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IMPACT OF SAFETY – SPECIFIC TRANSFORMATIONAL LEADERSHIP ON PROJECT SAFETY CLIMATE: A STUDY ON PAKISTAN TEXTILE INDUSTRY

Tayyaba JAMIL[1*], Patrycja KABIESZ[2], Joanna BARTNICKA[3]

[1] Silesian University of Technology, Faculty of Organization and Management, Department of Production Engineering; tjamil@polsl.pl, ORCID: 0009-0008-2928-8155
[2] Silesian University of Technology, Faculty of Organization and Management, Department of Production Engineering; Patrycja.Kabiesz@polsl.pl, ORCID: 0000-0003-1639-5804
[3] Silesian University of Technology, Faculty of Organization and Management, Department of Production Engineering; Joanna.Bartnicka@polsl.pl, ORCID: 0000-0003-1639-5804
* Correspondence author

Purpose: The impact of transformative leadership on the atmosphere of safety in projects is the focus of this research. In the high-risk textile business, the safety climate is crucial.
Design/methodology/approach: Questionnaires were used to gather information from 270 people working in the textile industry. These people were asked about their experiences with machinery used in different textile plants. Using moderated mediation, the data were evaluated.
Findings: According to the findings, transformational leadership is an important factor in ensuring a safe climates for projects. The findings reveal that transformational leadership had an effect on project safety climate, but that attitude towards safety completely moderated that effect, and that safety compliance mediated the relationship between the two. Project safety climate was shown to be positively correlated with safety-specific transformational leadership.
Practical implications: Frontline supervisors may use the study's results to better manage safety on the job and ensure the safety of their employees.
Originality/value: There has been little research on how different leadership styles among project managers affect final results, but this study fills that gap. In particular, we shed light on how a transformational leadership style that is safety-specific may improve the project safety climate as a crucial border condition. The scope of social exchange theory's applicability to project settings is further expanded upon.
Keywords: Safety Specific Transformational Leadership, Project Safety Climate, Attitude Towards Safety, Safety Compliance.
Category of the paper: Case study.

1. Introduction

The goal of this research was to identify the traits shared by effective leaders who inspire complete obedience from their followers. A leader's duty to create a risk-free work environment is what's known as safety-specific transformational leadership (SSTL) (Kelloway, Mullen, Francis, 2006). Executive leadership is more important than formal rules and procedures when it comes to maintaining a safe workplace (Zohar, 2000). Employee health and safety are directly impacted by an organization's safety rules and practices (Neal et al., 2000). Workers' reactions to and compliance with workplace policies and procedures directly affect the degree of safety in that setting (Michaelidou, Hassan, 2008).

This study emphasizes the significance of establishing safety standards, especially in the energy sector, based on historical data and losses that happened due to the lack of such implementations. If you want to make sure your company or workplace is financially stable, follow these rules (Flin et al., 2000). Rather of focusing on leadership's role, this study compares two variables: knowledge-domain safety and field-based employee motivation towards safety (Jiang, Probst, 2016). Research on the effects of leadership on company culture and the success of safety programs is expanding (Smith et al., 2016). One of the most critical aspects of a safe workplace is the safety atmosphere, which may be defined as the degree to which employees adhere to safety protocols (Huang et.al, 2016). Businesses should prioritize safety protocols, particularly for jobs where employees face high threats to their health and safety (Lee, Dalal, 2016). To prevent harm to people, property, or the environment, many critical systems must be operated in accordance with established safety standards (Vara et.al, 2016). Prior research has shown that when employees see new safety practices with optimism, the overall safety climate in the workplace improves (Kvalheim, Dahl, 2016).

According to the findings, two different leadership styles are associated with the effectiveness of safety measures implemented by employees (Kelloway et al., 2016). Although there have been earlier comparative studies on safety measures, none of them have specifically targeted Pakistan's textile sector (Shen et al., 2017). Transformative and transactional leadership and conduct are very necessary in life-or-death situations (Willis et al., 2017). The psychological safety environment is directly related to the overall health, happiness, and efficiency of the workforce via the words and actions that comprise it (Dollard, Idris, 2017). The impact of elements such as safety performance, conduct, and mindset is mitigated by SSTL (Mullen et al., 2017).

Decisions that might have fatal consequences call for both transformational and transactional styles of leadership and conduct (Willis et al., 2017). The psychological safety environment is directly related to the overall health, happiness, and efficiency of the workforce via the words and actions that comprise it (Dollard, Idris, 2017). The impact of elements such as safety performance, conduct, and mindset is mitigated by SSTL (Mullen et al., 2017).

