Summer 8-1-2020

A Quantitative Study of Transformational Leadership and Safety Incidence in a Unionized Public Utility

Ronald D. Schoff
Indiana State University

A QUANTITATIVE STUDY OF TRANSFORMATIONAL LEADERSHIP AND SAFETY INCIDENCE IN A UNIONIZED PUBLIC UTILITY

A Dissertation

Presented to

The College of Graduate and Professional Studies

College of Technology

Indiana State University

Terre Haute, Indiana

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

---

by

Ronald D. Schoff

August, 2020

Keywords: Transformational leadership, union, OSHA, Technology Management, public utilities.

VITA SUMMARY

Ronald D. Schoff

EDUCATION

Ph.D. Technology Management — August, 2020
Specialization Area: HRD/ Industrial Training
Indiana State University — Terre Haute, IN

MBA — July, 2011
Purdue University North Central — Westville, IN

B.S. Business
Ball State University — Muncie, IN

AWARDS AND CERTIFICATIONS

- Certified Technology Manager (ATMAE (2013).
- Sigma Beta Delta Honor Society in Business Management and Administration (2010).

TEACHING EXPERIENCE

Lecturer — 2012
Purdue North Central — Westville, IN

- Instructed classes in entrepreneurship in the School of Business at the undergraduate level.
- Encouraged discussion and student interaction in an active learning environment
- Graded research papers and quizzes to asses learning levels.

PUBLICATIONS

- Schoff, R. (2020). A quantitative study of transformational leadership and safety incidence in a unionized public utility (Dissertation).
- Leffakis, Z. & Schoff, R. (2012). Stop doing things dangerously: High performance work systems can increase employee safety. *Industrial Engineer Magazine, 44*(6), 48-53.

PROFESSIONAL EXPERIENCE

RSA Consulting
President

COMMITTEE MEMBERS

Committee Co-Chair: Dr. Vincent Childress

Associate Dean

College of Science and Technology

North Carolina A&T State University

Committee Co-Chair: Dr. Mehran Shahhosseini

Program Director & Professor

College of Technology

Indiana State University

Committee Member: Dr. Musibau Shofoluwe

Program Coordinator & Professor

Department of Built Environment

College of Science and Technology

North Carolina A&T State University

ABSTRACT

Worker Safety is an area of high focus. Costs and impacts associated with incidents of workplace injury or fatality can have powerful effects on the organization. Workplace leadership style studies have shown statistically significant relationships between leadership style and rates of OSHA incidence and severity. One such example is transformational leadership. Studies have been completed in various industries, including high hazard industries that confirm this positive relationship. Organized labor offers many benefits of value to the employment sector. Such benefits as higher wages and better workplace safety practices contribute to society in economic and health related ways, among others. Transformational leadership and subordinates safety have been studied in non-union settings. Prior to this study, no study had been conducted to explore if a relationship existed between the leaders' management style of transformational leadership and incidents of safety in a workplace setting that utilized a unionized workforce. This study addressed that literature gap. Specifically, this study examined if a relationship existed between transformational leadership style and OSHA incidence and severity in a unionized high hazard public private partnership utility. The study consisted of an analysis of transformational leadership ratings of front line, non-union supervisors as rated by their union-member subordinates and OSHA incident and lost time or severity rates. The results of the study indicated that, contrary to the results of the previous non-union based studies, this study found no statistically significant relationship between transformational leadership management style and OSHA incidence and severity rates.

Keywords: Transformational leadership, union, OSHA, Technology Management, public utilities.

ACKNOWLEDGEMENTS

The author would like to acknowledge and thank the dissertation committee of Dr. Vincent Childress, Dr. Mehran Shahhosseini, and Dr. Musibau Shofoluwe, whom without their oversight and direction the process would not have been completed. I would like to specifically thank my committee chair, Dr. Childress for his guidance and counsel while we worked through the dissertation process. His steadfast assurances as we addressed the unknowns and the unforeseen that can come with dissertations were greatly appreciated. I would also like to thank my good friends Dr. Howard Jablon and Professor Tony Sindone, who gave me moral support and words of wisdom throughout the process.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Workplace organizations understand the importance of providing a safe work environment. On the job injuries or other negative safety incidents can bring about OSHA inspections and potential fines. Workman's compensation claims, other insurance rate increases, or potential lawsuits can also result from workplace injuries. Indirect micro and macroeconomic costs including lost time from work by an employee, loss of employee good will or loss of societal good will can be consequences of workplace injuries. A cursory view of corporate websites, annual reports, press releases and other corporate literature gives evidence that safety is listed as a high, if not the top priority. One such example is the mining industry where a survey of mining executives, (American Society of Safety Engineers, 2013), as reported in Professional Safety Magazine, produced results that indicated safety is the number one priority. Safety importance was followed by managing capital projects and maximizing production effectiveness in that order.

