

The safety perception of marine sports instructors and the safety culture environment

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Abstract

Background/Objectives: To identify the relationship between the safety awareness of marine sports safety instructors and a safety culture environment, a questionnaire was used to survey marine sports instructors.

Methods/Statistical Analysis: This study used marine sports instructors as the parent group, in order to identify the relationship between the safety awareness of marine sports instructors and the safety culture environment. A convenience sampling was used for selecting 300 subjects. Those who responded insufficiently, inaccurately, with overlapping answers, or with prejudiced answers were excluded from the final analysis.

Findings: First, importance and interest had a positive correlation with organization, system, and individual environment. Safety behavior and trusting relationships had a positive correlation with all subvariables of the safety culture environment: organization, system, individual environ-

ment, and communication. Second, importance and safety behavior had a positive effect on organization and system, while importance, safety behavior, and trusting relationships had a positive effect on the individual environment. Moreover, safety behavior had a positive effect on communication. Third, organization and system, individual environment, and communication had a positive effect on importance.

Improvements/Applications: Organization and system had a positive effect on the level of interest. Moreover, organization, system, and communication had a positive effect on safety behavior, while organization, system, and the individual environment had a positive effect on trusting relationships.

Key Words : Safety Culture Environment, Marine Sports Instructors, Safety Awareness, Safety Behavior, Communication.

1 Introduction

Safety has become one of the most important topics in contemporary times. There is even a saying, safety has become one of the most important attention is paid to safety. Safety is not a concept only for specific social classes, nor is it required only during a certain period of time. It is required constantly throughout our lives. Therefore, attention to safety is nothing abnormal, but it is also not often applied to daily life.

Safety-related issues arise in sports, too. There are many dangerous situations, and given the competitiveness in sports, there is a higher chance of accidents than in other activities. In fact, an athlete of luge representing Georgia in the Winter Olympics crashed during practice and died. There are many other accidents that occur during games, such as heart attacks.

Marine sports require highly sophisticated equipment, which one must master, even more so than in many other sports. Being on firm ground is relatively safe, but small mistakes on the sea can lead to fatal accidents. Therefore, sufficient training and practice must come first, along with licenses in some cases. Given

these characteristics and risks, the role of marine sports instructors is all the more important. Jun ¹ noted that for many accidents, there was a lack of correct instruction by a skilled instructor. To prevent accidents in marine sports, careful instruction and training on safety awareness are required. The mindset of participants must also change. The fostering of expert instructors helps prevent accidents and promotes marine sports.

Many efforts are being made to ensure that participants in marine sports can exercise in a safe environment. Many studies, such as Kim & Park ², and Watkins & Peabody ³, have been conducted on various safety incidents in a sports situation. Yoon ⁴ and Caine, Maffulli, & Caine ⁵, among others, have undertaken follow-up studies. Moreover, Shin, Yoo, & Park ⁶ and Jung & Sung ⁷ have also undertaken studies on safety awareness in order to propose various resolutions to sports safety issues.

However, despite such efforts, there is little in society that ensures safety during marine sports. An increase in marine sports accidents testifies to this. In addition, most of the previous studies were one-dimensional. For example, although there have been many studies on the current status of sports safety incidents and measures to address them, there have been almost no studies that take a more comprehensive view, especially about establishing a culture that values sports safety; that is, none that consider whether a safe environment has been established in marine sports or that look at the organic relationships between various environmental elements, such as individual, organizational, or communication. Therefore, it is high time that a study on establishing a safe environment is needed. We need to identify how the safety awareness of the instructor correlates with safety culture, so that participants in marine sports can enjoy them in a safe environment. In this sense, there is a need to review the relationship between the mediating variables to establish a system for safe marine sports.

In order to set up questions for investigation, we need first to define some terms. By "safety culture environment" or SCE, we mean an organizational culture in which safety is highly and appropriately valued. By "safety awareness" or "safety behavior," we refer to an instructor's professional obligation to not only behave safely, but also serve as a role model in exemplifying safe behavior and teaching the principles of safety to the students.

The questions for investigation are therefore as follows. First, is there a correlation between the safety awareness of the marine sports instructor and the safety culture environment? Second, does the safety awareness of marine sports instructors affect the safety culture environment? Third, does the safety culture environment of marine sports instructors affect safety awareness?

2 Methods

2.1 Study subjects

This study used marine sports instructors as the parent group, in order to identify the relationship between the safety awareness of marine sports instructors and the safety culture environment. A convenience sampling was used for selecting 300 subjects. Those who responded insufficiently, inaccurately, with overlapping answers, or with prejudiced answers were excluded from the final analysis. The general characteristics of the study subjects are as seen in Table 1.

