

Development of an attitude scale for occupational health and safety

Kazancı Yabanova E¹, Öztürk M¹

¹ Department of Labour Economics and Industrial Relations, Isparta Süleyman Demirel University, Isparta, Türkiye.

ABSTRACT

Corresponding author:

Ecehan Kazancı Yabanova, PhD,
Department of Labour Economics
and Industrial Relations,
Süleyman Demirel University,
Isparta, Türkiye.

E-mail: ecehankazanci@gmail.com

Tel.: +902462110401

ORCID ID: <https://orcid.org/0000-0002-1602-2904>

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Introduction: The concept of occupational health and safety has become one of the most fundamental issues in today's working life. This concept, which has extremely important implications in human, economic, legal and social dimensions, has created an important field of research in the scientific arena. The aim of this study is to develop an attitude scale towards occupational health and safety, which is one of the most current issues in working life.

Methods: In this study, scale design technique, one of the quantitative research methods, was used. The study was conducted on 554 blue-collar workers employed at two factories operating in the ceramics and forest products sectors in the Çanakkale Çan Organised Industrial Zone.

Results: A draft scale consisting of 50 items was developed. Exploratory factor analysis was performed with data collected from 277 participants, and the scale completed the EFA analysis with 34 items and 4 sub-factors.

Conclusion: As a result of the study, the Attitude Scale Towards Occupational Health and Safety was developed, consisting of four sub-factors (personal, management, education, and work environment) and 32 items.

Keywords: Attitude, Occupational health and safety, Scale

Introduction

A qualified and active workforce has become one of the most fundamental socio-economic indicators for societies today. In a competitive global environment, the workforce is one of the most important concepts to protect in working life for both economic and moral reasons. The production-oriented working conditions that emerged during the industrial revolution, in which the health and safety of workers were

neglected, have now been transformed into a system that prioritizes worker health and safety. Of course, this transformation has not been easy; it has taken many years, and a series of framework regulations established by numerous international organizations, which have been enshrined in national legislation, to achieve the current structure. Despite its thousands of years of history, occupational health and safety still faces many

challenges that need to be overcome,¹ and has begun to be addressed more strongly at the national and international levels in terms of implementation and impact in the last quarter of a century.² Awareness of the negative effects of occupational accidents and diseases on workers and workplaces has increased, leading to the implementation of more preventive measures.³

Worker safety is extremely important for many reasons. While this concept is largely driven by business economic factors, it also takes on a moral dimension from the perspectives of workers, their families, and society, regarding the ability to lead a life befitting human dignity. Workplace accidents and occupational diseases result in significant losses for national economies, in addition to their human costs.⁴ For employers, the economic factors of an employee's absence from work due to an accident or occupational disease, such as loss of manpower, difficulties in replacing qualified personnel, and compensation payments, come to the fore. On the other hand, the employee's permanent disability, inability to work due to an occupational disease, or loss of life due to an accident can result in irreparable consequences for their family and social life. In this sense, occupational health and safety is not only related to the economic dimension of production activities but also closely related to family happiness.⁵ Another approach considers the protection of employees against work accidents and occupational diseases as related to the most basic human right, the right to life.¹

To prevent these negative consequences, the concept of occupational health and safety has emerged as an extremely important issue in recent years. The primary goal of these practices is to prevent work accidents and occupational diseases before they occur, thereby protecting workers.^{2,6} These approaches, which have gained momentum at the national and international levels, have led to the health and safety of workers becoming the most important aspect of working life. This issue, which is addressed in various laws regulating working life in Turkey, has been codified in the law, the Occupational Health and Safety Law No.

6331. This Law comprehensively addresses the requirements related to occupational health and safety in Turkish working life. With the entry into force of this Law in 2012, many duties and responsibilities have been imposed on employers and employees.

Statistics published since the Law took effect show that the desired reductions in workplace accidents and occupational diseases have not been achieved. This raises the question of why significant improvements have not been achieved despite these regulations, prompting scientific discussion. Most of the studies conducted have focused on the structural dimensions of occupational health and safety.⁷ The approach adopted by employees, who are the subjects of the laws and regulations implemented, in the face of all these new circumstances, has gained importance. In this regard, the role of individual factors in occupational health and safety has come to the fore.^{8,9} The attitude of workers towards this situation, which brings new tasks and responsibilities and creates changes in their usual work routines, has become a matter of interest. Attitude emerges as the most important dimension that drives behavior. Therefore, understanding employees' attitudes towards occupational health and safety provides an important starting point for understanding the behavior they will exhibit in this regard. Attitudes and professional culture are considered to be the most significant barriers to initiatives aimed at improving occupational health and safety.¹⁰ It is thought that the question of why employees do not exhibit behaviors consistent with occupational health and safety practices can be explained by the concept of attitude. Negative attitudes towards any phenomenon directly affect behavior. Therefore, understanding employees' attitudes towards occupational health and safety and taking additional measures to identify and eliminate negative attitudes can contribute to the desired behavior. Existing studies ignore attitudes towards occupational health and safety and therefore fail to provide solutions for its management.⁵ Approaches that address the issue

primarily from technical, organizational, institutional, and legal perspectives tend to overlook individual factors related to these practices, which employees encounter in the workplace and which directly affect their own safety, or fail to address them holistically. Some scales developed in this field address employees' perceptions of safety culture,^{11,12} behaviors related to safe working,¹³ and dimensions such as safety culture and teamwork.¹⁴ The purpose of this study is to develop a scale to determine employees' attitudes toward occupational health and safety in terms of personal, management, education, and work environment dimensions.

Methods

This research is a scale development study. The research was conducted using a quantitative method and a survey design.¹⁵ The aim was to

develop a scale to evaluate blue-collar workers' attitudes towards occupational health and safety. In line with this aim, the 'Occupational Health and Safety Attitude Scale' was developed.

