

Individual and Organizational Factors of Safe Behaviour among Ghanaian Industrial Workers

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Abstract

The aim of this study is to compare individual and organizational factors as predictors of accident frequency. Four hypotheses based on the literature were presented: 1) both individual and organizational factors contribute to accident frequency, 2) individual factors have more impact than organizational factors, 3) both Organizational citizenship behaviour and Perceived organizational support are positively associated with safety behaviour, and 4) among the four organizational factors, Perceived organisational support has the most impact. The participants were 320 Ghanaian industrial workers from textile factories, breweries and mines. Organizational safety climate was measured using the 50-item Workplace Safety Scale. Organizational citizenship behaviour, Perceived organizational support and job satisfaction were measured by standardised scales. Individual factors were gender, age, education, marital status and job tenure. The respondents reported their accidents during the past 12 months. Models were tested using Structural Equation Modelling: Both individual and organizational factors contributed to accident frequency supporting hypothesis 1. Hypothesis 2 was rejected as organizational factors were more strongly related to accident frequency than individual factors. Organizational citizenship behaviour and Perceived organizational support were positively associated with safety performances as Hypothesis 3 suggested. In line with Hypothesis 4 the strongest predictor of safety behaviour was Perceived organizational support. This study showed that both individual and organizational factors are contributory for accident process. However, the influence of organizational factors was stronger than that of individual factors. Implications for safety in Ghanaian organizations were discussed.

Keywords: individual factors, organizational factors, job satisfaction, citizenship behaviours, organizational support

1. Introduction

Organizational climate is defined as *a relatively enduring quality of the internal environment of an organization that is experienced by its members, influences their behavior, and can be described in terms of the values of a particular set of characteristics of the organization* (Tagiuri & Litwin, 1986). The division of organizational climate that has impacted the safety performances of workers is termed *organizational safety climate*. Safety climate is regarded in the literature as the shared perceptions of safety values, norms, beliefs, practices, and principles of workers in their work environments (Zohar, 1980).

Research in this area began in the early 1980s with Zohar's (1980) ubiquitous study. Among the prominent importance of safety perception surveys as leading indicators of safety performance, they have helped in the identification of precursors to accident occurrence, and by doing so, effectively decreased accident occurrence. Second, by providing proactive information regarding safety problems before they develop into accidents and injuries, safety perception surveys have provided guidance to management in developing specific safety programmes.

1.1 Individual Factors

Gender is one of the individual factors contributing to occupational injury. A review of 16 studies showed that the injury risk of males was 3.3 times higher than that of females. The injuries of men were often more serious,

as the risk of a fatality is 13 times higher for males than for females in nine studies (Salminen, Saari, Saarela, & Räsänen, 1992). Another review based on 15 different studies indicated that the average injury frequency of males is 3.0 times higher than that of females (Messing, Courville, Boucher, Dumais, & Seifert, 1994). However, the sex ratios for fatal occupational injuries decreased substantially in the US and Italy from 1955 to 1995 (Waldron, McCloskey, & Earle, 2005). The gender difference in occupational injuries is mostly explained by the lower proportion of females in high-risk industries (Toscano, Windau, & Knestaut, 1998). However, females in heavy manufacturing were more often involved in injuries than their male counterparts (Taiwo et al., 2009).

A review of 63 non-fatal studies showed that young employees have a higher injury rate than older workers. However, the injuries of young employees were less serious, because their fatality rate was lower than that of older employees (Salminen, 2004). A later review with nine cross-sectional studies showed that work injuries of young employees varied with hazard exposure, perceived work overload and job (Breslin et al., 2007). Night shifts in particular increased the risk of injury among young employees (Horwitz & McCall, 2005), and mother's education contributed strongly to the injuries involved of young workers (Rauscher & Myers, 2008). Older employees have a lower injury rate than younger ones among Ghanaian industrial workers (Gyekye & Salminen, 2009a).

Injuries tend to accumulate around new inexperienced workers (Barreto, Swerdlow, Schoemaker, & Smith, 2000). For example, the risk of a woodworker having an injury on his/her first day on the job can be even 50 times higher than that of a worker with one year's work experience (Larsson, 1988). Injury risk generally decreases as work experience increases (Butani, 1988; Gyekye & Salminen, 2010). On the other hand, it has been shown that experience per se does not decrease injury frequency independent of age (Gun & Ryan, 1994).

