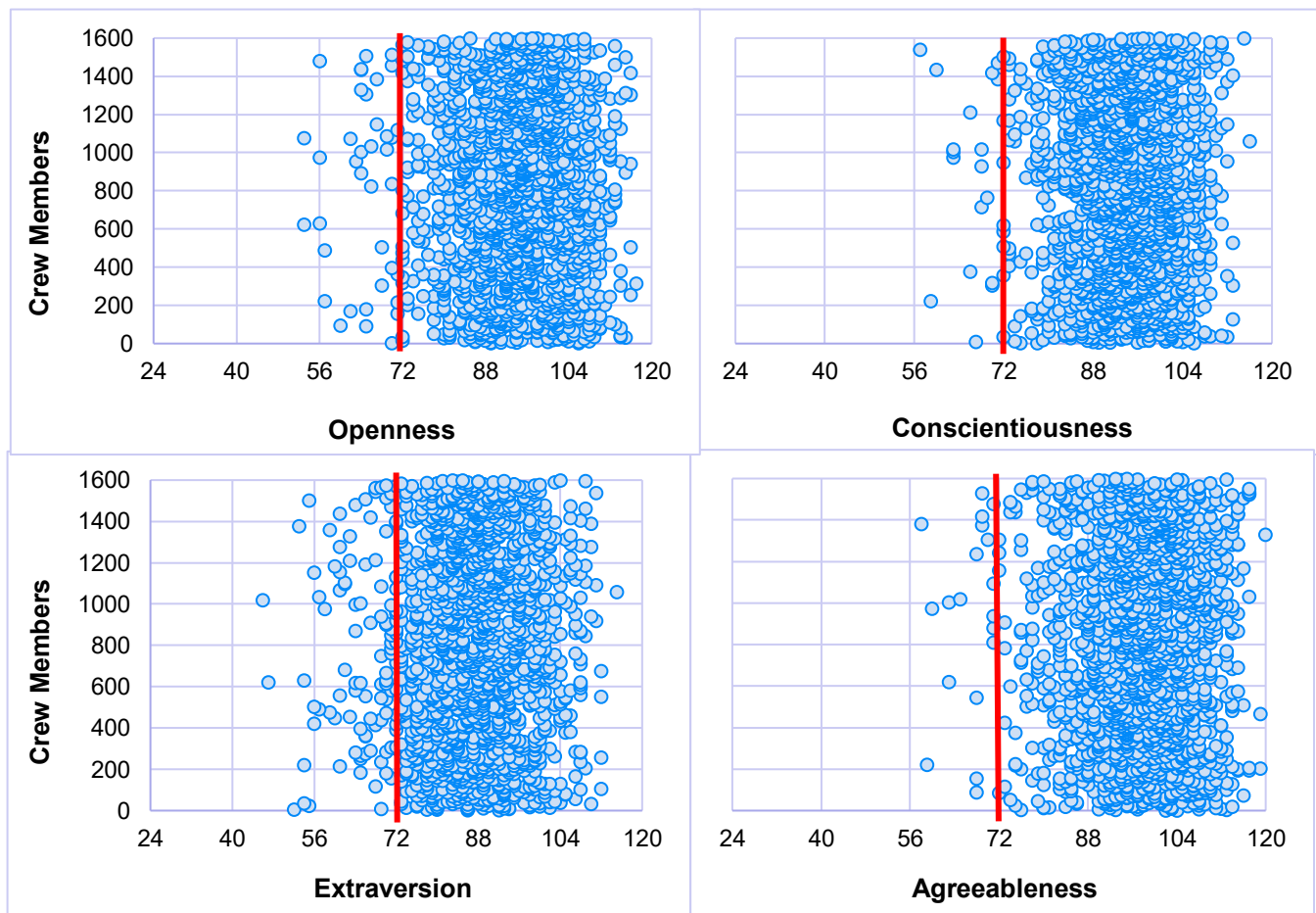
Chapter 3: Bulkiers

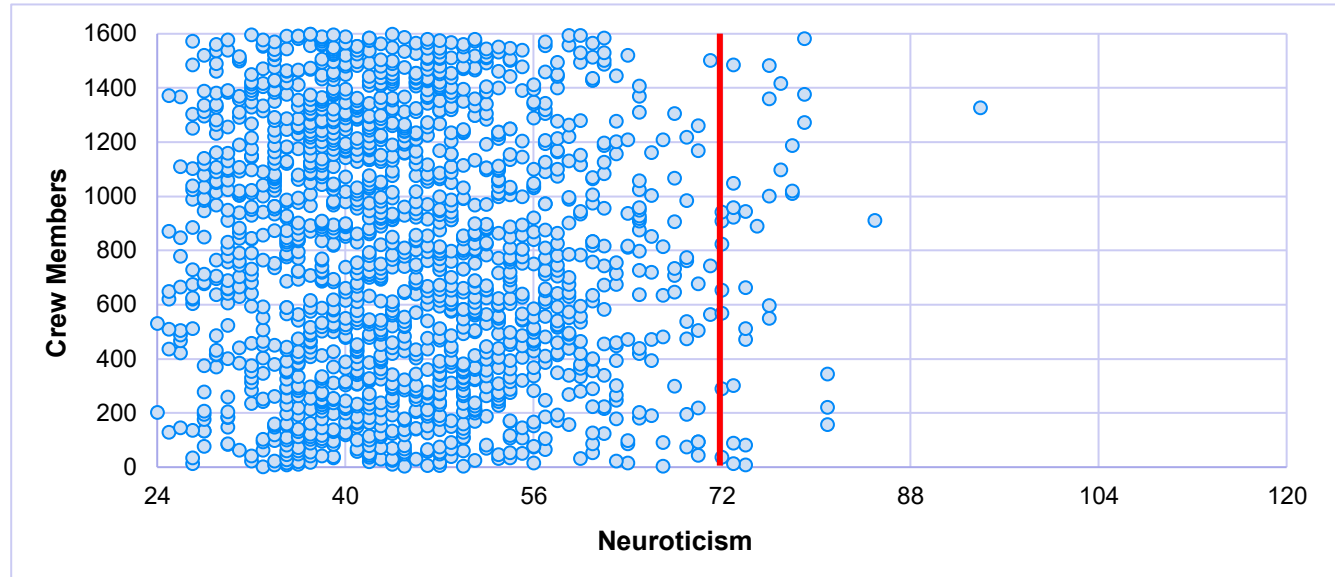
Section A: Examining The Impact of The Big-5 on Safety

This section's main aim is to unveil how each of the Big-Five factors impact seafarer propensity for safe behaviors. The importance of this section is twofold as it, firstly, sheds light into the crew's overall personality tendencies and, secondly, it informs the interested parties on which personality elements are most crucial to hone into during the recruitment process.

A1. Big-Five and Safety

Prior to presenting the results, it is important to underline that, in the PEQ Safety Assessment, the Big-Five personality factors can range from a score of "24" (minimum) to "120" (maximum). As such, a score of "72" is considered the average score for each factor. Scores above this cut-off point are considered to reflect individuals who exhibit the respective personality factor to a high degree. In the scatterplots below, bulker crew's scores on the Big-Five personality factors are displayed. Each crew member is represented by a blue dot, and the vertical red line pinpoints the mid-way point.





As is evident from the graphs above, **the vast majority of bulker crew members exhibit the desired scores on the Big-Five factors**, such as low Neuroticism, and high Conscientiousness and high Openness. The detailed descriptive statistics for the total bulker sample (N=1599) can be found in Table 10.

Table 10

Big-Five Descriptive Statistics for Bulker Crew Members

	Minimum	Maximum	Mean	Std. Deviation ⁴
Openness	53	117	93,63	10,22
Conscientiousness	57	116	93,41	8,53
Extraversion	46	115	87,24	10,21
Agreeableness	58	120	97,27	9,65
Neuroticism	24	94	45,43	11,1

A multiple linear regression was performed to assess the ability of age, marital status, contract type, and the Big-Five personality factors to predict safety scores among bulker crew members. A preliminary analysis was conducted to ensure there was no violation of assumptions of normality, linearity, multicollinearity, and homoscedasticity. The model predicted 95,3% of the variance of

⁴ A standard deviation is a measure of how dispersed the data is in relation to the mean (average score).



safety scores; $R^2 = .953$, $F(5, 1589) = 6501,23$, $p < .001$. In the model, all Big-Five factors and Marital Status contributed significantly to the prediction of safety scores (Table 11).

Table 11

Hierarchical Linear Regression Analysis Predicting Safety Scores from Age, Marital Status, Contract Type, and the Big-Five Factors

	t	B ⁵	β	F	df	p ⁶	R ²
Overall Model				6501,23	(5, 1589)	<,001	,953
Age	-,856	-,025	-,005			,392	
Marital Status	-1,956	-1,259	-,012			,051	
Contract Type	,206	,122	,001			,837	
Openness	43,037	1,439	,290			<,001	
Conscientiousness	41,398	1,631	,275			<,001	
Extraversion	-1,912	-,064	-,013			,056	
Agreeableness	-5,387	-,185	-,035			<,001	
Neuroticism	-117,540	-3,253	-,713			<,001	

The aforementioned regression analysis suggests that **Neuroticism has the strongest effect on safety-related behaviors, followed by Conscientiousness and Openness**. It was deemed important to examine whether these traits exhibited the same strength across occupational categories. As such, a series of regressions were conducted to examine, between ranks in bulkers, which of the Big-Five play the biggest role in predicting safety. All information are in Table 12.

Table 12

Strength of Predictive Ability of the Big-Five Factors Regarding Safety (Across Occupational Categories)

		O*	C	E	A	N	p
Masters	Predictor**	YES	YES	NO	YES	YES	<,001
	Strength***	3 rd	2 nd	-	4 th	1 st	

⁵ Unstandardized Beta scores (B) reflect the impact of the factor on predicting safety scores. Higher B values reflect a higher impact. In this case, the highest B value is that of Neuroticism, pinpointing as the strongest predictor of safety.

⁶ The p value inform us whether the analysis was significant or not. In statistical analysis, a p value of 0.05 or lower reflects statistical significance, thus interpretable results.



Engineers	Predictor	YES	YES	NO	YES	YES	<,001
	Strength	3 rd	2 nd	-	4 th	1 st	
Other Engineers	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	3 rd	2 nd	-	-	1 st	
Officers	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	3 rd	2 nd	-	-	1 st	
Other Officers	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	3 rd	2 nd	-	-	1 st	
Deck Ratings	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	3 rd	2 nd	-	-	1 st	
Engine Ratings	Predictor	YES	YES	NO	YES	YES	<,001
	Strength	3 rd	2 nd	-	4 th	1 st	
Services-related	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	3 rd	2 nd	-	-	1 st	
Cadets	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	3 rd	2 nd	-	-	1 st	

*Openness (O), Conscientiousness (C), Extroversion (E), Agreeableness (A), and Neuroticism (N)

**"YES" indicates that the particular factor significantly predicts safety, "NO" indicates it does not

***This line indicates the hierarchy of strength with which the factors affect safety ("1st" indicates the strongest)

Table 12 clearly illustrates that **Neuroticism, Openness, and Conscientiousness consistently emerge as the most important predictors of overall safety, with Neuroticism exhibiting the strongest impact.**

A2. Exploring Big-5 Differences Among Occupational Categories

Section A1 focused on examining which personality factors seem to impact safety behaviors the most. The results revealed that Neuroticism, Conscientiousness and Openness seem to predict safety consistently and strongly, with Neuroticism having the greatest impact. Section A2 focuses on examining whether different occupations score differently on the Big-5 personality factors. This will not only provide insight about the Shipping Company crew's current personality constellation, but will also indicate which personality traits seem to dominate each occupation.



To examine whether occupational categories within bulkers exhibit significant differences on the Big-5 factors, a series of five one-way analyses of variance (ANOVA) were conducted. The aim was to examine whether there are any significant differences in (i) Openness, (ii) Conscientiousness, (iii) Extraversion, (iv) Agreeableness, and (v) Neuroticism among occupational categories. **The analyses revealed that, indeed, there seem to be certain personality differences among occupations. Out of the five factors, Conscientiousness, Agreeableness, and Neuroticism generated differences among occupations.** The overall ANOVA results are exhibited in Table 13.

Table 13

ANOVA Examining Differences in the Big-Five Factors Among Occupational Categories in Bulkers

	F	df	p
Openness	1,838	(8, 1598)	,066
Conscientiousness	2,178	(8, 1598)	,027
Extraversion	1,391	(8, 1598)	,195
Agreeableness	1,961	(8, 1598)	,048
Neuroticism	2,018	(8, 1598)	,041

Conscientiousness. Although conscientiousness did produce a significant p value, upon closer inspection, only one comparison was significant among occupational groups. Specifically, only “Other Officers” and “Deck Ratings” seemed to exhibit significant differences regarding conscientiousness ($p=.048$), with Officers ($M=95,2$, $SD=7,28$) scoring higher than Deck Ratings ($M=92,86$, $SD=8,72$). All other comparisons did not reach statistical significance.

Agreeableness. Although the ANOVA analysis did reach statistical significance, upon closer inspection, no noteworthy differences were detected among occupational groups. The only comparison that barely failed to reach significance was the one between Officers and Engine Ratings ($p=.068$).

Neuroticism. Similar results were observed for Neuroticism, as, despite the ANOVA reaching significance, no noteworthy discrepancies were uncovered among occupational groups.

In summary, it is evident that no noteworthy differences exist among occupational groups regarding their scores on the Big-Five factors.



A3. Exploring Big-5 Differences Among Vessel Types

The final section focuses on exploring whether certain personality characteristics are exhibited differently between vessel types. By using ANOVA analysis, these potential discrepancies can be uncovered. **Results suggest that Openness, Conscientiousness, and Extraversion seem to be exhibited differently between vessel types.** The ANOVA results are exhibited in Table 14.

