

## The Effect of Safety Culture on Safety Performance: Intermediary Role of Job Satisfaction

Dilaver Tengilimoglu<sup>1</sup>, Elif Celik<sup>2</sup> and Alper Guzel<sup>3\*</sup>

<sup>1</sup>Faculty of Management, Atilim University, Ankara, Turkey.

<sup>2</sup>Ministry of Labour and Social Security, Ankara, Turkey.

<sup>3</sup>Faculty of Economics and Administrative Sciences, Gazi University, Ankara, Turkey.

### Authors' contributions

This work was carried out in collaboration between all authors. Author EC designed the study, wrote the protocol, and managed the analyses of the study. Author DT has supervised this study. Author AG wrote the first draft of the manuscript and managed the literature searches. All authors read and approved the final manuscript.

### Article Information

DOI: 10.9734/BJEMT/2016/29975

#### Editor(s):

(1) Alfredo Jimenez Palmero, Kedge Business School, France.

#### Reviewers:

(1) Russell Davis, Columbia Southern University, Alabama.

(2) Bidyut Bijoya Neog, University of Science & Technology, India.

Complete Peer review History: <http://www.sciencedomain.org/review-history/16798>

Original Research Article

Received 7<sup>th</sup> October 2016  
Accepted 26<sup>th</sup> October 2016  
Published 4<sup>th</sup> November 2016

### ABSTRACT

**Aims:** Development of safety culture at work environments which has emerged as an important solution in the field of occupational health and safety is important for minimizing the number of occupational accidents and diseases. The main purpose of this research is to determine the relationship between safety culture, safety performance and job satisfaction and propose a model showing how safety culture increases safety performance via the mediation of job satisfaction, and to determine whether occupational accidents are caused by unsafe practices or unsafe work environments.

**Study Design:** The research was designed as a cross-sectional field study. Survey technic was used as the data collection method and the survey consists of 73 questions.

**Place and Duration of Study:** A mining enterprise operating in the city of Kutahya, Turkey in January 2014

**Methodology:** Convenience sampling method was used and the data was collected face to face from the employees who volunteered to participate in the research. The collected data was analyzed via SPSS Statistics 22 and AMOS 20 program was used in order to determine the

\*Corresponding author: E-mail: [alper\\_guzel@hotmail.com](mailto:alper_guzel@hotmail.com), [guzel@gazi.edu.tr](mailto:guzel@gazi.edu.tr);

relations between safety culture, safety performance and job satisfaction. The values for which  $P=0.05$  has been accepted as statistically significant.

**Results:** A total of 358 employees constitute the research sample. More than half (52%) of the employees perceive unsafe worker practices as the most common reason of occupational accidents. Also, significant relationships were found between safety culture, safety performance and job satisfaction. These results point out that human factor has the most important role in the prevention of occupational accidents. Accordingly, businesses and employers should establish and disseminate safety culture in their organizations.

*Keywords: Safety culture; safety performance; job satisfaction; occupational health and safety.*

## 1. INTRODUCTION

The concept of occupational health and safety, which is one of the most important issues for professional life, has become an important subject that attracts increasing attention in the recent years. In order to continue employees' professional lives, the primary purpose is to protect and maintain their health and safety. The sum of systematic studies in relation with this purpose is described as occupational health and safety. Occupational health and safety plays a major role in establishing a positive safety culture concept at a work environment. When statistics on occupational accidents and diseases are reviewed, the importance of this situation is better understood. According to International Labor Organization, [1] more than 2.3 million people die as a result of occupational accidents or work-related diseases per year and 317 million accidents occur on the job annually around the world. Moreover, according to Social Security Institution, 221,366 occupational accidents, 494 occupational diseases and 1,626 fatal occupational accidents were reported in Turkey in 2014. Also in 2014, there were nearly 400 workers dead because of fatal mining accidents. These numbers show that occupational health and safety is a very important issue for Turkey, especially in mining sector, which cannot be overlooked.

## 2. MATERIALS AND METHODS

In the prevention of occupational accidents and the dissemination of occupational safety practices by creating occupational health and safety management systems in enterprises, establishing occupational safety culture has become a major issue for businesses. The first studies in the field of safety culture began with the report published by the International Atomic Energy Agency after the Chernobyl accident. In this report, lack of safety culture was pointed out as the cause of the accident [2,3]. Safety climate and safety culture studies began first of all with

the definition of Zohar in 1980 [4]. Zohar (1980) defined the concept of safety climate as "a summary of holistic perceptions on work environment shared by workers" [2, p.656]. Meanwhile, IAEA defines safety culture as "a product of the patterns of values, attitudes, competency and behaviors of individuals and groups which determine the adequacy, style and persistency of implementation of the organization's health and safety programs" [5]. Because the organizations have more than one target as well as more than one means to achieve those targets they develop policies on issues such as high level customer management services, product quality and employee safety. For this reason safety climate is related with shared perceptions regarding safety policy, procedure and implementations [6, p.376].

