

Maritime safety culture and safety behaviours in Greece and Norway: Comparing professional seafarers and private leisure boat users

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ABSTRACT: The present study compares professional seafarers and private leisure boat users in Norway and Greece. The aims of the present study are to examine the safety behaviours related to personal injuries and accidents among these groups and to study the factors influencing these behaviours. This will serve as a backdrop to a general discussion of why the level of fatalities is higher among private boat users than among professional seafarers and what the former may learn from the latter. The study is based on surveys to crew members on Norwegian and Greek cargo and passenger vessels and leisure boat users in Norway and Greece. Our study indicates that while unsafe behaviours related to work pressure and risk taking are important among professional seafarers (i.e. risk acceptance and violations), unsafe behaviours related to the leisure/holiday situation was important for the leisure boat users (i.e. alcohol use while driving a boat). Additionally, we discuss how the situation of private leisure boat users is less regulated than that of professional seafarers. Our study indicates that both in the professional and the private setting, norms for interaction and conduct seem to be influenced by norms and expectations rooted in different socio-cultural groups, e.g. the national culture, the specific sector in question, the organisations and in peer groups.

1 INTRODUCTION

1.1 *Background*

Maritime transport is a substantial part of world trade, as approximately 90% of the goods traded worldwide are transported by sea. Although safety improvements have led to a significant decrease in the mortality rates of seafarers in recent decades, seafaring is still termed one of the most hazardous occupations (Oldenburg & Jensen 2012). In a questionnaire study including 6461 participants in 11 countries, Jensen et al. (2004) found that during the latest tour of duty, 9% of all seafarers were injured and 4% had an injury with at least 1 day

of incapacity. According to Nævestad et al. (2015) there were on average 15 killed and 424 injured annually on Norwegian ships, i.e. Norwegian Ordinary Ship Register (NOR) and Norwegian International Ship Register (NIS) in the period 2004–2013. At EU level, in the period 2011–2016, there were on average 100 fatalities and 935 injuries annually reported in the European Marine Casualty Information Platform (EMCIP) (EMSA, 2017).

In Norway, as in many other countries, the number of persons killed using different transport modes has decreased since 1970. This is especially true for road transport, but it also applies to professional seafarers (Nævestad et al 2015). Leisure

boating on the other hand, have not had the same positive development, and in Norway the number of deaths using leisure boats have more or less stayed the same since 1995 (with some annual variations).

In 2006–2015, on average 33 people died each year in recreational boating accidents in Norway, which is about 0.65 persons per 100 000 inhabitants. Approximately 4.4 persons have died per 100 000 vessels (registered and not). More than 90% of these persons are men, and a majority of the victims were not wearing personal floating devices (PFD). Most of the accidents happen during the summer months, when the boats are in more use. Only 20–30% of the people found dead was wearing a lifejacket.

1.2 Aims

The present study compares professional seafarers and private leisure boat users in Norway and Greece.

The aims of the study are to examine the safety behaviours related to personal injuries and accidents among these groups and to study the factors influencing these behaviours. This will serve as a backdrop to a general discussion of why the level of fatalities is higher among private boat users than among professional seafarers and what the former may learn from the latter.

The data in this study have been collected as part of the SafeCulture project, which is funded by the Norwegian Research Council, and undertaken by the Institute of Transport Economics—TØI (Norway) and the National Technical University of Athens—NTUA (Greece).

The research on safety culture suggests that if we are to fully understand its effects on safety in transport, we should study not only safety culture particular to organisations, but that particular to peer-groups, sectors, regions and nations. We define transport safety culture (TSC) as shared norms prescribing certain transport safety behaviours, shared expectations regarding the behaviours of others and shared values signifying what's important (e.g. safety, mobility, respect, politeness) (Nævestad & Bjørnskau, 2012). An important aspect of our approach is that overall TSC is a composite of overlapping safety cultures associated with different types of sociocultural unit. Thus, we apply the safety culture concept to the national level, to organisations and to peer groups in the present study.