Along with the connection between safety-related knowledge and motivation, this study does not investigate the role of leadership in the realm of safety involvement (Jiang, Probst, 2016). Many critical systems must operate in accordance with stringent safety standards at all times to avoid endangering people, property, or the environment (Vara et al., 2016). No studies have examined safety compliance (SC) or attitude towards safety (ATS) in a mediating or moderating capacity. The topic of whether forms of revolutionary leadership are possible in the safety sector is now quite topical. The outcomes of applying transformational leadership methods and tactics with a focus on safety have been the subject of much research and analysis by experts in the field as well as in academia. Nevertheless, there is a dearth of literature on the topic of transformational leadership's potential applications in the management and mitigation of risk exposure inside organizations.

Few studies have focused on the issue of project risk. Although there have been earlier comparative studies on safety measures, none of them have specifically targeted Pakistan's textile sector (Shen et al., 2017). The significance of employees' and workers' involvement in organizational safety is well-established, but there is still a gap in our understanding of how context and culture affect businesses' safety environments (Petitta et al., 2017). As a result, there is a dearth of literature on the topic of the area we are studying for our project.

1.1. Social exchange theory

Human relations may be better understood by analyzing people's trading behavior (Homans, 1958). People figured out how to talk to one other and work together via social trade (Blau, 1964). The process of exchange has consistently gained traction in several academic domains, despite the fact that its theoretical validity has been questioned (Emerson, 1976). Psychology, sociology, and organizational behavior are just a few of the academic disciplines that back up research on human interpersonal relationships. A pattern of exchange behavior underpins this contact between management and employees, as it does other human interactions. When leaders and employees have fruitful conversations, it strengthens their bond and motivates them to understand each other's perspectives. The way a person acts determines the nature and trajectory of one's relationships and interactions with them. It may help project-based companies create a safe workplace by facilitating two-way communication between employees and management.

The fact that SC is built on social interaction lends credence to its position as a mediator between safety outcomes and revolutionary leadership. Managers and employees are more likely to engage in SC behavior when they are able to trust one another, which allows leaders to provide effective help. The success of a leader in implementing safety protocols depends on the social connection between the boss and their workers.

Keeping employees safe while projects are underway is a leader's top priority. As far as taking care of employees is concerned, leaders put their safety first. And therefore, SSTL, project safety climate (PSC), SC and ATS are all related. If leaders' instructions to their teams do not result in complete compliance with all safety requirements, then they should resort to whatever tactics are required to ensure compliance.

2. Preliminary studies

2.1. Safety specific transformational leadership and project safety climate

The presence of rules and regulations is less important in ensuring a safe workplace than the behavior of leaders inside the organization (Zohar, 2000). This study rests on three primary tenets: The leader's leadership style dictates the level of effect it has on subordinates, the leader's style guides those subordinates, and employees are more likely to be enthusiastic about the effort if the leader announces safety precautions (Zohar, 2002). Workers' propensity to adopt safety measures and their output were both measured by the study's two leadership styles (Kelloway et al., 2006).

This study looks at the leadership style and how well it manages the safety measures that the company has in place for its employees. A strong relationship existed between the ways leaders led and the things their employees did. A capable and effective manager will make sure that his employees follow these safety measures (Clarke, Ward, 2006). The leaders of 21 healthcare organizations were evaluated both before and after they received training on transformational leadership and the rules and regulations that control how their firms execute safety measures. According to the results of the post-test, there was a significant improvement in the safety procedures put in place by businesses after the trainings (Mullen, Kelloway, 2009).

This study's findings show how the variables are related to one another and to the other known components, as well as to the mediators and moderators. Although these links have been there for quite some time, it is only in the last 30 years that scholars have started to look at them in more detail, including the potential impact of leadership as a climatic antecedent (Zohar, 2010). This article delves at the reasons of the many accidents and injuries that have occurred in Dutch warehouses in the last several years (Koster et al., 2011). A recent study shows that effective leadership styles of supervisors positively affect the safety protocols that employees follow. Unexpected payoffs and transformational leadership are tested in several sectors where PSC is put to the test (Kapp, 2012).

Research on the effects of leadership on company culture and the success of safety programs is expanding (Smith et al., 2016). Companies should strongly urge their employees to adopt safety measures if their projects might put their health and safety at risk (Lee, Dalal, 2016). Research has shown that when employees see new safety practices with optimism, the overall safety climate in the workplace improves (Kvalheim, Dahl, 2016). In addition to safety performance, attitude, and behavior, SSTL moderates (Mullen et al., 2017).

Hypothesis 1: The correlation between safety specific transformational leadership (SSTL) and project safety climate (PSC) is significant.