Study Group

The study group consisted of 554 participants working in two factories operating in the Ceramics and Forest Products sectors in the Çanakkale Çan Organized Industrial Zone. Çanakkale Çan Organized Industrial Zone was selected because it is an industrial zone with a high concentration of blue-collar workers and companies operating in high-risk sectors. Of the study group, 277 individuals formed the sample for the exploratory factor analysis process, and 277 individuals formed the sample for the confirmatory factor analysis process. Demographic information about the participants is presented in Table 1.

Table 1: Demographic Characteristics of the Study Group

		Exploratory Factor Analysis		Confirmatory Factor Analysis	
		n	%	n	%
Gender	Female	53	19.1	73	26.4
	Male	224	80.9	204	73.6
Marital Status	Married	205	74.0	212	76.5
	Single	72	25.9	65	23.5
Age	20 – 25 age	34	12.3	27	9.7
	26 – 30 age	54	19.5	26	9.4
	31 – 35 age	57	20.6	50	18.1
	36 – 40 age	59	21.3	51	18.4
	41 – 45 age	43	15.5	48	17.3
	46 and above	30	10.8	75	27.1
Educational Status	Primary school	56	20.2	73	26.4
	Middle school	48	17.3	50	18.1
	High school	105	37.9	120	43.4
	Vocational high school	37	13.3	19	6.9
	Bachelor's degree	23	8.3	15	5.4
	Master's degree	8	2.9	-	-

As shown in Table 1, the study groups in the EFA and CFA processes consist of an equal number of

individuals with similar demographic characteristics.

Scale Development Stages

There are many stages in the scale development process, as indicated in the literature.¹⁶ Within the scope of this study, the scale development process went through the stages indicated below prior to application.

- **Literature Review:** In the first stage of scale development, the literature review examined the field of occupational health and safety and attitudes. Scales developed for similar purposes in this field were examined, and a draft scale comprising 50 items was developed within the scope of the sub-factors of occupational health and safety and attitudes, and their relationship to each other. The statements were formulated in simple, easy-to-understand language.
- **Item Pool:** When creating the item pool, the theoretical information obtained from the literature review was carefully analyzed. Sub-factors were created by considering the three components of attitude: cognitive, behavioral, and affective. These three components were addressed separately within the personal, management, training, and work environment factors identified within the scope of occupational health and safety. Care was taken to develop statements related to attitude in the item pool that were both positive and negative and that included all three sub-factors of attitude.
- **Expert Opinion (Content Validity):** One of the methods used to test the content validity of a scale is content validity, which is determined by considering the opinions of experts in the field rather than determining the level of validity based on numerical values.¹⁶ With the submission of the draft

scale form to expert opinion, field experts evaluate the necessity, clarity, and originality of the questions. At this point, suggestions may be made to remove or modify some statements from the draft scale.¹⁷ In this context, the statements in the item pool of the draft scale form prepared to determine content validity were submitted to expert opinion to ensure content and face validity. The draft scale form was submitted to five field experts: two in labor economics, two in scale development, and one in Turkish language. Necessary revisions were made to the items based on the opinions and suggestions of the field experts.

- **Pilot Application:** It is recommended that the number of people required for the pilot application in the scale development stage should not be less than 50.¹⁸

The draft scale, consisting of 50 items and evaluated by experts for content validity, was administered to 56 blue-collar workers randomly sampled from a factory operating in an organized industrial zone for a pilot application. The aim was to analyze any issues that may arise regarding readability, comprehensibility, etc., in a sample appropriate for the scale's target audience.

Limitations

This research was conducted as part of a scale development study, and the study group was limited to blue-collar workers employed at two factories in order to ensure a sufficient sample size for validity and reliability analyses. This may limit the generalizability of the findings to different sectors, job categories, or employee groups.

Results

The data collected from 554 participants for scale development were divided into two sets using a random split.¹⁹ The first data set (N=277) was used in exploratory factor analysis, while the

second data set (N=277) was used in confirmatory factor analysis. Descriptive analyses were conducted to assess the suitability of the draft scale dataset for EFA and CFA.

Table 2: Descriptive Analysis of Draft Scale Data

N	Average	Varians	Standard Deviation	Skewness	Kurtosis
554	206.53	332.054	18.22	-0.353	0.492

As a result of the analysis, it was observed that the skewness and kurtosis values of the data set were between -1.5 and 1.5, which are the reference values, and that the data set was suitable for the analyses.²⁰

Exploratory Factor Analysis - EFA

EFA is used in the scale development process to relate a large number of items to a small number of factors or latent constructs.²¹ During the analysis, it is recommended to perform rotation to clearly identify the factors and to facilitate the

interpretation of highly correlated items.²⁰ In this context, the Varimax technique, which is an orthogonal rotation method, was applied to the Principal Component Analysis. As a result of the analysis, items 6, 9, 11, 15, 16, 20, 23, 38, 40, 42, 47, and 50, which had cross-loadings, and items 13, 39, 45, and 46, which had single-item-single-factor loadings, were removed from the scale. To determine whether the sample size and dataset were sufficient for factor analysis, the KMO and Bartlett's Test of Sphericity were applied.

Table 3: KMO and Bartlett's Test Analysis Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.917
Bartlett's Test of Globality	Approximate K-Square	6142.538
	df	561
	Significance (p)	0.000

The analysis revealed that the KMO value was 0.917 and Bartlett's Sphericity Test was significant ($\chi^2 [561] = 6142.538, p < 0.001$). Accordingly, the sample size and data set are sufficient for factor analysis.²¹ After removing the items obtained from the variance analysis, it was

observed that the scale has a four-factor structure. This result is consistent with the number of sub-factors determined in the theoretical framework. The total variance analysis results are presented in Table 4.