1.3 Previous research

There seem to be few studies examining the relationship between safety behaviours and work

accidents in the maritime sector, although there are some exceptions (cf. Håvold and Nasset, 2009). The existing studies within this area do, however, indicate that demographic factors (age, nationality, position, line of work) influence work accident risk, and we should assume that this relationship is mediated by some kind of unsafe behaviour (e.g. risk taking, violations), resulting in injuries. Younger seafarers have a higher risk (Hansen et al 2002; Jensen et al 2004). Foreigners have a considerably lower accident risk than local (in the specific study, Danish) citizens (Hansen et al 2002). Previous research also indicates that alcohol consumption may be an important risk factor in the maritime sector (Akhtar & Bouwer Utne 2014, Hetherington et al 2014), and that alcohol and drug abuse are greater for seafarers compared to workers ashore (Nitka 1990; Kariris 2012 in Zhang & Zhao 2017), partly because of their working situation (e.g. social isolation). However, given the relatively unregulated character of private boat use, we may perhaps assume that alcohol consumption “boating while under the influence”, is an even more important risk factor in this sector. Likewise, we may perhaps also assume that the other risky behaviours related to boating accidents (e.g. over speeding close to shore) are more prevalent among the less regulated private boat users.

Based on a review of previous foreign studies of recreational boating accidents in Norway, Amundsen (2016) asserts that questions about alcohol use and lifejacket use are common in almost all of the international surveys. We may infer from this that alcohol use and life jacket use are key safety behaviours influencing the risk of accidents among private leisure boat users. Amundsen (2016) reports that the questions used in the different countries are adapted to the specific use of leisure boat in that country, and the accident situation. Based on a review of studies relevant to Norway, Amundsen and Bjørnskau (2017) point to the following safety behaviours as likely to influence the safety of private boat users: Drive faster than the permitted speed close to shore, Carry more passengers than the boat is licensed for, Drink a beer or a glass of wine before going boating, Drive in the dark without using the lantern/lights, Wearing a life jacket, Carrying enough lifejackets for everybody onboard the boat. The questions are partly based on the findings from a review of the safety situation for the recreational boaters performed by the Norwegian Maritime Authority in 2012.

Moreover, it is also important to ask whether the difference between the two groups are due to differences in private and professional maritime safety culture in Norway and Greece. The professional maritime safety culture is closely related to the safety regulation (e.g. the ISM-code) in

professional maritime transport. The International Safety Management (ISM) code of the International Maritime Organisation requires shipping companies to implement Safety Management Systems (SMS) on board their vessels, including describing safety roles, goals, procedures, monitoring, reporting, follow up etc. (Thomas 2012). Studies indicate that the SMS requirements of the ISM code foster a positive safety culture on board vessels (Lappalainen et al 2014). Additionally, shipping companies also often work to implement a positive organizational safety culture, including policies for seafarer behavior. Based on previous research, we may hypothesize first that organizational safety culture influences safety behaviours among professional seafarers (cf. Håvold & Nesset 2009, Lu & Tsai 2010).

Also, professional seafarers have undergone an IMO approved training in their respective home countries. Thus, this training, the SMS and safety culture are elements which are likely to influence the professional maritime safety culture. Additionally, it is important to remember that professional seafarer culture also is likely to be influenced by the working conditions of professional seafaring, which may include a high work pressure, demanding working conditions, fatigue etc. (cf. Nævestad 2017). Størkersen et al (2011) found that a third of the respondents in the Norwegian coastal cargo sector reported that they put themselves in danger to get the job done, while about 40% violate procedures to get the job done, especially because of efficiency demands (Størkersen et al 2011).

Moreover, research has also highlighted the importance of national safety culture for the safety behaviours of professional seafarers (Håvold 2005). We compare two countries (Norway and Greece), and we therefore, also compare the influence of national safety culture. The theoretical link between safety culture and safety behaviours is often omitted in research (Ward et al 2010). In the present study, we conceptualise this relationship as both direct social pressures and more subtle social mechanisms, producing important normative influences on behaviour (Cialidini et al., 1990). Individuals' perceptions of peers' opinions about a given behaviour are often defined as injunctive norms, while individuals' perceptions of what peers actually do often are defined as descriptive norms (Ajzen 1991; Ravis & Sheeran 2003; Ward et al 2010). Since injunctive norms are normative they can be expected to directly influence peoples' behaviour (Cialidini et al. 1990). In the present study national culture is measured as descriptive norms. Descriptive norms may influence behaviour by providing information about what is normal, but they can also influence behaviour through the false consensus bias, in which individuals over-

estimate the prevalence of risky behaviour among their peers in order to justify their own behaviour. The focus on normative influences on behaviour is important in the theory of planned behaviour (TPB) (Ajzen, 1991, 2006), and in the critique of it (Ravis & Sheeran 2003). In short, TPB predicts that our behaviour is the result of our intention to carry out the behaviour, and that our intention to carry out a particular behaviour is influenced by our attitudes towards the behaviour, injunctive norms and our perceived control over our behaviour (Ajzen 1991, 2006).