The IAEA defines a strong safety and security culture as The concepts of safety culture and safety climate are separate but most of the time they have also been used interchangeably [2, p.656; 3, p.423]. While authors like Mearns [7] distinguish between safety culture and safety climate, others like Guldenmund [8] accept that these concepts are derived from each other [9, p.201]. According to Guldenmund [10], safety climate is part of the culture and is affected by both the structure and the process [10, p.738]. Meanwhile, Cox and Fliin (1998) treat the concept of safety climate as a reflection of the safety culture concept explaining employee attitude and behavior [11, p.642].

The key variables of the study have been determined as safety culture, safety performance and job satisfaction. Several studies [12-16] have revealed that significant and positive relationships have been found between safety culture and safety performance. Researchers who have utilized the concept of safety climate in order to measure the occupational safety perception of employees regarding work environment have found that there is a significant relationship between safety climate and safety

performance [17-22]. Moreover, the existence of significant and positive relationships between safety culture and job satisfaction have been expressed in the field literature [23-25]. In accordance with this information, the main purpose of the study is to identify the occupational safety culture in organizations and to investigate the effects of safety culture on security performance and job satisfaction. The hypotheses of the research have been constructed as follows:

- H1: There is a significant relationship between safety culture and safety performance.
- H2: There is a significant relationship between safety culture and job satisfaction.
- H3: There is a significant relationship between safety performance and job satisfaction.
- H4: Job satisfaction functions as an intermediary in the relationship between safety culture and safety performance.

## 2.1 Methodology

The research has been designed as a cross-sectional field study. The main purpose of the research is to determine the relationship between safety culture, safety performance and job satisfaction and propose a model showing how safety culture increases safety performance via the intermediary of job satisfaction.

In the research "survey technique" has been used as a data collection method. The survey used in the research as a means of data collection consists of 73 questions. In the first section of the survey, there are a total of 18 questions and while nine are related to demographic characteristics and the other nine questions, which were developed by [26], are about the occupations of the participants. The second section consists of a total of 35 questions with 29 on safety culture [26] and 6 on safety performance [27,28]. In the third section there is the Minnesota Job Satisfaction scale which has been developed by Weiss et al. [29] and translated into Turkish by Baycan [30] and consists of 20 questions. While there are multiple-choice questions in the first section of the survey the second and third sections require participant evaluation of the questions according to a 5-point Likert scale. Accordingly the format of the scale is as follows "1: Totally disagree", "2: Disagree", "3: Somewhat agree", "4: Agree", "5: Totally agree".

A pilot study was conducted with a group of 30 people and the survey design was finalized after

questions and concepts which were difficult for the participants to understand were rephrased. Moreover, it was determined that it took about 30 minutes to complete a survey. Survey was conducted in a mining enterprise operating in the city of Kutahya and the research universe consists of 1452 personnel working at the mining enterprise. Convenience sampling method was used and the surveys were conducted with employees who volunteered to answer the questions. Data has been collected via face to face surveys. Due to the hazardous work environment and the intensity of workload, a total of 403 surveys were completed. Out of these 45 were left out of evaluation because they were not completed properly or fully and as a result 358 surveys were included in the analysis. Thus a total of 358 people constitute the research sample.

In the analysis of the collected data, frequency distribution, mean and standard deviation were used and SPSS for Windows 22.0 (Statistical Package for the Social Sciences) has been utilized for these analyses and calculations. Moreover, Structural Equation Model has been used in the exploration of the relationships between factors and the investigation of the intermediary effect of job satisfaction. AMOS 20 program has been used for confirmatory factor analysis and the structural equation model analysis. The values for which  $P=0.05$  has been accepted as statistically significant.

Conducting the research in a mining enterprise which operates in the high-risk mining sector, the difficulty of working conditions and the critical issue of practices of occupational health and safety being the subject matter have been the main constraints of the research. In this sense, the contribution of this study to the field literature is important.

## 3. RESULTS AND DISCUSSION

A total of 358 employees of the mining enterprise participated in the research. It has been observed that while the majority of the participants (38%) are 45 years old and older, 53.7% are between 27 and 44 years. Also, 8.3% of the participants belongs to in the age group of 18-26 years. Almost half (49.7%) of them are high school and vocational high school graduates. Moreover, while only 6.7% of the employees are women, 85.8% are married.

More than half of the participants (57.8%) are workers. In mining enterprises, the most risky

group is workers in terms of occupational safety and health. Their contribution is valuable as they face most of the risks. While 41.9% of the participants work at departments such as open furnace, study projects, machine services, 25.7% of them work at underground production and control departments or laboratories. Also, 32.4% of the participants work at administrative parts such as financial affairs, human resources and administrative social affairs. Almost 42.5% of the employees have 0-5 years of experience at this work place and 26.8% have 16 years of experience or more. In addition, 23.8% work for 6-10 years and 6.9% work for 11-15 years for the mining enterprise. Also, while 54.5% of the participants are working in shift, 45.5% of them are working full time. Moreover 79% of the employees have stated that they have received training related to their job and almost 60% perceive this training to be sufficient.