2.2. Mediating role of safety compliance

The newly-initiated study set out to examine the link between SC, safety performance, and accidents on the job. There is a dearth of information on project-related workplace accidents, despite the abundance of literature on the topic of SC's effect on safety performance. As a result, this study establishes a link between construction site and organizational safety behaviors, worker performance, and injuries on the job (Clarke, 2006). Research on safety climate persisted for decades, maintaining its level of depth throughout. The main goal of this study is to compare safety climates at the organizational and group levels. On several fronts, this study advances the notions around the safe environment (Dov, 2008).

The leaders of 21 healthcare organizations were evaluated both before and after they received training on transformational leadership and the rules and regulations that control how their firms execute safety measures. According to the results of the post-test, there was a significant improvement in the safety procedures put in place by businesses after the trainings (Mullen, Kelloway, 2009). This new study investigates the relationship between effective managers' leadership styles and the safety measures their employees take. Both the manufacturing and construction sectors put revolutionary leadership and uncertain remuneration to the test in PSC-specific situations (Kapp, 2012). Organizational, leadership, and safety studies are seeing a boom in research on the effects of leadership on safety culture and the outcomes of safety programs in the workplace.

Numerous safety projects have shown improved results when led by transformational leaders with a focus on safety. Having said that, these links have not been thoroughly discussed by their service. Research on the effects of leadership on company culture and the success of safety programs is expanding (Smith et al., 2016). In particular, companies should push their employees to adopt preventive safety precautions if their jobs put them in danger of health and safety (Lee, Dalal, 2016). What employees do and how they behave in a dangerous work environment is the greatest indicator of how important that environment is. According to recent research, fostering a good safety culture may enhance the efficacy of safety measures while decreasing the probability of accidents and injuries.

We start by exploring various scenarios and determining safety climate. The next step is to look at the research on the effects of a safe workplace on employees' motivation, decision-making, and performance (Grin, Curcuruto, 2016).

Hypothesis 2: The connection between safety specific transformational leadership (SSTL) and project safety climate (PSC) is mediated by safety compliance (SC).

2.3. Moderating role of attitude towards safety

Scientists in the domains of psychology and related disciplines have long been curious about attitude strength. The findings provide light on how a person's perception of a product affects their behavior (Howe, Krosnick, 2017). Many consider the construction business to be among the most dangerous globally. There may be fewer instances if workers are more familiar with the ATS. The purpose of this study was to determine how often accidents were directly caused by workers' activities and how inclined workers were to be safe on the job (Gharibi et al., 2016).

Employees have serious reservations about the quality of service they get from any business (Wilcock et al., 2004). A rapidly expanding area of research is the effect of leadership on the culture of organizations and the outcomes of safety programs (Smith et al., 2016). To be more specific, companies should push for preventive safety measures from employees whose jobs are known to be hazardous to health and safety (Lee, Dalal, 2016).

Research has shown that when employees see new safety practices with optimism, the overall safety climate in the workplace improves (Kvalheim, Dahl, 2016). In order to prevent harm to people, property, or the environment, it is essential that several critical systems follow stringent safety rules when placed into operation (Vara et.al, 2016). There must be an alignment between words and actions about the psychological safety climate if an organization cares about its employees' health, happiness, and productivity (Dollard, Idris, 2017). Safety performance, behavior, and attitude are all impacted by many elements, but SSTL acts as a moderator (Mullen et al., 2017).

Hypothesis 3: As attitude towards safety (ATS) acts as a moderator between safety specific transformational leadership (SSTL) and safety compliance (SC), a higher ATS strengthens the correlation between SSTL and SC.

Figure 1 shows the relationships between safety specific transformational leadership (SSTL), project safety climate (PSC), attitude towards safety (ATS), and safety compliance (SC).

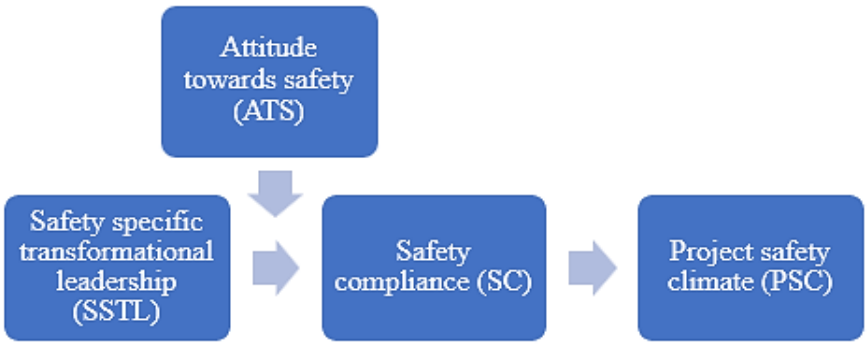

Figure 1. Theoretical Framework.