Additionally, research on maritime safety has found that the framework conditions and safety level varies considerably between (sub)sectors (Størkersen 2017; Hansen et al 2002; Jensen et al 2004). The influence of sector and sector safety culture is examined for professional seafarers. Studies of private transport operators have found that other sociocultural groups, e.g. peer groups (Nævestad et al 2014) and region (e.g. urban vs. rural) (Rakauskas et al 2009) are important when it comes to influencing safety behaviours. Thus, we also seek to examine the influence of peer-groups and regional maritime safety culture. Boat type and background variables are examined for leisure boat users.

2 METHOD

2.1 *Recruitment of respondents*

The Norwegian professional seafarers were recruited through the Norwegian researchers' contact with Norwegian shipping companies, i.e. shipping companies that are located in Norway, with mainly Norwegian crew members. Web links to the questionnaires were distributed by the shipping companies to all employees working on board vessels, along with an introductory text explaining the purpose of the survey, and stressing that the surveys were confidential. The Norwegian private boat users were recruited through a) the Norwegian researchers' contact with a boating association distributing survey links to members, and b) distribution on a member website for leisure boat owners, which in many years has been Scandinavia's largest boat forum (e.g. with 1.6 million posts submitted by members). The Greek professional seafarers were recruited through a marketing research company in Greece, which was under the scientific supervision of researchers from the NTUA. Seafarers working for Greek shipping companies, i.e. shipping companies that are located in Greece, with mainly Greek crew members, were approached. Private boat users in Greece were also recruited by the same marketing research company.

2.2 Survey measures: Professional seafarers

The present paper analysis of professional seafarers builds on and takes further the knowledge gained from two previous conference papers. The first (Nævestad et al 2017) compares organizational safety culture, working conditions and occupational injuries in Norwegian cargo and passenger transport. The second (Nævestad et al 2018), compares cultural influences on maritime cargo transport in Norway and Greece. The present paper takes the knowledge from these two papers further, as it compares professional seafarers with private leisure boat users.

- 1. Background variables** (15 questions): e.g. gender, nationality, age group, seafarer experience, position/area of work, employment status, vessel type, vessel size, manning on board, ship register,
- 2. Safety performance** (5 questions): respondents' occupational injuries on board, ship accidents, type of ship accidents, safety compromising fatigue and assessment of work place safety level (1–10).
- 3. Safety behaviours** (7 questions): questions on safety behaviours. Respondents were asked: How often do you think the following events tend to occur for every 100 working days/nights on board?: 1) I accept small risks because the "situation demands it" (e.g. because of time pressure, bad weather), 2) I violate procedures to get the job done, 3) I work, even though I am so tired that safety may be compromised, 4) I refrain from using the required protection equipment in my work, 5) I work while being under the influence of alcohol (e.g. one beer or more), or while being hungover, (Answer alternatives: 1) Never, 2) 1–2 times, 3) 3–5 times, 4) 6–10 times, 5) 11–15 times, 6) 16–20 times 7) More than 20 times, 8) Do not know/not relevant)
- 4. Working conditions** (3 questions): How often do you think the following events tend to occur for every 100 working days/nights on board: 1) Your shift change is delayed because of work operations, for instance port calls?, 2) You work more than 16 hours in the course of a 24-hour period?, 3) You are interrupted when you are off duty". (Answer alternatives: 1) Never, 2) 1–2 times, 3) 3–5 times, 4) 6–10 times, 5) 11–15 times, 6) 16–20 times 7) More than 20 times, 8) Do not know/not relevant).

We removed the eight answer alternative and made a "Demanding working conditions index" of these three questions (Cronbach's Alpha: .728). The survey also included a question on work pressure: "Sometimes I feel pressured to continue working, even if it is not perfectly safe"