Education protects from occupational injury, because increased schooling decreased injury rate in Bangladesh (Davies, Koehlmoos, Courtice, & Ahmad, 2011). Highly educated miners had the lowest injury rate in Serbian underground coal mines (Stojadinovic et al., 2011) and in Ghanaian mines and manufacturing industry (Gyekye & Salminen, 2009b). On the other hand, young workers out of school had three times more occupational injuries than youngsters with a high school degree in Canada (Breslin, 2008).

1.2 Organizational Factors

One of the most prominent organizational factors is job satisfaction. Job satisfaction refers to the emotional state resulting from an employee's evaluation of all aspects of their work environment and the job itself (Locke, 1976). Research has indicated a positive association between job satisfaction and organizational safety climate (Gyekye & Salminen, 2006), safety behaviour (Gyekye & Salminen, 2007), and a negative relationship with accident frequency (Gyekye & Salminen, 2007).

Perceived organizational support (POS) refers to workers' general perceptions regarding their managements' or organizations' contributions and concern for their well-being (Aselage & Eisenberger, 2003; Eisenberger, Fasolo, & LaMastro, 1990). Workers make inferences about the extent to which their organizations value them, and reciprocate this perceived support in terms of increased commitment to performances (Rhoades & Eisenberger, 2002) and safety behaviour (Michael, Evans, Jasen, & Haight, 2005). Organizational support theory thus supposes that workers infer the extent to which organizations care about their well-being from meaningful organizational and social organizational values, norms, beliefs, practices and structures operational at the workplace. Research reports have indicated a positive association between supportive perceptions and workers' level of job satisfaction (Michael et al., 2005), safety performance (Gyekye & Salminen, 2007), organizational involvement and affective commitment (Aselage & Eisenberger, 2003; Eisenberger et al., 1990). A recent meta-analysis of the literature on POS by Rhoades and Eisenberger (2002) found strong support for all these findings. POS was selected as a measure in this study, because the support of organisation (supervisor and co-workers) has been shown to be an important factor in many studies.

Organizational citizenship behaviours (OCB) are discretionary behaviours that go beyond those formally prescribed by the organization and for which there are no direct rewards (Organ, 1988). Numerous studies have indicated a positive association between citizenship behaviours and job satisfaction, safety performance, and a negative association with accident involvement rate (Gyekye & Salminen, 2005). Organizational citizenship behaviour was selected to this study, because it is a rather new measure of engagement with an organization.

Based on the literature review, we developed a theoretical model about the relationships between organizational and individual factors related to occupational accidents (Figure 1). In the model, organizational factors are above accidents, whereas individual factors are below accidents. Every organizational factor shows a direct contribution to the accidents. In addition, job satisfaction, Perceived organizational support and Organizational citizenship behaviour influenced by the Work safety scale, which also contributes via safety compliance. Every

individual factor contributes directly to accidents, whereas gender and age indirectly influence via education: age also via experience and marital status.

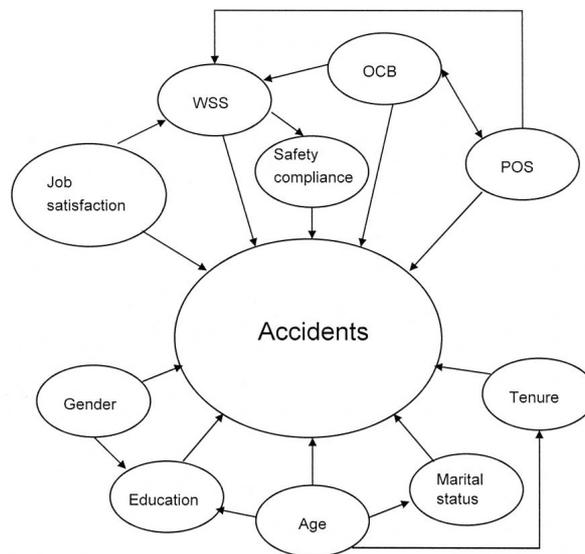


Figure 1. A theoretical model of individual and organizational factors

Drawing from the above review, the following hypotheses were tested in the present study:

- H1. Both individual and organizational factors contribute to safe behaviour and subsequently accident frequency.
 H2: Individual factors have more impact than organizational factors.
 H3. Both Organizational citizenship behaviour and Perceived organizational support are positively associated with safety behaviour, which in turn related to accidents.
 H4. Among the four organizational factors, POS will make the most impact.

Hypothesis 4 is based on the strong link between Perceived organisational support and organizational safety climate (Gyekye & Salminen, 2007).

The aim of this study is to compare individual and organizational factors as predictors of accident frequency. This is done by putting both types of variables into Structural Equation Modelling.