3. Methodology

3.1. Sample and population

The study was hosted by Gul Ahmad, a textile maker from Karachi, Pakistan. A group of people who had previously worked together in a cooperative formed the company to test the waters of the new free-market economy. The label makes high-quality, reasonably priced clothing for women. When customers shop online, the brand also offers international shipping to the United States, the United Kingdom, and Canada. The rapidity with which fashions come and go makes it critical for businesses to maintain a customer-centric focus at all times. The plus-size market has received little attention due to the traditionally difficult-to-please nature of this population. Hence, the company has to update its products with new designs and state-of-the-art technologies. The company employs 350 people. The workforce is dominated by women. Sewers, designers, tailors, and sewing technologists are just a few of the many occupations that use them. A shortage of skilled workers, particularly in rural parts of Pakistan, is slowing the company's growth. Problems in the Pakistani area are exacerbated by the lack of vocational schools. The fashion industry is one that is always changing and adapting. Businesses in the apparel industry may benefit from human resources since their workers' expertise determines how well the firm does. The knowledgeable and competent employees are the company's greatest asset. Issues with human resources pose the greatest threat to the company's growth. The overall apparel sector is based on very innovative products and cutting-edge technological developments. The competence and commitment of the employees determine the company's competitiveness. Consequently, managers' capacity to exhibit a transformational leadership style to their employees determines the organization's performance.

Those who worked for the Gul Ahmad apparel line made up the bulk of the review's sample. This is why the workers were brought closer together via the personal interactions. There were a total of 350 representatives who were contacted and requested to complete the questionnaires. On a widely agreed upon time, 291 of these surveys were collected in their whole. The lack of complete information prevented the inclusion of 21 out of 290 surveys. The research included the remaining 270 surveys.

3.2. Instrumentation

3.2.1. Safety specific transformational leadership

Safety specific transformational leadership (SSTL) was measured by using Smith, Eldridge, and DeJoy (2016) questionnaire developed a 10-item scale to measure SSTL; this scale was based on previous work by Barling et al. (2002). "My immediate supervisor shows pleasure when I execute my job safely", "My immediate supervisor acts in a manner that indicates a commitment to a safe workplace" and "My immediate supervisor encourages me to

communicate my thoughts and views regarding safety at work". A 5-point Likert-type scale, ranging from "strongly disagree" to "strongly agree" was used to evaluate the items. In this particular sample, the Cronbach alpha value is 0.95.

3.2.2. Safety compliance

Griffin and Neal's (2000) safety performance measure served as the basis for self-reports about safety compliance and involvement. For each item, respondents used a Likert scale from 1 (strongly disagree) to 5 (strongly agree). Ensuring the maximum degree of safety while carrying out my job, using all essential safety equipment, reporting that I carry out work in a safe way, and following the right safety procedures were the four elements that participants were asked to rate in terms of their personal safety compliance. In this particular sample, the Cronbach alpha value is 0.92.

3.2.3. Attitude towards safety or safety attitude

In an attitude survey, people are asked to express their opinions on a variety of statements on various events or behaviors. This formal attitude evaluation made use of a 25-item occupational safety attitude questionnaire that has previously been validated in a number of Iranian research. Hemmatjoo Y. (2004) found a significant Cronbach's alpha value of 0.86 for the questionnaire. In order to quantify the safety attitude, the questionnaire was scored using Likert 5-degree scales.

3.2.4. Project safety climate

Four components of safety atmosphere were found by DeJoy et al. (2000) and included 16 items: management's dedication to safety, supervisors' feedback on performance, employees' participation in safety, and norms of conduct among coworkers. Our brief safety climate assessment is based on these four characteristics, and we selected six questions from them: one for supervisory performance feedback, one for worker engagement in safety, and one for colleague behavior standards; three for management commitment to safety. The aspects of engagement, feedback, and behavior standards were selected as individual items because they are clear and easy to understand. However, additional criteria were deemed essential for appropriate assessment of management commitment, a larger construct. We incorporated the item(s) with the greatest loading in the exploratory factor analysis for each of the four variables into the 6-item measure (DeJoy et al., 2000). On a 5-point scale from "Strongly agree" to "Strongly disagree" each question was answered. The Cronbach’s alpha value for this scale is 0.85.

4. Results and analysis

The translation, detailing, and combining of precise review results make up this section. It goes over the methodologies for charts and tables, which allow for explaining and detailed evaluation of the data. The overall reliability of the instrument and all dependent and independent variables are also handled in this part. One way to look at the interplay between the variables is via the link and relapse.