Table 1. General characteristics of subjects

Variable		Frequency(n)	Percentage (%)
Gender	Male	137	75.3
	Female	45	24.7
Age	20s	59	32.4
	30s	71	39.0
	40s	42	23.2
	Older than 40s	10	5.4
	High school grad	18	9.9
Education	Currently in university	51	28.0
	University grad	68	37.4
	Graduate school or higher	45	24.7
	Less than 4 years	72	39.6
Experience	4-6 years	60	33.0
	6-8years	28	15.4
	8 years or more	22	12.1
	Total	182	100

2.2 Tools

2.2.1 Composition of the questionnaire

The socio-demographic variables were four questions asking about gender, age, educational background, and experience as an instructor. For safety awareness, the scale used by Lee ⁸, which was then

completed by Ko ⁹, was used after revision. The subvariables for safety awareness were two questions for importance, five questions for interest, five questions for safety behavior, and five questions for trusting relationships, a total of 17 questions. The safety culture environment was measured by using the questionnaire developed by AHRQ in the U.S.A. ¹⁰, which was later translated and revised by Kim et al. ¹¹ to better fit the sports safety culture environment. The subvariables of the safety culture environment were four questions for organization and system, three questions for individual environment, and four questions for communication, a total of 11 questions. Each question was measured on a 5-point Likert scale, with each question was measured in, 5estions for individual environment, five questions for safety behavior principles of safety to the stud.

2.2.2 The validity and confidence of the questionnaire

To verify the validity of the questionnaire, an investigative factor analysis was conducted. For factor extraction, a varimax method of orthogonal rotation and main element analysis were applied. In addition, the eigenvalue was set at 1.0 or higher, and only questions with a factor loading of .4 or higher were selected. For confidence analysis, only those with a Cronbach alpha of .6 or higher were used.

The validity of the safety awareness used in this study was four factors: importance, interest, safety behavior, and trusting relationship, which explained a total of 56.253% of variances. The unit matrix of Bartlett was 1404.556 ($p < .001$), and the KMO sample fitness was .817, showing that the selection of variables was appropriate. The loading of importance was higher than .778, the loading of interest was higher than .599, the loading of safety behavior was higher than .446, and the loading of trusting relationships was higher than .587. A review of inter-item consistency showed that Cronbach's alpha for the confidence level was .701 for importance, .669 for interest, .660 for safety behavior, and .658 for trusting relationships.

The validity of the safety culture environment used in this study was found to have three factors: organization and system, individual environment, and communication, explaining a total variance

of 58.051%. The unit matrix of Bartlett was 796.161 ($p < .001$) and the KMO sample fitness was .768, indicating that the selection of variables was appropriate. The loading of organization and system was higher than .686, the loading of individual environment was higher than .619, and the loading of communication was higher than .614. A review of inter-item consistency showed that confidence level (Cronbach's alpha) was .646 for organization and system, .647 for individual environment, and .694 for communication.

2.3 Survey procedure

To identify the relationship between the safety awareness of marine sports instructors and the SCE, the researcher and a research assistant randomly selected a specific day of the week (e.g., weekday or weekend) and time (e.g., morning, afternoon, evening). The subjects were instructors of marine sports. After verifying the active hours of the selected instructors, the researcher visited them in person. After explaining the purpose of the study and gaining consent, the survey was conducted. To generalize the study results, before the distribution of the questionnaire, the purpose of the questionnaire was explained to the marine sports instructors. After explaining the content of the questions and how to answer them, a self-administration method was used. The completed questionnaires were immediately collected.

2.4 Data analysis

Excluding copies that were deemed unfit for the purpose of the study, a total of 182 copies were used. To verify the normal distribution, validity, and confidence level of the collected data, SPSS 21.0 was used for technical statistical analysis, investigative factor analysis, and confidence-level analysis. The statistical significance level was set at $p < .05$. To review the relationships between variables, a correlation analysis was conducted, and a multiple regression analysis was conducted to identify the effect between variables.

Table 2. Correlation analysis between safety awareness and the SCE

Variable	Importance (A)	Interest (B)	Safety behavior(C)	Trusting relationships(D)	Organization and system (E)	Individual environment(F)	Communication(G)
A	-						
B	.450***	-					
C	.034	.136*	-				
D	.323***	.463***	.216***	-			
E	.222***	.229***	.474***	.264***	-		
F	.217***	.233***	.302***	.267***	.414***	-	
G	-.027	.038	.471***	.157**	.248***	.354***	-

* $p < .05$, ** $p < .01$, *** $p < .001$

3 Results

As seen in Table 2, importance had a positive correlation with organization and system ($r=.323$) and individual environment ($r=.217$). Interest had a positive correlation between organization and system ($r=.463$) and individual environment ($r=.233$). Safety behavior had a positive correlation between organization and system ($r=.474$) and individual environment ($r=.302$), as well as with communication ($r=.471$). Trusting relationships had a positive correlation with organization and system ($r=.264$), individual environment ($r=.267$), and communication ($r=.157$).

