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Article

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MANAGEMENT | RESEARCH ARTICLE

Safety training transfer in chemical manufacturing: The role of personality traits and learning motivation

Anasuya K Lingappa¹, Krithi Kiran K¹ and Asish Oommen Mathew^{1*}

Abstract: This study investigates the influence of personality characteristics and employees' motivation to learn on safety training transfer, in the context of a chemical manufacturing company. The study focuses on five personality characteristics: Locus of Control, Extraversion, Conscientiousness, Neuroticism, and Risk-Taking Propensity. Also, the roles of Motivation to Learn (MTL) and Motivation to Transfer (MTT) on Safety Training Transfer (STT) are examined. The data for the study was collected using a self-report questionnaire survey from 226 employees from an Indian subsidiary of one of the largest chemical companies in the world. The obtained responses were analyzed using Structural Equations Modelling (SEM), Partial Least Squares (PLS) method. The results of the analysis show that among the five personality factors considered, Conscientiousness and Locus of control positively influenced STT through MTL whereas Risk Taking Propensity had a negative relationship. Extraversion and Neuroticism did not indicate any significant influence.

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PUBLIC INTEREST STATEMENT

Workplace Safety is of paramount importance to any organization. Though implementation of preventative technology may abate the potential accidents to some extent, regular safety training to employees is considered equally important in accident deterrence and mitigation. However, how an employee receives and applies what is learnt in safety training is influenced by the individual's innate composition. Personality and motivational factors make up a huge part of an individual's wish to engage in workplace safety behavior. This research work identifies the specific personality traits which could significantly influence the desire to learn about safety and motivation to transfer what is learnt if an actual safety situation were to arise. Companies, especially where safety is critical, could use these findings to leverage their recruitment and training practices to enhance the effectiveness of their current safety practices.

This paper adds to academic knowledge of safety training by analyzing how employees' personality factors influence MTL, MTT, and STT behavior. The results shed light on safety training in the context of the chemical industry operational in a developing nation, a combination rarely found in previous studies.

Subjects: Work & Organizational Psychology; Personnel Selection, Assessment, and Human Resource Management; Human Resource Development

Keywords: personality characteristics; motivation to learn; motivation to transfer; safety training transfer; chemical industry

1. Introduction

"Prevention is better than cure", has been the motto of workplace safety. Therefore, rightly so, identification and mitigation of causal factors related to job-related accidents and incidents, and safety training have gained prime importance in instilling the desired safety behavior among employees. Safety behavior is defined as a set of actions or behavior that an employee exhibits to advance the health and safety of co-workers, the clients, the public, and the environment (Burke & Hutchins, 2007). Safety-related work behavior can be thought of as a true workplace safety indicator because it can be used to infer both the absence and presence of safety.

Safety in the chemical industry is of paramount importance in a densely populated nation like India. The chemical industries in India as well as across the world were sensitized to the importance of safety through a major disaster—the Bhopal gas tragedy in the year 1984. The recent Beirut blasts demonstrate the potential of devastation mishandled chemicals could cause. The International Labor Organization (ILO) indicates that the risk of fatal occupational injuries in the developing countries is nearly twice as high as in the developed countries which indicates a potential connection between the fatality rates and the nation's advancement level (Baradan et al., 2018).

Safety management systems related to safety behavior in developing countries have gained a lot of attention. According to past studies, training the employees on safety is the most influential safety management practice concerning safety performance components (Aksorn & Hadikusumo, 2007). The company can select, train and support its employees by providing a positive safety climate to maximize safety motivation and safety knowledge, which in turn leads to safe behaviors and minimizes accidents and injuries (Christian et al., 2009; Lee et al., 2014). When the work conditions are more hazardous, safety training tends to influence safety-related knowledge attainment due to the importance of personal safety under highly dangerous circumstances (Prentice-Dunn & Rogers, 1986). A commitment towards safety could create unity among safety-related human resource practices potentially improving a firm's overall safety performance (Sahinidis & Bouris, 2008). Hence high importance is given to the transfer of training to achieve the safety goals of an organization.

Although several researchers have explored the relationship between personality characteristics and motivation to learn, the majority of them have been studied in the context of general training and developed countries (Allik, 2012; Heaven & Ciarrochi, 2012; Komarraju et al., 2011). Geographical effects through cultural dissimilarities could result in the personality characteristics of workers in various countries to be different (Allik & McCrae, 2004). It is also important to keep in mind the demographic characteristics of the people being trained as these may have an influence on STT (Loosemore & Malouf, 2019). Further research would need to be conducted in developing countries, given that there are most likely different safety intervention levels for improving safety behavior depending on the characteristics of workers (Zaira & Hadikusumo, 2017). It is also possible that organization type affects the workers' learning characteristics and abilities; which in turn may result in varying levels of safety understanding and performance (Xu et al., 2019).