Approximately 2.9 million workplace illnesses or injuries were recorded under the Occupational Safety and Health Administration guidelines by private employers in 2016. Approximate 30% of these cases resulted in days away from work. (Bureau of Labor Statistics,

2017a). There were approximately 5190 workplace fatalities in the U.S. private sector workforce in 2016 (Bureau of Labor Statistics**,** 2017b). Of those 5190 workplace fatalities, there were 47 fatalities in 2016, under NAICS Code 211 which is the NAISC code for public and private utilities (Bureau of Labor Statistics, 2018a) The public private utility sector was the specific entity for this study. The public private partnership utilities sector is classified under NAICS 221. It is further divided into subsectors of three industry groups. These are represented by NAICS 2211 Electric power generation, Transmission, and Distribution; NAICS 2212 Natural Gas Distribution; 2213 Water, Sewage and Other Systems.

The economic impact of workplace injury or death is substantial. According to Leigh (2011), there were approximately 8.5 million injuries and more than 5,600 fatalities in the U. S. workforce in 2007. These incidents cost $186 billion and $6 billion respectively.

Public utilities face challenges of the future that are consistent with other industries. These challenges include globalization, consolidation, competition, privatization, and consumer expectations. Issues such as diversity, skills and tacit knowledge loss with retirement of the aging workforce also present challenges (Harmon, 2000).

Many public utilities are public private partnerships (PPP's). In the early twentieth century, such partnerships were created to assist in creating the infrastructure and providing public utilities to consumers. The public entities along with political assistance created an arrangement for the private sector to develop and maintain utilities. This allowed for such advantages as eminent domain power and monopolistic status. In exchange the private utility companies were required to accept government rate setting and additional government regulation (Southard, 2010).

Leadership styles can impact safety climate (Clark, Zickar, & Jex, 2014), safety practice (Barling, Loughlin, & Kelloway, 2002), and injury or OSHA recordable incident rates (Boroughf, 2012; Nolte, 2016; Steensma, 2010) within an organization. A multitude of studies have been conducted on the topic of workplace safety. Leadership style has been examined (Clarke, 2013; Conchie & Donald, 2009). Studies on workplace performance and strategies have been completed (Kochan, McKersie & Chalyoff, 1986; Leffakis & Schoff, 2012; Luthans & Sommer, 2005). Other studies have related to specific leadership styles such as transformational leadership and organizational processes (Sun & Henderson, 2017). Still others have dealt with union workers and safety (Brown, 2015; Ceniceros, 2012; Delp & Riley, 2015; Donado, 2015) or union and management relationships (Conlon & Gallagher, 1987; Dawkins, 2012; Dean, 1954; Deery, Iverson, Roderick, Buttigieg & Zatzick, 2014). Studies on relationships between unions and transformational leadership dealt with the union membership and the union leaders themselves (Cregan, Bartram & Stanton, 2009). Swindell (2014) based his study of union attitudes and their relationship among unionized airline pilots. His research dealt with attitudes toward the leadership style of managers of the union itself. Krouse's (2009) study examined transformational leadership's impact on workplace safety culture. Previous studies involving transformational leadership indicate a relationship to positive work behaviors and attitudes. All of the above studies have presented interesting findings to be addressed further in this document. However, no research to date, has dealt with transformational leadership of immediate front line non-union supervisors who lead a subordinate group of union members and the impacts this dynamic may have on recordable safety incidence in the workplace.

Wheatley (2015) discussed the principle of utilizing safety to lead organizational change. He illustrated the four levels in the hierarchy of safety leadership. At the lowest point of the

hierarchy is compliance. Compliance involves completing safety activity only as required. At this level of compliance, documents such as those required by OSHA are completed. The next level up on the hierarchy is that of supporter. The supporter understands the importance of safety along with the necessity to provide resources for it. Further up the hierarchy is the champion. The champion seeks to learn more about safety and advocates better safety practices. The visionary is at the top of the safety hierarchy. The visionary believes in matters of innovation and safety and makes such a process an underlying vision for the organization.

There can be differences in organizational climates regarding prioritization of behavior. Safety behaviors, as Zohar and Tenne-Gazit (2008) pointed out, can be fluid based on priorities such as production deadlines or the disregard of safety violations by supervisors due to the immediate organizational requirements. Zohar (1980) indicated two dimensions of high importance for an organizational safety climate. These are employee perceptions of management attitudes toward safety and the perceived relevance of safety in organizational operations. It was further noted by Zohar that organizational degree of safety climate had correlation to the organizational safety program effectiveness as judged by safety inspectors.