2. Material and Methods

2.1 The Participants

The participants were 320 Ghanaian industrial workers from nine organizations: textile factories, timber and saw-mill plants, breweries, food-processing plants, and underground mines,. Two out of three participants were males and one third females. A total of 13% had been at the workplace for less than a year, 22% between 1 - 4 years, 21% between 5 - 10 years, 25% between 11 - 14 years, and 19% over 15 years. Regarding age, 22% was between 18-29 years, 25% between 30-39 years, 43% between 40-49 years, and 10% was 50 or over. Marital status was single for 38% and married for 62%. Educational background of the subjects: 50% had basic education, 30% secondary education, 17% professional education, and 3% university education.

Participants were accident victims, co-workers, and supervisors. A total of 345 subjects were interviewed, but 25 responses were discarded because of multiple choices to the one question.

2.2 Methods

2.2.1 Organizational Safety Climate

Organizational Safety Climate measured workers' perceptions of safety were carried out by using the 50-item Workplace Safety Scale (WSS), developed by Hayes, Perander, Smecko, and Trask (1998). This instrument assesses employees' perceptions of work safety and measures five distinct constructs, each with 10 items: (i) work safety (sample item: "Safety programmes are effective", for all 10 items $\alpha = 0.96$), (ii) co-workers safety

(sample item: "Pay attention to safety rules", for 10 items $\alpha = 0.80$), (iii) supervisor safety (sample item: "Enforces safety rules", for 10 items $\alpha = 0.97$), (iv) management's commitment to safety (sample item: "Responds to safety concern", for 10 items $\alpha = 0.94$), (v) satisfaction with safety program (sample item: "Effective in reducing injuries", for 10 items $\alpha = 0.86$). The total coefficient alpha score (50 items) was 0.89. We have used only the total scale of WSS in the analysis, because it describes the best way the whole phenomenon. The respondents had a Likert scale from 1 not at all to 5 very much. The same 5-step response scale was used also in Organizational Citizenship Behaviour, Perceived Organizational Support, job satisfaction, and safety compliance scales.

2.2.2 Organizational Citizenship Behaviour (OCB)

Organizational Citizenship Behaviour (OCB): was measured with an adapted version of the OCB scale developed by van Dyne, Graham, and Dienesch (1994). The scale consisted of twenty items, under three subscales of Obedience (sample item: "Gives my very best even when exhausted", for six items $\alpha = 0.76$), Loyalty (sample item: "Volunteers for overtime work when needed", for seven items $\alpha = 0.92$) and Participation (sample item: "Helps co-workers with their assignments", for seven items $\alpha = 0.92$.) The total coefficient alpha score (20 items) was 0.92. In the analysis the total scale of OCB was used.

2.2.3 Perceived Organizational Support (POS)

Perceived Organizational Support (POS): was measured using the short version of Eisenberger et al.'s (1990) survey of Perceived Organizational Support. The scale consisted of eight items and assessed workers' evaluation of organizational issues that affect their well-being. Sample items were "My organization values my contribution to its well-being", "My organization takes pride in my accomplishments", and "Help is available from the organization when I have a problem". The responses ranged from 9 to 39 and responses to this scale (eight items) produced a satisfactory reliability of 0.97.

2.2.4 Job Satisfaction

Job Satisfaction was measured using Porter and Lawler's (1968) one-item global measure of job satisfaction. This scale was chosen because single-item measures of overall job satisfaction are considered to be more robust than scale measures.

2.2.5 Safety Compliance

Safety compliance was pooled from existent literature (Probst & Brubaker, 2001). They comprised four questions that assessed workers' compliance with safe work behaviour. Sample items were "Keep my workplace clean", and "Follow safety procedures regardless of the situation". Participants responded on a five-point scale ranging from 1 (= *not at all*) to 5 (= *very much*) on all the above scales. The value of the coefficient alpha measuring the reliability of the scale (four items) was 0.64.

2.2.6 Accident Frequency

Accident frequency was measured by responses to a question: "Please indicate the number of times you have involved in accidents in the past 12 months". All cases studied were accidents classified as serious by the safety inspection authorities. Because of the skew nature of accidents frequency the highest class was 4+ accidents.