This study was carried out at the largest Indian subsidiary of one of the world's leading chemical manufacturing companies producing chemicals like dyes and construction chemicals, catering to customers globally. The safety training policy and procedure apply to employees of all business and functional units of the organization regardless of age, position, gender, disability, or ethnic background who are expected to undertake safety training which is viewed as a continuous process throughout their employment duration. The current study contributes to the literature of workplace safety by exploring the influence of personality characteristics on Safety Training Transfer through Motivation to Learn and Motivation to Transfer. Although studies in the past have tried to understand the effect of personality characteristics on learning motivation and training transfer, it mostly focusses on general training, mostly academic, and has focussed on developed countries at large (Komarraju et al., 2009). The findings from this study will add to the body of knowledge as it focusses on the topic, in an organizational context of a chemical company from an emerging economy which is rarely addressed in past studies. In this context, this study aims to answer the following questions:

- a. *To what extent do personality characteristics influence employees' Motivation to Learn (MTL)?*
- b. *How does employees' motivation to learn influence Motivation to Transfer (MTT) of safety training?*
- c. *In what way does motivation to transfer affect transfer of safety training (STT)?*
- d. *Does motivation to learn and motivation to transfer mediate the relationship between personality characteristics and safety training transfer?*

2. Literature review and research hypotheses

2.1. Safety training transfer (STT)

The key process of transferring acquired knowledge is critical for organizations to maximize the transfer of knowledge and skills which is considered as an output of training (Shen & Tang, 2018). In safety training, the trainee is made aware of the hazards and dangers which are specific to the workplace and is provided training to foresee and predict potential accidents and injuries, in addition to general training to conduct day-to-day work-related tasks. An often-under-addressed area of safety training is the concept of training transfer (Prasad et al., 2018).

Barriers to transfer could emerge from various factors related to the work environment, motivation, and individual characteristics. Since the trainees themselves make the transfer decision of the knowledge and skills acquired through training, the personality characteristics of trainees and their motivation to do so play a key role when it comes to the transfer of training (Freitas et al., 2018). Pidd (2004) proposed that personality characteristics of trainees can interact with workplace social support to influence safety training transfer.

Among other factors, an employee's MTL and MTT may affect the transfer of knowledge acquired in workplace training (Gegenfurtner et al., 2009). In an industrial setting, where safety and health matters are of paramount importance, STT was found to be influenced by factors such as trainee motivation and commitment (Brinia & Efstathiou, 2012). According to Christian et al. (2009), safety motivation was most strongly related to safety performance behaviors, in addition to safety knowledge which can be imparted through training. Hence, MTT and MTL are among the two important factors that influence the transfer of safety training.

2.2. Motivation to transfer (MTT)

According to Noe (1986), MTT can be understood as the "desire to apply acquired knowledge and skills to the performance of job tasks". As explained by theories of expectancy, equity, and goal setting, trainees leave training programs with improved levels of motivation to transfer the learning onto their jobs (Yamhill & McLean, 2001). An employee lacking in MTT may not apply the newly attained knowledge and skills from training at work (Gegenfurtner et al., 2009). It is

understood that the combined motivational influences of MTL and MTT positively impact the desired training transfer (Naquin & Holton, 2002). Hence, we put forward the following hypothesis.

H₁: MTT has a significant positive influence on STT.

2.3. Motivation to learn (MTL)

According to Noe (1986), MTL is the “desire to obtain knowledge and skills through training”. MTL was observed to be significantly associated not only with learning measures but also with transfer measures (Colquitt et al., 2000; Weissbein et al., 2011). It is proposed that MTL has a significant positive influence on motivation to transfer and motivation to transfer has a significant positive influence on the transfer of training (Burke & Hutchins, 2007; Kim et al., 2019; Madagamage et al., 2014). Previous studies conducted in an organizational setting confirm that learning motivation is a significant predictor of transfer motivation (Kontoghiorghes, 2004; Rowold, 2007). We, therefore, try to examine this relationship in the context of safety training by presenting the following hypothesis.

H₂: MTL has a significant positive influence on MTT

2.4. Personality characteristics

The personality of an individual is considered as a trait that manifests in certain forms of behavior, insights and sentiments (Allik, 2012; Heaven & Ciarrochi, 2012). Several studies reveal the use of the personality characteristic measures to predict job performance and it is proved that personality is an important determinant of individual behavior at the workplace (Barrick et al., 2001).

The big five framework of personality by Costa and McCrae (1985) featuring extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience is used extensively in research (Bartels et al., 2012). However, safety training research prefers not to use openness to experience and agreeableness but uses Locus of Control and Risk-taking Propensity instead (Christian et al., 2009).