### 3.1 Perceiving the Causes of Occupational Accidents

While 52% of the participants perceive the most common cause of occupational accidents to be unsafe worker practices, the remaining 48% see unsafe work environment as the most common cause of occupational accidents. Approximately 54% of the employees have experienced a close call. 14.2% of the participants stated that they have suffered an occupational accident at this work place and nearly 21% have had an occupational accident in their professional lives. In a study by Ayber et al. [31], 44.4% pointed to factors related to unsafe work environment and 55.6% pointed to unsafe worker practices as the most common cause of occupational accidents. According to an early work of Demirbilek [26] on the textile sector, it has been stated that from among 200 employees 61% perceived unsafe worker practices and 39% perceived unsafe work environment as the most common cause of occupational accidents.

**Table 1. Classification of employees according to employment specifics**

<b>Position at work</b>	<b>Number</b>	<b>Percentage</b>
Manager	3	0.8
Engineer	36	10.1
Technician	40	11.2
Tech-artist	1	0.3
Operator/Mechanic	12	3.3
Supervisor	8	2.2
Foreman	2	0.6
Worker	207	57.8
Administrative personnel	41	11.5
Other	8	2.2
<b>Employment period at this job</b>		
0-5 years	152	42.5
6-10 years	85	23.8
11-15 years	25	6.9
16 years or more	96	26.8
<b>Department working for</b>		
Financial Affairs – Human Resources – Administrative Social Affairs	116	32.4
Open Furnace – Study Project – Machine Servicing – Machine Operation	150	41.9
Underground production – Underground Control – Lab – OHS – R&D	92	25.7
<b>Employment type</b>		
Working in shifts	195	54.5
Working full-time	163	45.5
<b>Occupational training</b>		
Received	280	78.2
Not received	78	21.8
<b>Sufficiency of received training</b>		
Sufficient	208	58.1
Insufficient	150	41.9
<b>Total</b>	<b>358</b>	<b>100</b>

**Table 2. Perceptions of employees towards occupational accidents**

	Number	Percentage
<b>The most common cause of occupational accidents</b>		
Unsafe worker practices	185	51.7
Unsafe work environment	173	48.3
<b>Ever experienced a close call at work</b>		
Yes	109	30.5
No	167	46.6
Partially	82	22.9
<b>Ever experienced an occupational accident at this workplace</b>		
Yes	51	14.2
No	307	85.8
<b>Ever experienced an occupational accident in professional life</b>		
Yes	74	20.7
No	284	79.3
<b>Total</b>	<b>358</b>	<b>100</b>

**Table 3. Investigation of the differences between those who have and those who have not experienced occupational accidents in terms of the level of safety culture**

Variables		N	Mean	Std. deviation	T	P
Have you ever experienced an occupational accident?	Yes	74	2.07	0.486	-3.011	.003
	No	284	2.24	0.427		

**Table 4. Investigation of the differences between employees who have diverging opinions on the causes of occupational accidents in terms of the level of safety culture**

Variables		N	Mean	Std. deviation	T	P
In your opinion, which is the most common cause of occupational accidents?	Unsafe worker practices	185	2.34	0.348	6.142	.000
	unsafe work environment	173	2.06	0.492		

As a result of the independent sample t test, it is seen that there is a statistically significant difference between the levels of safety culture of those who have and those who have not experienced an occupational accident. Accordingly, the safety culture level of those who have experienced an occupational accident is significantly lower than those who have not experienced an occupational accident ( $t:-3.011$ ,  $P=0.05$ ).

As a result of the independent sample t test it has been found that there is a statistically significant difference between the safety culture levels of those who have diverging opinions on the causes of occupational accidents. Accordingly, the safety culture level of those who perceive the cause of occupational accidents as unsafe worker practices is significantly higher than the safety culture level of those who perceive the cause of occupational accidents as unsafe work environments ( $t:6.142$ ,  $P=.05$ ).

### 3.2 Confirmatory Factor Analysis

For the measurement model that consists of 27 items and 5 latent variables as determined as a result of the confirmatory factor analysis regarding the safety culture scale, first a primary level then a secondary level confirmatory factory analyses have been conducted. The dimensions which have been defined as latent variables are administrative commitment, safety priority, safety communication, safety training and safety participation. The secondary level factor analysis that recognized administrative commitment, safety priority, safety communication, safety training and safety participation, which were included in the measurement model as a result of the primary level factor analysis, as the sub-dimensions of the latent variable of safety culture is shown in Fig. 1.

In order to ensure that the measurement model remains within the acceptable range of adaptive

values, one item from safety priority dimension and one item from safety training dimension were removed. As a result of the confirmatory factor analysis the following results have been found:  $\chi^2/Sd = 1.753$ ; RMSEA=0.046; CFI=0.9952 and GFI=0.904. According to these results it can be seen that the validity of the scale is ensured and that the model has adapted well to the data.