2.3 Procedure

Letters requesting permission to undertake a research study as part of an academic program were sent to the Chief Inspectorates of Factories and Mines. A list of factories and mines was provided and they were contacted. During their lunch break, participants responded to a questionnaire in English - the official language of Ghana. The interviews lasted 15–20 minutes, depending on the context in which they were conducted, and on the respondents' level of education. Supervisors completed the questionnaire unaided, while for illiterate or semi-literate respondents who had difficulty understanding written English, the local language was used via an interpreter. All were assured that their responses would remain anonymous and confidential, and that none of their managers was involved in any way in the study.

2.4 Data Analyses

Data Analyses was done by the SAS Statistical Package, Version 9.1 (SAS Institute Inc, NC, USA) using for the psychometric properties of the measures, the descriptive statistics, and correlations. Structural Equation Modelling (SEM) and Confirmatory Factor Analysis (CFA) were used to test the predicted relationships. SEM was employed to test a mediation model. We checked the normal distribution of the scale. In order to examine the fit of the models, several criteria were examined: the criterion of a $GFI > 0.90$ was used to evaluate the goodness of fit (Bentler, 1990). The RMSEA quantifies the discrepancy between the data and a proposed model

per degree of freedom. Values below 0.06 indicate a good fit (Ullman, 2001) whereas values up to 0.08 represent reasonable errors of approximation (Roelofs, Verbraak, & Keijsers, 2005). Cudeck and Brown (1993) consider models with an RMSEA value of 0.10 or lower acceptable.

3. Results

3.1 Descriptive Results

Table 1 shows that male workers were more often involved in occupational injuries than their female counterparts. Young employees aged between 18 and 29 registered a relatively higher accident frequency than their older colleagues. Single workers had a relatively higher injury rate than their married counterparts. Employees with only basic education recorded the highest accident frequency among their colleagues. Accident frequency decreased linearly with increased experience.

Table 1. Individual factors related to accident frequency

Mean	Mean	t-tests
Male 2.06	Female 1.47	4.45, p<0.001
Single 2.69	Married 1.30	13.62, p<0.001
Age 18-29 2.98; 30-39 2.21; 40-49 1.21; 50+ 1.21		one-way variance F 77.42, p<0.001
Experience 1-12 mo 3.16; 1-4 y. 2.73; 5-10 y. 1.64; 11-15 y. 1.17; 15+ y. 1.10		F 79.22, p<0.001
Education Basic 2.93; Second 1.98; Professional 1.09; University 1.43		F 69.80, p<0.001

We found some links between individual factors and organizational citizenship behaviours (Table 2). Female workers more actively participated in citizenship behaviours than their male colleagues. Older workers and the married participated in organizational citizenship behaviours more actively than their younger and single counterparts. Employees with basic education were the least active in citizenship behaviours. Participation in OCBs increased linearly with experience at the company.

Table 2. Individual factors related to organizational citizenship behaviour

Mean	Mean	t-tests
Male 66.88	Female 75.77	-4.09, p<0.001
Single 55.13	Married 79.73	-15.13, p<0.001
Age 18-29 49.03; 30-39 64.82; 40-49 80.87; 50+ 82.45		one-way variance F 105.66, p<0.001
Experience 1-12 mo 46.97; 1-4 y. 53.30; 5-10 y. 73.56; 11-15 y. 81.67; 15+ y. 84.80		F 124.42, p<0.001
Education Basic 51.39; Second 67.36; Professional 82.88; University 81.00		F 81.79, p<0.001

The following observation was recorded between individual factors and job satisfaction (Table 3). Older and married workers expressed more job satisfaction than their younger and single counterparts, respectively. Higher-educated workers expressed more job satisfaction than their lower-educated counterparts, and job satisfaction increased linearly with tenure.

Table 3. Individual factors related to job satisfaction

Mean	Mean	t-tests
Single 2.38	Married 3.88	-15.13, p<0.001
Age 18-29 2.21; 30-39 2.70; 40-49 3.94; 50+ 4.34		one-way variance F 46.58, p<0.001
Experience 1-12 mo 1.92; 1-4 y. 2.29; 5-10 y. 3.56; 11-15 y. 3.88; 15+ y. 4.25		F 43.72, p<0.001
Education Basic 2.00; Second 3.14; Professional 4.11; University 4.38		F 52.30, p<0.001

The following observations were made on the Work Safety Scale (Table 4). Female workers gave a more constructive assessment of the safety level in their workplace than their male counterparts. Perceived safety of the organization increased linearly with age. Married workers rated safety levels in the workplace more highly

than their single counterparts. The perceived safety level of the workplace increased with the increased education level of the subject and tenure in the company.