Table 1.
Taking age, education and work experience as control variables

Structural Path		Dependent Variable	Path Coefficients
SSTL	⟶	Project safety climate	0.610***
Age	⟶	Project safety climate	0.044
Education	⟶	Project safety climate	0.023
Experience	⟶	Project safety climate	0.056

Note. * p < .05, ** p < .01, *** p < .001, specific safety transformational leadership (SSTL).

Control variables are those that remain unchanged during an experiment in order to measure the correlation between other variables. We tested the effect of demographic variables on our suggested model using an analysis of variance (ANOVA). Results showed no statistically significant correlation between any of the model variables and respondent age, education level, or years of job experience. We tested the posited model once we were sure it had enough discriminating validity. Table 1 explained that employees age, education, and work experience as control variables. As the path coefficient values for age, education and experience are 0.044, 0.023 and 0.066 respectively are lesser than 0.05 they show that there is no effect of the above mentioned factors on the overall model.

Table 2.
Relationship between Specific Safety Transformational Leadership and Project Safety Climate (Correlation)

S.no	Variables	1	2	3	4
1	SSTL	1			
2	PSC	0.59**	1		
3	SC	0.61**	0.63**	1	
4	ATS	0.59**	0.57**	0.67**	1

Note. * p < .05, ** p < 0.01, *** p < 0.001, specific safety transformational leadership (SSTL), safety compliance (SC), attitude towards safety (ATS), project safety climate(PSC).

Determining the strength of associations between a dependent variable and several independent variables is the goal of regression analysis, a collection of statistical procedures. In addition to simulating potential future relationships between variables, it may be used to evaluate the strength of existing ones. According to Table 2, we used regression analysis to check the significance between SSTL and PSC and we found that they are positively associated. We adopted the first hypothesis. B = 0.59, t = 16.50, p = 0.001 indicates a statistically significant connection. A t-value of 16.50 for SSTL indicates a very significant connection. There is

a statistically significant relationship between SSTL and PSC, according to this hypothesis, with a t-value of 16.50. The B-coefficient value of.59 indicates that the association between SSTL and PSC will strengthen by 59% if SSTL is changed by one unit, strengthening the relationship. Therefore, the aforementioned findings are supported by previous research that also indicates a favorable correlation between SSTL and PSC (confirmation of hypothesis 1).

Table 3.
Mediating Role of Safety Compliance between Specific Safety Transformational Leadership and Project Safety Climate

Model	Un-standardized Coefficients		Significance Level	
	B	Std. Error	t-ratio	Sig.
(Constant)	1.823	0.434	4.259	0.001
Safety Compliance	0.610	0.099	6.912	0.000
(Constant)	1.823	0.434	4.259	0.001
Safety Compliance	0.473	0.250	2.140	0.039
Safety Specific Transformational Leadership	0.095	0.198	0.0485	0.640

Note. Dependent variable: project safety climate: $R^2 = 0.15$, $p = 0.000$.

Table 3 shows the relationship between the independent variables SSTL and the dependent variables PSC, with safety compliance serving as a mediator. It became clear that SC completely mediates the link between SSTL and PSC when the value of B for relational SSTL decreased from 0.473 to 0.095, which was close to 0. After adjusting for M, there was no further significance for either X or M, suggesting complete mediation. Hypothesis 2 was therefore confirmed and the mediation role of Safety Compliance was acknowledged by these results.

Table 4.
Moderating role of attitude towards safety among specific safety transformational leadership and safety compliance

Model	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	0.863	0.968	0.892	0.374
SSTL_MEAN	0.279	0.266	1.047	0.002
ATS_MEAN	0.375	0.282	1.328	0.015
ATS_SC	0.532	0.075	7.093	0.003

Note. Dependent Variable = safety compliance (SC) MEAN R2 = 0.42, F = 57.279, P = 0.000 attitude towards safety (ATS).

Table 4 tests the hypothesis 3 (attitude towards safety moderates and strengthens the link between safety specific transformational leadership and safety compliance) moderation regression analysis was run by using the Barron and Kenny (1986) method. To test the hypothesis 3 (attitude towards safety moderates and strengthens the relation between safety specific transformational leadership and safety compliance) moderation regression analysis was run by using the Barron and Kenny (1986) method. In the table 4 results shows that the association among SSTL and SC, the ATS of the organization moderates this relationship significantly. F value is 57.279 shows model fitness with $p = 0.000 \leq 0.05$ which indicates that data was fitting overall model. The regression results show that the R square vale is .42 which

means that 42% fluctuation was clarify by psychological climate in innovative work behavior. B carries a value of .375 and p value was significant at $\alpha = 0.05$ which means that the association among ATS and SC was significant. The p value was 0.015 which is significant and ≤ 0.05 which means that the third hypothesis that is (ATS moderates and strengthens the relation between SSTL and SC) was accepted.