Table 14

ANOVA Examining Differences in the Big-Five Factors Among Vessel Types

	F	df	p
Openness	4,248	(2, 2549)	,014
Conscientiousness	7,441	(2, 2549)	,001
Extraversion	8,069	(2, 2549)	<,001
Agreeableness	2,062	(2, 2549)	,127
Neuroticism	1,922	(2, 2549)	,147

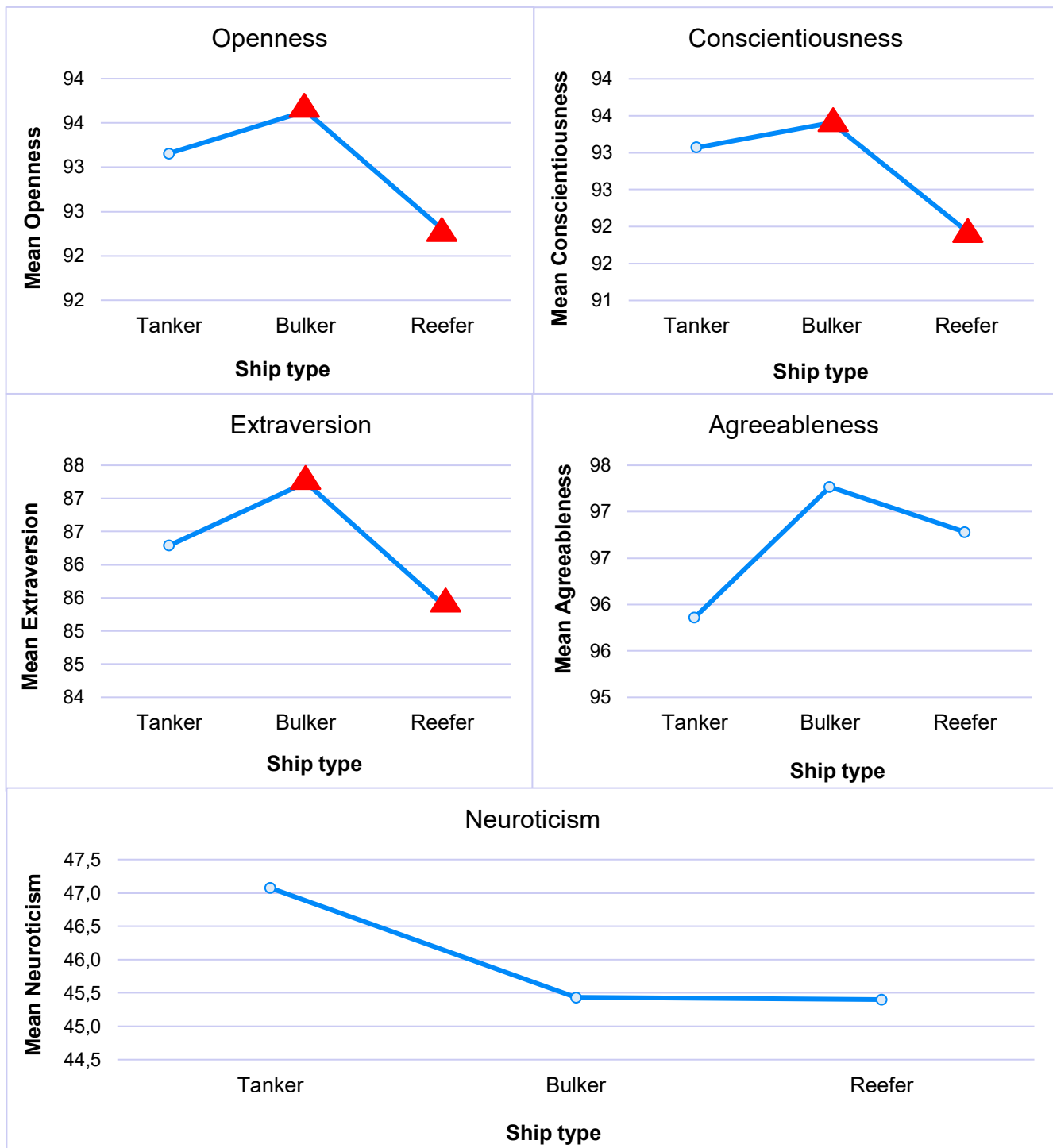
Openness. The analysis revealed that Openness levels in Bulkers ($M=93,63$, $SD=10,22$) are significantly higher than those in Reefers ($M=92,3$, $SD=10,68$, $p=,011$).

Conscientiousness. A finding similar to openness emerged for conscientiousness. More specifically, Bulkers ($M=93,41$, $SD=8,53$) seem to score significantly higher than those in Reefers ($M=91,94$, $SD=8,938$, $p<,001$).

Extraversion. Bulkers and Reefers produced similar results for extraversion. As evidenced by the previous two factors, Extraversion levels in Bulkers ($M= 87,24$, $SD= 10,21$) are significantly higher than those in Reefers ($M= 85,41$, $SD= 11,06$, $p<,001$).

In summary, **the vessels' crews do not differ in terms of Agreeableness and Neuroticism. More specifically, Tankers are not significantly different from neither Bulkers nor Reefers. On the contrary, Bulkers' seamen seem to consistently present higher levels of Openness, Conscientiousness and Extraversion compared to those in Reefers.** The differences in the average scores among vessel types is also visually represented in the graphs below. The red triangles indicate the aforementioned significant differences.





Further analysis was conducted to examine which occupational categories created the discrepancies among Bulkiers and Reefers. **The results revealed that Deck Ratings occupied in Bulkiers score higher on Extraversion, Openness, and Conscientiousness than Deck Ratings working in Reefers.**



Section A: Conclusions

- ✓ Bulker crew members exhibit satisfactory scores on the Big-Five indicators.
- ✓ Among the Big-Five, Neuroticism is the strongest predictor regarding the exhibition of safety-related behaviors, followed by Openness and Conscientiousness.
- ✓ For all occupational categories, Neuroticism remains the strongest predictor regarding safety, followed by Openness and Conscientiousness.
- ✓ Demographic information do not significantly impact safety scores in bulkers.
- ✓ Despite initial differences among occupational categories in Agreeableness, Conscientiousness, and Neuroticism, no noteworthy discrepancies were uncovered.
 - Such results indicate crew personality consistency and robust recruitment methods.
- ✓ Bulklers scored higher on Openness, Conscientiousness, and Extraversion compared to Reefers
 - This difference was created by the Deck Ratings (in comparison to reefer deck ratings).



Section B: Analyzing The Safety Indicators

Section B focuses on the twelve safety indices provided by the PEQ Safety Assessment. More specifically, the aim of this section is to explore whether bulkier crew members differ significantly on the positive and negative safety indices. This is crucial, as it provides a snapshot of the crew's safety propensity and can provide valuable insight to the parties in charge of these processes.

At this point, it is important to underline the following. As indicated in the safety report, **company's crew exhibits high levels of safety**. As such, in the case where certain occupational groups score lower on a safety indicator, this does not necessarily reflect actual problems concerning safety.

In order to obtain a clear and simple picture of how safety is exhibited within **company's** crew, the following table was constructed. Table 15 compares the average scores (means) of each occupational group on the six positive and six negative safety indicators. Despite—as will be shown in the following section—certain small differences among occupational categories, there seems to be **a consistent trend of Cadets scoring the best in all indicators**.

Table 15

Average Scores of Occupational Groups on Each of the Twelve Safety Indicators

	Masters	Engineers	Other Engineers	Officers	Other Officers	Deck Ratings	Engine Ratings	Services- related	Cadets
Defiant	15,46	16,21	16,14	15,3	14,97	17,4*	17,03	17,35	13,58**
Compliant	46,25	45,96	46,67	47,25	47,29	46,44	46,37	46,62	48,37
Anxious	20,44	21,22	21,57	20,79	21,78	20,72	20,46	20,93	19,24
Calm	36,73	36,73	36,33	36,51	35,87	37,56	38,1	37,36	38,66
Irritable	22,53	23,03	23,29	23,14	23,36	22,66	21,92	22,71	21,32
Relaxed	37,59	37,25	37,19	37,54	37,04	37,55	37,86	37,49	38,74
Distractible	57,05	56,59	56,79	56,46	56,94	55,41	55,07	55,97	53,76
Focused	66,44	65,57	65,63	66,78	67,32	63,98	64,08	63,66	69,21
Negligent	25,24	24,8	24,91	25,16	25,31	24,17	23,59	24,22	23,37

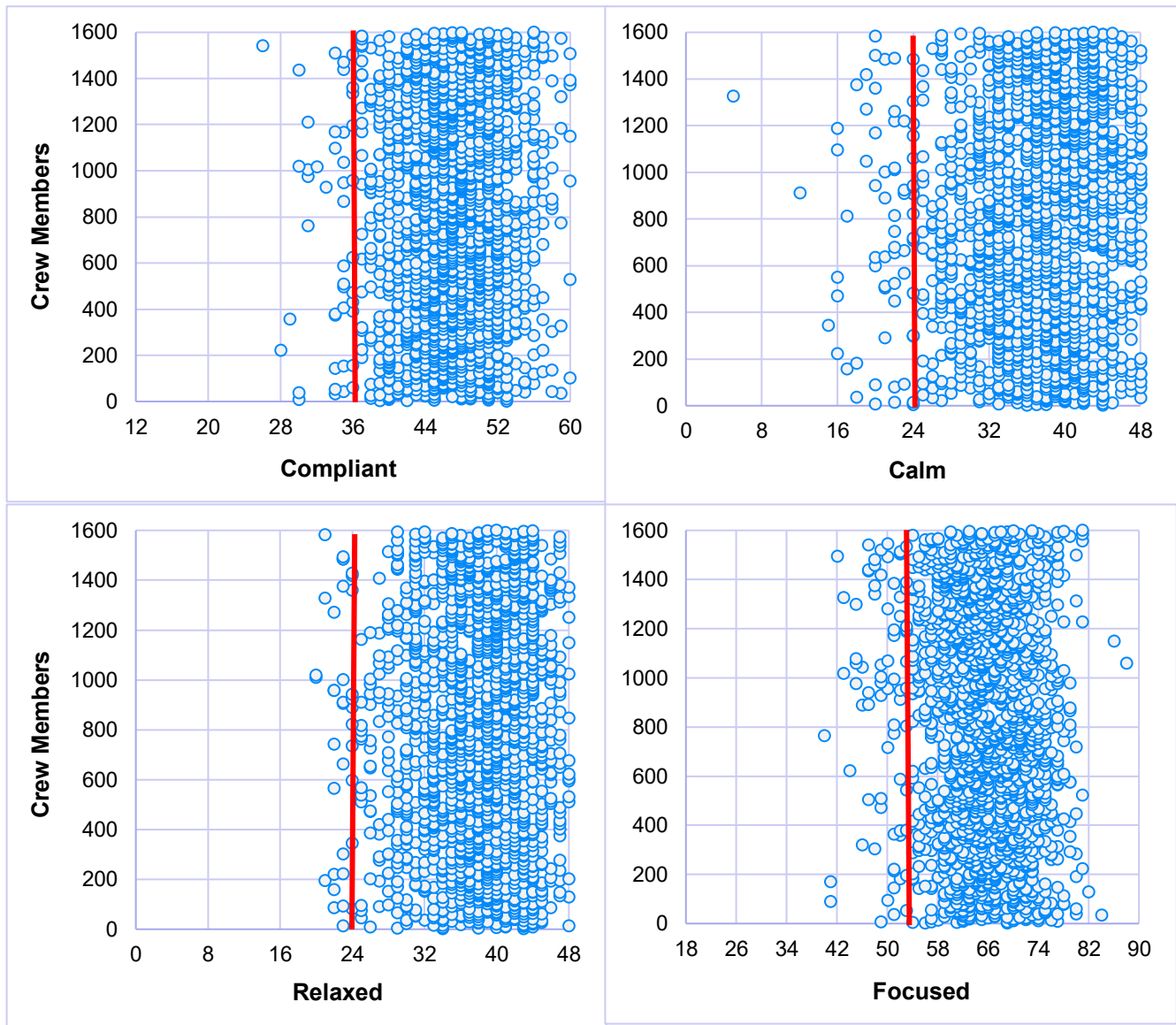


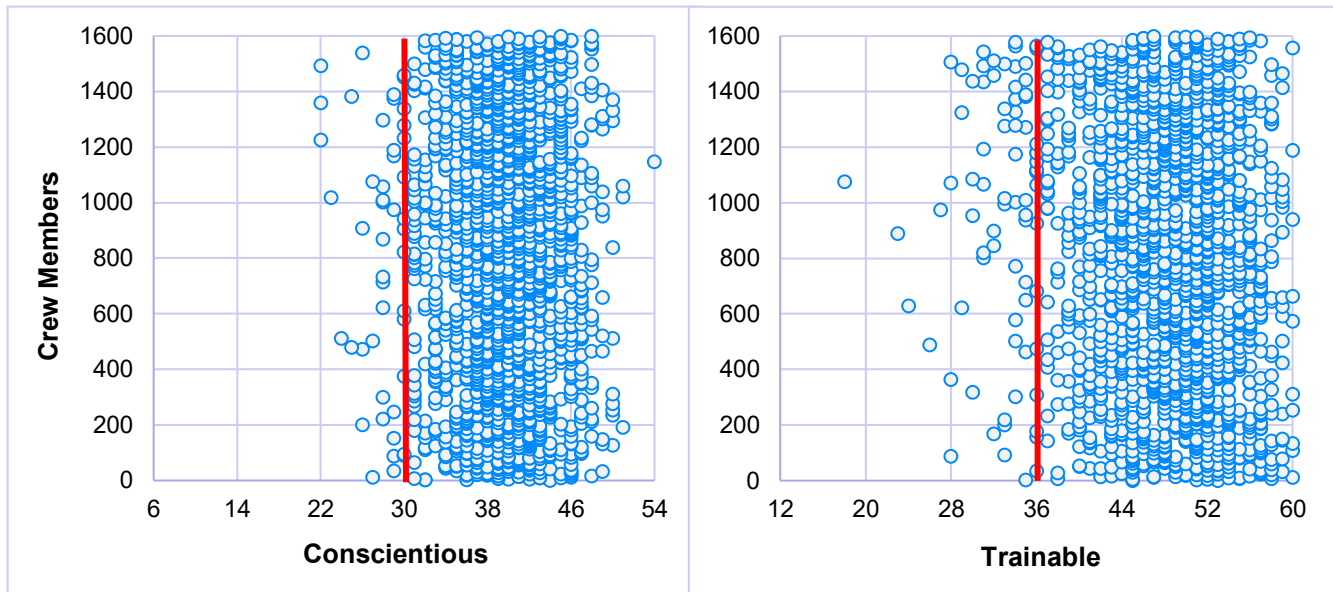
Conscientious	39,33	39,51	39,57	39,84	39,83	39,4	39,21	39	41,13
Overconfident	12,44	12,76	12,69	12,85	12,29	12,44	12,24	12,84	11,89
Trainable	49,65	48,97	48,03	48,62	49,02	46,96	47,61	45,91	49,82

*The red square indicates the occupational group with the worst score.

**The green square indicates the occupational group with the best score.

B1. Positive Safety Indicators





As evident in the scatterplots presented above, **the vast majority of the crew exhibits satisfactory levels in the positive safety indices. With very few exceptions, bulker crew members present above par safety-related scores.**

A series of six ANOVA analyses were conducted to examine whether occupational groups would exhibit significantly different scores in the positive safety indices. The statistical analyses revealed that **certain occupational groups scored significantly differently on the “Calm”, “Focused” and “Trainable” indices.** No differences were discovered in the remaining three positive safety indices. The overall ANOVA results are exhibited in Table 16.

Table 16

ANOVA Examining Differences in the Positive Safety Indicators Among Occupational Groups

	<i>F</i>	<i>df</i>	<i>p</i>
Compliant	1,519	(8, 1598)	,146
Calm	3,463	(8, 1598)	,001
Relaxed	,601	(8, 1598)	,778
Focused	6,753	(8, 1598)	<,001
Conscientious	,883	(8, 1598)	,53
Trainable	7,275	(8, 1598)	<,001



Calm. The only significant difference was located between Engine ratings ($M=38,67$, $SD=5,97$) and Officers ($M=35,53$, $SD=6,14$; $p=,026$), and Engine Ratings and Other Officers ($M=35,94$, $SD=6,82$; $p=,02$). In both cases, the engine ratings are showcased as significantly calmer compared to officers.