- 5. Organisational safety culture** (7 questions): We made an organisational culture index, consisting of questions from the GAIN-scale on organisational safety culture. We have used this scale in previous research from different transport sectors (Bjørnskau & Longva, 2009; Nævestad & Bjørnskau, 2014). The GAIN-scale is presented in the "Operator's Safety Handbook" (GAIN 2001). The GAIN-scale originally consists of 25 questions measuring five themes, but we have reduced the scale to 7 questions, e.g. 1) Ship management regards safety to be a very important part of all work activities, 2) The shipping company regards safety to be a very important part of all work activities, 3) Ship management detects crew members who work unsafely, 4) Ship management often praises crew members who work safely etc.
- 6. National safety culture** (7 questions): In the present study we measure national safety culture as descriptive norms (Cialdini 1990) at the national level meaning "what respondents expect that other seafarers from their own country do" expressed through question "When working on vessels, I expect the following behaviours from other seafarers from my country:" 1) That they sometimes violate procedures to get the job done, 2) That they sometimes refrain from using the required protection equipment in their work, 3) That they sometimes work, even when they are so tired that safety may be compromised, 4) That they sometimes work being under the influence of alcohol (e.g. one beer or more), or while hungover, 5) That they sometimes take small risks if the "situation demands it" (e.g. because of time pressure, bad weather), 6) That they sometimes avoid telling colleagues taking risks to work safely, 7) That they sometimes refrain from reporting safety problems and unsafe situations that they experience in their work to the ship management. An exploratory factor analysis (EFA) was conducted to examine the underlying factor structure of the 7 national safety culture (descriptive norms) items.
- 7. Sector safety focus** (2 questions): We measure sector safety focus by means of two questions that were selected after a "scale if items deleted" analysis (including five items): 1) Safety is more important than deadlines to our customers, 2) Safety is more important than price to our customers (CA = .875).

2.3 Survey measures: Private boat users

- 1. Background variables** (12 questions): gender, nationality, age group, experience as a boat driver, participation in organized boat training/educational programme, boat type, use of navigation equipment, boat length, engine capac-

ity, maximum boat speed, purpose of boat use, municipality of residence, education level.

2. **Safety performance** (4 questions): respondents' accidents/incidents, injuries in accidents, safety self-assessment as a boat driver (1–10), boat use duration.
3. **Safety behaviours**: (12 questions): Respondents were asked:
 - A. For every ten times you are driving your boat, approximately how often do you do the following things, before you go out: 1) Tell someone where I will be going and when I will be back, 2) Check the weather forecast, 3) Check the fuel level, 4) Drink two units of alcohol (e.g. two beers, two gl. of wine)
 - B. For every ten times you are driving your boat, approximately how often do you do the following things: 1) Personally wear a life jacket the entire trip, 2) Drink two units of alcohol (e.g. two beers, two glasses of wine), 3) Drive faster than the permitted speed close to shore, 4) Drive so fast or offensively that passengers or others (e.g. other boat drivers) express concern or react in other ways, 5) Look down at navigational equipment/GPS for so long that I have been surprised to see other boats, islands, skerries etc. when I look up, 6) Become angered by a certain type of boat driver and indicate your hostility by whatever means you can.
 - C. For every ten times you are driving your boat with passengers, approximately how often do you do the following things: 1) Ensure that adult passengers on your boat wear a life-jacket, 2) Ensure that child passengers on your boat wear a lifejacket. (Answer alternatives for A, B and C: 1) Never, 2) 1–2 times, 3) 3–4 times, 4) 5–6 times, 5) 7–8 times, 6) more than 8 times but not always, 7) Always
4. **National safety culture** (3 questions): National safety culture is again measured as descriptive norms at the national level meaning “what respondents expect that other boat drivers from their own country do” expressed through question “Based on your experience, how many boat drivers in your country do you think do the following:” 1) Drink two units of alcohol (e.g. two beers, two glasses of wine) while driving the boat, 2) Drive faster than the permitted speed close to shore, 3) Drive so fast or offensively that passengers or others (e.g. other boat drivers) express concern or react in other ways. The questions were combined into an index. The survey included six additional questions about this that are not listed here.
5. **Peer group safety culture** (3 questions): The same principle and questions as for national safety culture are applied.

6. **Safety culture at municipality level** (3 questions):

The same principle and questions as for national safety culture are applied.

3 RESULTS

3.1 *Professional seafarers*

3.1.1 *Which behaviours influences personal injuries?*

A logistic regression analysis was conducted with personal injuries as dependent variable, to find the variables predicting personal injury among our respondents (Table 1). In this analysis, the injury variable, which originally had four answer alternatives, was dichotomized, 0 = no personal injury, 1 = personal injury. B values are presented and they indicate whether the risk of personal injuries is reduced (negative B values) or increased (positive B values), when the independent variables increase by one value.