According to these results it can be argued that the safety performance dimension and the

variables are related, that the model is appropriate and the confirmatory factor analysis is statistically significant. As a result of the confirmatory factor analysis performed for the Safety Performance Scale, the following results have been found:  $\chi^2/Sd = 2.155$ ; RMSEA=0.057; CFI=0.987 and GFI=0.986. According to these results it can be seen that the validity of the scale is ensured and that the model has adapted well to the data.

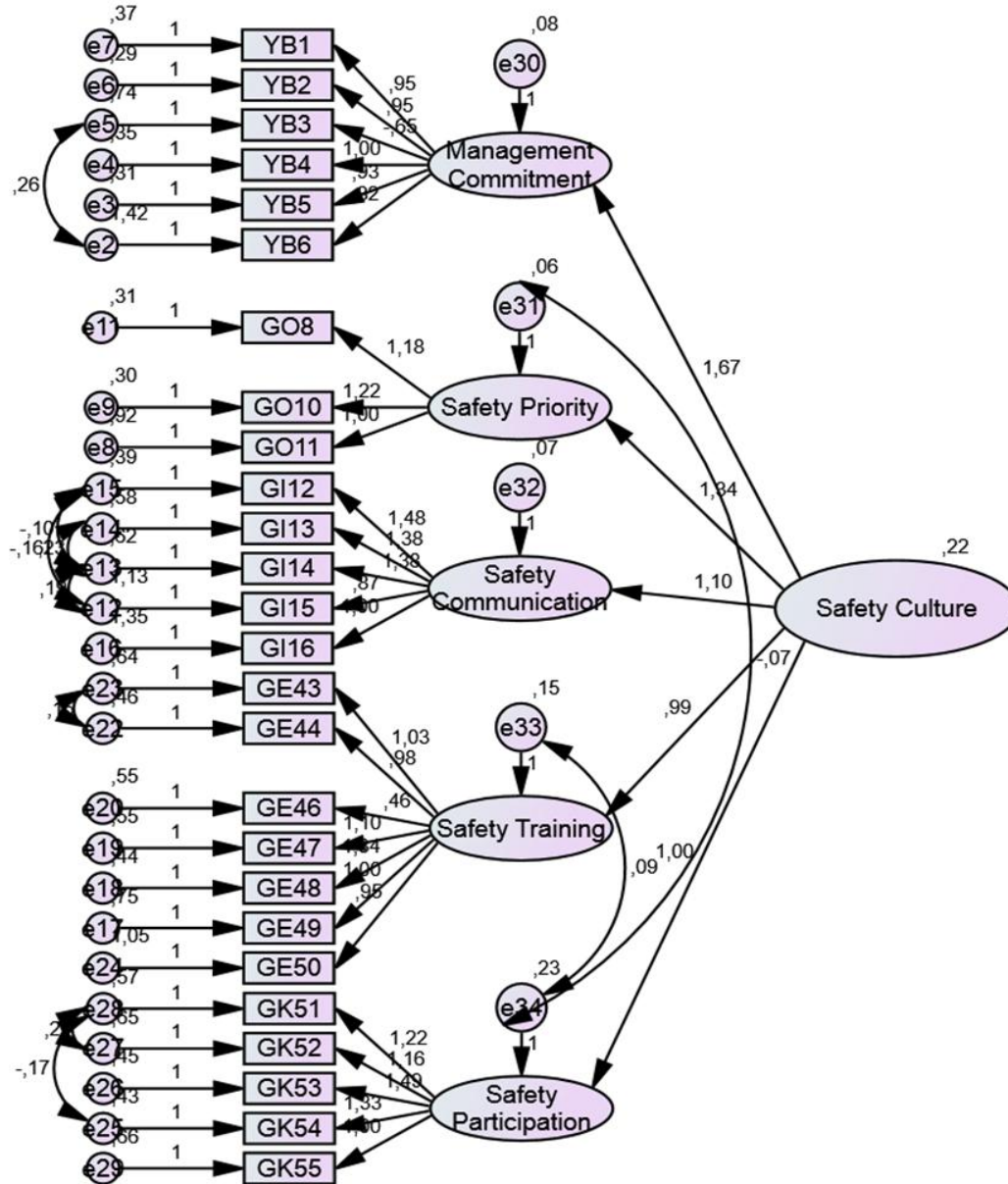


Fig. 1. Confirmatory factor analysis

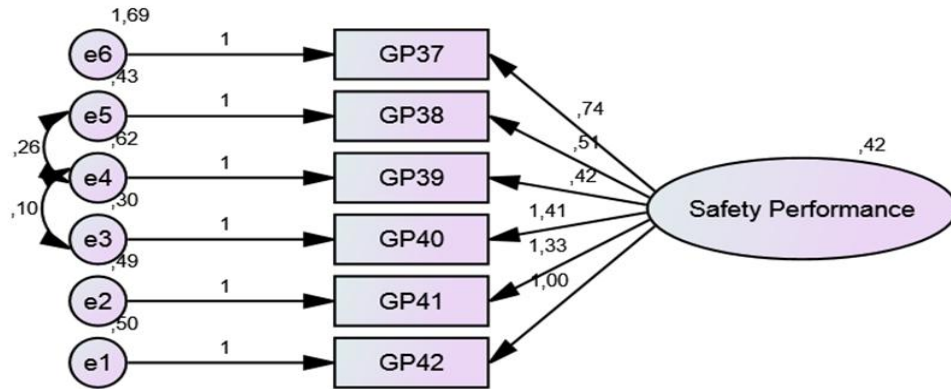


Fig. 2. Confirmatory factor analysis for safety performance scale

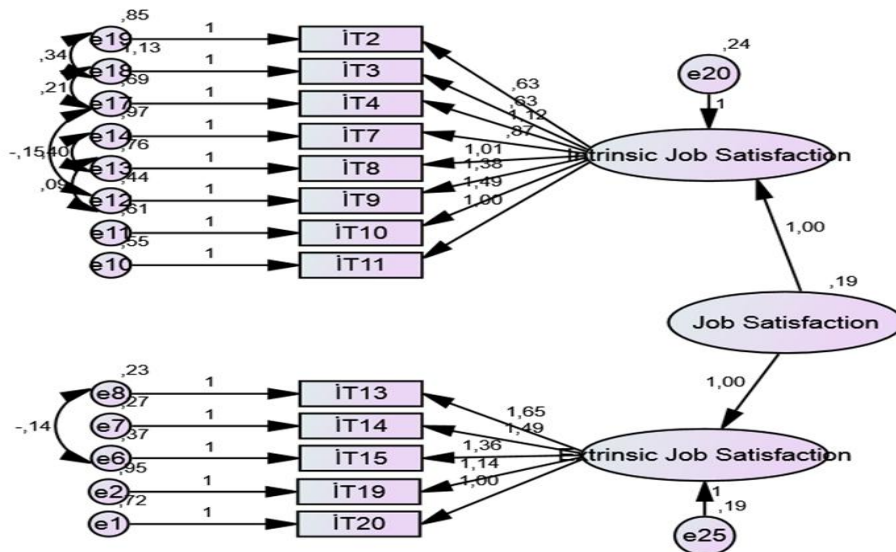


Fig. 3. Confirmatory factor analysis for job satisfaction scale

For the measurement model that consists of 13 items and 2 latent variables as determined as a result of the second level confirmatory factor analysis regarding job satisfaction, first a primary level then a secondary level confirmatory factor analyses have been conducted. The latent variables are intrinsic job satisfaction and extrinsic job satisfaction. Intrinsic and extrinsic job satisfaction, which were involved in the measurement model as a result of the primary level factor analysis, are defined as the sub-dimensions of the latent variable of job satisfaction and the secondary level confirmatory factor analysis is shown in the above Fig. 3. In order to ensure that the measurement model remains within the acceptable range of adaptive