Focused. This indicator produced a higher number of comparable differences. A consistently emerging finding was that crew members in Services-Related jobs ($M=63,46$, $SD=7,74$) seem to be significantly less focused than Officers ($M=66,56$, $SD=6,6$; $p=,031$), Other Officers ($M=67,43$, $SD=6,17$; $p<,001$), and Cadets ($M=69,36$, $SD=6,74$; $p<,001$).

Besides those in the Services-Related jobs, Other Officers are also significantly more focused than Deck ratings ($M=64,61$, $SD=7,08$; $p<,001$) and Engine ratings ($M=64,12$, $SD=6,56$; $p=,003$).

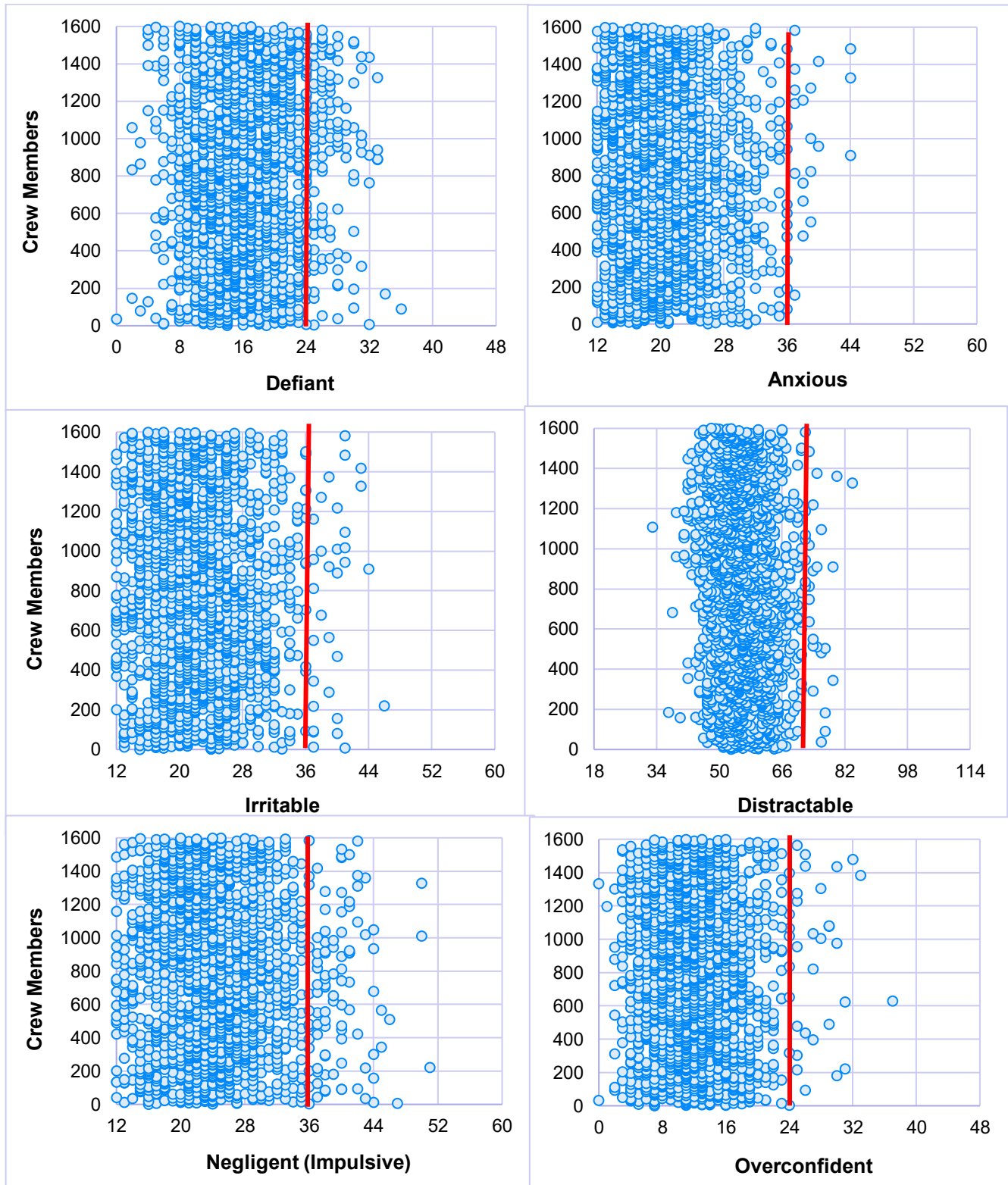
Lastly, Cadets are significantly more focused than Deck Ratings ($p=,004$) and Engine Ratings ($p=,005$).

Trainable. The “Trainable” indicator was the one that yielded the most prominent results. To be exact, crew members occupying service-related jobs ($M=45,19$, $SD=6,88$) scored significantly lower on trainability compared to all other eight occupational categories; Masters ($M=49,93$, $SD=5,83$; $p<,001$), Engineers ($M=49,14$, $SD=6,15$; $p<,001$), Other engineers ($M=48,16$, $SD=5,64$; $p<,001$), Officers ($M=48,75$, $SD=6,41$; $p<,001$), Other Officers ($M=48,98$, $SD=5,66$; $p<,001$), Deck ratings ($M=47,31$, $SD=6,42$; $p=,013$), Engine ratings ($M=47,3$, $SD=6,61$; $p=,009$), and Cadets ($M=49,56$, $SD=5,07$; $p=,008$).

The final difference was located for Deck Ratings, who score significantly lower on trainability than Masters ($p=,01$), Engine ratings ($p=,019$), and Other officers ($p=,049$).



B2. Negative Safety Indicators



As evident in the scatterplots presented above, **the vast majority of the crew exhibits satisfactory levels in the negative safety indices. With very few exceptions, bulker crew members do not present worrisome results regarding safety.**

A series of six ANOVA analyses were conducted to examine whether occupational groups would exhibit significantly different scores in the negative safety indices. The statistical analyses revealed that **certain occupational groups scored significantly differently on the “Defiant” and “Distractable” Indices.** No differences were discovered in the remaining four negative safety indices. The overall ANOVA results are exhibited in Table 17.

Table 17

ANOVA Examining Differences in the Negative Safety Indicators Among Occupational Groups

	<i>F</i>	<i>df</i>	<i>p</i>
Defiant	4,868	(8, 1598)	<,001
Anxious	1,699	(8, 1598)	,094
Irritable	1,589	(8, 1598)	,123
Distractable	3,537	(8, 1598)	<,001
Negligent	1,776	(8, 1598)	,077
Overconfident	1,175	(8, 1598)	,311

Defiant. The first difference was located between “Other officers” and “Deck Ratings” ($p=.002$), with Other Officers ($M=14,98$, $SD=4,78$) scoring significantly lower compared to Deck Ratings ($M=16,91$, $SD=5,97$). The second difference occurred between “Other officers” and “Services-related” ($p=.001$), with Other Officers ($M=14,98$, $SD=4,78$) scoring significantly lower than “Services-related” ($M=17,57$, $SD=5,99$). The final differences were observed for the group of Cadets ($M=13,52$, $SD=4,82$), who scored lower than both Deck Ratings ($p=.022$) and Services-related ($p=.005$).

Distractable. Although the ANOVA analysis did reach statistical significance, upon closer inspection, no noteworthy differences were detected among occupational groups.



B3. Safety Indices—Differences Among Vessel Types

The final analysis regarding the twelve safety indices focused on their emergence between vessel types. Simply put, the aim of this section is to examine whether certain safety indicators are more prominent or inconspicuous in specific vessel types.

In order to examine this, a series of twelve ANOVA analyses were conducted—one for each safety indicator—in order to examine differences between vessel types. Results indicated that, among the twelve indicators, only **“Compliant”, “Irritable”, “Negligent” and “Overconfident” yielded discrepancies among vessels.** ANOVA results are exhibited in Table 18.

Table 18

ANOVA Examining Differences in the Safety Indicators Among Vessel Types

	<i>F</i>	<i>df</i>	<i>p</i>
Defiant	2,203	(2, 2547)	,111
Compliant	5,175	(2, 2547)	,006
Anxious	,274	(2, 2547)	,761
Calm	1,642	(2, 2547)	,194
Irritable	3,138	(2, 2547)	,044
Relaxed	1,661	(2, 2547)	,190
Distractible	,922	(2, 2547)	,398
Focused	2,692	(2, 2547)	,068
Negligent	3,593	(2, 2547)	,028
Conscientious	1,142	(2, 2547)	,319
Overconfident	5,204	(2, 2547)	,006
Trainable	1,245	(2, 2547)	,288

Compliant. The post-hoc comparisons revealed that, across vessel types, Bulkers ($M=46,84$, $SD=5,18$) score significantly higher on compliance compared to Reefers ($M=46,1$, $SD=5,41$; $p=,004$).

Irritable. The finding that emerged was that Tankers ($M=23,87$, $SD=5,88$) seem to score higher on irritability compared to Bulkers ($M=22,71$, $SD=5,98$; $p=,038$).

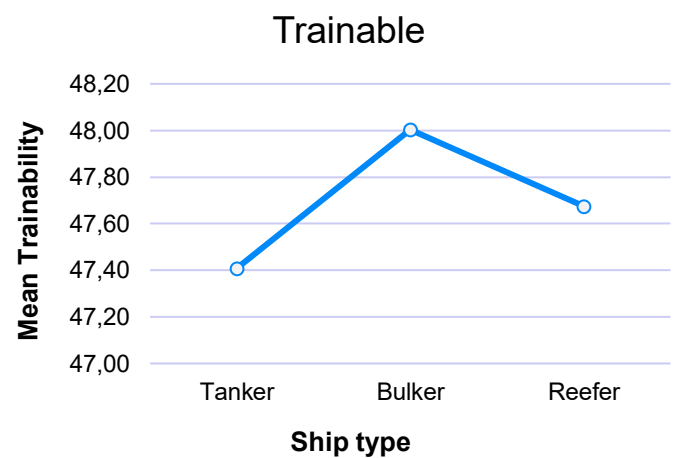
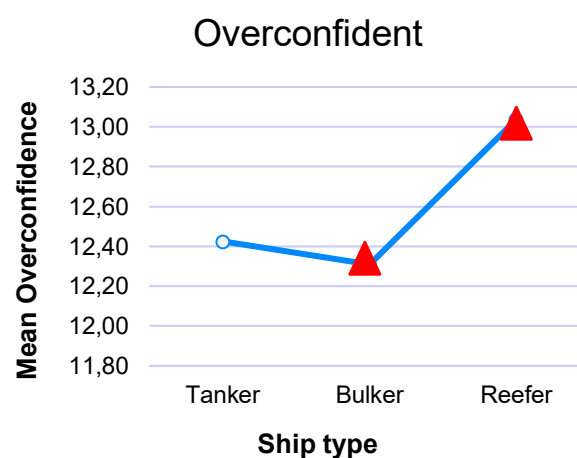
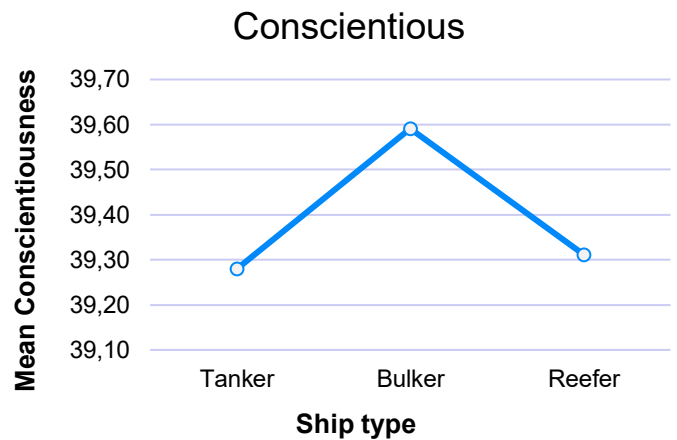
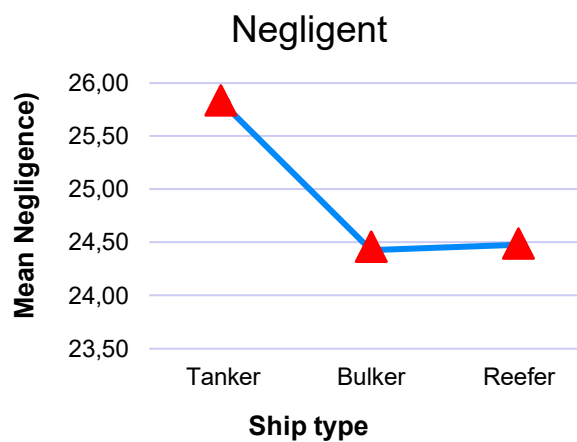
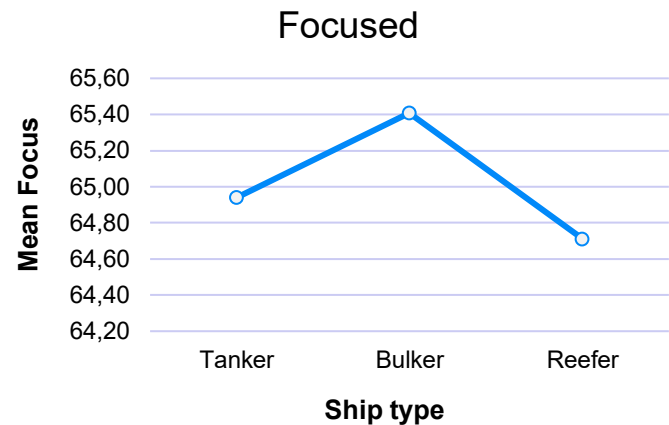
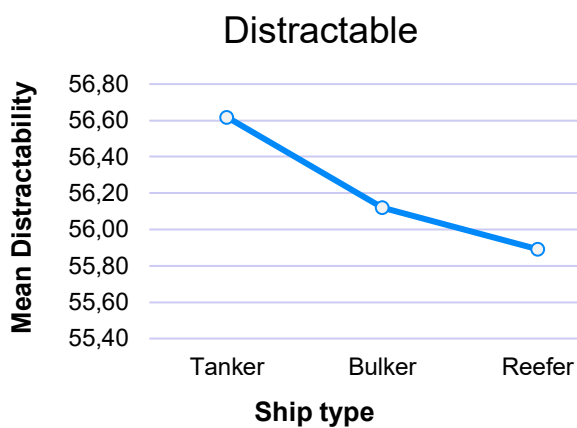
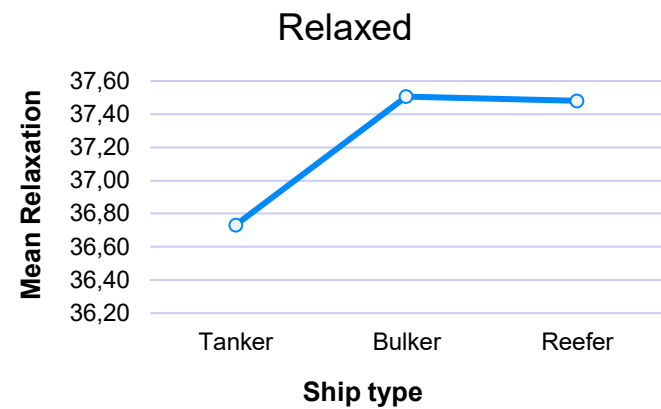
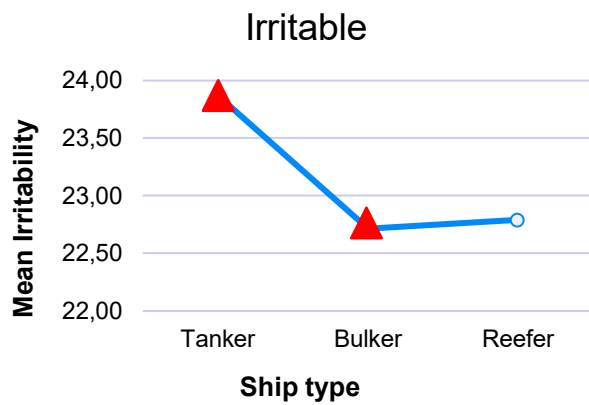


Negligent. Regarding negligence, post-hoc comparisons reveal that Tankers ($M=25,81$, $SD=6,71$) score higher than Bulkers ($M=24,43$, $SD=6,65$; $p=,023$) and Reefers ($M=24,48$, $SD=6,74$); $p=,046$).