Table 1 provides three main results. The first is that nationality influences respondents' work injuries in the last two years on board. This is the variable with the strongest contribution. The Norwegian seafarers reported to have been more involved in injuries than the Greek seafarers. The variable with the second strongest contribution is the Risk acceptance/violations index; indicating that the more violations and risk accepting behaviour you are involved in, the more likely it is that you are injured on board. The variable with the third strongest contribution is age group, indicating that controlled for the other variables, the youngest seafarers have a higher risk of being injured on board. In Table 1, the Nagelkerke R^2 is 0.188 which indicates that the independent variables explain 19% of the variance in the dependent variable.

3.1.2 *Which factors influence safety behaviours?*

In Table 2 we show results from a hierarchical, linear regression analysis, where independent variables are included in successive steps to examine the variables predicting respondents' scores on the Risk acceptance/violations index.

Table 2 provides five main results: first, the more demanding working conditions that the respondents experience, the more likely they are to be involved in Risk acceptance/violations. Second, we see that the national safety culture—descriptive norms index contributes positively, indicating that the more unsafe behaviours the respondents say that they expect from seafarers from their own country, the more likely they are to be involved in unsafe behaviours themselves. Third, the higher organizational safety culture scores the respondents report, the less unsafe are their behaviours.

Table 1. Logistic regression. Dependent variable: Personal injuries on board in the last two years (dichotomized: 0: no personal injury, 1 = personal injury). B values.

Variables	B value
Age group (26 years = 0, Other = 1)	0.373**
Nationality (Greek = 0, Norwegian = 1)	2.226**
Vessel type (Live fish carrier = 0, Other = 1)	0.888
Position/line of work (Deck crew = 0, Other = 1)	0.657
Risk acceptance/violations index	1.164***
Working under the influence of alcohol/hungover	0.304
Non-reporting/non-intervention index	0.940
Sometimes I feel pressured to continue working even if it is not perfectly safe	1.224
Organisational safety culture index	1.025
Nagelkerke R ²	0.188

*P < 0.1, **p < 0.05, ***p < 0.01.

Table 2. Linear regression. Dependent variable: “Risk acceptance/violations Index”. Standardized beta coefficients.

Variables	Beta coeff.
Age group (26 = 2)	0.003
Nationality (Greek = 2)	-0.030
Position (Apprentice = 2)	0.052
Vessel type (Tank = 2)	-0.031
Sometimes I feel pressured to continue working, even if it is not perfectly safe	0.167**
Demanding working conditions index	0.281**
Organisational safety culture index	-0.195**
Sector focus on safety	-0.144**
National safety culture: descriptive norms	0.206**
Adjusted R ²	0.453

*P < 0.1, **p < 0.05, ***p < 0.01.

Thus, a positive organisational safety culture may reduce the negative contribution of demanding working conditions and safety compromising work pressure. The same applies to the index “sector focus on safety”. In Table 2, Adjusted R² is 0.453 which indicates that the independent variables explain about 45% of the variance in the dependent variable.

3.2 Private boat users

3.2.1 Which behaviours influences personal injuries?

A logistic regression analysis was conducted with boating incidents (grounding, collision, intake of water) as dependent variable, to find the variables

predicting personal injury among our respondents (Table 3). Seven percent of the respondents had experienced this. The incident variable, was dichotomized, 1 = no personal injury, 0 = personal injury. B values are presented and they indicate whether the incident risk is reduced (negative B values) or increased (positive B values), when the independent variables increase by one value.

Table 3 provides two main results. The first is that nationality influences respondents’ experiences with boating incidents in the last two years. This is the variable with the strongest contribution. The effect is negative, meaning that Greek boat users are involved in fewer incidents, controlled for the other relevant variables.

The second result is that alcohol use during trips as a boat driver contributes significantly and negatively, meaning that increased alcohol use increases the likelihood of boating incidents. In Table 3 the Nagelkerke R² is 0.222 which indicates that the independent variables explain 22% of the variance in the dependent variable.

3.2.2 Which factors influence safety behaviours?

In Table 4 we show results from a hierarchical, linear regression analysis, where independent variables are included in successive steps to examine the variables predicting respondents’ scores on the variable “Alcohol use during boat trip as driver”.

Table 4 provides four main results: first, national safety culture, specified as descriptive norms (boat users from your own country’s alcohol use, over speeding close to shore and offensive driving) provides the strongest contribution to respondents’ alcohol use while driving a boat. Respondents who report of unsafe behaviours among boat users in their country are more likely to drink alcohol while boating themselves. We made similar indexes for the peer group and the municipality level. The peer group level refers to “friends who own a boat”.