values, 5 items have been removed from the intrinsic job satisfaction dimension and 2 items from extrinsic job satisfaction dimension. As  $\chi^2/Sd = 2.568$  it remains within the acceptable range of adaptive values. As a result of the confirmatory factor analysis performed for the job satisfaction scale the following results have been found:  $\chi^2/Sd = 2.568$ ; RMSEA=0.066; CFI=0.955 and GFI=0.939. According to these results it can be seen that the validity of the scale is ensured and that the model has adapted well to the data.

As a result of the confirmatory factor analysis performed for the job satisfaction scale it has been seen that validity is ensured and the model has adapted well to the data. While work



commendation (question 10) is considered as an extrinsic dimension, in this study it is subsumed under intrinsic dimension. In a study of Koroglu [32], the factors in the Minnesota job satisfaction scale short form have expressed variation. The “commendation” item which in the original Minnesota Job Satisfaction Scale Short Form is listed within the extrinsic satisfaction structure in this research it is included in the intrinsic satisfaction factor structure. Also, researchers have stated that the short form of Minnesota job satisfaction scale can include different factor structures [33-35].

### 3.3 The Evaluation Process of the Structural Model and the Evaluation of Adaptation

A model has been developed in order to primarily investigate the relationship between safety

culture and safety performance with the purpose of evaluating the model in the study.

From the developed model it can be seen that safety culture has a positive and statistically significant effect on safety performance. Accordingly, a unit of increase in safety culture leads to a 0.878 units of increase in safety performance.