Table 4. Individual factors related to work safety scale

Mean	Mean	t-tests
Male 144.69	Female 157.80	-3.98, p<0.001
Single 132.61	Married 162.85	-11.46, p<0.001
Age 18-29 126.56; 30-39 144.83; 40-49 162.89; 50+ 172.48		one-way variance F 55.93, p<0.001
Experience 1-12 mo 124.03; 1-4 y. 132.05; 5-10 y. 153.72; 11-15 y. 163.75; 15+ y. 169.91		F 47.78, p<0.001
Education Basic 128.28; Second 146.50; Professional 167.36; University 171.00		F 47.87, p<0.001

Finally females expressed greater supportive perceptions than their male counterparts (Table 5). Older employees perceived more support from their organization than their younger counterparts. Married employees perceived more support from their management than their single counterparts. Perceived organizational support was noted to increase linearly with increased level of education. Tenure increased linearly with the support received from the workplace.

Table 5. Individual factors related to perceived organizational support

Mean	Mean	t-tests
Male 23.84	Female 28.56	-3.93, p<0.001
Single 18.00	Married 30.69	-13.74, p<0.001
Age 18-29 15.32; 30-39 22.52; 40-49 30.94; 50+ 33.00		one-way variance F 74.44, p<0.001
Experience 1-12 mo 15.03; 1-4 y. 16.20; 5-10 y. 26.06; 11-15 y. 32.68; 15+ y. 33.72		F 106.24, p<0.001
Education Basic 15.55; Second 23.61; Professional 33.58; University 28.57		F 93.88, p<0.001

3.2 Models of Individual and Organizational Factors

Table 6 shows the matrix of product-moment correlations between individual and organizational factors and accident frequency. The highly significant correlations showed that organizational factors contributed to the accident frequency. However, the effects of organizational factors (OCB, WSS, and POS) were stronger than those of job satisfaction, gender, age, marital status, education, and tenure. There are some missing values, why the number of observations varied.

Table 6. Correlations among measures in the study

Scales (n=235-304)	1	2	3	4	5	6	7	8	9	10
1. Gender	-									
2. Age	.13**									
3. Marital status	.20**	.75**								
4. Education	.14*	.61**	.63**							
5. Tenure	.13*	.76**	.65**	.66**						
6. OCB ²	.23**	.69**	.66**	.64**	.76**					
7. Job Satisfaction	.11	.55**	.52**	.55**	.58**	.70**				
8. Work Safety Scale	.25**	.64**	.60**	.61**	.65**	.85**	.64**			
9. Safety compliance	.24**	.62**	.59**	.57**	.68**	.84**	.69**	.87**		
10. POS ³	.23**	.64**	.63**	.63**	.74**	.86**	.70**	.88**	.90**	
11. Accident frequency	-.25**	-.63**	-.62**	-.61**	-.68**	-.82**	-.65**	-.80**	-.82**	-.86**

¹ = p<0.05, ² = p<0.01, ³ = p<0.001

2 = Organizational Citizenship Behaviour

3 = Perceived Organizational Support

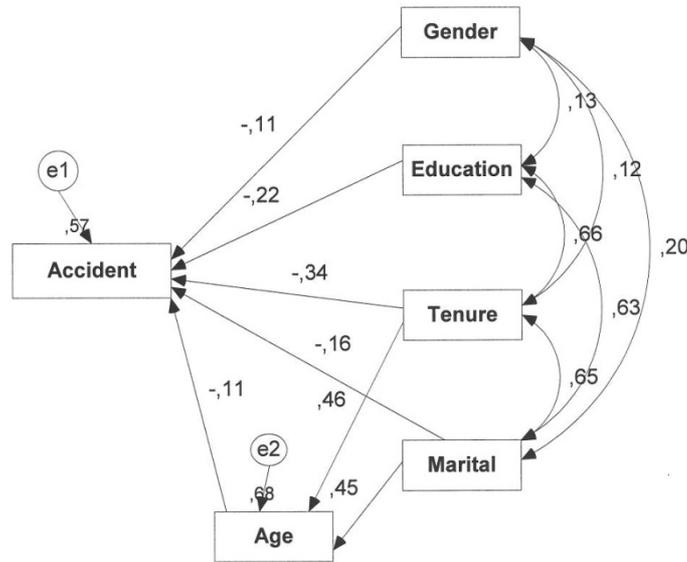


Figure 2. Individual factors influencing occupational accidents

The Harman's single factor test was used to test common method variance. The results with Confirmatory Factor Analysis (CFA) revealed a significant inferior fit of the model with one single factor ($\Delta X^2(2) = 640.77, p < 0.001$). Hence, one single factor could not account for the variance in the data.