In their study of safety in a medical environment, Leroy, Diernynck, Anseel, Simons, Halbesleben, McCaughey, Savage, and Sels (2012) discussed the double bind in which employees can find themselves. This double bind consists of adhering to the organizational safety protocols while concurrently being responsible for reporting violations of those same protocols. Their study indicated findings that forward the concept that when management stays true to safety as a priority, employees are more comfortable reporting safety violating situations.

In 2017, unions represented 10.7 percent of the workforce.. These union workers represent 14.8 million people (Bureau of Labor Statistics, 2018b). For 2016, the Bureau of Labor

Statistics reported that an additional 1.7 million workers indicated no union affiliation although they received benefits of the union (Bureau of Labor Statistics, 2017c). Unionized workforces offer many personal and societal benefits. These include higher wages of union members, reduction of wage inequality as union wages positively influence non-union wages, and increased fringe benefits including better health insurance and retirement plans (Walters & Mishel, 2003).

McCarthy, in his seminal two works on labor unions and closed shops, discussed facets of union relations in Britain. These topics included public and government relations (1963) and establishment of grievance protocols (McCarthy & Clifford, 1966). Brown (2015) credits McCarthy with supervising the first national survey on the subject of industrial relations. While these works focused on union or closed shop relationships with public relations and government (Brown, 2015), the research did not address the internal issues such as relationships between union subordinates and their non-union supervisors.

Organized labor offers many societal and economic benefits. It is anecdotally accepted that higher wages and increased benefits are goals of the labor union. Additionally, other societal and economic benefits can be realized. Fair treatment from management, safety and health concerns, and participation in management decisions are benefits that can result from union involvement (Verma, 2005). Further, Verma pointed out that long term human resource management decisions and strategies can be positively influenced by union involvement. Labor rights, such as collective bargaining, are a necessity to reduce or eliminate the unequal bargaining power that is typical between individual employees and management. Thus labor rights are vital to self-determination and dignity in workplace settings (Dawkins, 2012). As such, unions can have impact on economic issues. In discussing members of the steelworkers union,

specifically the population involved in this study, the former President of the union, Lynn Williams, pointed out that the steelworkers union has three obligations. These are to negotiate for the existing members, to recruit new members and to work with others regarding current social and political issues (Kaufman, 2001).

As was editorialized in the publication *America* (Martin, 2015), innovative business models of today including outsourcing for example, lead to reduced wages and worsening working conditions. These worsening workplace conditions may include workplace safety risks. Delp and Riley (2015) discussed the importance a three pronged approach brings to workplace safety. The three factors are the employer, organized labor as an advocate for the employer and employees, and regulatory bodies including OSHA or state level regulatory entities. While historical information may point to the anecdotal assumption that industrial organizations operate from a top down mode, researchers suggest that corporate governance may be better served through employees' ability to influence decision making in business matters and resources (Aguilera & Jackson, 2003). A requirement exists that organizations evolve regarding human resource capital. While innovative and economic transformations have taken place, organizational and institutional transformation including unions, industries and workplaces have not evolved as quickly (Lazes & Savage, 1996).

The union involvement in organizational health can offer positive methods of influence. This influence can be employed, for example in organizational restructuring. Capabilities may include the capacity to access information for management, education of the workforce, access to various management levels and access at various levels in the decision making process (Frost, 2000). In discussing organizational stakeholder theory, Kochan and Rubinstein (2000) indicated that unions have historically experienced legal and ideological opposition to gaining stakeholder

status in organizations. Practical changes have taken place in the last two decades that offer a partnership between organized labor and management. This results in the labor union gaining more control in business decisions while the organization gains competitive advantage (Rubenstein, 2001). This co-management arrangement leads to more opportunity for communication regarding issues involving safety, among others. Leahy (2001) discussed the necessity to allow organized labor involvement in business ethics. Such inclusion requires acceptance at the organizational structure level.

Miner (2003) conducted research dealing with the importance, validity, and usefulness of organizational behavior theories. Of the 73 theories that were rated in his study, 17 were concerned with leadership style. Of the 17, transformational leadership ranked highest in mean score of importance, scientific validity, and usefulness. Studies have been carried out to examine the possibility of a relationship between workplace safety and leadership style. Prior research has taken place regarding transformational leadership's possible association with recordable OSHA injury incidents and also the severity of recordable OSHA incidents in non-union manufacturing settings in the steel processing industry (Steensma, 2010), manufacturing plants (Boroughf, 2012), and scrap metal production facilities (Nolte, 2016). While these prior studies have indicated a positive association between workplace safety and the type of transformational leadership style, none have been conducted in a union based public private partnership utility setting. Transformational leadership research has been conducted in trade union based settings by such scholars as Cregan et al. (2009), O'Connor and Mortimer (2013), Spector (1987), and Twigg, Fuller and Hester (2008). However, such research has involved the connection between union employees and the union entity management rather than union employees and the employer. This research offers exploration of the style of managerial transformational leadership

of non-union front line supervisors as rated by union member subordinates and measured against OSHA recordable incidents. As such, it represents the first study of such nature.