Overconfident. Lastly, it was indicated that crew members on Reefers ($M=13,04$, $SD=5,27$) show higher levels of overconfidence compared to those working in Bulkers ($M=12,31$, $SD=5,11$; $p=,004$).

The differences in the average scores on the twelve safety indicators—among vessel types—is also visually represented in the graphs below. The red triangles indicate the aforementioned significant differences between vessel types.





Further analysis was conducted to examine which occupational categories created those discrepancies. Regarding bulkers, results revealed that **the compliance factor of the Deck Ratings in Bulklers was higher than that of the Deck Ratings in Reefers**. In addition, **Engine Ratings in Bulklers scored lower on the irritability factor than Engine Ratings in Tankers**. Regarding the negligence and overconfidence factors, no noteworthy discrepancies could be detected regarding Bulklers.

Section B: Conclusions

- ✓ Among occupational categories, **cadets produce the best results regarding the twelve safety indicators**. This finding is important, as cadets represent company's next generation of crew members.
- ✓ Regarding the positive safety indices, bulker crew members exhibit satisfactory scores.
- ✓ Regarding the positive safety indices, differences were found in the calm, focused and trainable safety indices.
 - Engine Ratings calmer than Officers
 - Officers more focused than Deck and Engine Ratings, and Services
 - Services less trainable than all other occupational categories
- ✓ Regarding the negative safety indices, bulker crew members exhibit satisfactory scores.
- ✓ Regarding the negative safety indices, significant differences were found in defiance.
 - Services-Related and Deck Ratings were higher in defiance compared to both Officers and Cadets
- ✓ When comparing vessel types, differences were revealed for the indicators of compliance and irritability.
 - Tanker Engine Ratings scored higher on irritability their Bulker counterparts.
 - Bulker Deck Ratings were more compliant than those in Reefers



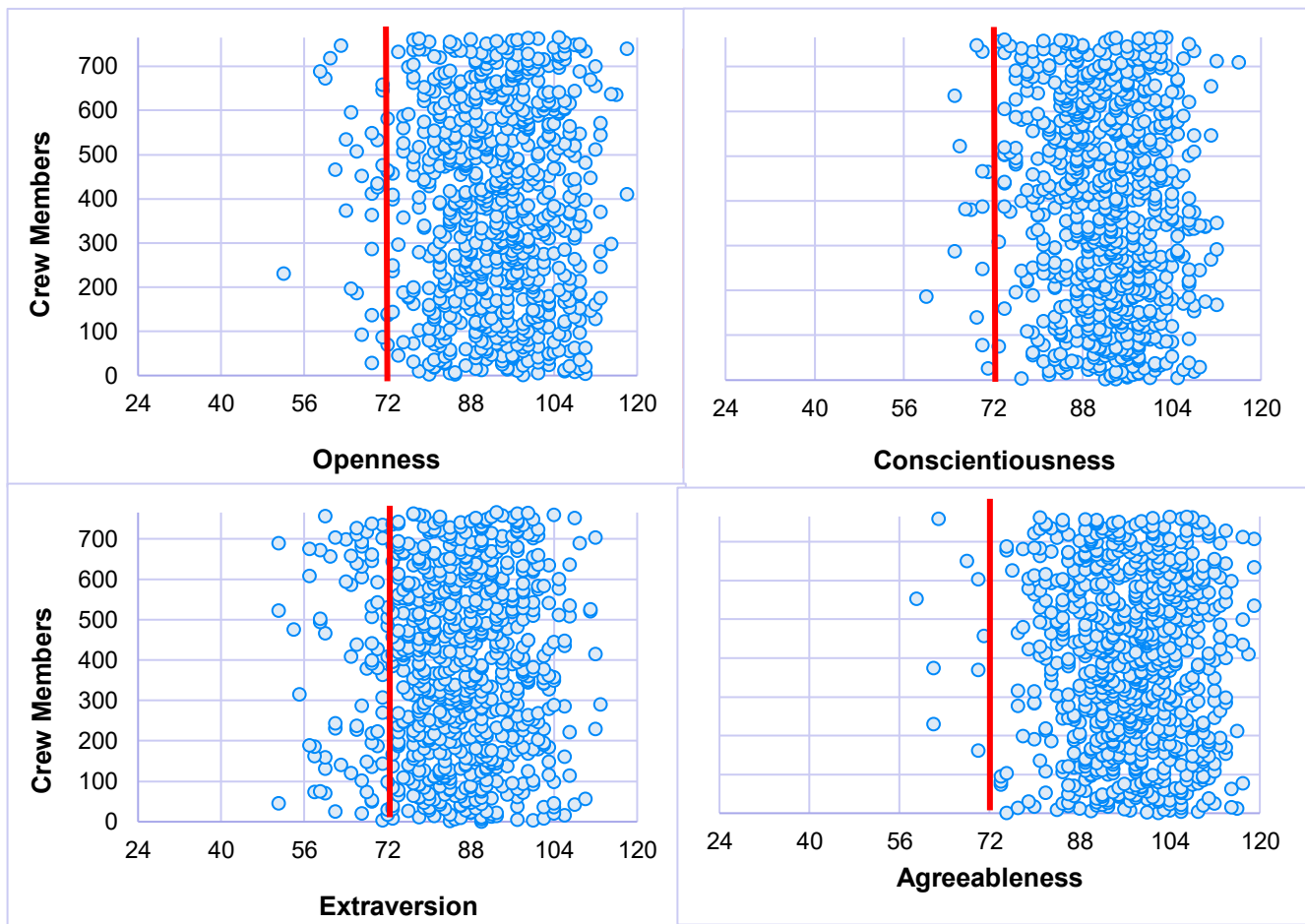
Chapter 4: Reefers

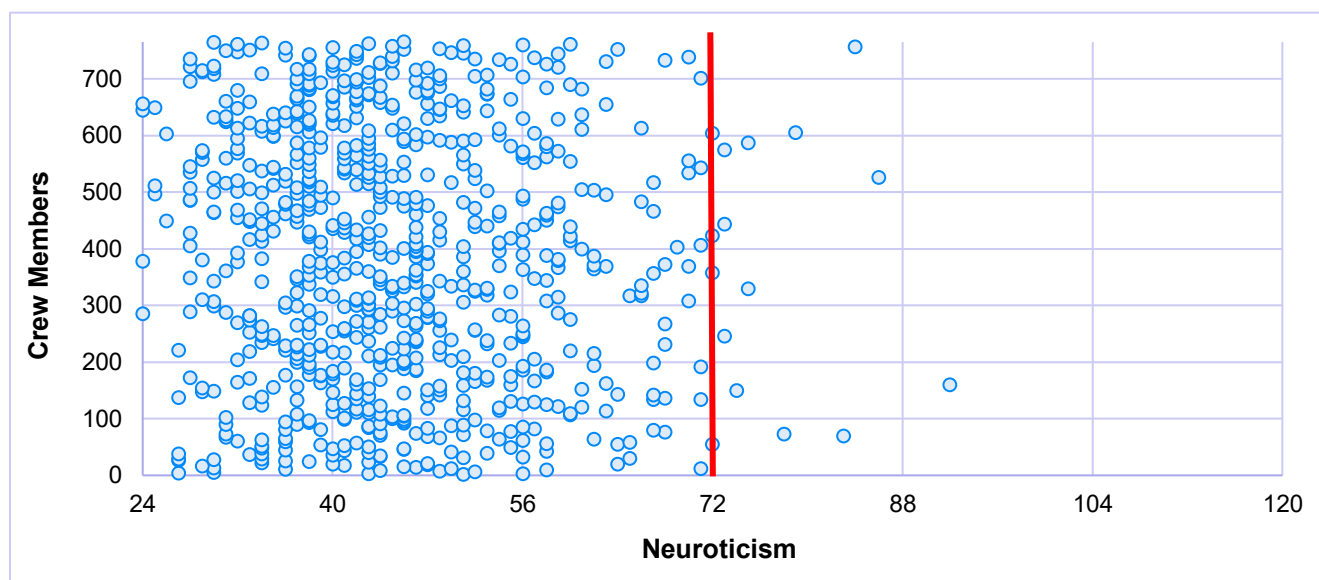
Section A: Examining The Impact of The Big-5 on Safety

This section's main aim is to unveil how each of the Big-Five factors impact seafarer propensity for safe behaviors. The importance of this section is twofold as it, firstly, sheds light into the crew's overall personality tendencies and, secondly, it informs the interested parties on which personality elements are most crucial to hone into during the recruitment process.

A1. Big-Five and Safety

Prior to presenting the results, it is important to underline that, in the PEQ Safety Assessment, the Big-Five personality factors can range from a score of "24" (minimum) to "120" (maximum). As such, a score of "72" is considered the average score for each factor. Scores above this cut-off point are considered to reflect individuals who exhibit the respective personality factor to a high degree. In the scatterplots below, bulker crew's scores on the Big-Five personality factors are displayed. Each crew member is represented by a blue dot, and the vertical red line pinpoints the mid-way point.





As is evident from the graphs above, **the vast majority of reefer crew members exhibit the desired scores on the Big-Five factors**, such as low Neuroticism, and high Conscientiousness and high Openness. The detailed descriptive statistics for the total reefer sample ($N=765$) can be found in Table 19.

Table 19

Big-Five Descriptive Statistics for Reefer Crew Members

	Minimum	Maximum	Mean	Std. Deviation ⁷
Openness	52	118	92,30	10,68
Conscientiousness	60	116	91,94	8,94
Extraversion	51	113	85,41	11,057
Agreeableness	59	119	96,78	9,78
Neuroticism	24	92	45,4	11,15

A multiple linear regression was performed to assess the ability of age, marital status, contract type, and the Big-Five personality factors to predict safety scores among reefer crew members. A preliminary analysis was conducted to ensure there was no violation of assumptions of normality, linearity, multicollinearity, and homoscedasticity. The model predicted 94,9% of the variance of safety scores; $R\ square=.949$, $F(8, 753)=1778,47$, $p<,001$. In the model, only Openness,

⁷ A standard deviation is a measure of how dispersed the data is in relation to the mean (average score).



Conscientiousness, Agreeableness, and Neuroticism contributed significantly to the prediction of safety scores (Table 20).

Table 20

Hierarchical Linear Regression Analysis Predicting Safety Scores from Age, Marital Status, Contract Type, and the Big-Five Factors

	t	B ⁸	β	F	df	p ⁹	R ²
Overall Model				1778,47	(8, 753)	<,001	,949
Age	1,108	,045	,011			,268	
Marital Status	,641	,619	,006			,522	
Contract Type	1,058	1,012	,009			,29	
Openness	31,152	1,460	,316			<,001	
Conscientiousness	27,697	1,519	,275			<,001	
Extraversion	,093	,004	,001			,926	
Agreeableness	-4,369	-,219	-,043			<,001	
Neuroticism	-82,522	-3,229	-,730			<,001	

The aforementioned regression analysis suggests that **Neuroticism has the strongest effect on safety-related behaviors, followed by Conscientiousness and Openness**. It was deemed important to examine whether these traits exhibited the same strength across occupational categories. As such, a series of regressions were conducted to examine, between ranks in reefers, which of the Big-Five play the biggest role in predicting safety. All information are in Table 21.

Table 21

Strength of Predictive Ability of the Big-Five Factors Regarding Safety (Across Occupational Categories)

		O	C	E	A	N	p
Masters	Predictor	YES	YES	NO	YES	YES	<,001
	Strength	2 nd	3 rd	-	4 th	1 st	

⁸ Unstandardized Beta scores (B) reflect the impact of the factor on predicting safety scores. Higher B values reflect a higher impact. In this case, the highest B value is that of Neuroticism, pinpointing as the strongest predictor of safety.

⁹ The p value inform us whether the analysis was significant or not. In statistical analysis, a p value of 0.05 or lower reflects statistical significance, thus interpretable results.



Engineers	Predictor	YES	YES	NO	YES	YES	<,001
	Strength	3 rd	2 nd	-	4 th	1 st	
Other Engineers	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	2 nd	3 rd	-	-	1 st	
Officers	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	2 nd	3 rd	-	-	1 st	
Other Officers	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	3 rd	2 nd	-	-	1 st	
Deck Ratings	Predictor	YES	YES	NO	NO	YES	<,001
	Strength	2 nd	3 rd	-	-	1 st	
Engine Ratings	Predictor	YES	YES	NO	YES	YES	<,001
	Strength	2 nd	3 rd	-	4 th	1 st	
Services-related	Predictor	YES	YES	NO	YES	YES	<,001
	Strength	3 rd	2 nd	-	4 th	1 st	
Cadets	Predictor	<i>Sample size did not allow for regression analysis (n=3)</i>					
	Strength						

*Openness (O), Conscientiousness (C), Extroversion (E), Agreeableness (A), and Neuroticism (N)

**"YES" indicates that the particular factor significantly predicts safety, "NO" indicates it does not

***This line indicates the hierarchy of strength with which the factors affect safety ("1st" indicates the strongest)

Table 21 clearly illustrates that **Neuroticism, Openness, and Conscientiousness consistently emerge as the most important predictors of overall safety, with Neuroticism exhibiting the strongest impact.**

A2. Exploring Big-5 Differences Among Occupational Categories

Section A1 focused on examining which personality factors seem to impact safety behaviors the most. The results revealed that, regardless of vessel type or occupational category, Neuroticism, Conscientiousness and Openness seem to predict safety consistently and strongly, with Neuroticism having the greatest impact. Section A2 focuses on examining whether different occupations score differently on the Big-5 personality factors. This will not only provide insight about Baltmed Reefer Services Ltd (BRS) crew's current personality constellation, but will also indicate which personality traits seem to dominate each occupation.