2.4.1. Locus of control (LOC)

Locus of Control (LOC) is the extent to which individuals feel they personally control the happenings in their lives as opposed to those events being regulated by external factors (Judge et al., 2002). People who believe they can control events should be more motivated to learn and engage themselves in safety practices when compared to people who do not believe they can control accidents (Christian et al., 2009). It was found that LOC has a positive relationship with safety performance behavior because of the inherent motivational component and therefore, has a weaker relationship with accidents and injuries (Timo & Mikko, 2004). Based on this argument, the following research hypothesis can be built.

H₃: Locus of Control (LOC) has a significant positive influence on MTL

2.4.2. Extraversion (EXT)

Individuals high in *Extraversion (EXT)* are described as outgoing, spontaneous, bold, and fun-loving (McCrae & Costa, 1987). Though high extraversion could cause harm because of the sensation-seeking aspect of the trait and could lead people to engage in risky behavior, it is generally found to be unrelated to accidents (Clarke & Robertson, 2005). In an academic setting, EXT was observed to have a significant association with motivation but not necessarily on exam performance (De Feyter et al., 2012; Komarraju et al., 2009). However, in an organizational context, EXT's influence on motivation as found to be mixed and uncertain (Barrick and Mount, 1991; Naquin & Holton, 2002). We, therefore, propose the following hypothesis in the context of safety training.

H₄: Extraversion (EXT) significantly influences MTL.

2.4.3. Conscientiousness (CON)

Conscientiousness (CON) consists of achievement, responsibility, and dependability components (Hough, 1992). Conscientious individuals are trustworthy and dependable people who fix, commit to, and voluntarily strive hard to accomplish personal objectives. It was also found that conscientious people tend to exhibit higher levels of intrinsic motivation (Furnham et al., 2002; Komarraju et al., 2009) and safety motivation (Griifin & Neal, 2000). Conscientious employees are more self-controlled, adhere to standard procedures to a greater extent, follow a more logical approach to decision-making, and therefore, commit fewer mistakes (Barrick & Mount, 2005; Kaplan et al., 2011). It was also found that conscientiousness and motivation to learn are significantly related through work commitment which was found to be an important factor influencing training transfer (Naquin & Holton, 2002). Therefore, we can posit that CON has a distal relationship with voluntary safety performance behavior.

H₅: Conscientiousness (CON) has a significant positive influence on MTL

2.4.4. Neuroticism (NRT)

Neuroticism (NRT) -People who are high in NRT are more prone to anxiety, self-consciousness, and stress, whereas people who are low in NRT are generally more calm and confident (McCrae & Costa, 1987). It is the trait of an individual where they have trouble dealing with threatening situations (Kanfer & Ackerman, 1989). NRT was found to be negatively related to motivation to learn which may hamper the safety outcomes. However, Clarke and Robertson (2005) found that neuroticism and accidents had a negligible relationship with safety behaviors. In fact, some researchers propose that people high in NRT may be attuned to signs of danger at the workplace and therefore are less prone to safety errors (Furnham et al., 2002). Based on these arguments, the following research hypothesis can be put forward:

H₆: Neuroticism (NRT) significantly influences MTL

2.4.5. Risk Taking propensity (RTP)

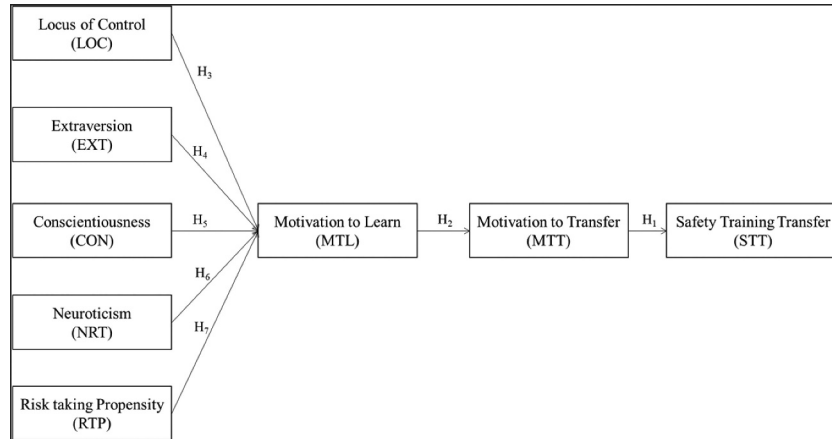
People high in RTP are more likely to be impulsive sensation seekers and may engage in unsafe behavior either because they underestimate the chances of accidents or because they are enthused by risk. They may be more likely to seek out high-risk jobs that might steer to riskier choices and actions (Nicholson et al., 2005). Risk-taking people are more likely to engage in unsafe behaviors than their co-workers because they neglect the chances of accidents and also they might be more stimulated to engage in risky behavior (Zuckerman et al., 1991). Further Christian et al. (2009) proposed that risk-taking has a negative relationship with safety performance and safety outcomes. Fung et al. (2010) found that the employees who are motivated to indulge in risk-taking are less aware of their safety issues and thus, RTP is weakly correlated to safety outcomes. We propose the following hypothesis to analyze the influence of RTP on MTL.