Table 4: Total Variance Analysis Results

Factor	Total Factor Load	Varians (%)	Accumulated variance (%)
Factor 1	11.320	33.295	33.295
Factor 2	4.077	11.990	45.285
Factor 3	3.280	9.646	54.931
Factor 4	2.329	6.849	61.780

The analysis identified four factors with eigenvalues above 1, and the total variance explained by all factors was 61.78%. This value exceeds the 50% threshold accepted for scale studies in the social sciences.²²

The analysis revealed four factors with eigenvalues above 1. The first factor accounts for 33.29% of the variance, the second for 11.99%, the third for 9.65%, and the fourth for 6.85%. The total variance of the four factors was 61.78%. This

value exceeds the 50% threshold accepted in the social sciences.²² Another analysis used to determine the number of factors, the scree plot analysis, was also applied, and the four factors

affecting bed breakage were identified on the graph. A transformed component distribution analysis was conducted on the 34 items and 4 factors identified through the extraction process.

Table 5: Distribution of Rotated Components of the OSH Attitude Scale

	Factor			
	1	2	3	4
Item 49	.785			
Item 32	.778			
Item 30	.776			
Item 41	.751			
Item 4	.751			
Item 21	.749			
Item 19	.748			
Item 43	.747			
Item 25	.747			
Item 36	.732			
Item 14	.725			
Item 27	.720			
Item 12	.706			
Item 1	.696			
Item 33		.822		
Item 35		.814		
Item 44		.775		
Item 29		.762		
Item 5		.695		
Item 31		.689		
Item 26		.686		
Item 28		.601		
Item 37			.774	
Item 18			.773	
Item 10			.756	
Item 2			.746	
Item 8			.739	
Item 48			.721	
Item 24			.694	
Item 3				.836
Item 7				.818
Item 22				.755
Item 34				.741
Item 17				.712

The analysis revealed that the factor loadings of all items exceeded the threshold values. Based on the four-factor theoretical model proposed during the scale development process, the factors were examined, and the sub-factors were named accordingly. Accordingly, the first factor was named Personal, the second Management, the

third Education, and the fourth Work Environment.

The effect of scale items on the variance explained, which is an important indicator in the factor analysis stage, was also analyzed. A high value indicates that the item contributes significantly to the total variance, and it is

recommended that items with values above 0.40 be retained. The analysis revealed that all items exceeded the 0.40 threshold. Item discrimination analysis, an important indicator of structural

validity, was also applied. The results of the upper-group-lower-group item-discrimination analysis for the scale formed after EFA are presented in Table 6.

Table 6: Scale Item Average Scores for the Lower Group (27%) and Upper Group (27%) Independent Sample T-Test Analysis