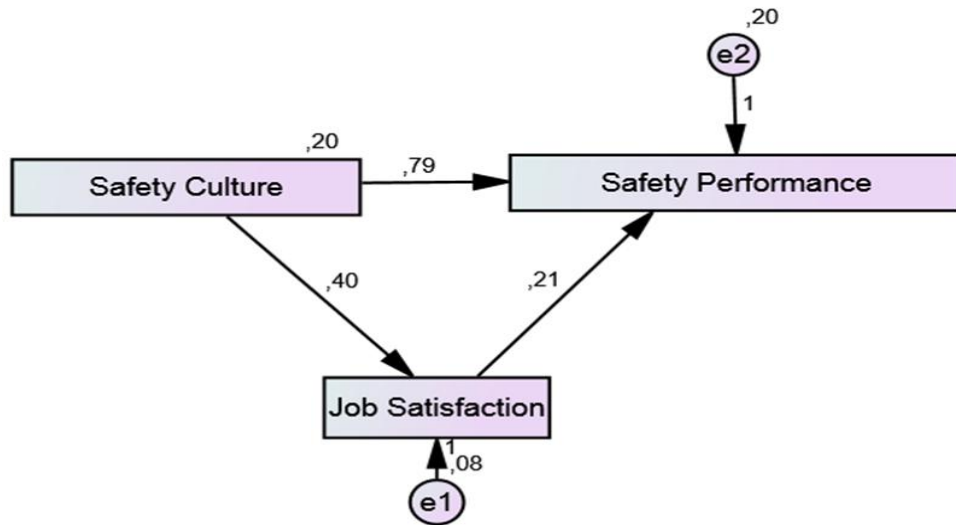
In the developed model to investigate the intermediary effect of job satisfaction, it has been determined that the effect of safety culture on safety performance is 0.793, the effect of safety culture on job satisfaction is 0.400 and the effect of job satisfaction on safety performance is 0.213. Moreover, the results of the model developed to investigate the intermediary role of job satisfaction are shown in Fig. 4.

**Table 5. Effect of safety culture on safety performance**

		Beta	T	P
Safety culture	→ Safety performance	0.878	16.376	.000**

**Table 6. Intermediary effect of job satisfaction on the relationship between safety culture and safety performance**

		Beta	T	P
Safety culture	→ Safety performance	0.793	12.736	.000**
Safety culture	→ Job satisfaction	0.400	11.551	.000**
Job satisfaction	→ Safety performance	0.213	2.625	.009**



**Fig. 4. Path analysis of the research model**



When the paths in the model are examined it is seen that all paths are significant. In order to examine the intermediary role of job satisfaction, the relationship between safety culture and safety performance must be investigated. It is seen that the coefficient which was 0.878 in the previous model has decreased to 0.793 when job satisfaction intervenes as model intermediary. Moreover, there are significant relationships between safety culture and job satisfaction, and between job satisfaction and safety performance. Accordingly, it is seen that job satisfaction has a partial intermediary effect on the relationship between safety culture and safety performance.

According to the results gathered at the end of the performed analyses H1, H2, H3 and H4 hypotheses have been accepted. Accordingly, we can say that there is a statistically significant relationship between job satisfaction, safety culture and safety performance and that job satisfaction has an intermediary role in the relationship between safety culture and safety performance.

#### 4. CONCLUSION

As a result of the research, it has been found that the relationships between safety culture, safety performance and job satisfaction are significant and moreover that job satisfaction assumes a partial intermediary role in the relationship between safety culture and safety performance. In the light of these findings we can say that safety culture has a positive effect on safety performance and moreover that, job satisfaction partially intermediates in this relationship. While on its own safety culture accounts for 27.2% of a change in job satisfaction ( $R^2=0.272$ ), safety culture together with job satisfaction can account for 44% of a change in safety performance ( $R^2=0.440$ ).

Taking occupational health and safety precautions, making sure that these are implemented and supervising their applications are the responsibilities of the administration and they are related with its commitment to this system. The most important dimension in the studies on especially both safety climate and safety culture is administrative commitment. Therefore, in order for safety performance to reach the desired levels, administration has to spend energy towards increasing businesses' safety culture and job satisfaction levels and make an effort to increase employees' job satisfaction. Remuneration systems aimed at

encouraging safe practices can make important contributions to decreasing the number of accidents. Moreover, as required by the recently accentuated issue of behavioral safety management, administration has to pay attention to psychological empowerment which increases employees' job satisfaction. One of the most important factors in the establishment of safety culture consciousness is employee participation. The representation of employees in occupational health and safety boards as well as listening to the opinions of employees while making other decisions are practices both of which increase job satisfaction.

It has been found that the safety culture and safety performance levels of employees who think that the cause of occupational accidents is 'unsafe worker practices' are significantly higher relative to those who think that the cause is 'unsafe work environment' ( $p<0.05$ ). This results from the fact that the employees who have higher levels of safety performance perceive the most important factor in the cause of occupational accidents as human error.