Subsequently, we tested our main hypotheses using Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM) procedures (Figure 2). The model of individual factors fit the data, as RMSEA was 0.000 (under 0.05) and other coefficients (NFI, RFI, IFI, TLI, and CFI) were about 1.00 (0.986-1.007). As depicted, tenure offered the strongest impact on accident frequency; the more experienced worker, the lower the accident frequency ($-0.34, p < 0.001$). The influence of education ($-0.22, p < 0.001$), gender ($-0.11, p < 0.01$) and marital status ($-0.16, p < 0.05$) were also statistically significant. Thus male and single workers with the only basic education had the highest accident frequency. Tenure ($0.46, p < 0.001$) and marital status ($0.45, p < 0.001$) also impacted significantly on age which was less influential on accident frequency.

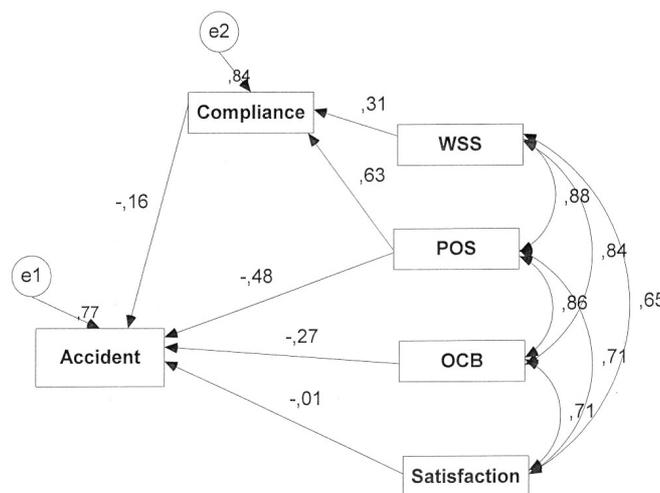


Figure 3. Organizational factors influencing occupational accidents

The model for organizational factors was also a good fit, as RMSEA was 0.059, and NFI (0.997) and CFI (0.998) were close to 1.00 (Figure 3). POS was the strongest explanatory factor for accident frequency ($-0.48, p < 0.001$): workers with stronger supportive perceptions recorded fewer accidents. OCB ($-0.27, p < 0.001$) and safety compliance ($-0.16, p < 0.05$) were all significant predictors of accident frequency because of the employees binding with his/her organization and working safely had less accidents. POS ($0.63, p < 0.001$) and WSS ($0.31, p < 0.001$) were both strongly related to safety compliance.