H₇: Risk Taking Propensity (RTP) significantly influences MTL

2.5. Mediating effects of MTL and MTT

The most widely accepted theories regarding personality and job performance focus on work motivation as the key mediating mechanism (Barrick & Mount, 2005; Komarraju et al., 2009; Lee & Dalal, 2016). It is proposed that MTL has a significant positive influence on motivation to transfer and motivation to transfer has a significant positive influence on the transfer of training (Burke & Hutchins, 2007; Madagamage et al., 2014). Furthermore, studies suggest that MTT mediates the relationship between learning during training and transfer after training (Lee et al., 2014). Motivation to improve work through learning (MTIWL), which is an integration of MTL and MTT is not only an outcome of personality characteristics but also serves as an important determinant of training transfer (Ng & Ahmad, 2018). Therefore, in the context of safety training, we propose to test the mediation effects of MTL and MTT as follows.

Figure 1. Conceptual framework.



H_{8a}: MTL and MTT mediates the relationship between LOC and STT

H_{8b}: MTL and MTT mediates the relationship between EXT and STT

H_{8c}: MTL and MTT mediates the relationship between CON and STT

H_{8d}: MTL and MTT mediates the relationship between NRT and STT

H_{8e}: MTL and MTT mediates the relationship between RTP and STT

The conceptual model of this research is presented in Figure 1.

3. Methodology

This research used a quantitative approach and data was collected through a questionnaire survey method. The responses were measured with the help of a 5-point Likert Scale and analyzed using Partial Least Square-Structural Equation Modelling (PLS-SEM) method.

3.1. Survey instrument and validation

A self-administered questionnaire using a five-point Likert scale was constructed based on the literature for all the constructs involved in the conceptual model. The questionnaire used for the survey (Table 1) included three items of Locus of Control (LOC), three items of Extraversion (EXT), two items of Conscientiousness (CON), four items of Neuroticism (NRT), two items of Risk Taking Propensity (RTP), four items of Motivation to Learn (MTL), three items of Motivation to Transfer (MTT) and three items of Safety Training Transfer (STT).

3.2. Target population and sampling

The data for the study was collected using a self-report questionnaire survey from 226 employees from an Indian subsidiary of one of the largest chemical companies in the world. The total population of the company was 484 employees which include both regular employees and as well as contract workers. As per company rules and regulations safety training is mandatory training for all the employees of the company regardless of age, gender, cadre, contract or regular, disability, or ethnic background. Based on this the sample size is calculated using the formula given below (Kothari, 2004).

$$N = \frac{Z^2 \times p \times q \times N}{e^2 \times (N - 1) + Z^2 \times p \times q}$$

Table 1. Survey questionnaire

Construct	Item Code	Description	Source
Locus of Control	LOC1	I feel that what happens in my life is mostly determined by powerful people.	Correia de Caires (2013)
	LOC2	I feel that events in my life mostly happen unplanned.	
	LOC3	People like me have little chance of protecting myself when there is conflict with other influential people.	
Extraversion	EXT 1	I like to be in the company of people.	John and Srivastava (1999)
	EXT 2	By nature, I am a social person.	
	EXT 3	I enjoy being part of a group.	
Conscientiousness	CON1	I put efforts to excel in whatever I do.	John and Srivastava (1999)
	CON2	I work very hard.	
Neuroticism	NRT1	I am not easily stressed by situations.	John and Srivastava (1999)
	NRT2	I am calm, even in very difficult situations.	
	NRT3	I often get worried that I will do mistakes.	
	NRT4	I always keep my cool, no matter what happens.	
Risk Taking Propensity	RTP1	Risk taking is in my nature.	John and Srivastava (1999)
	RTP2	I consider myself a risk-taker.	
Motivation to Learn	MTL1	I am always motivated to learn.	Adapted from Noe and Schmitt (1986)
	MTL2	I always try to learn as much as I can.	
	MTL3	I feel it is important for me to learn what is being taught in safety training sessions.	
	MTL4	I think that what I am learning in safety training sessions is useful.	
Motivation to Transfer	MIT1	I will set the specific goals for maintaining the skills that I have learned in the training.	Madagamage et al. (2014)
	MIT2	I will examine the potential obstacles to using the skills that I have learned in safety training.	
	MIT3	I usually discuss with my co-workers the ways to use the safety training knowledge that I have learned.	
Safety Training Transfer	STT1	I have accomplished the job tasks better by using knowledge acquired from safety training sessions.	Adapted from Lee, D. H. (1996)
	STT2	I have accomplished my job tasks in a safer manner after safety related training.	
	STT3	The usage of new knowledge acquired from safety training has helped me improve my work.	