To examine whether occupational categories within tankers exhibit significant differences on the Big-5 factors, a series of five one-way analyses of variance (ANOVA) were conducted. The aim was to examine whether there are any significant differences in (i) Openness, (ii) Conscientiousness, (iii) Extraversion, (iv) Agreeableness, and (v) Neuroticism among occupational categories. **The analyses revealed that, indeed, there seem to be certain personality differences among occupations. Out of the five factors, only Conscientiousness generated differences among occupations.** The overall ANOVA results are exhibited in Table 22.

Table 22

ANOVA Examining Differences in the Big-Five Factors Among Occupational Categories in Reefers

	<i>F</i>	<i>df</i>	<i>p</i>
Openness	1,346	(8, 764)	,210
Conscientiousness	2,677	(8, 764)	,007
Extraversion	1,33	(8, 764)	,225
Agreeableness	,963	(8, 764)	,464
Neuroticism	1,802	(8, 764)	,073

Conscientiousness. Although the ANOVA analysis did reach statistical significance, upon closer inspection, no noteworthy differences were detected among occupational groups.

In summary, it is evident that no noteworthy differences exist among occupational groups regarding their scores on the Big-Five factors.

A3. Exploring Big-5 Differences Among Vessel Types

The final section focuses on exploring whether certain personality characteristics are exhibited differently between vessel types. By using ANOVA analysis, these potential discrepancies can be uncovered. **Results suggest that Openness, Conscientiousness, and Extraversion seem to be exhibited differently between vessel types.** The ANOVA results are exhibited in Table 23.

Table 23

ANOVA Examining Differences in the Big-Five Factors Among Vessel Types

	<i>F</i>	<i>df</i>	<i>p</i>
Openness	4,248	(2, 2549)	,014



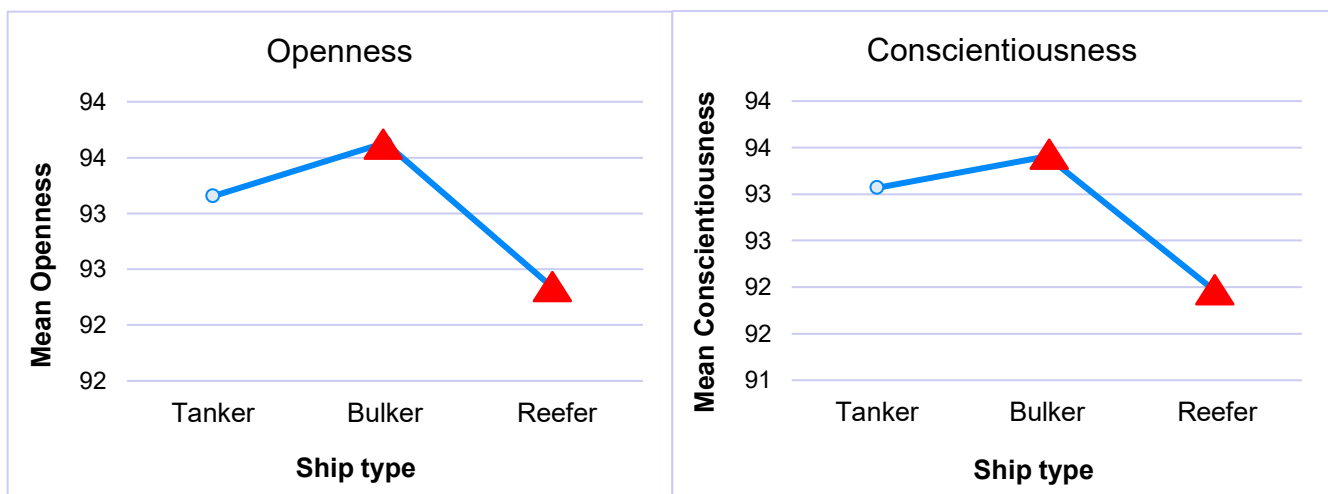
Conscientiousness	7,441	(2, 2549)	,001
Extraversion	8,069	(2, 2549)	<,001
Agreeableness	2,062	(2, 2549)	,127
Neuroticism	1,922	(2, 2549)	,147

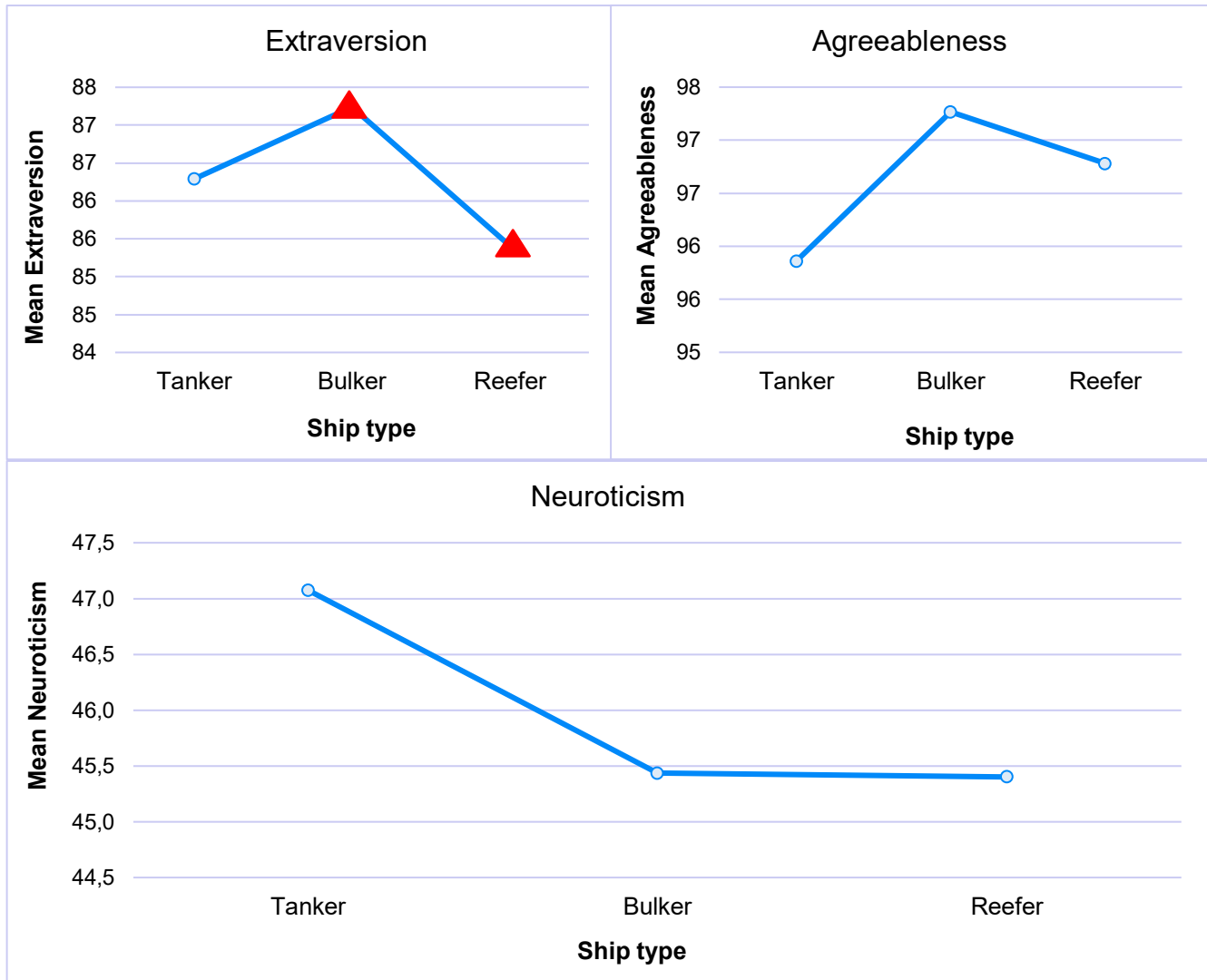
Openness. The analysis revealed that Openness levels in Bulklers ($M=93,63$, $SD=10,22$) are significantly higher than those in Reefers ($M=92,3$, $SD=10,68$, $p=,011$).

Conscientiousness. A finding similar to openness emerged for conscientiousness. More specifically, Bulklers ($M=93,41$, $SD=8,53$) seem to score significantly higher than those in Reefers ($M=91,94$, $SD=8,938$, $p<,001$).

Extraversion. Bulklers and Reefers produced similar results for extraversion. As evidenced by the previous two factors, Extraversion levels in Bulklers ($M= 87,24$, $SD= 10,21$) are significantly higher than those in Reefers ($M= 85,41$, $SD= 11,06$, $p<,001$).

In summary, **the vessels do not differ in terms of Agreeableness and Neuroticism. More specifically, Tankers are not significantly different from neither Bulklers nor Reefers. On the contrary, Bulklers seem to consistently present higher levels of Openness, Conscientiousness and Extraversion compared to those in Reefers.** The differences in the average scores among vessel types is also visually represented in the graphs below. The red triangles indicate the aforementioned significant differences.





Further analysis was conducted to examine which occupational categories created the discrepancies among Bulkiers and Reefers. **The results revealed that Deck Ratings occupied in Bulkiers score higher on Extraversion, Openness, and Conscientiousness than Deck Ratings working in Reefers.**



Section A: Conclusions

- ✓ Reefer crew members exhibit satisfactory scores on the Big-Five indicators.
- ✓ Among the Big-Five, Neuroticism is the strongest predictor regarding the exhibition of safety-related behaviors, followed by Openness and Conscientiousness.
- ✓ For all occupational categories, Neuroticism remains the strongest predictor regarding safety, followed by Openness and Conscientiousness.
- ✓ Demographic information do not significantly impact safety scores in reefers.
- ✓ Despite initial differences among occupational categories in Conscientiousness, no noteworthy discrepancies were uncovered.
 - Such results indicate crew personality consistency and robust recruitment methods.
- ✓ Reefers scored lower on Openness, Conscientiousness, and Extraversion compared to Bulkiers
 - This difference was created by the Deck Ratings (in comparison to bulkier deck ratings)



Section B. Analyzing The Safety Indicators

Section B focuses on the twelve safety indices provided by the PEQ Safety Assessment. More specifically, the aim of this section is to explore whether crew members differ significantly on the positive and negative safety indices. This is crucial, as it provides a snapshot of the crew's safety propensity and can provide valuable insight to the parties in charge of these processes.

At this point, it is important to underline the following. As indicated in the safety report, **BRS's crew exhibits high levels of safety**. As such, in the case where certain occupational groups score lower on a safety indicator, this does not necessarily reflect actual problems concerning safety.

In order to obtain a clear and simple picture of how safety is exhibited within BRS's crew, the following table was constructed. Table 24 compares the average scores (means) of each occupational group on the six positive and six negative safety indicators. Despite—as will be shown in the following section—certain small differences among occupational categories, there seems to be **a consistent trend of Cadets scoring the best in all indicators**.

Table 24

Average Scores of Occupational Groups on Each of the Twelve Safety Indicators

	Masters	Engineers	Other Engineers	Officers	Other Officers	Deck Ratings	Engine Ratings	Services-related	Cadets
Defiant	15,46	16,21	16,14	15,3	14,97	17,4*	17,03	17,35	13,58**
Compliant	46,25	45,96	46,67	47,25	47,29	46,44	46,37	46,62	48,37
Anxious	20,44	21,22	21,57	20,79	21,78	20,72	20,46	20,93	19,24
Calm	36,73	36,73	36,33	36,51	35,87	37,56	38,1	37,36	38,66
Irritable	22,53	23,03	23,29	23,14	23,36	22,66	21,92	22,71	21,32
Relaxed	37,59	37,25	37,19	37,54	37,04	37,55	37,86	37,49	38,74
Distractible	57,05	56,59	56,79	56,46	56,94	55,41	55,07	55,97	53,76
Focused	66,44	65,57	65,63	66,78	67,32	63,98	64,08	63,66	69,21
Negligent	25,24	24,8	24,91	25,16	25,31	24,17	23,59	24,22	23,37
Conscientious	39,33	39,51	39,57	39,84	39,83	39,4	39,21	39	41,13