Item		$\bar{x} \pm Ss$	t	p	Item		$\bar{x} \pm Ss$	t	p																																																																																																																																																																																																																										
Item 1	Lower	4.00±0.70	11.579	0.000	Item 26	Lower	3.61±0.87	6.821	0.000																																																																																																																																																																																																																										
	Upper	5.00±0.00				Upper	4.56±0.73			Item 2	Lower	4.00±0.70	10.902	0.000	Item 27	Lower	3.55±0.68	9.653	0.000	Upper	4.97±0.17	Upper	4.59±0.55	Item 3	Lower	4.35±0.67	7.317	0.000	Item 28	Lower	3.77±0.80	9.764	0.000	Upper	4.97±0.17	Upper	4.85±0.40	Item 4	Lower	3.83±0.69	12.936	0.000	Item 29	Lower	3.47±1.01	8.375	0.000	Upper	4.97±0.17	Upper	4.65±0.54	Item 5	Lower	3.58±0.84	8.451	0.000	Item 30	Lower	3.70±0.63	11.694	0.000	Upper	4.62±0.55	Upper	4.80±0.44	Item 7	Lower	4.33±0.71	6.338	0.000	Item 31	Lower	3.68±0.83	8.103	0.000	Upper	4.92±0.27	Upper	4.73±0.65	Item 8	Lower	4.05±0.71	8.642	0.000	Item 32	Lower	3.48±0.64	15.429	0.000	Upper	4.88±0.33	Upper	4.86±0.35	Item 10	Lower	3.92±0.71	10.733	0.000	Item 33	Lower	3.56±0.84	9.311	0.000	Upper	4.92±0.27	Upper	4.73±0.57	Item 12	Lower	3.86±0.58	11.418	0.000	Item 34	Lower	4.15±0.59	10.074	0.000	Upper	4.83±0.38	Upper	4.94±0.24	Item 14	Lower	3.50±0.68	11.415	0.000	Item 35	Lower	3.45±0.91	11.330	0.000	Upper	4.73±0.54	Upper	4.83±0.38	Item 17	Lower	4.06±0.68	9.095	0.000	Item 36	Lower	3.64±0.51	12.708	0.000	Upper	4.89±0.31	Upper	4.76±0.50	Item 18	Lower	4.00±0.66	10.288	0.000	Item 37	Lower	3.73±0.87	8.959	0.000	Upper	4.92±0.32	Upper	4.79±0.41	Item 19	Lower	3.86±0.65	10.689	0.000	Item 41	Lower	3.55±0.61	11.266	0.000	Upper	4.86±0.39	Upper	4.65±0.51	Item 21	Lower	3.64±0.57	15.296	0.000	Item 43	Lower	3.45±0.73	12.962	0.000	Upper	4.88±0.33	Upper	4.79±0.41	Item 22	Lower	4.21±0.54	9.979	0.000	Item 44	Lower	3.61±0.87	9.119	0.000	Upper	4.94±0.24	Upper	4.73±0.48	Item 24	Lower	3.61±0.76	11.948	0.000	Item 48	Lower	3.79±0.79	7.626	0.000	Upper	4.86±0.39	Upper	4.70±0.55	Item 25	Lower	3.70±0.58	13.345	0.000	Item 49	Lower	3.55±0.61
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	Upper	4.97±0.17				Upper	4.85±0.40			Item 4	Lower	3.83±0.69	12.936	0.000	Item 29	Lower	3.47±1.01	8.375	0.000	Upper	4.97±0.17	Upper	4.65±0.54	Item 5	Lower	3.58±0.84	8.451	0.000	Item 30	Lower	3.70±0.63	11.694	0.000	Upper	4.62±0.55	Upper	4.80±0.44	Item 7	Lower	4.33±0.71	6.338	0.000	Item 31	Lower	3.68±0.83	8.103	0.000	Upper	4.92±0.27	Upper	4.73±0.65	Item 8	Lower	4.05±0.71	8.642	0.000	Item 32	Lower	3.48±0.64	15.429	0.000	Upper	4.88±0.33	Upper	4.86±0.35	Item 10	Lower	3.92±0.71	10.733	0.000	Item 33	Lower	3.56±0.84	9.311	0.000	Upper	4.92±0.27	Upper	4.73±0.57	Item 12	Lower	3.86±0.58	11.418	0.000	Item 34	Lower	4.15±0.59	10.074	0.000	Upper	4.83±0.38	Upper	4.94±0.24	Item 14	Lower	3.50±0.68	11.415	0.000	Item 35	Lower	3.45±0.91	11.330	0.000	Upper	4.73±0.54	Upper	4.83±0.38	Item 17	Lower	4.06±0.68	9.095	0.000	Item 36	Lower	3.64±0.51	12.708	0.000	Upper	4.89±0.31	Upper	4.76±0.50	Item 18	Lower	4.00±0.66	10.288	0.000	Item 37	Lower	3.73±0.87	8.959	0.000	Upper	4.92±0.32	Upper	4.79±0.41	Item 19	Lower	3.86±0.65	10.689	0.000	Item 41	Lower	3.55±0.61	11.266	0.000	Upper	4.86±0.39	Upper	4.65±0.51	Item 21	Lower	3.64±0.57	15.296	0.000	Item 43	Lower	3.45±0.73	12.962	0.000	Upper	4.88±0.33	Upper	4.79±0.41	Item 22	Lower	4.21±0.54	9.979	0.000	Item 44	Lower	3.61±0.87	9.119	0.000	Upper	4.94±0.24	Upper	4.73±0.48	Item 24	Lower	3.61±0.76	11.948	0.000	Item 48	Lower	3.79±0.79	7.626	0.000	Upper	4.86±0.39	Upper	4.70±0.55	Item 25	Lower	3.70±0.58	13.345	0.000	Item 49	Lower	3.55±0.61	13.144	0.000	Upper	4.83±0.38	Upper	4.76±0.43																						
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	Upper	4.97±0.17				Upper	4.65±0.54			Item 5	Lower	3.58±0.84	8.451	0.000	Item 30	Lower	3.70±0.63	11.694	0.000	Upper	4.62±0.55	Upper	4.80±0.44	Item 7	Lower	4.33±0.71	6.338	0.000	Item 31	Lower	3.68±0.83	8.103	0.000	Upper	4.92±0.27	Upper	4.73±0.65	Item 8	Lower	4.05±0.71	8.642	0.000	Item 32	Lower	3.48±0.64	15.429	0.000	Upper	4.88±0.33	Upper	4.86±0.35	Item 10	Lower	3.92±0.71	10.733	0.000	Item 33	Lower	3.56±0.84	9.311	0.000	Upper	4.92±0.27	Upper	4.73±0.57	Item 12	Lower	3.86±0.58	11.418	0.000	Item 34	Lower	4.15±0.59	10.074	0.000	Upper	4.83±0.38	Upper	4.94±0.24	Item 14	Lower	3.50±0.68	11.415	0.000	Item 35	Lower	3.45±0.91	11.330	0.000	Upper	4.73±0.54	Upper	4.83±0.38	Item 17	Lower	4.06±0.68	9.095	0.000	Item 36	Lower	3.64±0.51	12.708	0.000	Upper	4.89±0.31	Upper	4.76±0.50	Item 18	Lower	4.00±0.66	10.288	0.000	Item 37	Lower	3.73±0.87	8.959	0.000	Upper	4.92±0.32	Upper	4.79±0.41	Item 19	Lower	3.86±0.65	10.689	0.000	Item 41	Lower	3.55±0.61	11.266	0.000	Upper	4.86±0.39	Upper	4.65±0.51	Item 21	Lower	3.64±0.57	15.296	0.000	Item 43	Lower	3.45±0.73	12.962	0.000	Upper	4.88±0.33	Upper	4.79±0.41	Item 22	Lower	4.21±0.54	9.979	0.000	Item 44	Lower	3.61±0.87	9.119	0.000	Upper	4.94±0.24	Upper	4.73±0.48	Item 24	Lower	3.61±0.76	11.948	0.000	Item 48	Lower	3.79±0.79	7.626	0.000	Upper	4.86±0.39	Upper	4.70±0.55	Item 25	Lower	3.70±0.58	13.345	0.000	Item 49	Lower	3.55±0.61	13.144	0.000	Upper	4.83±0.38	Upper	4.76±0.43																																				
