

Work Engagement's Importance for Safety Culture

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Abstract

Research on high reliability organizations considers safety a feature ensuring a system's smooth operation (Fahlbruch & Wilpert, 1999). To increase safety, the entire organization as well as influences of organizational culture on individual safety behavior of organization members become focal points of safety discussions (Helmreich & Merrit, 1998; Leveson et al., 2004; Meshkati, 2002). Thus, the question arises, which aspects of organizational culture influence safety and to what extent. Safety culture plays a crucial role at this, as it represents the entirety of an organization's and its members' characteristics and attitudes towards safety matters.

This contribution investigates the as yet little researched relationship between safety culture, work engagement and risk perception in the railway sector. Furthermore, it emphasizes the importance of organizational culture in developing and designing a purposeful safety culture.

KEYWORDS: safety culture, organizational culture, safety climate, work engagement, risk perception

Introduction

Safety culture constitutes an interplay between "non-observable" and "observable attributes" regarding safety in an (organizational) culture (Schein, 1990). Based on Schein's (1990) model of organizational culture, perceived safety culture—the so called safety climate—can be outlined as a 'snapshot' at a particular point in time, which is understood as "a summary of molar perceptions that employees share about their work environment" (Zohar, 1980, p. 96). Safety is also linked with risk (Antonsen, 2009). Employees contribute to safety through their behavior, through knowledge of potential risks or dangers. When people are confronted with dangers in the workplace, the question arises how they perceive, assess and manage such situations.

Concerning occupational safety, one variable as yet insufficiently investigated is work motivation in terms of work engagement. Work engagement influences attitudes towards safety and is interrelated with safety culture. Work engagement is characterized as a positive emotional and motivational state and is a form of work motivation.

This contribution follows the notion of "informed culture" (Reason, 1997) and aims to explore positive markers of safety culture, including Christian et al.'s (2009) meta-analysis as well as new aspects (e.g., risk perception and work engagement).

Methodology

For a holistic capture of safety culture and aspects of organizational culture, different measuring tools were employed. Observable attributes of safety culture were assessed through site inspections and document analyses, which are not the focus of this contribution. Subsequently, underlying layers of safety culture were analyzed, i.e. non-observable attributes such as employees' attitudes and values regarding safety as well as risk perception and work engagement.

For this purpose, an online survey was employed. The sample consisted of 349 employees of a railway company, primarily train and maintenance staff. The online survey consisted of multiple questionnaires:

- (1) A short version of the Safety Orientation Scale (**SOS**) by Håvold & Nasset (2009). It consists of 47 items and 8 scales. All scales use Likert scales, using six-point response formats. The SOS enables valuable insights into safety culture. It is based on Håvold's Safety Orientation Model (SOM) on one side, and extensive research into the items and scales that were used in different studies on safety culture and safety climate, on the other side. The questionnaire has been validated in multiple studies.
- (2) The Risk Orientation Questionnaire (**ROQ**) by Rohrman (1997): It consists of 12 items and is used here in a ten-point response format. The 12 questions give information on risk perception and help to determine risk-taking propensity in order to draw conclusions about risk behavior.
- (3) The Utrecht Work Engagement Scale (**UWES-9**) by Schaufeli, Bakker & Salanova (2006). Its short version consists of 9 items and 3 scales. The scales use a seven-point Likert scale.

Results

For estimating the relationships between the variables correlation analysis and regression analysis were conducted. Based on the correlation analyses after Bravais-Pearson, linear relations between SOS factors and UWES-9 were analyzed. The correlations found are highly significant and exhibit primarily moderate effect size. A linear regression analysis was conducted to predict the individual SOS factors. UWES-9 proved to be a significant predictor for most of the SOS factors.

Moreover, for reliability analysis, Cronbach's alpha was calculated to assess the internal consistency of the UWES-9. It presents an $\alpha = .95$ at a medium inter-item correlation of $r = .69$. Furthermore, there are highly significant and positive intercorrelations of the 3 subscales of the UWES-9.

The analysis of the ROQ showed no relations to UWES-9 or SOS factors, except for two of the latter (fatalism & job dissatisfaction). A further regression analysis showed the factor fatalism to be a significant predictor for risk propensity.