Table 3. Logistic regression. Dependent variable: boating incidents in the last two years (dichotomized: 0: incident, 1 = no incident). B values.

Variables	B value
Age group (46–55 years = 0, Other = 1)	0.711
Exposure	0.002
Boat type (motor boat w/sleeping facilities = 0, other = 1)	0.328
Alcohol use during trip as boat driver	-0.359**
Nationality (Greek = 0, Norwegian = 1)	-1.683***
Education/training in boat use (No = 1)	-0.179
Navigational equipment on board	0.826
Nagelkerke R ²	0.222

*P < 0.1, **p < 0.05, ***p < 0.01.

Table 4. Linear regression. Dependent variable: “Alcohol use during boat trip as driver”. Standardized beta coefficients.

Variables	Beta coeff.
Age group (Under 56 years = 1, over = 2)	-0.147**
Nationality (Norwegian = 1, Greek = 2)	-0.160**
Boat type (Other = 1, motor boat w/ sleep = 2)	0.171***
Purpose of trip (Other = 1, Leisure = 2)	0.119*
Perceived enforcement: police/coast guard	0.028
Peer group safety culture	0.151*
Municipal safety culture	-0.157*
National safety culture	0.218***
Adjusted R ²	0.167

*P < 0.1, **p < 0.05, ***p < 0.01.

We see that that peer group safety culture and municipality safety culture only contributes significantly at the 10% level. The contribution of peer group safety culture is positive, as the national culture variable, but the municipality contribution is negative. This is unexpected, and we return to it in the discussion section.

Second, we see that boat type (motor boat with sleeping facilities) contributes positively, indicating that using this boat type involves a higher incident risk in our sample. Third and fourth, we see that age (>56 years) and nationality (Greek) gives a lower risk of having experienced incidents.

Finally, we also see that purpose (i.e. leisure and holiday) contributes positively to incidents, but only at the 10% level. Thus, we see, not unexpectedly, that compared with other purposes (e.g. fishing, transport), boat drivers on leisure/trips are more likely to drink alcohol while driving. In Table 4, Adjusted R² is 0.167 which indicates that the independent variables explain about 17% of the variance in the dependent variable.

4 CONCLUDING DISCUSSION

The aims of the study were to examine the safety behaviours related to personal injuries and accidents among professional seafarers and private leisure boat users in Norway and Greece, and to study the factors influencing these behaviours.

4.1 Factors predicting injuries/accidents

Looking at the factors predicting injuries/accidents in the two groups, we saw that nationality (Norwegian), risk acceptance/violations and age group (<26 years) predicted professional seafarers’

work injuries in the last two years on board. The contribution of age and nationality is in accordance with previous research on professional seafarers (Hansen et al 2002; Jensen et al 2004).

Looking at the private boat users, we also saw that nationality influenced respondents’ risk of boating incidents in the last two years. Second, we found that alcohol use during trip as a boat driver increased the likelihood of boating incidents. Working under the influence did not contribute significantly to professional seafarers’ risk of work accident.

This contrasting result is in line with the hypothesis we mentioned in the introduction; that private boat use seems to be a relatively unregulated behaviour compared with professional seafaring. Previous research indicates that alcohol consumption may be an important risk factor in the maritime sector (Akhtar & Bouwer Utne 2014, Hetherington et al 2014), and that alcohol and drug abuse are greater for seafarers compared to workers ashore (Nitka 1990; Kariris 2012 in Zhang & Zhao 2017), partly because of their working situation (e.g. social isolation). However, as private boat use is less regulated than professional boat use, we hypothesized that alcohol consumption “boating while under the influence”, would be an even more important risk factor among private boat users. Results indicate that this is the case, at least based on our sample.

As noted, Amundsen (2016) also asserts that questions about alcohol use and lifejacket use are common in almost all of the international surveys, indicating the importance of these factors for boating safety. Moreover, Norwegian boating accident statistics report a number of death involving alcohol, and where the drowned person did not wear a life jacket (Amundsen & Bjørnskau 2017).

4.2 Factors predicting safety behaviours

Analysing the factors influencing professional seafarers’ risk acceptance and violations, we found that demanding working conditions and work pressure were important factors. This is in line with previous research (Størkersen et al 2011, Nævestad 2017). The former was the most important factor. We also found that a positive organisational safety culture may reduce the negative contribution of demanding working conditions and safety compromising work pressure. This has also been pointed out in a previous study (Nævestad 2017). We also found that “sector focus on safety” may reduce the negative influence of demanding working conditions on professional seafarers’ safety behaviours.