Item 5	Lower	3.58±0.84	8.451	0.000	Item 30	Lower	3.70±0.63	11.694	0.000																																																																																																																																																																																																																										
	Upper	4.62±0.55				Upper	4.80±0.44			Item 7	Lower	4.33±0.71	6.338	0.000	Item 31	Lower	3.68±0.83	8.103	0.000	Upper	4.92±0.27	Upper	4.73±0.65	Item 8	Lower	4.05±0.71	8.642	0.000	Item 32	Lower	3.48±0.64	15.429	0.000	Upper	4.88±0.33	Upper	4.86±0.35	Item 10	Lower	3.92±0.71	10.733	0.000	Item 33	Lower	3.56±0.84	9.311	0.000	Upper	4.92±0.27	Upper	4.73±0.57	Item 12	Lower	3.86±0.58	11.418	0.000	Item 34	Lower	4.15±0.59	10.074	0.000	Upper	4.83±0.38	Upper	4.94±0.24	Item 14	Lower	3.50±0.68	11.415	0.000	Item 35	Lower	3.45±0.91	11.330	0.000	Upper	4.73±0.54	Upper	4.83±0.38	Item 17	Lower	4.06±0.68	9.095	0.000	Item 36	Lower	3.64±0.51	12.708	0.000	Upper	4.89±0.31	Upper	4.76±0.50	Item 18	Lower	4.00±0.66	10.288	0.000	Item 37	Lower	3.73±0.87	8.959	0.000	Upper	4.92±0.32	Upper	4.79±0.41	Item 19	Lower	3.86±0.65	10.689	0.000	Item 41	Lower	3.55±0.61	11.266	0.000	Upper	4.86±0.39	Upper	4.65±0.51	Item 21	Lower	3.64±0.57	15.296	0.000	Item 43	Lower	3.45±0.73	12.962	0.000	Upper	4.88±0.33	Upper	4.79±0.41	Item 22	Lower	4.21±0.54	9.979	0.000	Item 44	Lower	3.61±0.87	9.119	0.000	Upper	4.94±0.24	Upper	4.73±0.48	Item 24	Lower	3.61±0.76	11.948	0.000	Item 48	Lower	3.79±0.79	7.626	0.000	Upper	4.86±0.39	Upper	4.70±0.55	Item 25	Lower	3.70±0.58	13.345	0.000	Item 49	Lower	3.55±0.61	13.144	0.000	Upper	4.83±0.38	Upper	4.76±0.43																																																		
Item 7	Lower	4.33±0.71	6.338	0.000	Item 31	Lower	3.68±0.83	8.103	0.000																																																																																																																																																																																																																										
	Upper	4.92±0.27				Upper	4.73±0.65			Item 8	Lower	4.05±0.71	8.642	0.000	Item 32	Lower	3.48±0.64	15.429	0.000	Upper	4.88±0.33	Upper	4.86±0.35	Item 10	Lower	3.92±0.71	10.733	0.000	Item 33	Lower	3.56±0.84	9.311	0.000	Upper	4.92±0.27	Upper	4.73±0.57	Item 12	Lower	3.86±0.58	11.418	0.000	Item 34	Lower	4.15±0.59	10.074	0.000	Upper	4.83±0.38	Upper	4.94±0.24	Item 14	Lower	3.50±0.68	11.415	0.000	Item 35	Lower	3.45±0.91	11.330	0.000	Upper	4.73±0.54	Upper	4.83±0.38	Item 17	Lower	4.06±0.68	9.095	0.000	Item 36	Lower	3.64±0.51	12.708	0.000	Upper	4.89±0.31	Upper	4.76±0.50	Item 18	Lower	4.00±0.66	10.288	0.000	Item 37	Lower	3.73±0.87	8.959	0.000	Upper	4.92±0.32	Upper	4.79±0.41	Item 19	Lower	3.86±0.65	10.689	0.000	Item 41	Lower	3.55±0.61	11.266	0.000	Upper	4.86±0.39	Upper	4.65±0.51	Item 21	Lower	3.64±0.57	15.296	0.000	Item 43	Lower	3.45±0.73	12.962	0.000	Upper	4.88±0.33	Upper	4.79±0.41	Item 22	Lower	4.21±0.54	9.979	0.000	Item 44	Lower	3.61±0.87	9.119	0.000	Upper	4.94±0.24	Upper	4.73±0.48	Item 24	Lower	3.61±0.76	11.948	0.000	Item 48	Lower	3.79±0.79	7.626	0.000	Upper	4.86±0.39	Upper	4.70±0.55	Item 25	Lower	3.70±0.58	13.345	0.000	Item 49	Lower	3.55±0.61	13.144	0.000	Upper	4.83±0.38	Upper	4.76±0.43																																																																
Item 8	Lower	4.05±0.71	8.642	0.000	Item 32	Lower	3.48±0.64	15.429	0.000																																																																																																																																																																																																																										
	Upper	4.88±0.33				Upper	4.86±0.35			Item 10	Lower	3.92±0.71	10.733	0.000	Item 33	Lower	3.56±0.84	9.311	0.000	Upper	4.92±0.27	Upper	4.73±0.57	Item 12	Lower	3.86±0.58	11.418	0.000	Item 34	Lower	4.15±0.59	10.074	0.000	Upper	4.83±0.38	Upper	4.94±0.24	Item 14	Lower	3.50±0.68	11.415	0.000	Item 35	Lower	3.45±0.91	11.330	0.000	Upper	4.73±0.54	Upper	4.83±0.38	Item 17	Lower	4.06±0.68	9.095	0.000	Item 36	Lower	3.64±0.51	12.708	0.000	Upper	4.89±0.31	Upper	4.76±0.50	Item 18	Lower	4.00±0.66	10.288	0.000	Item 37	Lower	3.73±0.87	8.959	0.000	Upper	4.92±0.32	Upper	4.79±0.41	Item 19	Lower	3.86±0.65	10.689	0.000	Item 41	Lower	3.55±0.61	11.266	0.000	Upper	4.86±0.39	Upper	4.65±0.51	Item 21	Lower	3.64±0.57	15.296	0.000	Item 43	Lower	3.45±0.73	12.962	0.000	Upper	4.88±0.33	Upper	4.79±0.41	Item 22	Lower	4.21±0.54	9.979	0.000	Item 44	Lower	3.61±0.87	9.119	0.000	Upper	4.94±0.24	Upper	4.73±0.48	Item 24	Lower	3.61±0.76	11.948	0.000	Item 48	Lower	3.79±0.79	7.626	0.000	Upper	4.86±0.39	Upper	4.70±0.55	Item 25	Lower	3.70±0.58	13.345	0.000	Item 49	Lower	3.55±0.61	13.144	0.000	Upper	4.83±0.38	Upper	4.76±0.43																																																																														