Moreover, it has been seen that the safety culture, safety performance and job satisfaction levels of those who have received job training are significantly higher relative to those employees who have not received such training ( $P=.05$ ). It has been found that the safety culture, safety performance and job satisfaction levels of those employees who think that the job training they received was sufficient are significantly higher relative to those who do not think that the training was sufficient ( $P=.05$ ). The importance of training in behavioral change is irrefutable. Employers have a responsibility to train their employees regarding both their rights as well as the risks specific to their sector. The main purpose of these trainings is to inform employees about the risks relevant to the workplace and minimize the number of occupational accidents and diseases. Therefore, rather than considering these trainings as a legal burden, they should be held in an interactive manner with the genuinely active participation of employees. Furthermore, exemplary cases of past accidents can be presented during trainings in order for employees to gain experience.

In the instillation of safety culture, establishing a reporting system and conducting risk evaluations are important. The purpose of risk evaluation is to take the necessary protective precautions to prevent accidents with a proactive approach.

Detecting, recording, reporting and sharing with employees the accidents and close calls that take place in the enterprises which operate in the same sector are important in reducing the number of accidents as a result of the gained experience.

In Turkey, one of the most serious deficiencies in the field of occupational health and safety is the lack of standards at the sectoral level. The state, by meeting with all parties, has to provide solutions appropriate to the problems in occupational health and safety and establish industry-specific regulations. Although the most important responsibility lies with employers in establishing and implementing occupational health and safety precautions the state must make sure through its inspections that sanctions are efficient.

Identifying levels of safety culture and investigating the intermediary role of job satisfaction for employees from different sectors in the future studies will increase the generalizability of the study. Furthermore, it is suggested that researchers conduct studies on the different dimensions of safety culture. Because the number of variables was high some of the sub-dimensions of safety culture were not included in the analysis of this study. In future research, other variables can be included in analysis. Moreover, conducting research on larger universes will ensure the generalizability of the study.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. ILO, Safety and health at work, International Labour Organization, [cited 2016 May 15]. 1996-2016. Available:<http://www.ilo.org/global/topics/safety-and-health-at-work/lang-en/index.htm>
2. Flin R. Measuring safety culture in healthcare: A case for accurate diagnosis. *Safety Science*. 2007;45:653-667.
3. Wu TC, Lin CH, Shiau SY. Predicting safety culture: The roles of employer, operations manager and safety professional. *Journal of Safety Research*. 2010 ;41(5):423-431.
4. Fang D, Wu H. Development of a Safety Culture Interaction (SCI) model for construction projects. *Safety Science*. 2013;57:138-149.
5. Ozkan T, Lajunen T. Güvenlik Kültürü ve İklimi [Safety culture and climate]. *Pivolka*. 2003;2:10. [Cited 2014 Sep 14]. Available:<http://www.elyadal.org/pivolka/10/guvenlik.htm>
6. Zohar D. Safety climate and beyond: A multi-level multi-climate framework. *Safety Science*. 2008;46:376-387.
7. Mearns K, Flin R, Gordon G, Fleming M. Measuring safety culture in the offshore oil industry. *Work and Stress (Special Issue: Safety Culture)*. 1998;12:238-254.
8. Guldenmund FW. The nature of safety culture: a review of theory and research. *Safety Science*. 2000;34:215-257.
9. Glendon AI, Stanton NA. Perspectives on safety culture. *Safety Science*. 2000;34:193-214.
10. Guldenmund FW. The use of questionnaires in safety culture research-an evaluation. *Safety Science*. 2007;45:723-743.
11. Mearns K, Whitekar SM, Flin R. Safety climate, safety management practice and safety performance in offshore environments'. *Safety Science*. 2003;41:641-680.
12. Clarke S. Perceptions of organizational safety implications for the development of safety culture'. *Journal of Organizational Behavior*. 1999;20:185-198.
13. Molenaar K, Park J, Washington S. Framework for measuring corporate safety culture and its impact on construction safety performance. *Journal of Construction Engineering and Management*. 2009;135(6):488-496.
14. Dursun S. Güvenlik Kültürünün Güvenlik Performansı Üzerine Etkisine Yönelik Bir Uygulama [An application for the impact on safety performance of safety culture]. *Yayınlanmamış Doktora Tezi*. Bursa: Uludağ University; 2011.
15. Goh YM, Love P, Stagbouer G, Annesley C. Dynamics of safety performance and culture: A group model building approach. *Accident Analysis and Prevention*. 2012; 48:118-125.
16. Dursun S. İş Güvenliği Kültürünün Çalışanların Güvenli Davranışları Üzerine Etkisi [The impact on safety behavior of