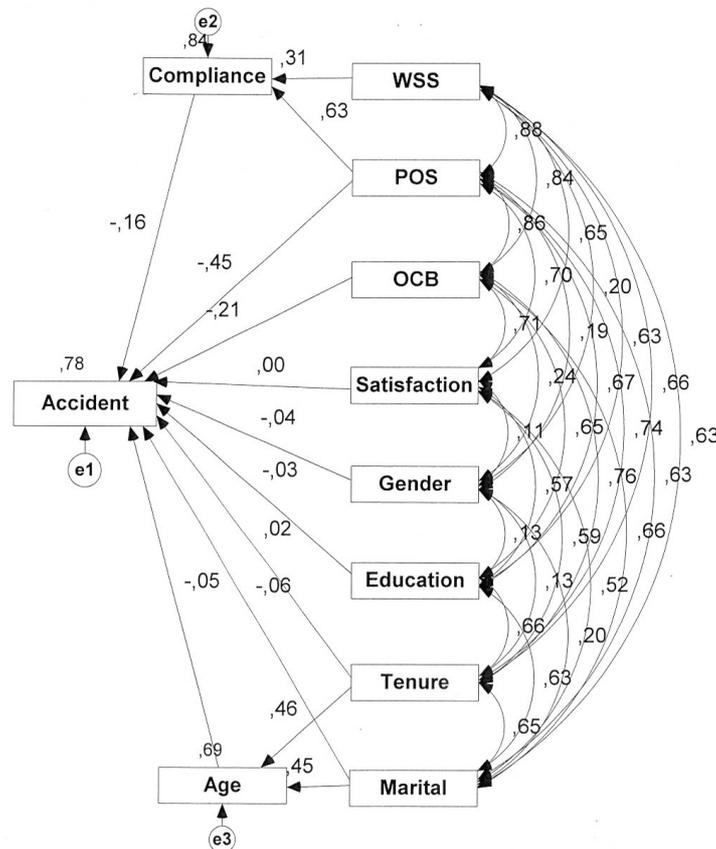


Figure 4. Final model of individual and organizational factors

The final SEM model depicting both individual and organizational factors is presented in Figure 4. The test statistics indicate that the model fits the data well, as RMSEA = 0.029. The other 'goodness of fit' indicators were as follows: NFI = 0.994; CFI = 0.999; and CMIN/DF = 1.264 (between 1.00 and 2.00). The model clearly indicates that OCB ($-0.21, p < 0.001$) and safety compliance ($-0.16, p < 0.05$) were significant predictors of accident frequency meaning that workers bind strongly with organisation and its safety policy had less injuries. POS ($-0.45, p < 0.001$) indicated the strongest impact thus showing that the stronger support from his/her organisation the subject received, the less accident he/she had. POS ($0.63, p < 0.001$) and WSS ($0.31, p < 0.001$) also demonstrated strong links with safety compliance.

Finally, we tested different mediation models and the best of them was shown in the Figure 5. The mediation model fit the data, as RMSEA was 0.055, NFI 0.974, RFI 0.963, IFI 0.987, TLI 0.982, and CFI 0.987. In the model Work Safety Scale (WSS) was the strongest predictor of accidents ($-.89, p < 0.001$) and the Perceived Organizational Support (POS) had a strong connection with WSS ($.99, p < 0.001$). These results mean that employees receiving strong support from their organization and behaving in safe way that leading few accidents.

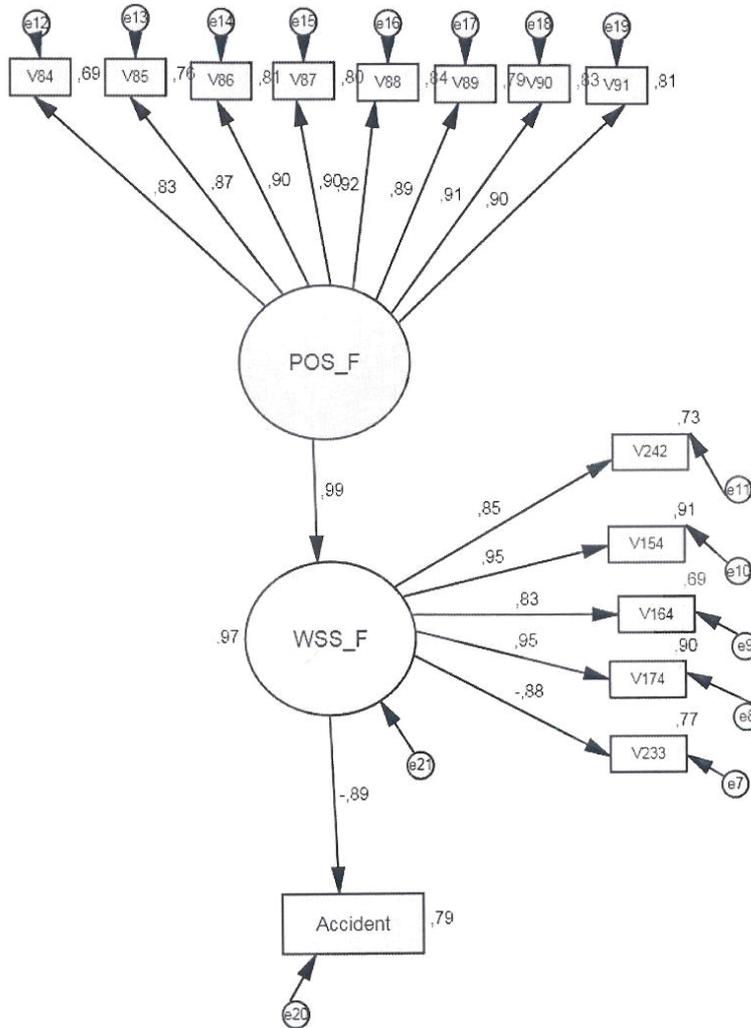


Figure 5. Mediation model of individual and organizational factors

4. Discussion

The current study explored the impact of individual and organizational factors on safe behavior. We hypothesized that (i) both individual and organizational factors contribute to accident frequency; (ii) individual factors have a stronger impact than organizational factors, (iii) safety behaviour mediates between individual factors, organizational factors and accident frequency, and (iv) among the organizational factors, Perceived organizational support made the most impact. The findings reported here indicate partial support for our hypotheses, and the final model fit the data adequately.