Equation 3.1: Sample size calculation

Where,

p = population reliability (or frequency estimated for a sample of size n); $p = 0.05$

$q = (1-p)$

$z = 1.96$ as per table of scores in normal distribution within selected range of z for a confidence level of 95%

e = acceptable error 0.05 (an error of 5% of true value is assumed)

N = Population size = 484

Therefore; n = sample size = 214

3.3. Data collection and analysis method

Permission was sought to conduct the survey at the workplace and employees were requested to participate in the survey. Initially, a pilot study was conducted taking responses from 32 employees which included employees from all the departments to pretest the questionnaire. Minor modifications were done in the questionnaire based on the pilot study results. For the large-scale data collection, 226 responses were collected, and data were entered in a Microsoft Excel for generating the descriptive statistics and further analysis was done using Smart PLS 3.0.

The survey was filled by the Head of all the departments, regular employees working in respective departments, and as well as the contract workers. Majority of the respondents were males ($n = 181$, 80.1%) compared to females ($n = 45$, 19.9%). Department wise representation for the survey was highest for the production department ($n = 67$, 29.5%). The other departments which participated in the survey were Research & Development ($n = 46$, 20.4%), Maintenance ($n = 41$, 18.1%), Quality Assurance ($n = 29$, 12.8%), Warehouse & Logistics ($n = 28$, 12.4%), Safety & Environment ($n = 7$, 3.1%), Accounts & Purchase ($n = 5$, 2.2%) and Personnel & Administration ($n = 3$, 1.3%). The respondents had an experience of 10 years or less ($n = 98$, 43.3%), 11 to 20 years ($n = 91$, 40.3%) and 20 years or above ($n = 37$, 16.4%).

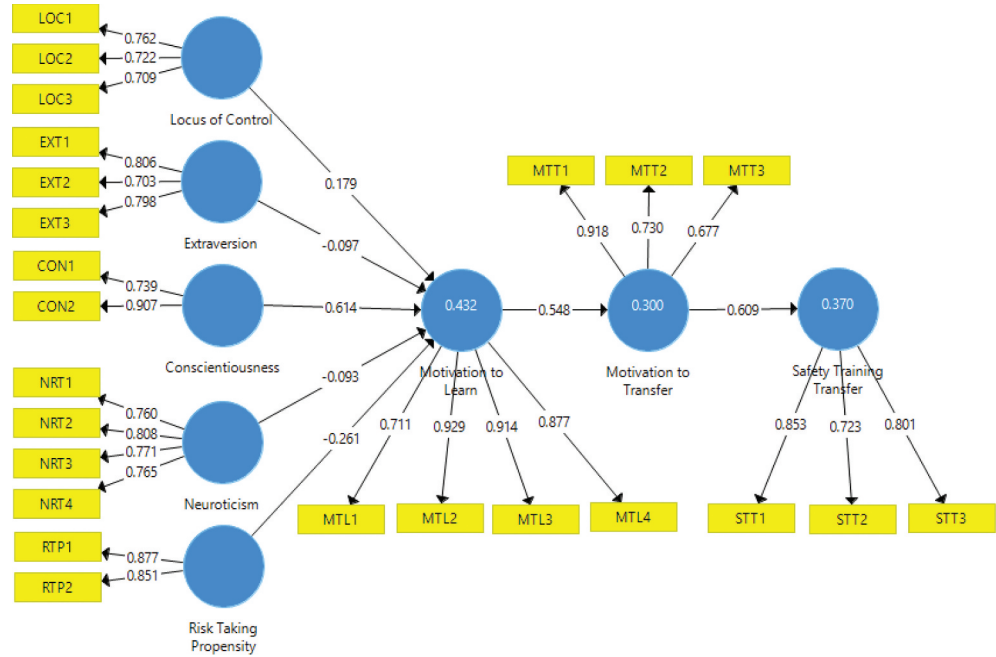
Common method bias (CMB) can be an issue when a study is cross sectional and uses the same survey instrument to measure both independent and dependent variables (Podsakoff, 2003). Therefore, it is important to statistically quantify the impact of CMB on the reported results. In this research, CMB was evaluated using Harman's single factor (HSF) analysis. The HSF analysis showed that the total variance explained by single factor was 29.88% which is significantly less than 50%. Therefore, it can be assumed that there was no single dominant factor in the data collected using the survey instrument. This proves that CMB was not an issue with respect to the sample collected.