The relationship between safety awareness and SCE was analyzed in terms of the factors that constituted the SCE, as shown in Tables 3-9.

Table 3. Relationship between safety awareness and organization and system

	B	SE	β	t	p
constant	1.180	.251		4.698***	.000
Importance	.114	.046	.144	2.506*	.013
Interest	.058	.059	.060	.974	.331
Safety behavior	.390	.046	.442	8.501***	.000
Trusting relationships	.091	.057	.094	1.593	.112

 $R^2 = .279$, $F = 27.184$ **** $p < .05$, *** $p < .001$

As seen in Table 3, the relationship between safety awareness and organization and system had a statistically significant effect ($F=27.184$, $p<.001$), with a total explanatory power of approximately 27.9 ($R^2 = .279$). The Beta, which is the relative effect of safety awareness on organization and system, had a positive effect on safety behavior ($\beta=.442$, $p<.001$).

Table 4. The relationship between safety awareness and individual environment

	B	SE	β	t	p
constant	1.464	.312		4.697***	.000
Importance	.117	.056	.128	2.072*	.039
Interest	.085	.073	.076	1.155	.249
Safety behavior	.260	.057	.257	4.570***	.000
Trusting relationships	.150	.071	.135	2.123*	.035
$R^2 = .158, F = 13.178^{***}$					

* $p < .05$, *** $p < .001$

As seen in Table 4, the relationship between safety awareness and individual environment had a statistically significant effect ($F=13.178$, $p<.001$), with a total explanatory power being approximately 15.8 ($R^2=.158$). The Beta value, which shows the relative effect of safety awareness on individual environment, showed that it had a positive effect on safety behavior ($\beta=.257$, $p<.001$), trusting relationships ($\beta=.135$, $p<.05$), and importance ($\beta=.128$, $p<.05$).

Table 5. The relationship between safety awareness and communication

	B	SE	β	t	p
constant	1.598	.317		5.035***	.000
Importance	-.053	.058	-.054	-.919	.359
Interest	-.056	.075	-.047	-.744	.458
Safety behavior	.494	.058	.458	8.526***	.000
Trusting relationships	.116	.072	.097	1.606	.109
$R^2 = .231, F = 21.099^{***}$					

*** $p < .001$

As seen in Table 5, the relationship between safety awareness and communication had a statistically significant effect ($F=13.178$, $p<.001$), with a total explanatory power being approximately 15.8 ($R^2=.158$). The Beta value, which shows the relative effect of safety awareness on individual environment, showed that there was a positive effect on safety behavior ($\beta=.458$, $p<.001$).

Table 6. The relationship between SCE and importance

	B	SE	β	t	p
constant	2.742	.301		9.906***	.000
Organization and system	.218	.079	.174	2.760**	.006
Individual environment	.214	.072	.195	2.987**	.003
Communication	.146	.063	.141	2.307*	.022
$R^2 = .085, F = 8.707^{***}$					

* $p < .05$, ** $p < .01$, *** $p < .001$

As seen in Table 6, the relationship between SCE and importance had a statistically significant effect ($F=8.707$, $p<.001$), with a total explanatory power being approximately 8.5 ($R^2=.085$). The Beta value, which shows the relative effect of SCE, showed a positive effect on individual environment ($\beta=.195$, $p<.01$), organization and system ($\beta=.174$, $p<.01$), and communication ($\beta=.141$, $p<.05$).

Table 7. The relationship between SCE and interest

	B	SE	β	t	p
constant	2.728	.249		10.961***	.000
Organization and system	.172	.065	.166	2.622**	.009
Individual environment	.172	.059	.190	2.897**	.004
Communication	.062	.052	.073	1.183	.238

$R^2 = .079$, $F = 8.105^{***}$

** $p < .01$, *** $p < .001$

As seen in Table 7, the relationship between SCE and interest had a statistically significant effect ($F=8.105$, $p < .001$), with total explanatory power being approximately 7.9 ($R^2=.079$). The Beta value, which shows the relative effect of SCE on interest, shows that it had a positive effect on individual environment ($\beta=.190$, $p<.01$), and organization and system ($\beta=.166$, $p<.01$).