The transformational leadership concept was created by James MacGregor Burns (1978). Burns was devoted to research and had written extensively on leadership characteristics of notable world political leaders and others throughout history (Burns, 2003). Two basic types of leadership are described by Burns (1978). These two types of leadership are defined as transformational leadership and transactional leadership. Transactional leadership was conceptualized as an exchange of one consideration for another. These transactions can be the act of performing a task for compensation in one economic example. As Burns (1978) described, such transactions may take the form of a politician promising jobs or political favors to gain votes. Transformational leadership, on the other hand, involves more than an exchange of one consideration for another. The transformational leadership concept in action seeks to allow more involvement of the subordinate in idea exchanges, personal growth and input into information, and activity toward the common good. In short, while transactional leadership involves little autonomy on the part of the subordinate, transformational leadership offers the opportunity for the subordinate to gain autonomy and influence for the common good. Four components represent transformational leadership. These are Idealized Influence (II), characterized by the followers or subordinates striving to emulate leaders; Inspirational Motivation (IM), characterized by allowing subordinates to benefit from the leader's belief in offering meaning and challenge to the tasks and responsibilities of the subordinates; Intellectual Stimulation (IS), which allows the subordinate to question or challenge ways of doing things; and Idealized Consideration (IC), which allows the subordinate to create a sense of autonomy and self direction (Bass & Riggio, 2006).

Transactional leadership offers a less transformational approach. This transactional nature of leadership style is divided into several components. These components are Contingent Reward (CR) which offers an exchange for a consideration, Management by Exception (MBE), which is indicative of the leader being only focused on exceptions to standards and protocols, and Laissez Faire leadership (LF) which is the acquiescence of any leadership style by the leader. In the Laissez Faire leadership realm, the leader takes a very passive role in management (Bass and Riggio, 2006).

In Miner's (2003) extensive review of organizational behavior theories, his study reviewed 17 leadership theories among other organizational behavior theories. In his study, scholars rated the 17 leadership theories in the contexts of factors including usefulness of theory, explaining and predicting organizational behavior, creation of significant research on the theory, practical adaptation of theory, and other criteria the rating scholar thought useful. Study results indicated transformational leadership scored highest of all rated leadership theories in mean score of the ratings and ranked first in organizational rating. Avolio and Bass (2004), Bass (2008) and Bass and Riggio (2006) have written extensively on transformational leadership. Much of these scholars' studies have focused on organizational behavior and organizational development. Avolio and Bass created the Multifactor Leadership Questionnaire (MLQ). The MLQ has undergone several iterations and improvements. The MLQ-5X employs the method of utilizing raters to rate the specific leader on attributes that convert to a rating on the standard transformational leadership scale. The MLQ-5X questionnaire was utilized as the instrument for this research study. The study required union-member subordinates to rate their individual non-union front line supervisor. These results were then used to compute a transformational leadership mean score. Further, the individual front line supervisor's transformational leadership

mean score was compared to rates of OSHA incidence and severity occurring under the manager's stead. The purpose of this comparison was to establish if a relationship exists between mean transformational leadership score and rates of OSHA incidence and severity.

In assessing any type of performance, indicators that impact results are useful as measures of that performance. Indicators can be of two basic kinds. These are leading indicators and lagging indicators. Leading indicators tell us what can be predicted to happen before it may occur and thus allows influence over the occurrence and perhaps keep it from happening (Manuele, 2009). A types of management style, for example may act as a prior leading indicator that a positive or negative action may occur. Such influences as management styles may offer leading indicator information. Safety audits by managers, for example, can offer leading indicator information of potential workplace risks (Schiavi, 2014).

A lagging indicator can also indicate connection to an action, however, this lagging indicator is evident after the act has occurred. A difficult aspect of worker protections from injuries involves the OSHA recordable incident requirements for workplace illnesses or injuries. These requirements tell us what happened after the incident has occurred. As such, these after-the-fact reporting mechanisms are identified as lagging indicators. Lagging indicators can assist in predicting future subsequent actions, however this can only happen after the initial action has been recorded. An example that is pertinent to the framework of this specific research is the OSHA 300 Form. This form is a log of work related injuries or illnesses. The OSHA 300 Form is mandatorily completed after such safety incidents occur. As such it represents a lagging indicator. A lagging indicator such as this reports a workplace safety incident rather than preventing or minimizing its risk. Leading indicators have the advantage of allowing for appropriate action before a negative incident occurs.