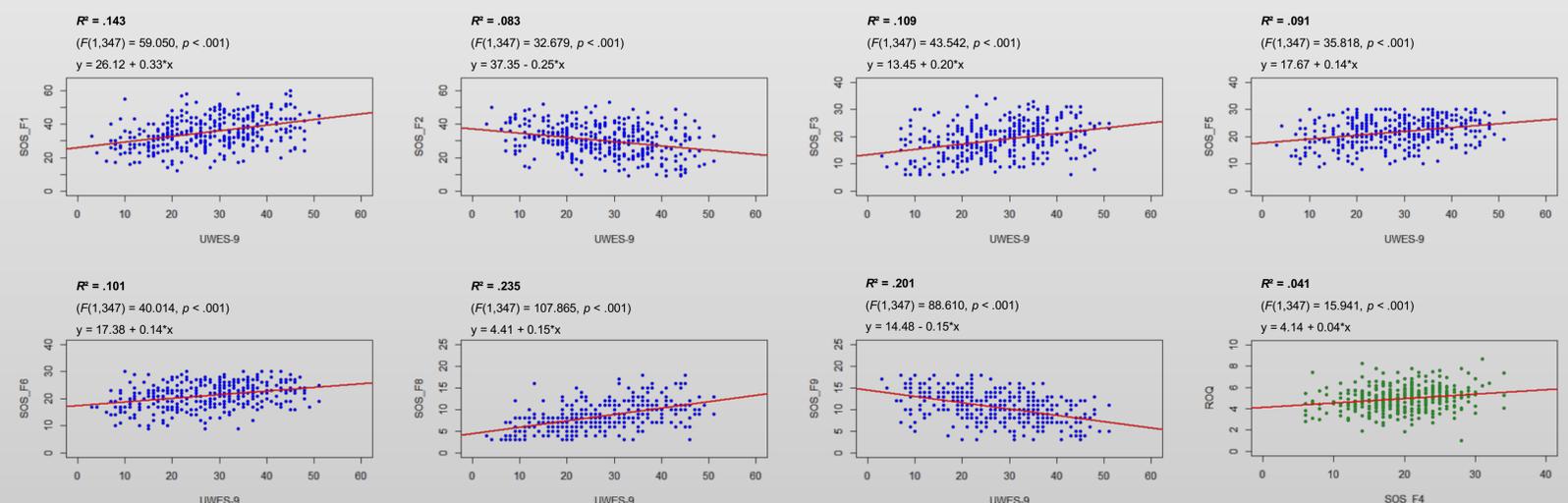
Table 1

Means, standard deviations, and correlations with confidence intervals

Variable	M	SD	1	2	3	4	5	6	7	8	9
1. UWES-9	27.53	10.67									
2. ROQ	4.94	1.13	.01								
			[-10, .11]								
3. SOS_F1	35.29	9.31	.38**	-.09							
			[.29, .47]	[-.19, .02]							
4. SOS_F2	30.36	9.23	-.29**	.05	-.56**						
			[-.39, -.19]	[-.05, .16]	[-.63, -.48]						
5. SOS_F3	18.89	6.27	.33**	.06	.56**	-.42**					
			[.24, .42]	[-.04, .17]	[.49, .63]	[-.51, -.33]					
6. SOS_F4	19.50	5.74	-.01	.21**	-.11*	.20**	.03				
			[-.12, .09]	[.11, .31]	[-.21, -.00]	[.10, .30]	[-.08, .13]				
7. SOS_F5	21.63	5.01	.31**	-.05	.55**	-.27**	.35**	-.13*			
			[.21, .40]	[-.16, .05]	[.47, .62]	[-.36, -.17]	[.26, .44]	[-.24, -.03]			
8. SOS_F6	21.12	4.51	.32**	-.05	.62**	-.42**	.35**	-.05	.52**		
			[.22, .41]	[-.16, .05]	[.55, .68]	[-.51, -.33]	[.26, .44]	[-.16, .05]	[.44, .59]		
9. SOS_F8	8.47	3.23	.49**	-.10	.52**	-.43**	.57**	-.02	.33**	.42**	
			[.40, .56]	[-.20, .01]	[.44, .59]	[-.52, -.34]	[.50, .64]	[-.12, .09]	[.23, .42]	[.33, .50]	
10. SOS_F9	10.50	3.42	-.45**	.13*	-.33**	.50**	-.23**	.19**	-.23**	-.28**	-.39**
			[-.53, -.36]	[.02, .23]	[-.42, -.24]	[.41, .57]	[-.33, -.13]	[.09, .29]	[-.33, -.13]	[-.37, -.18]	[-.48, -.30]

Note. M and SD are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. UWES-9: Utrecht Work Engagement Scale 9; ROQ: Risk Orientation Questionnaire; SOS_F1: Satisfaction with safety activities and safety rules; SOS_F2: Perception of management attitude towards safety; SOS_F3: Perception of work situation/work pressure; SOS_F4: Fatalism; SOS_F5: Knowledge/Competence; SOS_F6: Reporting culture; SOS_F8: Job satisfaction; SOS_F9: Job dissatisfaction. * indicates $p < .05$. ** indicates $p < .01$.

Figure 1



Conclusion

Firstly, UWES-9 proves to be a predictor for SOS factors and explains a highly significant fraction of variance in SOS factors. Thus, the results of this study ascertain that work engagement can be used as a predictor for safety culture. However, the results do not show any meaningfully significant correlations between SOS factors and ROQ. A more context-specific risk measurement tool is necessary to examine the exact relation between risk perception and safety culture.

Secondly, most studies do not focus on work engagement. And yet, as this study has shown, the constructs of safety and motivation are closely linked: Safety motivation does not only affect the perceived organizational safety culture, but also influences employees' behavior in safety settings. Research on safety culture can be criticized for focusing predominantly on high security sectors until now, such as public air traffic, nuclear facility operations or hospitals. Today, however, safety and safety culture are important subjects everywhere. Accordingly, safety management needs quantifiable measures (i.e., safety indices) regarding aspects of organizational culture. Furthermore, in order to infer measures for safety trainings, work engagement must be taken into consideration.

Håvold's Safety Orientation Model and the Safety Orientation Scale designed for its validation constitute a first attempt at designing an instrument, which can be used in diverse sectors. Further efforts in that direction are desirable.