First, we found strong evidence for both individual factors and organizational factors as contributory factors for accident frequency. However, the results did not support Hypothesis 2, as the impact of organizational factors on occupational injuries stronger than individual factors in the final model. This result reflects to the meaning of safety culture in the safety literature as integrating individual and organizational level of action (Glendon, 2008).

Hypothesis 3 was supported: Organizational citizenship behaviour and Perceived organizational support were positively associated with safety performances, indicating that citizenship behaviours and supportive perceptions have a positive effect on safety behaviour. Existing theory and research suggest that both citizenship behaviours and supportive perceptions are context-related phenomena that are influenced by both personal characteristics and work environmental factors (Somech & Drach-Zahavy, 2004). It is workers' appraisals, assessments and evaluations of workplace conditions that either promote or discourage participation supportive perceptions and citizenship behaviours. Thus previous studies have consistently found a positive association between these two variables and job satisfaction and safe behaviour, and a negative association with accident frequency (Gyekye &

Salminen, 2005, 2006).

Hypothesis 4 was also supported: the strongest predictor of safety behaviour in the model was perceived organizational support. In the safety literature it is viewed as a context-related phenomenon influenced by a variety of contextual factors such as the prevailing safety climate (Eisenberger, et al., 1990; Rhoades & Eisenberger, 2002). When workers perceive their organizations as being supportive, concerned and interested in their general well-being, they have also perceive management as valuing their safety. Such supportive perceptions create a feeling of indebtedness and a corresponding sense of obligation among workers to respond positively in return. As a means of reciprocity for the management's recompense, workers had been enthused into complying to the safety management policies (Gyekye & Salminen, 2005, 2007) and subsequently recorded a decrease in their accident involvement.

4.1 Practical Implications

Our findings indicated that organizational (contextual) factors have a stronger effect than individual factors. This surely has practical implications for safety management interventions. Organizational behaviours (e.g. POS & OCB) do not occur in a vacuum. They are activated or discouraged by the organizational context within which workers perform their duties. Incorporating assessments of individual factors and organizational variables into safety monitoring systems will therefore provide a more complete assessment not only of the effectiveness of safety practices, but also of the entire organizational set-up. When management invests into making their organizations more satisfying and safe by implementing fairness perception measures, creating job enrichment programmes, and providing support beyond what is formally stated in the contractual agreement, they increase worker job-satisfaction, organizational efficiency and productivity, inspire safe work practices, and consequently decrease accident frequency (Gyekye & Salminen, 2007; Aryee, Budhwar, & Chen, 2002). The findings complement previous ones which have demonstrated that the general organizational climate influences perceptions of safety climate, which in turn influences safety performance and accident frequency (Neal, Griffin, & Hart, 2000).

Despite the quantity of research that has investigated the mechanisms by which safety climate affects safety behaviour, there are surprisingly few high quality, primary analytical studies that have explored the differential and combined effects of individual and organizational factors on safety performance and the resulting outcome on accident frequency.

4.2 Study Limitations

The study is limited by its reliance on self-reported instruments. The possibility thus exists that the findings may be distorted by participants' desire to respond in a consistent manner. High correlations between measures may reflect this problem. However, recent meta-analytic research by Crampton and Wagner (1994) indicates that while this problem continues to be cited regularly, the magnitude of distortions may be overestimated. Self-reported measures have previously been effectively used in workplace accident analyses and safety surveys (Gyekye & Salminen, 2005, 2007). Additionally, the use of structural equation analyses, in itself, cannot provide evidence about causation. However, we believe that SEM is a powerful technique that allows measurement (model parameters) and path parameters to be measured simultaneously (Landis, Beal, & Tesluk, 2000). By so doing, it enabled us to test a series of hypotheses that were consistent with a causal model.

Nevertheless, the current research model provides valuable evidence regarding the relative impact of individual factors and specific forms of organizational variables on safety behaviour and accident frequency. It can thus be considered an extension of the traditional research models on organizational climate, which assume a direct relationship between individual factors, aspects of the organizational climate, and accident frequency.

4.3 Conclusions

This study showed that both individual and organizational factors contributed to the occurrence of occupational accidents among Ghanaian industrial workers. Tenure was the strongest individual factors, but education, gender and marital status have also a significant effect on accident frequency. Perceived organizational support was the strongest explanatory factor among organizational factors, although Organizational citizenship behavior and safety compliance had also significant contribution on occupational accidents. These results showed that one needs to do many-sided work to prevent occupational injuries.

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