While OSHA safety incident rate reports, as in the required OSHA 300 Form, are lagging indicators, the information supplied can be valuable. OSHA requires reporting of workplace safety incidents and also days away, restricted or transfer (DART) required incidents. Additionally, OSHA requires reporting of annualized incident rates and DART rates. In discussing OSHA incident and incident rates and also DART and DART rates, it is essential to comprehend the differences and purposes. An OSHA recordable incident is any "work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid" (OSHA, 2007 p. 811). A days away, restricted or transfer (DART) incident is an incident of such severity that it requires lost time or days absent from the job, restricted duty, or transfer to another duty. These incidents are recorded as raw numbers of workplace incidences.

Incident rates and DART rates are annualized calculations established from a formula that adjusts for various sizes of organizations classified in comparable workplace injury risk industries. The incident rate is calculated utilizing an annualized calculation as follows: Total # of injuries and illnesses for the year X 200,000 ÷ Number of hours worked by employees per year = Total recordable incident rate.

The DART rate is calculated utilizing an annualized calculation as follows: Total # of injuries and illnesses for the year resulting in days away, restricted duty or job transfer X 200,000 ÷ Number of hours worked by employees per year = Total recordable DART case rate.

Each of these incident rates and DART rate calculations results in a ratio of illness or injury to total number of employee hours worked. As such, these rates can allow for comparison of companies of various sizes in comparable risk industries.

Statement of the Problem

Workplace safety is stated as a top priority in organizations as is evidenced through an evaluation of many corporate websites, press releases, mission statements and annual reports. Even with this emphasis on safety, there were 2.8 million work related injuries in the United States in 2018 (Bureau of Labor Statistics, 2019). Many studies were previously conducted to establish if a relationship may exist between style of leadership and workforce safety. Studies have recently been completed to establish if a relationship exists linking transformational leadership to OSHA recordable injury incidents and also the severity of such OSHA recordable incidents in non-union manufacturing settings (Boroughf, 2012; Nolte, 2016; Steensma, 2010). These study results have indicated a positive connection linking transformational leadership attributes and relatively lower workplace safety incidents. Prior to this study, such a study utilizing a labor union based public private partnership utility setting had yet to be conducted. This study was focused on establishing whether a relationship exists between management style consistent with transformational leadership attributes and the incidence and severity of recordable safety events in a union based public private partnership utility organization. If such a relationship does exist, it can offer direction in corporate strategy for developing effective management styles and in doing so, reducing the organizational OSHA recordable incidence and severity of such incidence. Research has previously been conducted regarding transformational leadership based in a trade union setting. (Cregan et al., 2009; O'Connor & Mortimer, 2013; Spector, 1987; Twigg et al., 2008). However, these studies specifically focused on the possible relationship between union employees and the union entity management instead of such relationship between union-member subordinates and their non-union supervisor. The studies referenced above offered no information regarding any relationship between union-member

subordinates and their non-union supervisor and any relationship between a front line manager's transformational leadership approach and OSHA workplace safety incidents. Thus a gap existed in the body of knowledge relevant to this information. Specifically, this study attempted to establish if a relationship exists linking transformational leadership approach of non-union supervisors and recordable safety incidents, while managing union-member subordinates.

Purpose Statement

The purpose of this study was to address the gap that existed in the literature regarding the possible link between leadership styles of non-union supervisors toward union-member subordinates. And further, the relationship, if any, between leadership style and recordable safety incidents. Specifically, the study examined if a link can be established connecting transformational leadership attributes of non-union shift managers and recordable safety incident rates and the severity of those safety incidents in a union public private partnership utility organization. This study attempted to offer information based on management style relative to a transformational leadership context. The non-union shift managers were rated by their union-member subordinates on the manager’s leadership style. The mean results of manager scores were compared to OSHA incidence and severity to establish if a statistically significant relationship exists between the two variables.

Significance of the Study

This study endeavored to discover, on a theoretical basis, if workplace safety incidence and its connection to supervisory transformational leadership characteristics differs between a unionized workforce and a non-unionized workforce. Studies have indicated a statistically significant relationship between style of leadership and workforce safety in a non-unionized high hazard workforce. (Steensma, 2010; Nolte, 2016). Of interest to this study was whether these

results hold true in a unionized workforce. If so, the incremental knowledge gained by this study would indicate non-impactful union influence. If the study results were not consistent with prior non-union study applications, further study as to union influence factors would be warranted.

Workforce safety. Safety of the workforce is of primary importance to organizational health. This study examined if a relationship exists between management style based on attributes of transformational leadership for non-union front line supervisors in relation to their union-member subordinates, and the incidence and severity of recordable injuries. The study offers to add significant organizational leadership information as it relates to safety. If management style is a predictor of workplace safety incidence in a unionized workforce, then addressing, designing, developing, implementing and evaluating strong leadership strategic plans can promote a safer work environment.