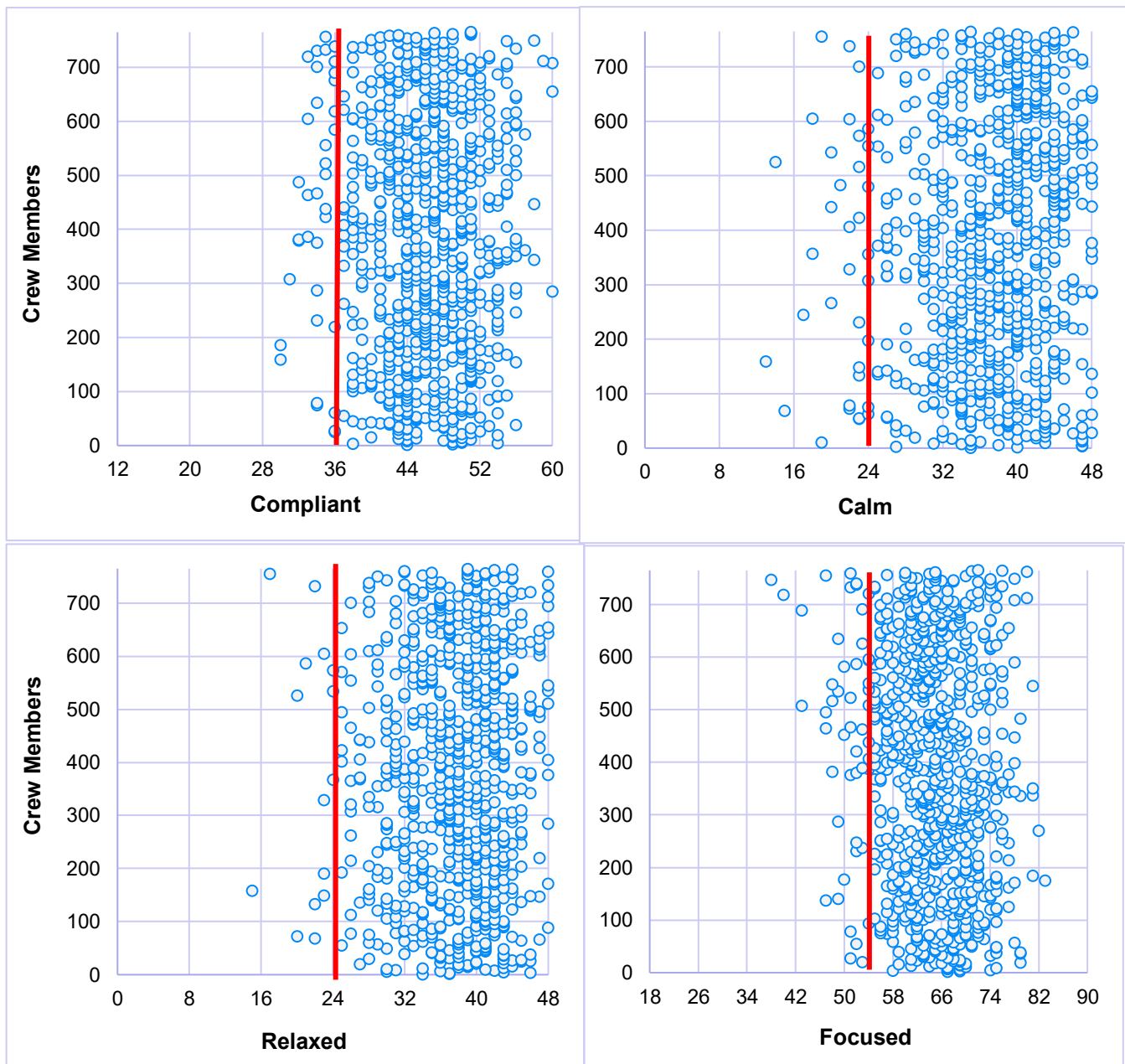


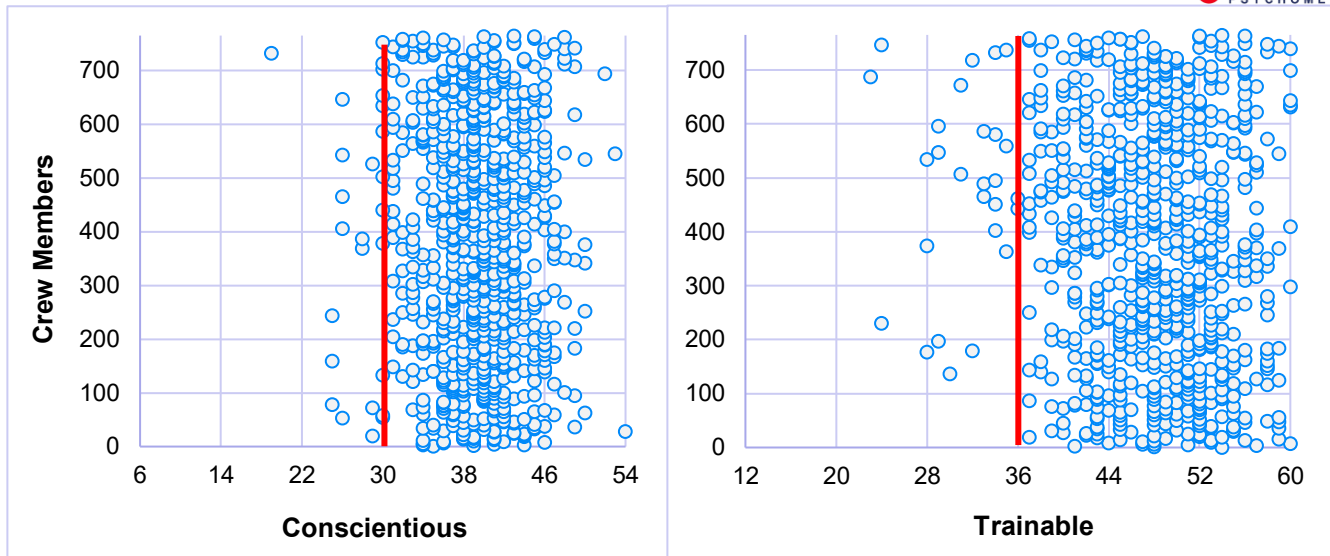
Overconfident	12,44	12,76	12,69	12,85	12,29	12,44	12,24	12,84	11,89
Trainable	49,65	48,97	48,03	48,62	49,02	46,96	47,61	45,91	49,82

*The red square indicates the occupational group with the worst score.

**The green square indicates the occupational group with the best score.

B1. Positive Safety Indicators





As evident in the scatterplots presented above, **the vast majority of the crew exhibits satisfactory levels in the positive safety indices. With very few exceptions, reefer crew members present above par safety-related scores.**

A series of six ANOVA analyses were conducted to examine possible differences in the positive safety indices. It was revealed that certain occupational groups scored significantly differently on the **“Calm”, “Focused” and “Trainable” indices**. No differences were discovered in the remaining three positive safety indices. The overall ANOVA results are exhibited in Table 25.

Table 25

ANOVA Examining Differences in the Positive Safety Indicators Among Occupational Groups

	<i>F</i>	<i>df</i>	<i>p</i>
Compliant	1,349	(8, 764)	,216
Calm	2,062	(8, 764)	,037
Relaxed	1,1	(8, 764)	,361
Focused	5,861	(8, 764)	<,001
Conscientious	,762	(8, 764)	,637
Trainable	2,999	(8, 764)	,003

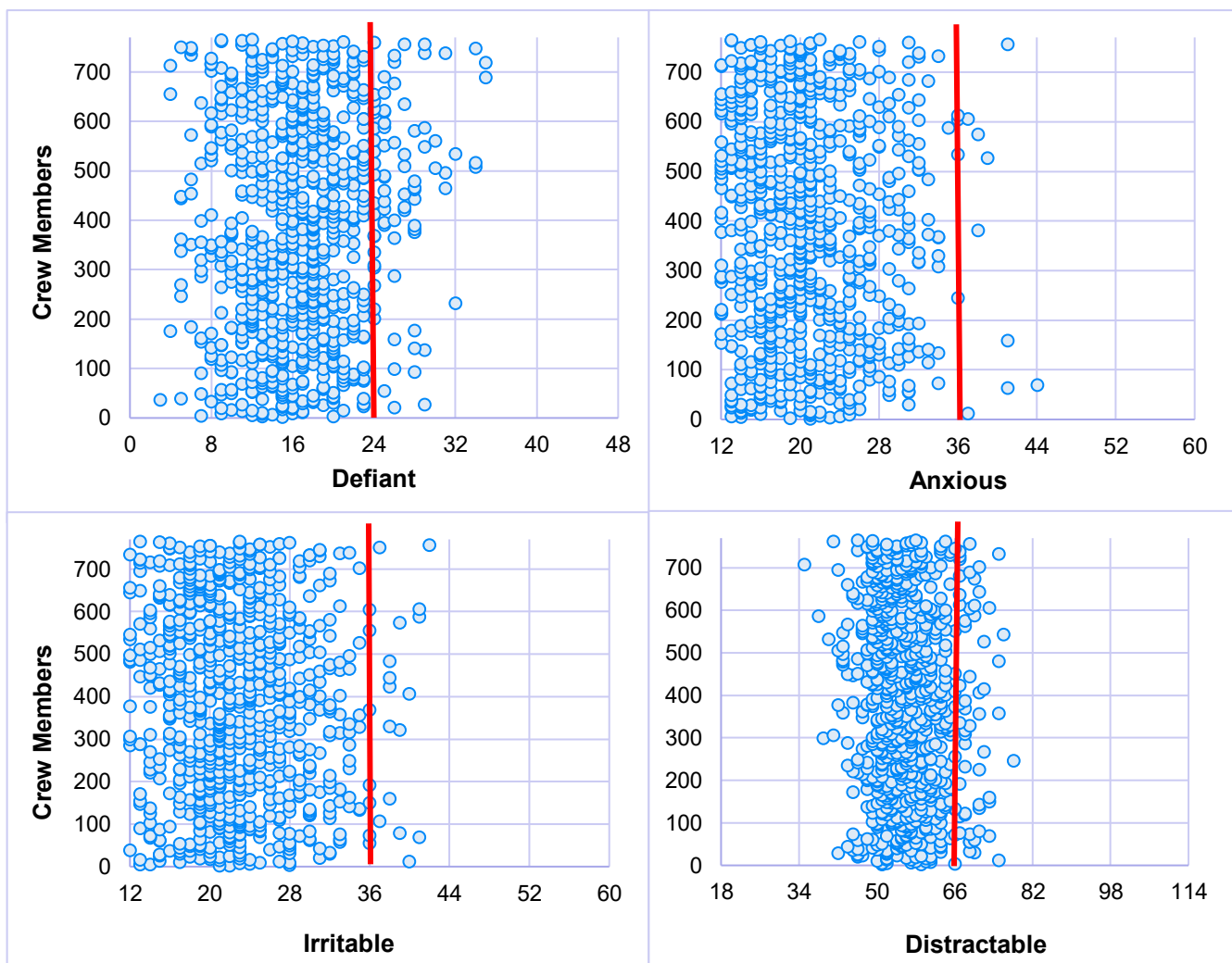
Calm. Although the ANOVA analysis did reach statistical significance, upon closer inspection, no noteworthy differences were detected among occupational groups.

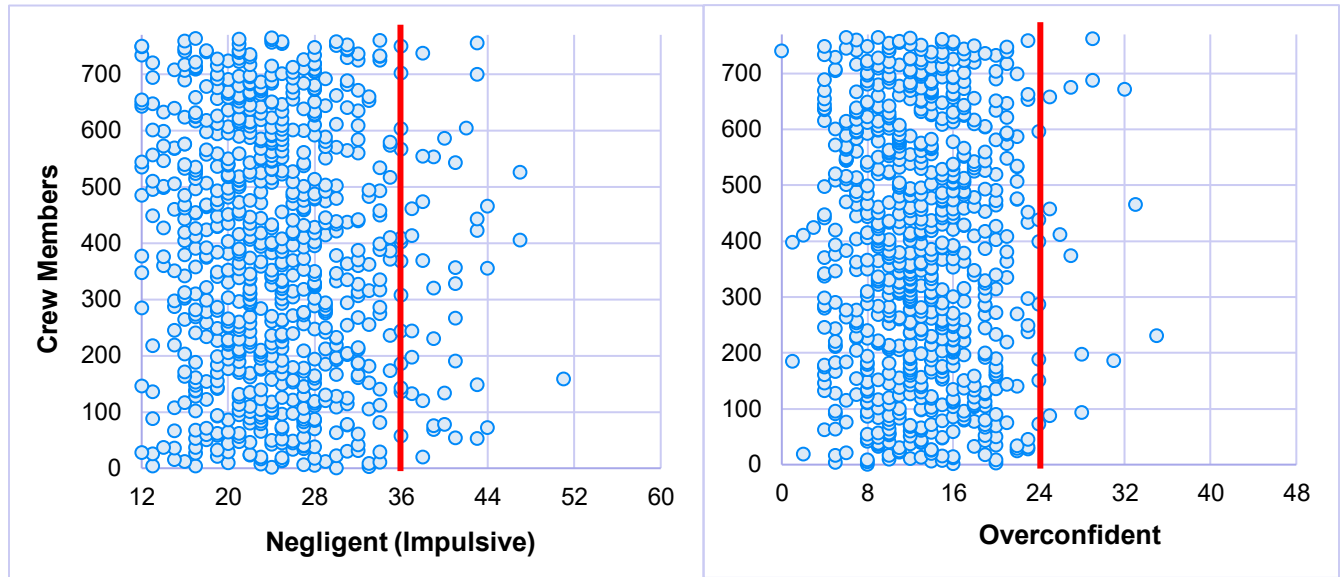


Focused. The group of crew members that consistently scored lower on focus was that of Deck Ratings ($M=62,59$, $SD=6,92$). To be exact, they scored lower than Engineers ($M=65,63$, $SD=6,41$; $p=,008$), Other engineers ($M=65,45$, $SD=6,71$; $p=,011$), Officers ($M=67,07$, $SD=5,99$; $p=,003$), and Other Officers ($M=67,27$, $SD=6,41$; $p<,001$).

Trainable. Similar to the indicator of focus, Deck Ratings ($M=46,24$, $SD=6,19$) scored significantly lower on trainability compared to Engineers ($M=48,85$, $SD=5,51$; $p=,018$) and Other Officers ($M=49,06$, $SD=5,87$; $p=,025$).

B2. Negative Safety Indicators





As evident in the scatterplots presented above, **the vast majority of the crew exhibits satisfactory levels in the negative safety indices. With very few exceptions, reefer crew members do not present worrisome results regarding safety.**

A series of six ANOVA analyses were conducted to examine whether occupational groups would exhibit significantly different scores in the negative safety indices. **The statistical analyses revealed differences on the “Defiant” and “Anxious” Indices.** No differences were discovered in the remaining four negative safety indices. The overall ANOVA results are exhibited in Table 26.

Table 26

ANOVA Examining Differences in the Negative Safety Indicators Among Occupational Groups

	<i>F</i>	<i>df</i>	<i>p</i>
Defiant	5,01	(8, 764)	<,001
Anxious	2,269	(8, 764)	,021
Irritable	1,682	(8, 764)	,099
Distractable	1,92	(8, 764)	,054
Negligent	1,018	(8, 764)	,421
Overconfident	,501	(8, 764)	,856

Defiant. Out of the nine occupational groups, deck ratings emerged as the group consistently higher on defiance ($M=18,44$, $SD=5,84$). More specifically, they scored significantly higher



compared to Engineers ($M=15,99$, $SD=4,93$; $p=,009$), Other Engineers ($M=16,42$, $SD=4,97$; $p=,055$), Officers ($M=14,95$, $SD=4,58$; $p=,006$) and Other Officers ($M=14,84$, $SD=5,2$; $p<,001$).

Anxious. Although the ANOVA analysis did reach statistical significance, upon closer inspection, no noteworthy differences were detected among occupational groups.

B3. Safety Indices—Differences Among Vessel Types

The final analysis regarding the twelve safety indices focused on their emergence between vessel types. Simply put, the aim of this section is to examine whether certain safety indicators are more prominent or inconspicuous in specific vessel types.

In order to examine this, a series of twelve ANOVA analyses were conducted—one for each safety indicator—in order to examine differences between vessel types. Results indicated that, among the twelve indicators, only **“Compliant”**, **“Irritable”**, **“Negligent”** and **“Overconfident”** yielded **discrepancies among vessels**. ANOVA results are exhibited in Table 27.

Table 27

ANOVA Examining Differences in the Safety Indicators Among Vessel Types

	<i>F</i>	<i>df</i>	<i>p</i>
Defiant	2,203	(2, 2547)	,111
Compliant	5,175	(2, 2547)	,006
Anxious	,274	(2, 2547)	,761
Calm	1,642	(2, 2547)	,194
Irritable	3,138	(2, 2547)	,044
Relaxed	1,661	(2, 2547)	,190
Distractible	,922	(2, 2547)	,398
Focused	2,692	(2, 2547)	,068
Negligent	3,593	(2, 2547)	,028
Conscientious	1,142	(2, 2547)	,319
Overconfident	5,204	(2, 2547)	,006
Trainable	1,245	(2, 2547)	,288

Compliant. The post-hoc comparisons revealed that, across vessel types, Bulkers ($M=46,84$,



$SD=5,18$) score significantly higher on compliance compared to Reefers ($M=46,1$, $SD=5,41$; $p=,004$).