5. Discussions

To ensure the project's success, SSTL in a project-based company will promote safety standards and norms for workers, which will immediately enhance morale. This is because managers play a crucial role in guiding all tasks and activities towards success. This means that the project's overall level of safety is enhanced when SSTL plays a supporting role in recognizing and rewarding personnel for their efforts to mitigate risk. In order to ensure that all personnel adhere to the project's safety protocols, SSTL has instituted stringent safety procedures.

In project-based companies, SSTL is crucial for maintaining a safe environment. Workers look up to their leaders and follow their example if those leaders are charismatic and successful. The only way for a leader to ensure that his people follow safety protocols is for him to do the same. To ensure that his employees or workers adhere to such safety protocols, a leader might use a variety of methods. In a project-based company, the leader is responsible for implementing safety measures and should be aware of the techniques that will enable him do so. In the Polish setting in particular, it is an absolutely necessary quality for a project to be a success.

Together, SSTL and SC form a favorable correlation. The hypothesis was declared true and accepted. With a significant connection (B=0.59, t= 16.50, p=0.001), it might be concluded that. The link is very significant, as shown by the t value of 16.50 for SSTL. With a t-value of 16.50, this hypothesis proves that SSTL and PSC are significantly related. Because the B-coefficient was 0.59, we can see that a one-unit change in SSTL will result in a 59% shift in the connection between SSTL and SC, further strengthening the association. All of the aforementioned findings are consistent with the positive correlation between SSTL and PSC that has been reported in the literature. As a leader, you should always keep in mind that effective communication is a crucial skill for guiding your team and the project to success. Those rules and regulations are meant to be followed by staff working on the projects, and the person accountable for this is known as a project leader. The boss must communicate or coerce the employees into following safety procedures if the employees do not care about them. As a corollary, a project manager is the one who must inform all team members of the safety protocols that must be followed in order for the project to be executed successfully,

and this can only be done with the full support and involvement of the project manager. In order to ensure that all workers are well-informed on all critical aspects, plans, and policies pertaining to safety measures, SSTL is essential for enforcing the rules across all levels of a project-based business. The leader of any given enterprise or organization must ensure that his workers are secure from harm. A leader in a project-based company, and particularly one in Pakistan, needs the personality traits that will ensure his team members adhere to the established norms and policies. Simply put, this matter has been almost disregarded by Pakistani groups.

The results demonstrate a strong correlation between SC and SSTL and PSC, suggesting that SC mediates this relationship. The unstandardized regression coefficient shows positive limits of 0.41, and the bootstrapped 95% interval around the indirect effect of this relationship between SSTL and PSC through SC does not contain zero.

Results show that safety compliance improves when leaders use a transformative approach that focuses on safety. But researchers haven't looked at these connections in depth. Research in organizations has shifted its focus to the leadership's impact on safety atmosphere and the results of safety measures (Smith et al., 2016). These findings corroborate the extensive literature demonstrating SC's mediating function between SSTL and PSC.

It is crucial to have a work environment that reflects safety, and workers' actions and reactions assist to shape this view. Accident and injury rates, as well as other safety-related outcomes, may be better predicted by creating an environment that encourages and rewards safe practices, according to studies conducted in recent years. We begin by investigating the potential applications of safety-related circumstances to various levels of analysis and by examining the basis of a safety atmosphere that represents safety. As a result, we may see that the safety-conscious work environment influences employee actions (Grin, Curcuruto, 2016). Leaders may improve the degree of safety in a project by actively participating and being present, and by implementing effective SC rules and regulations that they inculcate in their staff via good counseling inside the project-based organization. According to the data, ATS acts as a mediator between SSTL and SC, supporting this idea.

Consistent with previous research, these findings provide credence to SC's mediating function between SSTL and PSC. The degree of safety atmosphere in a company is influenced by the attitude of its workers towards the execution of safety measures, according to previous study (Kvalheim, Dahl, 2016).