3.4. Measurement model

The measurement model analysis was conducted in SmartPLS V3.0 to validate the measurement model by estimating the convergent validity, discriminant validity, and reliability of the instrument (Figure 2). To test how well the items of a construct are related, confirmatory factor analysis was performed. If the factor loadings were less than 0.50, those items were excluded from the questionnaire permanently (Hair et al., 2016).

The reliability of the constructs was estimated through Cronbach's alpha (α), composite reliability (CR), and average variance extracted (AVE) measures. These measures range from 0 to 1.0, where the values on the higher side indicate higher reliability. Often, the cut-off values for

Figure 2. Measurement model.



Cronbach’s alpha (α) and composite reliability (CR) are taken as 0.7 and for average variance extracted (AVE) the cut-off value is 0.5 (Hair et al., 2016). The table below (Table 2) has factor loadings, Cronbach’s alpha, composite reliability, and average variance extracted (AVE). However, for SEM-PLS models even if the Cronbach’s alpha values are less than 0.7, the constructs are considered to be reliable if the composite reliability values are favorable (>0.7) (Hair et al., 2016).

The R^2 value or the coefficient of determination of the model exhibits its’ predictive accuracy. The predictive accuracy of a model is defined as the proportion of variance in the dependent variable as explained by the variation in the independent variables. An R^2 value above 13.8% is considered to be large (Cohen, 1988) and R^2 value of safety training transfer is 0.370, which shows that 37% of the variation in safety training transfer can be explained using the existing model.

Every research which involves latent variables must conduct the assessment of discriminant validity test for the prevention of multicollinearity issues. One of the most widely used methods for this purpose is Fornell and Larcker criterion. This tests whether the variables that are not supposed to be related are actually unrelated (Hair et al., 2016). According to Fornell and Larcker criterion, the square root of average variance extracted (AVE) of a particular latent variable should be greater than the correlation of the latent variable with other variables of the model. This is exhibited in Table 4 where the diagonal elements indicate the square root of AVE and the other cells give the inter-latent correlation.

4. Results

4.1. Hypothesis testing

The bootstrapping procedure was carried out in SmartPLS to examine the T- statistics and p values, which are used to test the significance of paths in the conceptual model of the study (Figure 3). It was found that Conscientiousness, Locus of Control, and Risk Taking Propensity had a significant influence on Motivation to Learn. Extraversion and neuroticism did not have an influence on Motivation to Learn (Table 5).

Table 2. Construct reliability and validity

Variables	Items	Factor loading(λ)	Cronbach's alpha(α)	Composite reliability	Average variance extracted (AVE)
Locus of control (LOC)	LOC1	0.762	0.599	0.775	0.535
	LOC2	0.722			
	LOC3	0.709			
Extraversion (EXT)	EXT1	0.806	0.654	0.813	0.593
	EXT2	0.703			
	EXT3	0.798			
Conscientiousness (CON)	CON1	0.739	0.559	0.811	0.685
	CON2	0.907			
Neuroticism (NRT)	NRT1	0.760	0.783	0.858	0.603
	NRT3	0.808			
	NRT4	0.771			
	NRT5	0.765			
Risk taking propensity (RTP)	RTP1	0.877	0.662	0.855	0.747
	RTP2	0.851			
Motivation to learn (MTL)	MTL1	0.711	0.884	0.920	0.743
	MTL2	0.929			
	MTL3	0.914			
	MTL4	0.877			
Motivation to transfer (MTT)	MTT1	0.918	0.719	0.822	0.611
	MTT2	0.730			
	MTT3	0.677			
Safety training transfer (STT)	STT1	0.853	0.711	0.836	0.631
	STT2	0.723			
	STT3	0.801			