Table 8. The relationship between SCE and safety behaviors

	B	SE	β	t	p
constant	.632	.227		2.787**	.006
Organization and system	.424	.059	.377	7.152***	.000
Individual environment	.013	.054	.013	.242	.809
Communication	.347	.047	.374	7.306***	.000

$R^2 = .359$, $F = 52.842^{***}$

** $p < .01$, *** $p < .001$

As seen in Table 8, the relationship between SCE and safety behaviors had a statistically significant effect ($F=52.842$, $p<.001$), with total explanatory power being approximately 35.9 ($R^2=.359$). The Beta value, which is the relative effect of SCE on safety behaviors, showed that it had a positive effect on organization and system ($\beta=.377$, $p<.001$) and communication ($\beta=.374$, $p<.001$).

Table 9. The relationship between SCE and trusting relationships

	B	SE	β	t	p
constant	2.442	.244		10.001***	.000

Organization and system	.181	.064	.177	2.839**	.005
Individual environment	.158	.058	.176	2.728**	.007
Communication	.041	.051	.049	.813	.417
$R^2 = .101, F = 10.571^{***}$					

** $p < .01$, *** $p < .001$

As seen in Table 9, the relationship between the SCE and trusting relationships had a statistically significant effect ($F=10.571$, $p<.001$), with the total explanatory power being approximately 10.1 ($R^2=.101$). The Beta value, which is the relative effect of SCE on trusting relationships, showed that it had a positive effect on organization and system ($\beta=.177$, $p<.01$) and individual environment ($\beta=.176$, $p<.01$).

4 Discussion

A comprehensive discussion based on the above findings on the relation between the safety awareness of marine sports instructors and safety culture environment is as follows.

Mankind acquires knowledge needed for the safety of individuals and groups in daily life through education. This helps people to protect their own lives and the lives of others and become able to lead a safe and healthy life. To maintain a basic framework for practicing safety knowledge, safety awareness is a must. Even if the importance of safety training for securing a safe environment is high, unless the awareness of the instructor and students are correctly established, effective and efficient safety training cannot be achieved. Therefore, whether the instructors understand safety correctly is of the utmost importance.

Safety culture within an organization is the result of dedicated efforts by members, including their determination, values, attitudes, perceptions, and behavior¹⁰. An organization with a positive safety culture shares the common denominator of smooth communications and has a practical, standard measurement tool for safety as a way to prevent accidents. Establishing a safety culture is an approach that is widely acclaimed as comprehensive, where the organization approach that is widely acclaimed as ted¹². Therefore, this study hypothesized that the safety awareness of marine sports instructors would affect their safety culture environment. We found

a positive correlation between organization, system, and individual environment. For the relationship between safety behavior and trusting relationships, the subvariables of organization and system, individual environment, and communication all had a positive correlation. A closer look showed that importance and safety behavior had a positive effect on organization and system, and importance, safety behavior, and trusting relationships had a positive effect on the individual environment. Moreover, safety behavior had a positive effect on communication. Organization and system, individual environment, and communication had a positive effect on importance, while organization and system had a positive effect on interest. Organization, system, and communication had a positive effect on safety behavior, while organization, system, and individual environment had a positive effect on trusting relationships.

According to a study by Pronovost et.al.¹³, in a patient safety-related environment, the safety awareness of the manager was not found to be high, but played an important role in improving the patient-safety culture. This result supports the findings of this study that the safety awareness of the manager can be an important mediating variable in forming a sports safety culture environment.

Lee, Moon, & Oah¹⁴ conducted a study on the relationship between the instructor and the relation to find the safety atmosphere within the organization, and the safety behavior of employees, which supports the findings of this study. More specifically, an instructor found relation this study that the safety awareness of the significant effect on forming a safe environment. It was also found to have a positive effect in improving the safety behavior of employees. This finding is consistent with the findings of this study, where a higher safety awareness of the instructor was likely to lead to a better safety culture environment. That is, given the findings of this and preceding studies, regardless of the field, when a manager accurately understands safety-related rules and tries to practice safety behavior, then a safety culture environment is more likely to be fostered.

5 Conclusion and suggestions

To identify the relationship between the safety awareness of marine sports safety instructors and a safety culture environment, a questionnaire was used to survey marine sports instructors. A total of 182 copies of the questionnaire were used for the final analysis. The findings were as follows.

First, importance and interest had a positive correlation with organization, system, and individual environment. Safety behavior and trusting relationships had a positive correlation with all sub-variables of the safety culture environment: organization, system, individual environment, and communication. Second, importance and safety behavior had a positive effect on organization and system, while importance, safety behavior, and trusting relationships had a positive effect on the individual environment. Moreover, safety behaviors had a positive effect on communication. Third, organization and system, individual environment, and communication had a positive effect on importance. Organization and system had a positive effect on the level of interest. Moreover, organization, system, and communication had a positive effect on safety behavior, while organization, system, and the individual environment had a positive effect on trusting relationships.

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