5.1. Practical and theoretical implication

In the existing literature, this work has contributed to a new area by testing and analyzing the association of SSTL with other factors like Safety Compliance and Project safety climate. This research has contributed significantly to the existing knowledge on SSTL by examining its effects on PSC. This research has shown a new way for leaders to solve safety problems in projects by being proactive and actively involved, which is great since safety is the most popular demand in the project industry right now. In this research, we looked at new types of

relationships that are crucial for startups to get an edge in today's dynamic and innovative market. This work makes a significant contribution to the literature by elucidating the functions of SC and ATS in mediating the relationship between SSTL and PSC and SSTL and SC, respectively. Because ATS is both distinctive and critically important, studies that focus on it have made substantial contributions to the literature and will likely continue to do so in the future.

Managers, subordinates, supervisors, and employees can all benefit from this study because, as the most pressing need of this century, Pakistan is grappling with a number of safety-related issues that necessitate additional research into how to address these cultural norms. The study's findings will shed light on the concepts of SSTL, subordinates, and supervisors, which can improve the relationship between leaders and employees through the use of effective communication channels and procedures to ensure project safety.

Researchers should devote more time and energy to studying SSTL and PSC because these variables can be applied to other fields that place a premium on safety, such as the electrical and civil engineering industries, by drawing comparisons to other fields where safety is an essential component of the job description. This work might be improved and expanded upon by following the provided suggestions for future research.

6. Conclusion

When it comes to completing tasks successfully, SC is crucial. In a nutshell, they are the policies and procedures that govern the implementation of safety measures in project-based companies. An organization's procedures for compliance with these laws and regulations should be rather stringent. Strict action must be taken against any employee who demonstrates any degree of negligence with respect to these safety measures. In project-based organizations in Pakistan, in particular, SC mediates the relationship between SSTL and PSC, and leaders are expected to adhere rigidly to those guidelines in order to ensure the success of their projects. The link is very significant, as seen by the ATS values.

Because it is the employee's actions that lead him to adhere to those laws and regulations concerning the safety measures of the workers, the ATS is particularly crucial. The degree of safety in projects may be enhanced if personnel adhere to certain safety precautions, which are implemented for their own protection.

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References

1. Bazzoli, A., Curcuruto, M. (2016). Safety leadership and safety voices: Exploring the mediation role of proactive motivations. *Journal of risk research, Vol. 24, No. 11,* pp. 1368-1387.
2. Blau, P. (2017). *Exchange and power in social life.* Abingdon-on-Thames: Routledge.
3. Clarke, S. (2006). The relationship between safety climate and safety performance: a meta-analytic review. *Journal of occupational health psychology, Vol. 11, No. 4, Iss. 315.*
4. Clarke, S., Ward, K. (2006). The role of leader influence tactics and safety climate in engaging employees' safety participation. *Risk analysis, Vol. 26, No. 5,* pp. 1175-1185.
5. de Koster, R.B., Stam, D., Balk, B.M. (2011). Accidents happen: The influence of safety-specific transformational leadership, safety consciousness, and hazard reducing systems on warehouse accidents. *Journal of Operations management, Vol. 29, No. 7-8,* pp. 753-765.
6. de La Vara, J.L., Borg, M., Wnuk, K., Moonen, L. (2016). An industrial survey of safety evidence change impact analysis practice. *IEEE Transactions on Software Engineering, Vol. 42, No. 12,* pp. 1095-1117.