Additionally, we, found that the national safety culture—descriptive norms index contributed

positively, indicating that the more unsafe behaviours the respondents say that they expect from seafarers from their own country, the more likely they are to be involved in unsafe behaviours themselves. We found the same in the analysis of the private boat users; in fact, this analysis showed that, national safety culture, specified as descriptive norms (boat users from your own country's alcohol use, over speeding close to shore and offensive driving) provided the strongest contribution to respondents' alcohol use while driving a boat. To our knowledge, there are few other studies that have examined the influence of national culture (specified as descriptive norms) on both professional seafarers and private boat users.

Examining the cultural influences on private boat users' safety behaviours, we also found that peer group and municipality safety culture contributed significantly at the 10% level. The contribution of peer group safety culture is positive, as the national culture variable, but the municipality contribution is negative. This is likely to be a result of a collinearity effect, indicating that these two variables are strongly related and measure "the same effect". In practice (and based on observing the means and the standard deviations on these two variables) it seems that respondents do not separate clearly between boat users in their own municipality and their peer group. This is understandable, given the memory, knowledge and analytical separation required to do this. Thus, we should exclude the municipality level from the analysis, as it is likely that this is the level (compare to peer group) that respondents know less about.

Analysing, the influences on private boat user behavior, we also found that boat type (motor boat with sleeping facilities) involves a higher incident risk in our sample. We also found that age (>56 years) and nationality (Greek) gives a lower risk of having experienced incidents. We also found that purpose (i.e. leisure and holiday) contributed positively to incidents, but only at the 10% level. This brings us to the important differences between the two groups that we study. Finally, previous research on private boat users has also found such background variables to be important for safety behaviours, e.g. type of boat used, gender, age, experience, what kind of activity they usually use the boat for (e.g. fishing, competition, holiday, recreation), type of location where they usually use the boat (cf., Amundsen 2016; Amundsen & Bjørn-skau 2017).

4.3 *Why are the number of fatalities higher for leisure boat users than professional seafarers?*

An overarching purpose of our study was to discuss possible reasons to the higher number of fatalities

for leisure boat users than professional seafarers. We wanted for instance to examine the kind of behaviours that are related to injuries/accidents in the two groups, and subsequently to examine the factors influencing these behaviours. We may of course only speculate based on our study, indicating hypotheses that should be examined further in future research, but our study indicates that the settings and purposes are important to understand this difference.

While unsafe behaviours related to work pressure and risk taking are important among professional seafarers (i.e. risk acceptance and violations), unsafe behaviours related to the leisure/holiday situation was important for the leisure boat users (i.e. alcohol use while driving a boat).

Additionally, it seems that the situation of private leisure boat users is less regulated than that of professional seafarers. The International Safety Management (ISM) code of the International Maritime Organisation requires shipping companies to implement Safety Management Systems (SMS) on board their vessels, including describing safety roles, goals, procedures, monitoring, reporting, follow up etc. (Thomas 2012). Additionally, shipping companies also often work to implement a positive organizational safety culture, including policies for seafarer behavior. Also, professional seafarers have undergone an IMO approved training in their respective home countries. Thus, this training, the SMS and safety culture are elements which are likely to influence the professional maritime safety culture.

Private boat users, on the other hand are not part of such a system of international and national regulation, involving education, inspections from port states, flag states, classification societies, transport buyers etc. Compared to the number of people who go boating in different countries, the risk of accidental death is quite high compared to that of other private transport modes. Despite of this, recreational boating is to a small extent being regulated and the level of enforcement is low (Amundsen & Bjørn-skau 2017). Some countries seem to take safety for leisure boat users more seriously than others. In a few countries it is, for instance, now mandatory to report all incident you experience while boating, even if no persons were injured in the incident/accident. Finally, it is important to remember that the above mentioned view points merely are hypothesis that must be examined in future research.

4.4 *Cultural influences on maritime safety behaviours*

The theoretical link between safety culture and safety behaviours is often omitted in research

(Ward et al 2010). In the present study, we conceptualise this relationship as descriptive norms, that may influence behaviour by providing information about what is normal. In the professional (organisational) setting, managers are an important source of social pressure, as well as colleagues, and the interaction between people within the organisation is important for the creation and maintenance of a safety culture influencing behavior, as indicated by the effect of organizational safety culture on professional seafarers' safety behaviors in Table 2.