Item 10	Lower	3.92±0.71	10.733	0.000	Item 33	Lower	3.56±0.84	9.311	0.000																																																																																																																																																																																																																										
	Upper	4.92±0.27				Upper	4.73±0.57			Item 12	Lower	3.86±0.58	11.418	0.000	Item 34	Lower	4.15±0.59	10.074	0.000	Upper	4.83±0.38	Upper	4.94±0.24	Item 14	Lower	3.50±0.68	11.415	0.000	Item 35	Lower	3.45±0.91	11.330	0.000	Upper	4.73±0.54	Upper	4.83±0.38	Item 17	Lower	4.06±0.68	9.095	0.000	Item 36	Lower	3.64±0.51	12.708	0.000	Upper	4.89±0.31	Upper	4.76±0.50	Item 18	Lower	4.00±0.66	10.288	0.000	Item 37	Lower	3.73±0.87	8.959	0.000	Upper	4.92±0.32	Upper	4.79±0.41	Item 19	Lower	3.86±0.65	10.689	0.000	Item 41	Lower	3.55±0.61	11.266	0.000	Upper	4.86±0.39	Upper	4.65±0.51	Item 21	Lower	3.64±0.57	15.296	0.000	Item 43	Lower	3.45±0.73	12.962	0.000	Upper	4.88±0.33	Upper	4.79±0.41	Item 22	Lower	4.21±0.54	9.979	0.000	Item 44	Lower	3.61±0.87	9.119	0.000	Upper	4.94±0.24	Upper	4.73±0.48	Item 24	Lower	3.61±0.76	11.948	0.000	Item 48	Lower	3.79±0.79	7.626	0.000	Upper	4.86±0.39	Upper	4.70±0.55	Item 25	Lower	3.70±0.58	13.345	0.000	Item 49	Lower	3.55±0.61	13.144	0.000	Upper	4.83±0.38	Upper	4.76±0.43																																																																																												
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	Upper	4.73±0.54				Upper	4.83±0.38			Item 17	Lower	4.06±0.68	9.095	0.000	Item 36	Lower	3.64±0.51	12.708	0.000	Upper	4.89±0.31	Upper	4.76±0.50	Item 18	Lower	4.00±0.66	10.288	0.000	Item 37	Lower	3.73±0.87	8.959	0.000	Upper	4.92±0.32	Upper	4.79±0.41	Item 19	Lower	3.86±0.65	10.689	0.000	Item 41	Lower	3.55±0.61	11.266	0.000	Upper	4.86±0.39	Upper	4.65±0.51	Item 21	Lower	3.64±0.57	15.296	0.000	Item 43	Lower	3.45±0.73	12.962	0.000	Upper	4.88±0.33	Upper	4.79±0.41	Item 22	Lower	4.21±0.54	9.979	0.000	Item 44	Lower	3.61±0.87	9.119	0.000	Upper	4.94±0.24	Upper	4.73±0.48	Item 24	Lower	3.61±0.76	11.948	0.000	Item 48	Lower	3.79±0.79	7.626	0.000	Upper	4.86±0.39	Upper	4.70±0.55	Item 25	Lower	3.70±0.58	13.345	0.000	Item 49	Lower	3.55±0.61	13.144	0.000	Upper	4.83±0.38	Upper	4.76±0.43																																																																																																																								
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	Upper	4.89±0.31				Upper	4.76±0.50			Item 18	Lower	4.00±0.66	10.288	0.000	Item 37	Lower	3.73±0.87	8.959	0.000	Upper	4.92±0.32	Upper	4.79±0.41	Item 19	Lower	3.86±0.65	10.689	0.000	Item 41	Lower	3.55±0.61	11.266	0.000	Upper	4.86±0.39	Upper	4.65±0.51	Item 21	Lower	3.64±0.57	15.296	0.000	Item 43	Lower	3.45±0.73	12.962	0.000	Upper	4.88±0.33	Upper	4.79±0.41	Item 22	Lower	4.21±0.54	9.979	0.000	Item 44	Lower	3.61±0.87	9.119	0.000	Upper	4.94±0.24	Upper	4.73±0.48	Item 24	Lower	3.61±0.76	11.948	0.000	Item 48	Lower	3.79±0.79	7.626	0.000	Upper	4.86±0.39	Upper	4.70±0.55	Item 25	Lower	3.70±0.58	13.345	0.000	Item 49	Lower	3.55±0.61	13.144	0.000	Upper	4.83±0.38	Upper	4.76±0.43																																																																																																																																						
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	Upper	4.92±0.32				Upper	4.79±0.41			Item 19	Lower	3.86±0.65	10.689	0.000	Item 41	Lower	3.55±0.61	11.266	0.000	Upper	4.86±0.39	Upper	4.65±0.51	Item 21	Lower	3.64±0.57	15.296	0.000	Item 43	Lower	3.45±0.73	12.962	0.000	Upper	4.88±0.33	Upper	4.79±0.41	Item 22	Lower	4.21±0.54	9.979	0.000	Item 44	Lower	3.61±0.87	9.119	0.000	Upper	4.94±0.24	Upper	4.73±0.48	Item 24	Lower	3.61±0.76	11.948	0.000	Item 48	Lower	3.79±0.79	7.626	0.000	Upper	4.86±0.39	Upper	4.70±0.55	Item 25	Lower	3.70±0.58	13.345	0.000	Item 49	Lower	3.55±0.61	13.144	0.000	Upper	4.83±0.38	Upper	4.76±0.43																																																																																																																																																				
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	Upper	4.94±0.24				Upper	4.73±0.48			Item 24	Lower	3.61±0.76	11.948	0.000	Item 48	Lower	3.79±0.79	7.626	0.000	Upper	4.86±0.39	Upper	4.70±0.55	Item 25	Lower	3.70±0.58	13.345	0.000	Item 49	Lower	3.55±0.61	13.144	0.000	Upper	4.83±0.38	Upper	4.76±0.43																																																																																																																																																																																														
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Table 7: Reliability Analysis of the OSH Attitude Scale after EFA