Style of leadership and human resource development and training. The study can offer new knowledge in the realm of human resource development and industrial training. The unionized workforce offers dynamics such as dual loyalties that may not exist in non-union settings. Previous studies indicate that a relationship exists linking transformational leadership traits of supervisors and workplace safety incidents and severity in such non-union settings. This study adds to the knowledge base of management style's influence or lack thereof on the influence of safety outcomes in high hazard work environments.

Filling an important gap that exists in the current body of knowledge. This research can add incrementally to the current body of knowledge. While other past studies consistent with the subject matter of this research, have focused primarily on the relationship concerning transformational leadership and incidence and severity of injury in non-union industrial manufacturing settings (Boroughf, 2014; Nolte, 2016; Steensma, 2010), these previous studies

have not addressed any possible relationship linking transformational leadership to recordable safety issues in a union based public private partnership utility industry. Furthermore, by adding to the existing body of knowledge, this research can offer information on justifications for building strong transformational leadership strategies for union based organizations. Also, this research can potentially offer other information and knowledge applicable to the unionized public private partnership utility workforce. Establishing a link between leadership approach and workplace injury rate can assist in the current and future organizational safety climate. As noted by Kitt and Howard (2013), the advances in technology and means of organizational action require the necessity to change business practices. Such factors as incremental advancements in the industry sector economy, the aging of the workforce, globalizations and other business economics will require continued evolvement by industry. All these factors can provide changing influences regarding management style and its connection to workplace injury incidence.

Research Questions and Hypotheses

In developing the design of the study, the following research questions along with supporting hypotheses were offered.

Research Question 1: Are lower OSHA incident rates related to mean scores of transformational leadership of non-union front line supervisors, as rated by union member subordinates in a public private partnership utility?

Research Question 2: Are lower OSHA lost workday incident rates (DART Days rates) related to mean scores of transformational leadership of non-union front line supervisors, as rated by union member subordinates in a public private partnership utility?

Research Question 3: Are mean score ratings of transformational leadership of non-union front line supervisors, as rated by their union member subordinates, among those specific

managers who experienced zero OSHA incidents statistically significantly different than those specific front line managers who experienced OSHA incidents exceeding zero in a public private partnership utility?

Research Question 4: Are mean score ratings of transformational leadership of non-union front line supervisors as rated by their union member subordinates, among those specific managers who experienced zero severity (DART Days) incidents statistically significantly different than those specific front line managers who experienced OSHA severity (DART Days) incidents exceeding zero in a public private partnership utility?

The hypotheses corresponding to the above research questions are as follows.

H_{10}: There will be no statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA incident rates.

H_{1A}: There will be a statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA incident rates.

H_{20}: There will be no statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA lost workday incident rates (DART Days rates).

H_{2A}: There will be a statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA lost workday incident rates (DART Days rates).

H_{30}: There will be no statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates,

with zero OSHA incidents and non-union front line supervisors with above zero OSHA incidents.

H_{3A}: There will be a statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA incidents and non-union front line supervisors with above zero OSHA incidents.

H_{40}: There will be no statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA lost workday (DART Days) incidents and non-union front line supervisors with above zero OSHA lost workday (DART Days) incidents.

H_{4A}: There will be a statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA lost workday (DART Days) incidents and non-union front line supervisors with above zero OSHA lost workday (DART Days) incidents.

Limitations

There are limitations to this study. The accuracy of the recorded data associated with the OSHA reporting process is one such limitation. Another limitation is the applicability to only unionized organizations in the public private partnership utility industry, in which front line supervisors are non-union. The study was a correlational study intended to provide direction for future research, perhaps including cause and effect research that could lead to effective management training protocols to improve workplace safety. The predictive strength found through regression analysis, if significant, may by itself, offer limited general usefulness.

While this study can provide information relevant to the context of transformational leadership attributes and its correlation to OSHA incident rates, the results may be potentially applicable only to U.S public private partnership utility facilities in the Midwest United States with non-union, frontline managers. As such, the results may not apply to non-union organizations. The dependent variables of OSHA incidence and also severity rates are required record keeping by U.S. business organizations only. As such, the study cannot be replicated outside of OSHA jurisdiction.

This study concerns itself with transformational leadership characteristics of front line supervisors. Other leadership theoretical applications and also higher level management personnel are not applicable to this study. Front line supervisors employed in their position for at least one year constituted the sample rated population due to annualized OSHA incident and severity rate information.

Delimitations

Because the researcher identified a specific gap in the literature, he delimited this study to addressing that gap; transformational leadership specific to non-union front line managers in unionized public private partnership utilities. While this is defined as a delimitation, it tends to act as a "control" that ensures this gap is addressed without introducing extraneous contexts and other variables.