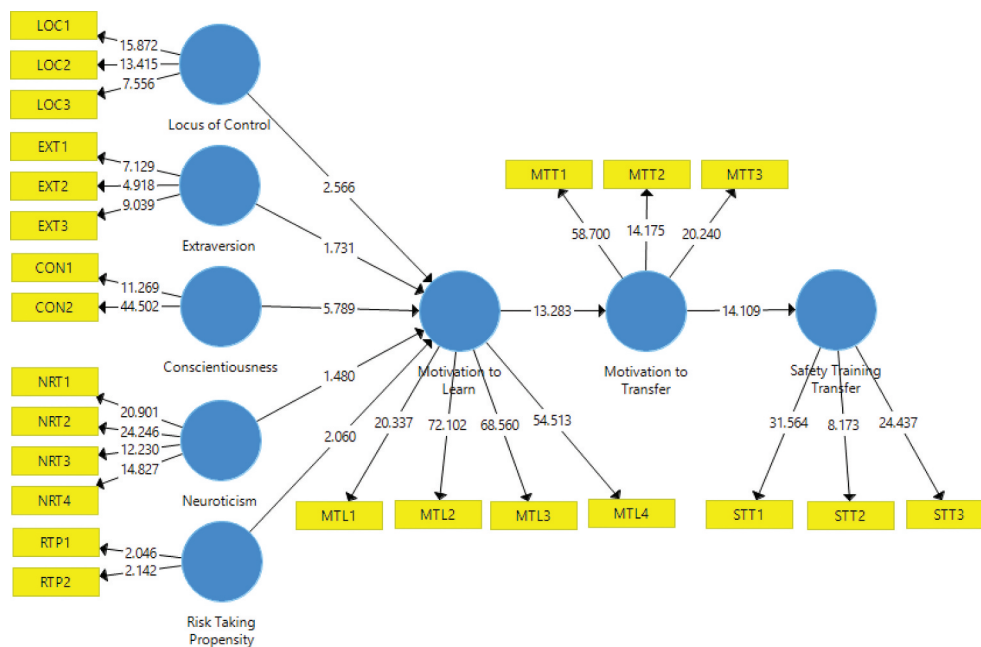
Table 4. Discriminant validity

	CON	EXT	LOC	MTL	MTT	NRT	RTP	STT
CON	0.828							
EXT	0.577	0.770						
LOC	0.495	0.242	0.731					
MTL	0.582	0.258	0.429	0.862				
MTT	0.465	0.201	0.058	0.548	0.782			
NRT	-0.445	-0.386	-0.489	-0.346	-0.168	0.776		
RTP	0.408	0.303	0.291	0.038	-0.131	-0.272	0.864	
STT	0.614	0.471	0.311	0.755	0.609	-0.409	0.056	0.794

4.2. Analysing the mediating effect

Mediation tests are conducted to understand the direct and indirect effects of an independent variable on a dependent variable through a mediating variable (MacKinnon & Luecken, 2008). By

Figure 3. Bootstrapping results.



conducting mediation analysis, it is tested whether there exists a significant relationship between the independent variable and the dependent variable through the mediator. A statistically significant indirect effect ($t\text{-value} > 1.96, p < 0.05$) should be taken as an evidence for mediation (Memon et al., 2018). If a model consists of multiple mediators, as in the current research, it is important to estimate the specific indirect effects rather than total indirect effects. From Table 6 motivation to learn and motivation to transfer mediates the relationship between conscientiousness \rightarrow safety training transfer, locus of control \rightarrow safety training transfer and, risk taking propensity \rightarrow safety training transfer.

5. Discussion

As anticipated, both learning motivation (MTL) and transfer motivation (MTT) were strongly related to safety transfer behavior (STT). This result is in accordance with previous studies where safety motivation was found to be significantly associated with the safety performance of employees in the workplace; MTL had a significant positive influence and MTT, in turn, had a significant positive influence on STT (Naquin & Holton, 2002; Burke & Hutchins, 2007; Christian et al., 2009; Blume et al., 2010; Madagamage et al., 2014).

Personality characteristics can influence the training skills of individuals, since they can affect motivation, engagement, attitudes, and attention to training, which can affect both learning and training transfer. Firstly, the positive influence of CON on MTL found in our results is in agreement with other findings where similar positive effects were observed (Naquin & Holton, 2002; Furnham et al., 2002; Komaraju et al., 2009; Christian et al., 2009; Hua Ng and Ahmad, 2016). Many studies demonstrate that the self-controlled, logical nature attributed to CON results in fewer mistakes (Barrick & Mount, 2005; Kaplan et al., 2011). LOC is understood to have a weaker relationship with workplace accidents and injuries and our results is in accordance with other studies proving LOC has a positive relationship with MTL (Christian et al., 2009; Colquitt et al., 2000)

RTP was found to have a significant negative relationship with MTL and subsequently on STT. Almost all studies concurred that RTP individuals are prone to engage in risk taking behaviors and

Table 5. Bootstrapping results

Paths	Original Sample (O)	Mean	STDEV	T-values	P- values	Significance
Conscientiousness -> Motivation to Learn	0.614	0.594	0.106	5.789	0.000**	Supported
Extraversion -> Motivation to Learn	-0.097	-0.092	0.056	1.731	0.084	Not Supported
Locus of Control -> Motivation to Learn	0.179	0.185	0.070	2.566	0.011	Supported
Motivation to Learn -> Motivation to Transfer	0.548	0.550	0.041	13.283	0.000**	Supported
Motivation to Transfer -> Safety Training Transfer	0.609	0.608	0.043	14.109	0.000**	Supported
Neuroticism -> Motivation to Learn	-0.093	-0.089	0.063	1.480	0.140	Not Supported
Risk Taking Propensity -> Motivation to Learn	-0.261	-0.218	0.126	2.060	0.040*	Supported