- occupational safety culture]. *Sosyal Güvenlik Dergisi*. 2013;3(2):61-75.
17. Neal A, Griffin MA, Hart PM. The impact of organizational climate on safety climate and individual behavior. *Safety Science*. 2000;34:99-109.
  18. Neal A, Griffin MA. Safety climate and safety behavior. *Australian Journal of Management*. 2002;27: Special Issue.
  19. Fay D, Tissington P. Safety and risks: Errors and accidents in different occupations. *Encyclopedia of Applied Psychology*; 2004.
  20. Siuo, Phillips DR, Leung T. Safety climate and safety performance among construction workers in Hong Kong: The role of psychological strains as mediators. *Accident Analysis & Prevention*. 2004; 36(3):359–366.
  21. Wu T, Chen CH, LICC. A correlation among safety leadership, safety climate and safety performance. *Journal of Loss Prevention in the Process Industries*. 2008; 21:307–318.
  22. Lallemand C. Contributions of participatory ergonomics to the improvement of safety culture in an industrial context. *Work*. 2012;41:3284-3290.
  23. Flin R, Mearns K, O'connor P, Bryden R. Measuring safety climate: Identifying the common features. *Safety Science*. 2000; 34(13):177-192.
  24. Gyekye SA. Workers' perceptions of workplace safety and job satisfaction.
  25. Gyekye SA, Salminen S. Educational status and organizational safety climate: Does educational attainment influence workers' perceptions of workplace safety? *Safety Science*. 2009;47:20–28.
  26. Demirbilek T. *İş Güvenliği Kültürü* [Occupational safety culture]. İzmir: Legal Yayıncılık; 2005.
  27. Tam CM, Ivan WH, Fung IV. Effectiveness of safety management strategies on safety performance in Hong Kong. *Construction Management and Economics*. 1998;16:49-55.
  28. Burke MJ, Sarpy SA, Tesluk PE, Smith-Crowe K. General safety performance: A test of a grounded theoretical model. *Personnel Psychology*. 2002;55:429-457.
  29. Weiss DJ, Dawis RV, England GW, Lofquist LH. *Manual for the satisfaction questionnaire*. Minnesota Studies in Vocational Rehabilitation: Minneapolis: University of Minnesota Press; 1967.
  30. Baycan A. An analysis of the several aspects of job satisfaction between different occupational groups. *Yayınlanmamış Yüksek Lisans Tezi*. İstanbul: Boğaziçi Üniversitesi Sosyal Bilimler Enstitüsü; 1985.
  31. Aybek A, Guvercin O, Hursitoglu C. Teknik Personelin İş Kazalarının Nedenleri ve Önlenmesine Yönelik Görüşlerinin Belirlenmesi Üzerine Bir Araştırma [Technical Personnel Perceptions of the Reasons and Preventive Measures of Work Accidents]. *KSÜ Fen ve Mühendislik Dergisi*. 2003;6(2):91–100.
  32. Koroglu O. İçsel ve Dışsal İş Doyum Düzeyleri İle Genel İş Doyum Düzeyi Arasındaki İlişkinin Belirlenmesi: Turist Rehberleri Üzerinde Bir Araştırma [Determination of the relationship between the levels of intrinsic and extrinsic job satisfaction with level of general job satisfaction: An investigation on tour guides]. *Doğuş Üniversitesi Dergisi*. 2012; 13(2):275–289.
  33. Schriesheim CA, Powers KJ, Scandura TA, Gardiner CC, Lankau MJ. Improving construct measurement in management research: Comments and a quantitative approach for assessing the theoretical content adequacy of paper-and-pencil survey-type instruments. *Journal of Management*. 1993;19(2):385-417.
  34. Hirschfeld RR. Does revising the intrinsic and extrinsic subscales of the Minnesota Satisfaction Questionnaire short form make a difference? *Educational and Psychological Measurement*. 2000;60(2): 255-270.
  35. Hancer M, George RT. Job satisfaction of restaurant employees: An empirical investigation using the minnesota satisfaction questionnaire. *Journal of Hospitality & Tourism Research*. 2003; 27(1):85-100.

## ANNEX I – QUESTIONNAIRE

### Occupational safety and culture research

#### Survey form

Dear Participant

This questionnaire is prepared to evaluate the level of safety culture, safety climate and job satisfaction. The results of this study will be prepared as a report and will be used scientific purposes for enhancing the occupational safety and health medium. Thank you for your efforts spent in completing this questionnaire.

#### Part I – General Information

---

1- Age : \_\_

---

2- Gender.  Female  Male

---

3- Marital Status.  Married  Single

---

4- Education.  Primary  Secondary  
 High/Vocational High School  Graduate/Post Graduate  Other

---

5- In what department do you work at this enterprise?  
.....

---

6- What is your position at work?

Manager  Engineer  Technician  Tech-artist  Operator/Mechanic  
 Supervisor  Foreman  Worker  Trainee  Administrative Staff

Other .....

---

7- How long have you been working at this enterprise?

Less than 1 year  1-5 years  6-10 years  11-15 years  Other

---

8- What is your experience at this job? Employment period at this job?

0-5 years  6-10 years  11-15 years  16-20 years  Other

---

9- What is your employment type?

In shift  Full time

---

10- Do you work overtime?

Yes (daily .....hour/s)  No

---

11- Have you received any occupational training relevant to your job?

Yes  No

---

© 2016 Tengilimoglu et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*  
*The peer review history for this paper can be accessed here:*  
<http://sciencedomain.org/review-history/16798>