Factor	Cronbach Alpha
Personal	0.947
Management	0.894
Education	0.896
Work Environment	0.876
General	0.935

The analysis revealed significant differences between the upper and lower group scores for all items of the scale, indicating that all items are

discriminative. Cronbach’s alpha was calculated to assess the scale’s internal consistency following EFA.

Accordingly, it was found that all factors were within the high-reliability range of .80 or above.²³ CFA analysis was performed to determine the scale's ability to produce consistent measurements after EFA.

Confirmatory Factor Analysis - CFA

The second part of the data set, which was randomly divided into two in the CFA process, was used. The analysis yielded CMIN/DF = 1.180,

RMSEA = 0.026, CFI = 0.984, and GFI = 0.886. Since the GFI value was below the reference value of .90, improvements were made; however, sufficient improvement was not achieved, so a second improvement was made. Items 7 and 43 were removed from the model because they loaded on multiple factors. As a result, the CFA with 32 items showed that the model fit was achieved in all reference values.

Table 8: CFA Fit Index Values

Conformity Criteria	Good Conformity	Acceptable Conformity	Scale Value
p	0.05 < p ≤ 1.00	0.01 ≤ p ≤ 0.05	0.128
χ ² /df	0 ≤ X ² /df ≤ 2	2 < X ² /df ≤ 3	1.076
RMSEA	0 ≤ RMSEA ≤ 0.05	0.05 < RMSEA ≤ 0.08	0.017
NFI	0.95 ≤ NFI ≤ 1.00	0.90 ≤ NFI < 0.95	0.915
CFI	0.97 ≤ CFI ≤ 1.00	0.95 ≤ CFI < 0.97	0.993
GFI	0.95 ≤ GFI ≤ 1.00	0.90 ≤ GFI < 0.95	0.903
AGFI	0.90 ≤ AGFI ≤ 1.00	0.85 ≤ AGFI < 0.90	0.887

Source: (24)

Table 9: CFA Item Analysis

Factor	Item	β ₀	β ₁	S.E.	C.R.	p
Personal	1	0,797	1	-	-	
	4	0,753	0,912	0,065	13,982	*
	12	0,730	0,947	0,070	13,438	*
	14	0,815	1,037	0,067	15,565	*
	19	0,723	0,932	0,070	13,285	*
	21	0,802	1,049	0,069	15,214	*
	25	0,744	1,000	0,073	13,762	*
	27	0,798	1,005	0,067	15,111	*
	30	0,812	1,046	0,068	15,473	*
	32	0,811	0,979	0,063	15,442	*
	36	0,774	0,964	0,067	14,495	*
Management	41	0,793	0,911	0,061	14,997	*
	49	0,840	1,034	0,064	16,236	*
	5	0,657	1	-	-	
	26	0,779	1,149	0,102	11,220	*
	28	0,822	1,302	0,111	11,712	*
	29	0,771	1,119	0,101	11,126	*
	31	0,793	1,205	0,106	11,388	*
	33	0,556	0,840	0,101	8,348	*
Education	35	0,794	1,190	0,105	11,332	*
	44	0,747	1,053	0,098	10,785	*
	2	0,578	1	-	-	
	8	0,805	1,471	0,150	9,786	*
	10	0,757	1,374	0,146	9,432	*
	18	0,781	1,421	0,148	9,614	*
	24	0,730	1,407	0,152	9,224	*
Work Environment	37	0,723	1,297	0,142	9,161	*
	48	0,701	1,213	0,135	8,985	*
Work Environment	3	0,786	1	-	-	
	17	0,694	0,990	0,088	11,294	*
	22	0,763	1,112	0,089	12,500	*
	34	0,793	1,079	0,083	12,958	*

β₀: Standardized loads β₁: Unstandardized loads S.E.: Approximate standard error C.R.: t-value P (*): 0.001 significance level

According to the analysis results, five of the seven indicator values in the confirmatory factor analysis process showed good fit, while two showed acceptable fit. CFA Item Analysis was performed to determine whether the items were loaded onto the factors at a meaningful level in accordance with the model.

The analysis showed that the scale met the model fit and structural validity criteria. As a result of CFA, the scale was finalized with 32 items and 4 factors. To determine internal consistency, Composite Reliability (CR) and Calculated Average Variance (AVE) values were examined

Table 10: Composite Reliability and Calculated Average Variance Analysis of Factors

Factor	CR	AVE
Personal	0.954	0.616
Management	0.908	0.554
Education	0.887	0.530
Work Environment	0.845	0.578

As a result of the analysis, the Composite Reliability (CR) value was found to be above the reference value of .70, and the Calculated Average Variance (AVE) value was also found to be above the reference value of .50. Accordingly,

it was observed that the scale meets the convergent validity criteria. Another indicator value, discriminant validity, was also analyzed using the Pearson Correlation method.

Table 11: Correlation Between the Factors of the Scale

Factor	Personal	Management	Education	Work Environment	General
Personal	1				
Management	0.254 0.01	1			
Education	0.420 0.01	0.245 0.01	1		
Work Environment	0.365 0.01	0.244 0.01	0.456 0.01	1	
General	0.860 0.01	0.591 0.01	0.686 0.01	0.596 0.01	1

p <.01

The analysis revealed that the correlation coefficients among all factors were below the reference value of .80. This result indicates that the scale meets the criterion for discriminant validity. The CFA model obtained after all these analyses is shown in Figure 1

of .50 or higher, which is a sufficient value for ensuring construct validity, were obtained for all items, and factor loadings above .70, which is the ideal value, were obtained for 28 items. The internal consistency Cronbach’s Alpha coefficient of the scale was calculated after CFA and is presented in Table 12.