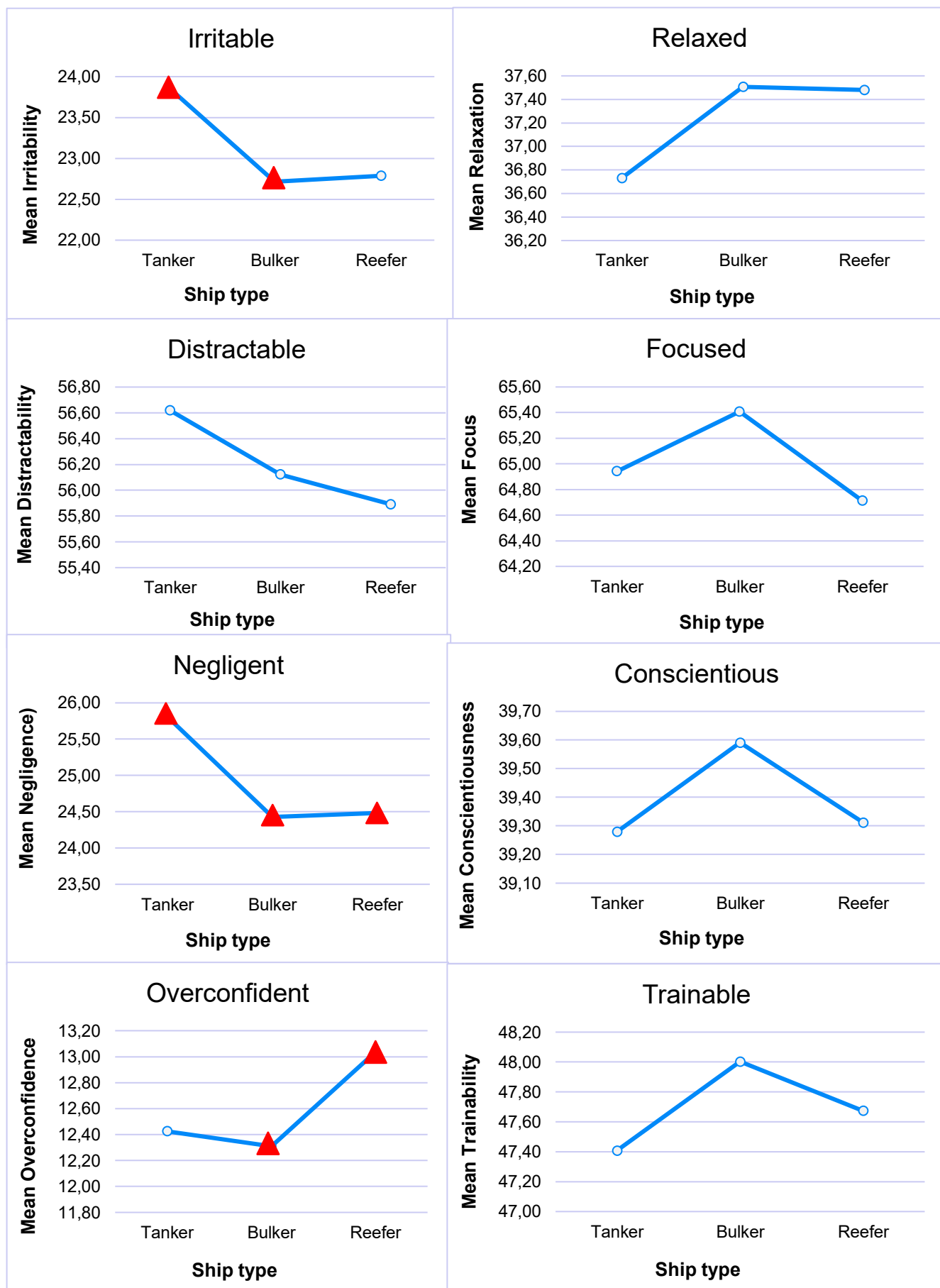
Irritable. The finding that emerged was that Tankers ($M=23,87$, $SD=5,88$) seem to score higher on irritability compared to Bulkers ($M=22,71$, $SD=5,98$; $p=,038$).

Negligent. Regarding negligence, post-hoc comparisons reveal that Tankers ($M=25,81$, $SD=6,71$) score higher than Bulkers ($M=24,43$, $SD=6,65$; $p=,023$) and Reefers ($M=24,48$, $SD=6,74$); $p=,046$).

Overconfident. Lastly, it was indicated that crew members on Reefers ($M=13,04$, $SD=5,27$) show higher levels of overconfidence compared to those working in Bulkers ($M=12,31$, $SD=5,11$; $p=,004$).

The differences in the average scores on the twelve safety indicators—among vessel types—is also visually represented in the graphs below. The red triangles indicate the aforementioned significant differences between vessel types.





Further analysis was conducted to examine which occupational categories created those discrepancies. Regarding Reefers, results revealed that **the compliance levels of Deck Ratings in Reefers was lower than that of Deck Ratings in Bulklers. Regarding the negligence and overconfidence factors, no noteworthy discrepancies could be detected regarding Reefers.**

Section B: Conclusions

- ✓ Among occupational categories, cadets produce the best results regarding the twelve safety indicators. This is important, as they represent BRS's next generation of crew members.
- ✓ Regarding the positive safety indices, reefer crew members exhibit satisfactory scores.
- ✓ Regarding the positive safety indices, differences were found in the focused and trainable indices.
 - For both focus and trainability, Deck Ratings scored lower than Engineers and Officers.
- ✓ Regarding the negative safety indices, reefer crew members exhibit satisfactory scores.
- ✓ Regarding the negative safety indices, significant differences were found in defiance.
 - Deck Ratings scored higher in defiance compared to both Engineers and Officers
- ✓ When comparing vessel types, differences were revealed for the indicators of compliance and overconfidence.
 - Reefer Deck Ratings were less compliant than deck Ratings in Bulklers



Chapter 5: A Deeper Look

Sections 3,4, and 5 focused on the quantitative analysis of the data as they have been obtained through the PEQ Safety Assessment and its plethora of indicators. Although informative and insightful regarding crew personality and safety, the researchers aimed at inspecting crew personality and behavior more closely. Section C focuses on that deeper look.

Firstly, through job analysis and the provision of quantitative data, researchers obtained information regarding each occupational category's job-related responsibilities, as well as desired personality traits and behaviors. Secondly, through semi-structured interviews conducted with crew members [Masters ($n=3$), Engineers ($n=6$), and Officers ($n=2$)], researchers obtained important qualitative data regarding the crew's attributes, behaviors, and attitudes, on specific subject matters; in this case, life on-board.

Content analysis of the aforementioned data resulted in **seven, new, composite personality traits** that were deemed important. Namely, these traits describe a crew member's ability to:

- | | |
|------------------------------|----------------------|
| ✓ Be reliable | ✓ Be resilient |
| ✓ Be responsible | ✓ Exhibit leadership |
| ✓ Delegate tasks effectively | ✓ Follow orders |
| ✓ Solve Problems | |

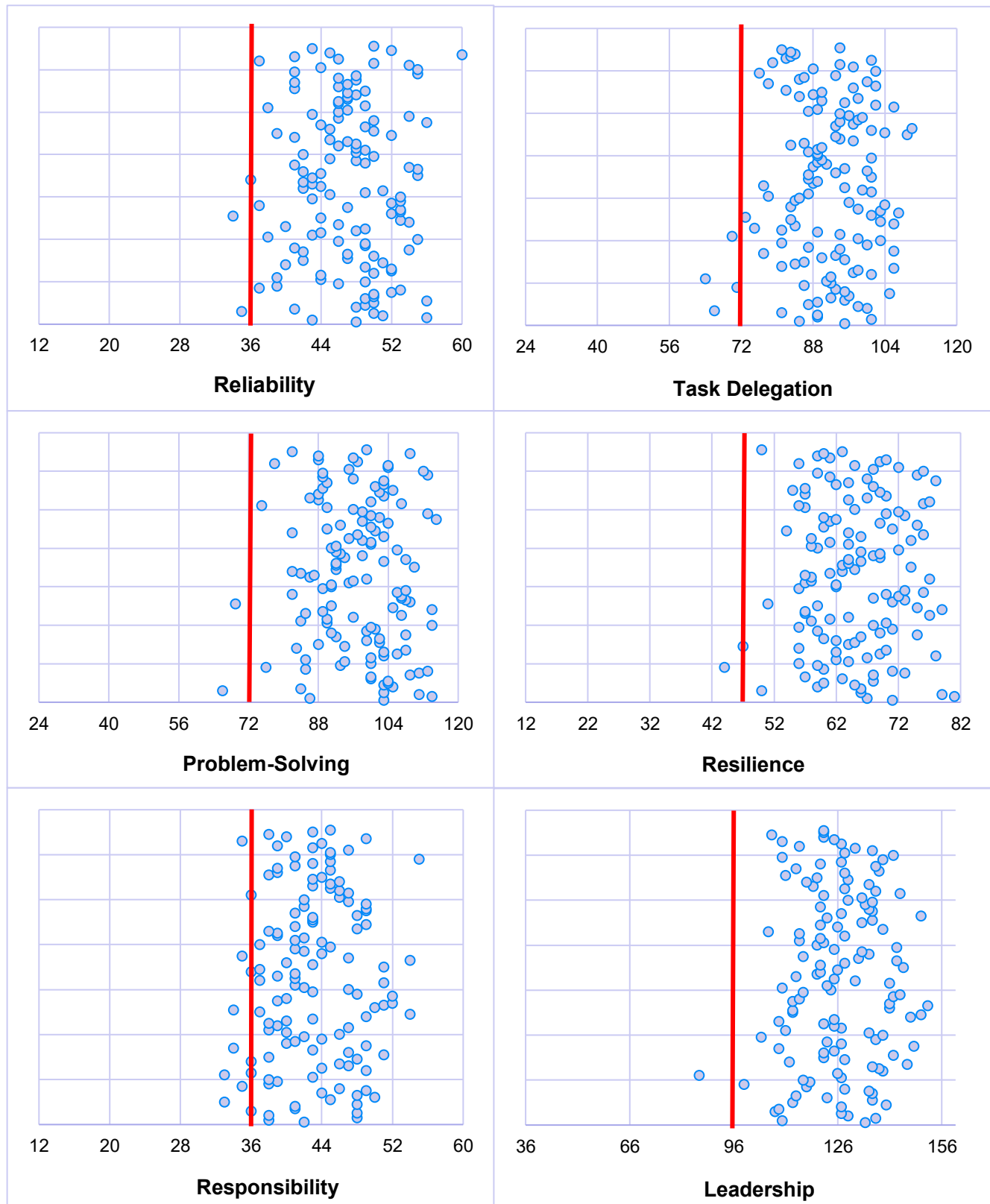
With Masters, Engineers, and Officers being (i) indispensable and crucial members of the crew, and (ii) the research's source of qualitative data, it was deemed important to examine, graphically, how they exhibit those important traits.

Scatterplots regarding crew members' scores on these seven factors are provided below. **The graphs indicate that these occupational categories, in their majority, exhibit very satisfactory results.**



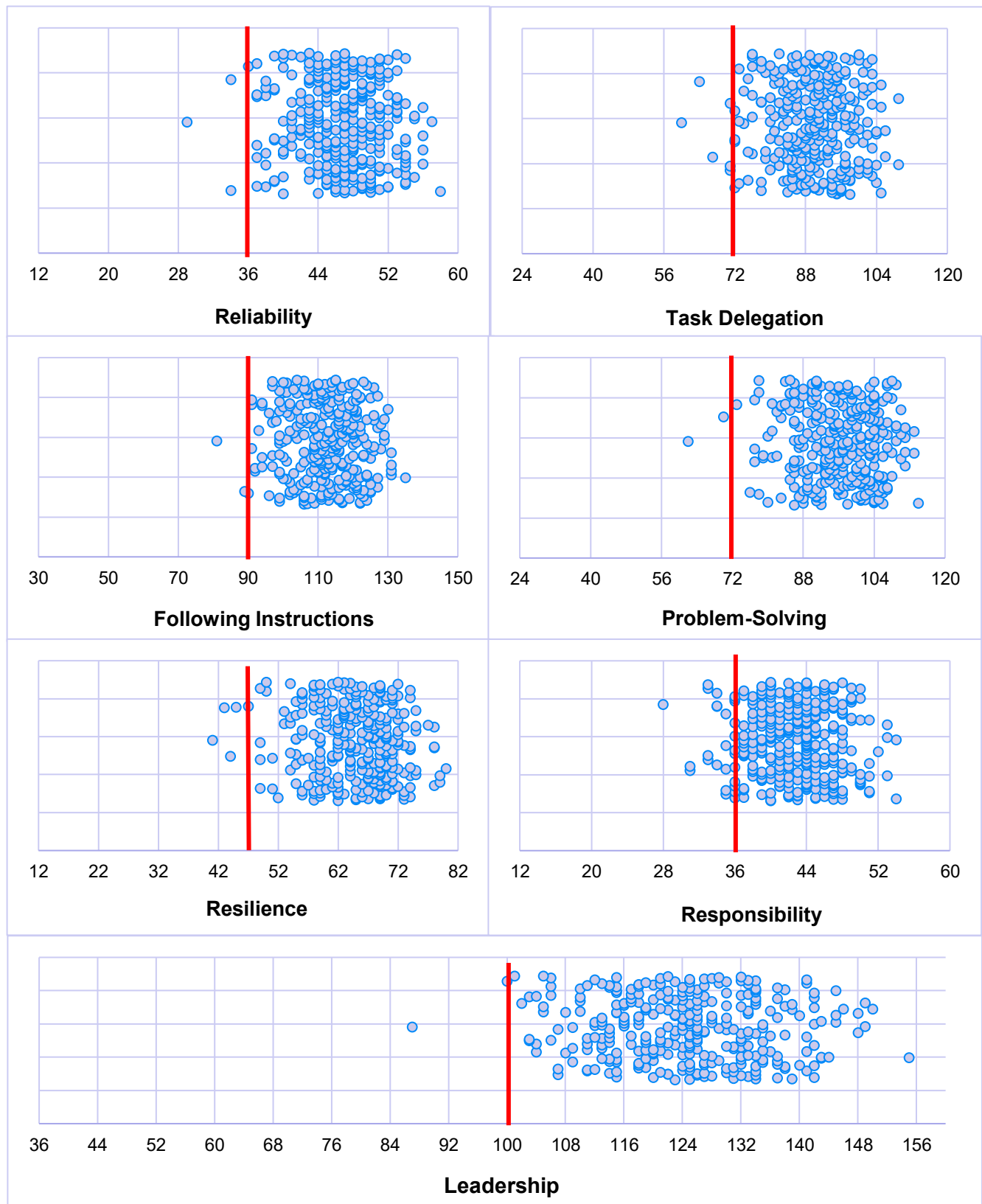
Masters

Scatterplots displaying Masters' scores on the composite factors are showcased below:



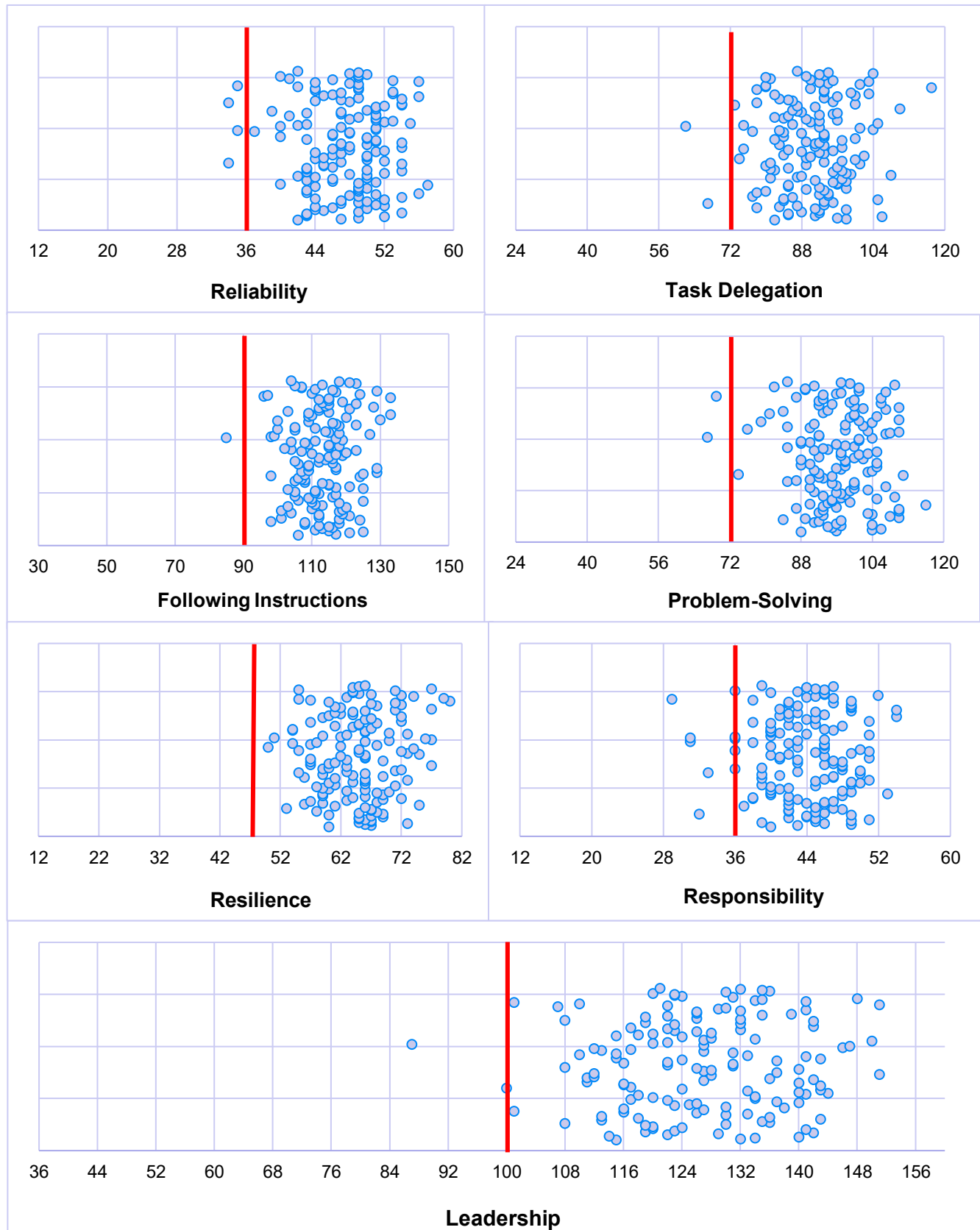
Engineers

Scatterplots displaying Engineers' scores on the composite factors are showcased below:



Officers

Scatterplots displaying Officers' scores on the composite factors are showcased below:



An ANOVA conducted to examine whether occupational groups would exhibit significantly different scores in the seven composite factors. The statistical analyses revealed differences on the “Reliability”, “Problem-Solving”, “Responsibility”, and “Leadership” factors. Overall results are exhibited in Table 28.

Table 28

ANOVA Examining Differences in the Composite Factors Among Occupational Groups

	<i>F</i>	<i>df</i>	<i>p</i>
Reliability	3,611	(8, 2549)	<,001
Delegation Ability	1,693	(8, 2549)	,095
Following Instructions	1,416	(8, 2549)	,185
Problem-Solving	2,348	(8, 2549)	,016
Resilience	,832	(8, 2549)	,574
Responsibility	5,835	(8, 2549)	<,001
Leadership	5,349	(8, 2549)	<,001

Reliability. Concerning reliability, Officers ($M=47,51$, $SD=4,6$) scored significantly higher than Services ($M=45,85$, $SD=5,65$; $p=,049$). Similarly, Other Officers ($M=47,59$, $SD=4,29$) scored higher than those in Services ($p=,002$) and Deck Ratings ($M=46,49$, $SD=5,16$; $p=,041$).

Problem-Solving. The only difference was found among Other Officers ($M=97,53$, $SD=7,95$) and those in Services ($M=94,84$, $SD=9,65$; $p=,02$), with Other Officers scoring significantly higher.

Responsibility. Engineers ($M=42,74$, $SD=4,51$) scored lower on responsibility than Other Officers ($M=44,28$, $SD=4,49$; $p=,003$) and Cadets ($M=45,58$, $SD=5,1$; $p=,022$). Continuing, Officers ($M=43,9$, $SD=4,73$) scored higher than Engine Ratings ($M=42,27$, $SD=4,82$; $p=,043$). Similarly, Other Officers scored significantly higher than Deck Ratings ($M=42,7$, $SD=4,87$; $p<,001$), Engine Ratings ($p<,001$), and those in Services ($M=42,79$, $SD=5,18$; $p=,021$). Lastly, Cadets scored better than Deck Ratings ($p=,012$), Engine Ratings ($p=,003$), and those in Services ($p=,036$).

Leadership Ability. Regarding leadership ability, the most prominent differences were located in the Cadets ($M=130,45$, $SD=9,83$) who scored significantly higher than Engineers ($M=124,52$, $SD=10,79$; $p=,076$), Other Engineers ($M=124,31$, $SD=11,2$; $p=,045$), Deck Ratings ($M=124,15$, $SD=11,47$; $p=,027$), Engine Ratings ($M=122,46$, $SD=11,41$; $p=,002$), and those in Services



($M=123,41$, $SD=11,78$; $p=.013$). Lastly, Other Officers ($M=126,84$, $SD=10,13$) scored higher on leadership than Deck Ratings ($p=.02$), Engine Ratings ($p<.001$) and those in Services ($p=.024$).

The table provided below provides a simple overview of the differences among occupational categories. Each number represents the average score of each respective occupational category on each of the composite factors. Although the differences among these average scores may not be statistically significant, they provide a simple and digestible image of crew personality.

Table 29

Mean Score Comparison of Composite Factors Among Occupational Categories

Composite Factors	Masters	Engineers	Other Engineers	Officers	Other Officers	Deck Ratings	Engine Ratings	Services	Cadets
Reliability	46,95	46,77	46,96	47,51	47,59	46,49	46,33	45,85	48,37
Task Delegation	91,4	89,76	90,11	90,26	90,63	90,43	89,21	90,05	93,32
Following Instructions	112,79	112,34	112,78	113,02	113,75	112,8	112,7	112,21	116,68
Problem-Solving	96,99	96,09	96,16	96,34	97,53	95,92	95,79	94,84	99,11
Resilience	65	64,7	64,77	64,79	64,71	65,31	65,55	65,72	65,53
Responsibility	43,08	42,9	43,27	43,9	44,28	42,7	42,27	42,79	45,58
Leadership	126,4	124,52	124,31	126,66	126,84	124,15	122,46	123,41	130,45

The table highlights three important observations. Firstly, as previously reported based on the twelve safety indicators, **cadets consistently produce the best scores**, indicating that the upcoming generation of crew members exhibit satisfactory levels of safety-enhancing personality traits. Secondly, **the lowest scores are generally observed in crew members working in service-related positions**. This is crucial, as crew members occupied in these positions are not directly responsible for issues regarding vessel and crew safety. Thirdly, if one was to disregard the cadets' scores, it is consistently shown that **masters exhibit the best scores in the majority of the factors**. Considering the multifaceted and challenging nature of the specific position, such findings should be more than encouraging.



Chapter 5: Conclusions

- ✓ Content and combinatorial analysis led to the emergence, and subsequent exploration, of seven new composite factors; **Reliability, Task Delegation, Following Instructions, Problem-Solving, Resilience, Responsibility, and Leadership.**
- ✓ Comparisons of masters', engineers', and officers' scores revealed satisfactory results concerning these factors.
- ✓ Differences among occupational categories were revealed for the "Reliability", "Problem-Solving", "Responsibility", and "Leadership" factors.
 - These differences were mostly created by Deck Ratings, Engine Ratings, and those working in Services-related occupations.
- ✓ Services-related employed crew members exhibited the lowest scores on these factors.
- ✓ Cadets consistently exhibited the best results on these seven factors.
- ✓ Following cadets, masters exhibit the best scores.



Conclusions

Chapter 2: Tankers

- ✓ Tanker crew members exhibit satisfactory scores on the Big-Five indicators.
- ✓ Among the Big-Five, Neuroticism is the strongest predictor regarding the exhibition of safety-related behaviors, followed by Openness and Conscientiousness.
- ✓ For all occupational categories, Neuroticism remains the strongest predictor regarding safety, followed by Openness and Conscientiousness.
- ✓ Demographic information do not significantly impact safety scores in tankers.
- ✓ Occupational Categories do not produce differences in their expression of the Big-Five personality traits, suggesting crew personality consistency and robust recruitment methods.
- ✓ Tankers, despite their smaller crew size, do not express any of the Big-Five indicators differently compared to the other two types of vessels.
- ✓ Among occupational categories, **cadets produce the best results regarding the twelve safety indicators**. This finding is important, as cadets represent AMC's next generation of crew members.
- ✓ Regarding the positive safety indices, tanker crew members exhibit satisfactory scores.
- ✓ Regarding the positive safety indices, no significant differences were found between occupational categories, suggesting consistency in behavior.
- ✓ Regarding the negative safety indices, tanker crew members exhibit satisfactory scores.
- ✓ Regarding the negative safety indices, no significant differences were found between occupational categories, suggesting consistency in behavior.
- ✓ When comparing vessel types, tankers did not significantly differ from bulkers or reefers.
 - The only difference that emerged for the irritability indicator, with tanker Engine Ratings scoring higher than their Bulker counterparts.



Chapter 3: Bulkiers

- ✓ Bulker crew members exhibit satisfactory scores on the Big-Five indicators.
- ✓ Among the Big-Five, Neuroticism is the strongest predictor regarding the exhibition of safety-related behaviors, followed by Openness and Conscientiousness.
- ✓ For all occupational categories, Neuroticism remains the strongest predictor regarding safety, followed by Openness and Conscientiousness.
- ✓ Demographic information do not significantly impact safety scores in bulkiers.
- ✓ Despite initial differences among occupational categories in Agreeableness, Conscientiousness, and Neuroticism, no noteworthy discrepancies were uncovered.
 - Such results indicate crew personality consistency and robust recruitment methods.
- ✓ Bulkiers scored higher on Openness, Conscientiousness, and Extraversion compared to Reefers
 - This difference was created by the Deck Ratings (in comparison to reefer deck ratings).
- ✓ Among occupational categories, **cadets produce the best results regarding the twelve safety indicators**. This finding is important, as cadets represent company's next generation of crew members.
- ✓ Regarding the positive safety indices, bulker crew members exhibit satisfactory scores.
- ✓ Regarding the positive safety indices, differences were found in the calm, focused and trainable safety indices.
 - Engine Ratings calmer than Officers
 - Officers more focused than Deck and Engine Ratings, and Services
 - Services less trainable than all other occupational categories
- ✓ Regarding the negative safety indices, bulker crew members exhibit satisfactory scores.
- ✓ Regarding the negative safety indices, significant differences were found in defiance.
 - Services-Related and Deck Ratings were higher in defiance compared to both Officers and Cadets
- ✓ When comparing vessel types, differences were revealed for the indicators of compliance and irritability.
 - Tanker Engine Ratings scored higher on irritability their Bulker counterparts.
 - Bulker Deck Ratings were more compliant than those in Reefers



Chapter 4: Reefers

- ✓ Reefer crew members exhibit satisfactory scores on the Big-Five indicators.
- ✓ Among the Big-Five, Neuroticism is the strongest predictor regarding the exhibition of safety-related behaviors, followed by Openness and Conscientiousness.
- ✓ For all occupational categories, Neuroticism remains the strongest predictor regarding safety, followed by Openness and Conscientiousness.
- ✓ Demographic information do not significantly impact safety scores in reefers.
- ✓ Despite initial differences among occupational categories in Conscientiousness, no noteworthy discrepancies were uncovered.
 - Such results indicate crew personality consistency and robust recruitment methods.
- ✓ Reefers scored lower on Openness, Conscientiousness, and Extraversion compared to Bulklers
 - This difference was created by the Deck Ratings (in comparison to bulker deck ratings)
- ✓ Among occupational categories, cadets produce the best results regarding the twelve safety indicators. This is important, as they represent BRS's next generation of crew members.
- ✓ Regarding the positive safety indices, reefer crew members exhibit satisfactory scores.
- ✓ Regarding the positive safety indices, differences were found in the focused and trainable indices.
 - For both focus and trainability, Deck Ratings scored lower than Engineers and Officers.
- ✓ Regarding the negative safety indices, reefer crew members exhibit satisfactory scores.
- ✓ Regarding the negative safety indices, significant differences were found in defiance.
 - Deck Ratings scored higher in defiance compared to both Engineers and Officers
- ✓ When comparing vessel types, differences were revealed for the indicators of compliance and overconfidence.
 - Reefer Deck Ratings were less compliant than deck Ratings in Bulklers



Chapter 5: Composite Factors

- ✓ Content and combinatorial analysis led to the emergence, and subsequent exploration, of seven new composite factors; **Reliability, Task Delegation, Following Instructions, Problem-Solving, Resilience, Responsibility, and Leadership.**
- ✓ Comparisons of masters', engineers', and officers' scores revealed satisfactory results concerning these factors.
- ✓ Differences among occupational categories were revealed for the "Reliability", "Problem-Solving", "Responsibility", and "Leadership" factors.
 - These differences were mostly created by Deck Ratings, Engine Ratings, and those working in Services-related occupations.
- ✓ Services-related employed crew members exhibited the lowest scores on these factors.
- ✓ Cadets consistently exhibited the best results on these seven factors.
- ✓ Following cadets, masters exhibit the best scores.