Assumptions

The researcher assumed that all union member rater/participants answered the MLQ-5X survey honestly and with integrity. It is also assumed that front line non-union supervisors represented as part of the study can be effectively evaluated utilizing the MLQ-5X survey. It is further assumed that appropriate OSHA logs were filled out completely and accurately. It is also

assumed the public private partnership utilities were representative of comparable public private partnership utilities.

Definition of Terms

Lagging Indicator- A lagging indicator is a factor that measures events from the past (US - EU Cooperation on Workplace Safety and Health, 2003). In the context of relevance to this research, a specific example of a lagging indicator is the OSHA required documentation of a workplace injury, illness or fatality.

Leading Indicator- Leading indicators are factors intended to predict the events of the future (US - EU Cooperation on Workplace Safety and Health, 2003). In the specific context of this research, leading indicators are some event or behavior that can predict an outcome in a workplace setting.

Multifactor Leadership Questionnaire (MLQ-5X)- This questionnaire was authored and developed by Avolio and Bass in 1995 and has evolved to the current 2004 version (Avolio & Bass, 2004). Its extensive use in the research of transformational research makes it appropriate for this research application.

OSHA 300 Form- The OSHA 300 Form document is required as mandatory completion of information relevant to "every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid. [It is also necessary to] record significant work-related injuries and illnesses that are diagnosed by a physician or licensed health care professional. [It is also necessary to] record work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR 1904.8 through 1904.12." (OSHA, 2007 p. 811).

OSHA DART Rate- The Days Away/Restricted or Job Transfer Rate. This rate is an OSHA reportable rate. The OSHA DART rates are based on annual calculations of non-fatal illness and

injury rates that caused time lost from employment, restricted work assignments or job transfer due to injury or illness. The rate is calculated utilizing the following formula: (Total # of illness and injury resulting in days away, restricted duty or job transfer X 200,000 ÷ Number of hours worked by employees = Total recordable DART case rate) (OSHA, 2007).

DART Days Rate- In the context of this study, the DART Days Rate is comparable to OSHA severity rate. As a proper measure for the study, the DART Days Rate is the number of days lost for Days Away Restricted or Transferred from their normal position. The formula is: (Total # of Days Away Restricted or Transferred from their normal position X 200,000 ÷ Number of hours worked by employees = Total recordable DART Days Rate).

OSHA Incidents Rates- OSHA incidents rates are annual calculations of non-fatal illness and injury rates. The formula is: Total # of injuries and illnesses X 200,000 ÷ Number of hours worked by employees = Total recordable case rate (OSHA, 2007).

Public Private Partnership (PPP) Organization- Utility providers in a public private partnership arrangement. In the context of this specific research, the study is based on a union based PPP in the utility sector as classified under NAICS 221.

Non-Union Front Line Supervisor (Rated subject)- In the context of this specific research, a front line supervisor is a non-union supervisor to which union-member workers directly report. This non-union front line supervisor was rated by each of their union member subordinates who chose to participate in the study. These subordinates completed the MLQ-5X transformational leadership rating scale based on their views of the front line supervisor.

Transformational Leadership- This leadership style was identified and developed by Burns (1978). Burns posited transformational leadership allows for leaders to develop subordinates by

allowing them to gain autonomy and growth by addressing the subordinates' higher needs. This concept can covert followers into leaders (Burns).

Union Member Subordinate (Rater)- A union member subordinate, in the context of this specific research, is the direct subordinate of the non-union front line supervisor. The union member subordinates who chose to participate in the study rated their non-union front line supervisor utilizing the MLQ-5X transformational leadership scale form.

CHAPTER 2

LITERATURE REVIEW

Introduction

This study can offer information as it relates to human resource development and industrial training as a specialization in the discipline of technology management. The study focused on the dynamics of non-union front line supervisors and union-member subordinates. Specifically, the study focused on transformational leadership characteristics of non-union front line supervisors as rated by their union-member subordinates and those transformational leadership characteristics' relationship to OSHA injury and severity rates. Such information may lead to a better understanding of these union/non-union dynamics. This further information may lead to strategic management methods to reduce workplace safety incidence.

It is a given that managers in organizations will indicate that organizational safety is a top priority as confirmed by corporate public information. Maxfield (2010) pointed out that safety is an organization's leading edge in a culture of accountability. Safety has been paramount in workplace settings for many years and for various reasons. The obvious reason is to protect employees from injury or fatality. Economic reasons including lost work-time costs in micro and macro settings, insurance costs, liability issues, and customer and societal goodwill are some

others. Union workforces have instrumentally assisted in providing safe working environments (Barling, Fullager & Kelloway, 1992; Ceniceros, 2012; Verma, 2005). As such, reductions in workplace injuries are consistent in union and also non-union environments (Morantz, 2013). In a 2015 survey among Environmental Health and Safety Managers, these EH&S managers offered responses related to engagement and culture (Smith, 2015). Responses such as wanting to see more emphasis on safety rather than production and utilizing leading indicators rather than lagging indicators were cited as important.