7. DeJoy, D.M., Searcy, C.A., Murphy, L.R., Gershon, R.R. (2000). Behavior–diagnostic analysis of compliance with universal precautions among nurses. *Journal of occupational health psychology, No. 5, Vol. 1, Iss. 127.*
8. Dollard, M.F., Idris, M.A. (2017). Climate congruence: How espoused psychosocial safety climate and enacted managerial support affect emotional exhaustion and work engagement. *Safety Science, Vol. 96*, pp. 132-142.
9. Dov, Z. (2008). Safety climate and beyond: A multi-level multi-climate framework. *Safety Science, Vol. 46, No. 3*, pp. 376-387.
10. Emerson, R.M. (1976). Social exchange theory. *Annual Review of Sociology, Vol. 2*, pp. 335-362.
11. Filho, G., Pinto, A., Waterson, P. Maturity models and safety culture: A critical review. *Safety Science, Vol. 105*, pp. 192-211.
12. Flin, R., Mearns, K., O'Connor, P., Bryden, R. (2000). Measuring safety climate: identifying the common features. *Safety Science, Vol. 34, No. 1-3*, pp. 177-192.
13. Gharibi, V., Mortazavi, S.B., Jafari, A.J., Malakouti, J. (2016). The relationship between workers' safety attitudes and their beliefs in destiny, chance and the rule of control measures in prevention of tunneling accidents. *International journal of occupational hygiene, Vol. 8, No. 4*, pp. 192-199.
14. Hemmatjoo, Y. (2004). Rel*ationship between safety attitude and work accidents in a factory in Tabriz.* MSc thesis. IRIB: Tehran University of Medical Sciences.
15. Homans, G.C. (1958). Social behavior as exchange. *American journal of sociology, Vol. 63, No. 6*, pp. 597-606.
16. Howe, L.C., Krosnick, J.A. (2017). Attitude strength. *Annual review of psychology, Vol. 68*, pp. 327-351.
17. Huang, Y.H., Lee, J., McFadden, A.C., Murphy, L.A., Robertson, M.M., Cheung, J.H., Zohar, D. (2016). Beyond safety outcomes: An investigation of the impact of safety climate on job satisfaction, employee engagement and turnover using social exchange theory as the theoretical framework. *Applied ergonomics, Vol. 55*, pp. 248-257.
18. Jiang, L., Probst, T.M. (2016). Transformational and passive leadership as cross-level moderators of the relationships between safety knowledge, safety motivation, and safety participation. *Journal of safety research, Vol. 57*, pp. 27-32.
19. Kapp, K.M. (2012). *The gamification of learning and instruction: game-based methods and strategies for training and education.* San Francisco: John Wiley & Sons.
20. Kelloway, E.K., Mullen, J., Francis, L. (2006). Divergent effects of transformational and passive leadership on employee safety. *Journal of occupational health psychology, Vol. 11, No. 1, Iss. 76.*
21. Kvalheim, Sverre, A., Øyvind, Dahl. Safety compliance and safety climate: A repeated cross-sectional study in the oil and gas industry. *Journal of safety research, Vol. 59*, pp. 33-41.

22. Lee, S., Dalal, R.S. (2016). Climate as situational strength: Safety climate strength as a cross-level moderator of the relationship between conscientiousness and safety behaviour. *European Journal of Work and Organizational Psychology, Vol. 25, No. 1*, pp. 120-132.
23. Michaelidou, N., Hassan, L.M. (2008). The role of health consciousness, food safety concern and ethical identity on attitudes and intentions towards organic food. *International journal of consumer studies, Vol. 32, No. 2*, pp. 163-170.
24. Mullen, J.E., Kelloway, E.K. (2009). Safety leadership: A longitudinal study of the effects of transformational leadership on safety outcomes. *Journal of occupational and organizational psychology, Vol. 82, No. 2*, pp. 253-272.
25. Mullen, J.E., Kevin, K., Michael, T. (2017). Employer safety obligations, transformational leadership and their interactive effects on employee safety performance. *Safety Science, Vol. 91*, pp. 405-412.
26. Neal, A., Griffin, M.A., Hart, P.M. (2000). The impact of organizational climate on safety climate and individual behavior. *Safety Science, Vol. 34*, pp. 99-109.
27. Petitta, L., Probst, T.M., Barbaranelli, C., Ghezzi, V. (2017). Disentangling the roles of safety climate and safety culture: Multi-level effects on the relationship between supervisor enforcement and safety compliance. *Accident Analysis & Prevention, Vol. 99*, pp. 77-89.
28. Shen, Y., Ju, C., Koh, T.Y., Rowlinson, S., Bridge, A.J. (2017). The impact of transformational leadership on safety climate and individual safety behavior on construction sites. *International journal of environmental research and public health, Vol. 14, No. 1, Iss. 45.*
29. Smith, T.D., Eldridge, F., DeJoy, D.M. (2016). Safety-specific transformational and passive leadership influences on firefighter safety climate perceptions and safety behavior outcomes. *Safety Science, Vol. 86*, pp. 92-97.
30. Wilcock, A., Pun, M., Khanona, J., Aung, M. (2004). Consumer attitudes, knowledge and behaviour: a review of food safety issues. *Trends in food science & technology, Vol. 15, No. 2*, pp. 56-66.
31. Willis, S., Clarke, S., O'Connor, E. (2017). Contextualizing leadership: Transformational leadership and Management- By- Exception- Active in safety- critical contexts. *Journal of Occupational and Organizational Psychology, Vol. 90, No. 3*, pp. 281-305.
32. Zohar, D. (2000). A group-level model of safety climate: testing the effect of group climate on microaccidents in manufacturing jobs. *Journal of applied psychology, Vol. 85, No. 4, Iss. 587.*
33. Zohar, D. (2002). The effects of leadership dimensions, safety climate, and assigned priorities on minor injuries in work groups. *Journal of organizational behavior, Vol. 23, No. 1*, pp. 75-92.
34. Zohar, D. (2010). Thirty years of safety climate research: Reflections and future directions. *Accident analysis & prevention, Vol. 42, No. 5*, pp. 1517-1522.