*p < 0.05, **p < 0.001

Table 6. Specific indirect effect

Paths	Indirect Effect	T -Values	P -Values	Mediation
Conscientiousness -> Motivation to Learn -> Motivation to Transfer -> Safety Training Transfer	0.205	3.483	0.001	Supported
Extraversion -> Motivation to Learn -> Motivation to Transfer -> Safety Training Transfer	-0.032	1.632	0.103	Not—supported
Locus of Control -> Motivation to Learn -> Motivation to Transfer -> Safety Training Transfer	0.060	3.004	0.003	Supported
Neuroticism -> Motivation to Learn -> Motivation to Transfer -> Safety Training Transfer	-0.031	1.444	0.149	Not—supported
Risk Taking Propensity -> Motivation to Learn -> Motivation to Transfer -> Safety Training Transfer	-0.087	2.009	0.045	Supported

therefore, have a negative relationship with safety outcomes (Christian et al., 2009; Fung et al., 2010; Zuckerman et al., 1991).

However, NRT and EXT showed no significant relationship on MTL in this study. Though one might be predisposed to think that NRT negatively affects MTL, in contrast, some studies point out the possibility that an individual high on NRT may be attuned to signs of hazards at the workplace and therefore less prone to safety errors (Furnham et al., 2002). Blume et al., (2010) showed meta-analytic associations of NRT with training transfer intention. The distal relationship between NRT and safety transfer behavior may have to be further analyzed through longitudinal studies or broader empirical studies in the context of safety training. Golimbet et al., (2007) found that the EXT trait of employees had a weak relationship to safety performance behavior and hence on safety outcomes. EXT also exhibited insignificant influence with regard to safety behavior through learning motivation (Rowold, 2007; Christian et al., 2009; Komarraju et al., 2009; Hua Ng and Ahmad, 2016). Supporting empirical evidence of EXT’s influence on MTL is mostly inconclusive and therefore warrants additional investigation.

6. Conclusion & implications

This study emphasizes the importance of training the employees by focusing on their personality characteristics in learning and transferring knowledge and skills. It contributes to the chemical industry sector in India in many ways. The study contributes to the training and development of the company by providing certain findings that will help the training management team to select appropriate learning strategies for employees who undergo safety training, considering their different personality types which encourages safety learning and supports better training transfer.

Hiring and training employees who tend to work safely is the essential first step in creating a safe working environment. When the organization wants to hire people for high-risk jobs or assign employees for jobs having safety issues, the organization can make the employees undergo personality-based safety assessments as a part of the solution.

It is very difficult to change the personality of an individual because it’s a stable characteristic (Barrick & Mount, 2005). Therefore, it is ideal that the company try to modify their training methods to influence safety training transfer through motivation. Since employees have better control over their learning strategies, they can tailor their way of learning much more easily than their personality characteristics to induce the transfer of training. Therefore, it is recommended that the company practice the safety training methods that suit employees learning styles based on their personalities in order to gain

motivation to learn safety and also will help them grasp the training contents faster and transfer effectively. Besides, as the way of learning is restricted to an individual, using various learning methods could make the process of understanding safety easier, also keep hold of the skills learned and effectively transfer them to work. The possibility of self-directed learning could also be explored in the context of safety training giving an unrestricted opportunity to enjoy the learning process (Kavani & Amjadiparvar, 2018; Song & Bonk, 2016). When learning strategies strongly relate to employees' personality types, their goals and achievement orientations facilitate the learning and transfer process.

7. Future scope of work and limitations of the study

The study has various limitations that must be addressed in future studies. Foremost, this study comprises a convenience sampled data collected from a limited number of employees belonging to only one site of a chemical manufacturing company. Therefore, the representativeness of the data is limited. Future studies can include employees from a broad range of industries having safety issues within India including a variety of cross-cultural backgrounds to enhance the representativeness of the sample. Future studies can also collect data from different developing countries and compare the result obtained.

The main aim of this study is to test the relationships between personality characteristics of employees who undergo safety training, their motivation towards learning, their motivation towards transferring the training, and finally the safety training transfer. Other antecedents and outcomes of safety training transfer were not included in the conceptual model. For example, safety climate or organizational climate, Leadership, Job attitudes may influence the relationships being tested. Also, understanding the learning strategies of the employees will help the trainers to implement appropriate training methods for the successful transfer of knowledge and skills, since learning strategies affect individuals' learning processes and transfer in different situations (Nielsen et al., 2010; Von Stumm & Furnham, 2012).

Qualitative studies can be done through in-depth interviews to understand how and why personality characteristics affect safety performance in a professional setting. Since the mediation effect of motivation to learn and motivation to transfer was found to be significant, for some personality traits, additional empirical tests can be conducted separately to ascertain if the motivation to learn and motivation to transfer mediates differently. The results can help organizations develop specific strategies to improve the effectiveness of training transfer.

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