In the private setting, there will not be a similar strong link from managers to transport safety culture. Some peers are, however, likely to assert stronger social influence than others, and may be as important as managers in organizations in exerting social pressures that shape safety culture and influence behaviour. In our study (Table 4), we saw that peers are central as advocates of social norms related to safety (i.e. drinking alcohol while boating), but we also saw that the reference to other people in the boat users' country were even more important. In Table 2 we also saw the importance of sector for professional seafarer behavior.

To conclude, our study indicates that both in the professional and the private setting, norms for interaction and conduct seem to be influenced by norms and expectations rooted in different socio-cultural groups, e.g. the national culture, the specific sector in question, the organisations and in peer groups.

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REFERENCES

- Akthar M.J. & I. Bouwer Utne (2014) Human fatigue's effect on the risk of maritime groundings—A Bayesian Network modeling approach, *Safety Science*, vol. 62, pp. 427–440.
- Antonsen, S. (2009). The relationship between culture and safety on offshore supply vessels, *Safety Science*, Vol. 47. Issue 8, pp. 1118–1128.
- Bjørnskau, T., F. Longva, Sikkerhetskultur i transport. TØI rapport 1012/2009. 2009: Transportøkonomisk institutt.
- Cialdini, R.B., R.R. Reno and C.A. Kallgre (1990) A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places, *Journal of Personality and Social Psychology*, 58, pp. 1015–1026.
- EMSA (2017). Annual overview of marine casualties and incidents 2017. European Maritime Safety Agency.
- GAIN (Global Aviation Network) (2001). Operator's Flight Safety Handbook.
- Hale, A. (2000). Editorial: Culture's Confusions, *Safety Science*, vol. 34, pp. 1–14.
- Hansen, H.L et al. (2002). Occupational accidents aboard merchant ships, *Occup Environ Med*, 59, pp. 85–91.
- Håvold, J.I. (2005). Safety-culture in a Norwegian shipping company. *Journal of Safety Research*, 36, pp. 441–458.
- Hetherington, C., Flin, R., Mearns, K. (2006). Safety in shipping: The human element. *Journal of Safety Research*, 37(4), pp. 401–411.
- Jensen, O.C. et al. (2004). Incidence of self-reported occupational injuries in seafaring—an international study, *Occupational Medicine*, doi:10.1093/occmed/kqh090.
- Nævestad T-O. and T. Bjørnskau (2014), Kartlegging av sikkerhetskultur i tre godstransportbedrifter. TØI rapport 1300/2014. 2014: Transportøkonomisk institutt.
- Nævestad, T.-O. (2017) "Safety culture, working conditions and personal injuries in Norwegian maritime transport", *Marine Policy*, Vol. 84, pp. 251–262.
- Nævestad, T.O. et al. (2015). Work-related accidents in road sea and air transport: prevalence and risk factors, TØI report 1428/2015, Oslo: Transportøkonomisk institutt.
- Nitka, J. (1990) Selected medical and social factors and alcohol drinking in Polish seafarers, *Bull. Inst. Marit. Trop. Med. Gdynia* 41 (1990) 53–57.
- Oldenburg, M. & H.J. Jensen (2012). Merchant seafaring: A changing and hazardous occupation, *Occupational and environmental medicine* 69(9):685–8 · June 2012.
- Rivis, A., P. Sheeran (2003). Descriptive norms as an additional predictor in the theory of planned behaviour: A meta-analysis. *Current Psychology: Developmental, Learning, Personality, Social*, 22, p. 218–233.
- Størkersen K.V. (2017). Coastal cargo work: How can safety shout instead of whisper when money talks? Paper to be presented at the 2017 ESREL conference.
- Størkersen, K.V. et al. (2011). Sikkerhet i fraktestarten. Analyse av drifts- og arbeidsmessige forhold på fraktestartøy, NTNU Samfunnsforskning AS, Studio Apertura, Trondheim: NTNU.
- Ward, N.J. et al. (2010). White Paper on Traffic Safety Culture. White Papers for "Toward zero deaths: a national strategy for highway safety" Series—White Paper No.2, Montana State University.
- Zhang, P., Zhao, M. (2017) Maritime health of Chinese seafarers (2017) *Marine Policy*, Vol. 83, pp. 259–267.