In the model, it can be seen that covariances exist between items 20-21 and 21-22. Factor loadings

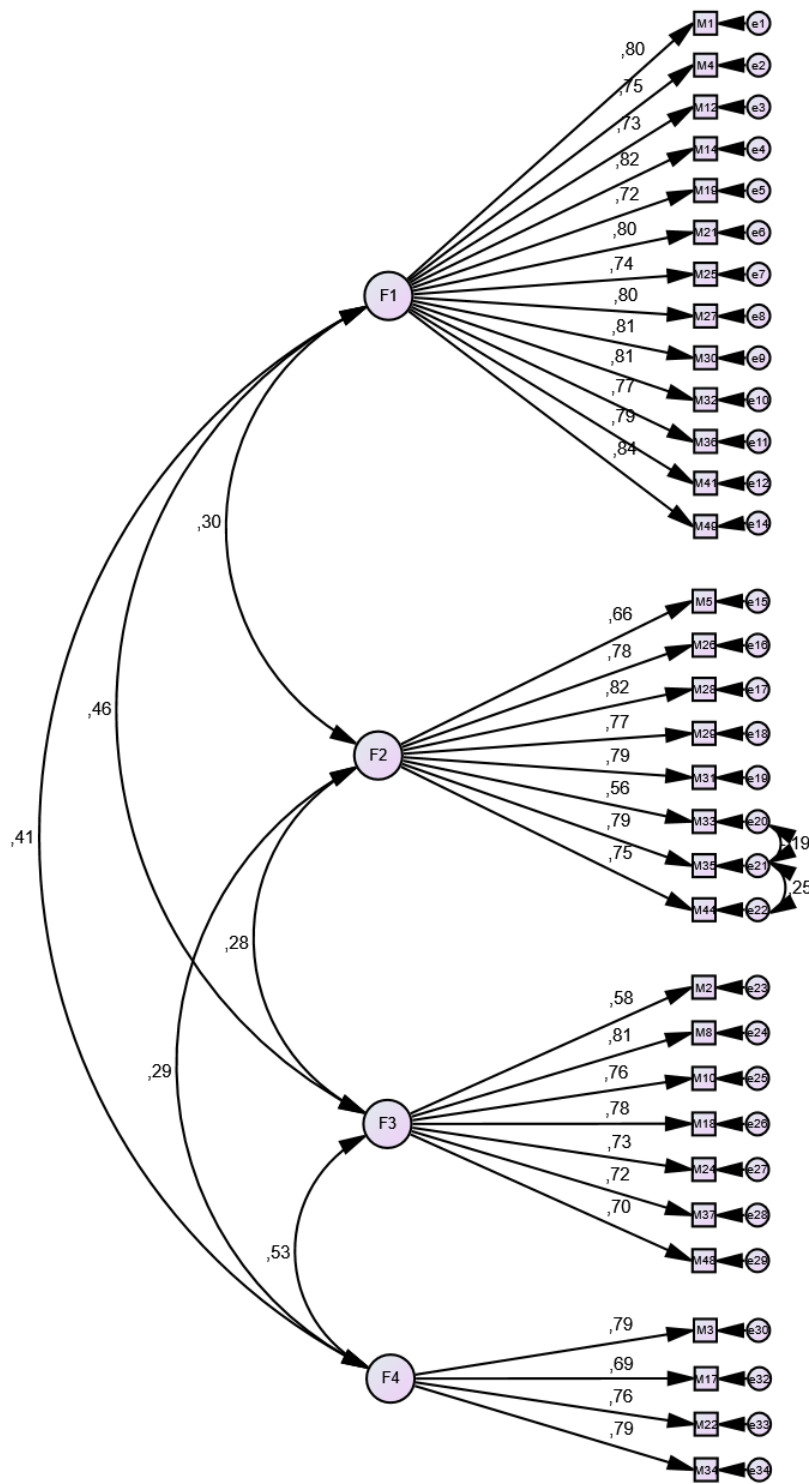


Figure 1: Standardized CFA Model of Scale Factors

Table 12: Reliability Analysis of the OSH Attitude Scale After CFA

Factor	Cronbach Alpha
Personal	.954
Management	.906
Education	.887
Work Environment	.842
General	.935

After all analyses, it was observed that the overall reliability of the scale was finalized with

32 items and 4 factors, and all sub-factors were at a high level.

Common Method Bias Control

Common method variance,²⁵ which is seen as a problem arising from the data collection method, was analyzed with single-factor control. According to this, the total variance of the first factor, to which EFA was applied without rotation, was determined as 25%. In another

Discussion and Conclusion

Attitude is considered one of the most important cognitive components that trigger behavior. Without direct behavioral support from employees, it is not possible to achieve the desired success in ensuring employee health and safety through occupational health and safety practices. Despite the implementation of numerous national regulations on occupational health and safety in recent years, there have been no significant reductions in occupational accidents, necessitating a deeper examination of the issue from employees' perspective.

In this context, the attitude scale developed in our study reveals employees' attitudes towards occupational health in four sub-factors. It is anticipated that determining employees' attitudes towards occupational health practices in the personal, managerial, educational, and work environment factors, identifying any low attitudes in these areas, and supporting occupational health and safety practices with a set of additional measures to improve these attitudes will lead to positive improvements in employee behavior. For example, if a group of employees has a very low attitude level in the managerial dimension, it is extremely important to develop additional training content to increase managerial attitudes in occupational health and safety training. Only then will a holistic attitude improvement and behavioral patterns be supported. It has been observed that positive developments occur when hospital employees are included in occupational health and safety decision-making processes.²⁴ At this point, it is

single-factor analysis, the entire data set was analyzed using Varimax rotation, and the first factor accounted for 18% of the total variance. Both values were found to be well below the threshold value of 50%,²⁶ and it was concluded that there was no common method bias in the research data.

seen that each sub-factor studied within the scope of the scale has a separate effect.

The occupational health and safety attitude scale development study began with 50 items and resulted in a final scale with 32 items and 4 factors. During the exploratory factor analysis, 16 questions were excluded from the scale because they fell outside the reference values, and the EFA was completed with 34 items. As a result of the CFA analyses, the scale was finalized with 32 items and 4 factors. This scale will help determine employees' attitudes towards occupational health and safety before implementing any occupational health and safety measures. It will provide an important starting point for businesses and researchers working in the field, from the content of the training to the identification of current employee perspectives. In addition to determining employees' readiness levels and providing standard occupational health and safety training, it is anticipated that adding content dimensions that address identified deficiencies will increase the effectiveness of the training provided. In particular, determining employees' current attitude levels in line with the organizational psychology approach, analyzing the employee by taking them into consideration in the activity to be carried out, and adopting an approach that values the employee will contribute to the formation of an organizational culture that values its employees, transforming occupational health and safety practices from mechanical activities into a human-centered approach.

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