Many research studies have been conducted and much has been written on management style and workplace impact (See Table 2.1). These research studies as indicated in Table 2.1 include leadership and management styles (Clarke, 2013; Conchie & Donald, 2009); workplace performance and strategies (Kochan, McKersie & Chalyoff, 1986; Luthans & Sommer, 2005; Leffakis & Schoff, 2012); union and management relationships (Conlon & Gallagher, 1987; Dawkins, 2012; Dean, 1954; Deery, Iverson, Roderick, Buttigieg, & Zatzick, 2014); and union worker and union leaders themselves (Cregan et al., 2009, Swindell, 2014). Other research has concentrated on safety culture and climate (Clark et al., 2014; Krouse, 2009). Research has also be conducted on union workers and safety (Brown, 2015; Ceniceros, 2012; Delp & Riley, 2015; Donado, 2015). Still more studies have been conducted on safety practice (Barling, Loughlin, & Kelloway, 2002); transformational leadership and organizational processes (Sun and Henderson, 2017); and transformational leadership and OSHA recordable incidents within non-union settings (Boroughf, 2012; Nolte, 2016; Steensma, 2010).

Table 2. 1 Studies of Management Style and Workplace Impact

Area of Study	Authors
Leadership and Management Style	Conchie and Donald, 2009
	Clarke, 2013
Workplace Performance and Strategy	Kochan, McKersie and Chalyoff, 1986
	Luthans and Sommer, 2005
	Leffakis and Schoff, 2012
Union and Management Relationships	Dean, 1954
	Conlon and Gallagher, 1987
	Dawkins, 2012
	Deery, Iverson, Roderick, Buttigieg and Zatzick, 2014
Union Workers and Union Leaders Themselves	Cregan, Bartram and Stanton, 2009
	Swindell, 2014
Safety Climate and Culture	Krouse, 2009
	Clark, Zickar, and Jex, 2014
Union Workers and Safety	Ceniceros, 2012
	Brown, 2015
	Delp and Riley, 2015
	Donado, 2015
Workplace Safety Practice	Barling, Loughlin, and Kelloway, 2002
Transformational Leadership and Organizational Processes	Sun and Henderson, 2017
Transformational Leadership and OSHA Recordable Incidents within Non-Union Settings	Steensma, 2010
	Boroughf, 2012
	Nolte, 2016

Safety Performance Indicators

In the context of this research, safety performance indicators are of two basic modes. These are lagging indicators and leading indicators. The form of lagging or trailing indicator utilized in this study is the OSHA 300 form. This form is used to record safety incident rates and incident severity rates after their occurrence. An OSHA recordable incident is defined as any "work-related injury or illness that involves loss of consciousness, restricted work activity or job

transfer, days away from work, or medical treatment beyond first aid" (OSHA, 2007 p. 811). Severity rates represent a subset of incident rates. Severity rates are defined as those incidents that require days away from work, restricted duty at work, or transfer to another workplace area. These severity rates are reported as DART rates. DART is the acronym for Days away from work, Restricted duty at work, or Transfer to another workplace area. These incidents are recorded as raw numbers of workplace incidences. This raw data are also then converted to rates. These rates allow for normalization of the data for comparison among organizations within industries of comparable safety risks.

Incident rates and DART rates are annualized calculations established from a formula that adjusts for various sizes of organizations classified in comparable workplace injury risk industries. The incident rate is calculated utilizing an annualized calculation as follows: Total # of injuries and illnesses for the year X 200,000 ÷ Number of hours worked by employees per year = Total recordable incident rate.

The DART rate is calculated utilizing an annualized calculation as follows: Total # of injuries and illnesses for the year resulting in days away, restricted duty or job transfer X 200,000 ÷ Number of hours worked by employees per year = Total recordable DART case rate.

Each of these incident rates and DART rate calculations results in a ratio of illness or injury to total number of employee hours worked. As such, these rates can allow for comparison of companies of various sizes in comparable risk industries.

Safety performance indicators are methods to assist in analyzing the lagging and leading indicators involved in safety (Sugden, Healey, Howard & Rushton, 2010). Safety professionals are responsible for coming up with increased methods to better improve safety through leading indicators. As McKnight (2015) indicated, there are two reasons why this is difficult. The first

reason is that a common standard cannot be agreed to among professionals, industries and employers. Secondly, a standard does not exist for safety performance measurement in the form of total recordable incident frequency (TRIF). As O'Connor, Cowan and Alton (2010) suggest, effective leading indicators should be developed to supplement the traditional lagging indicators. This is based on a study of high reliability organizations (HRO's) such as naval aviation. Lagging or trailing indicators can present issues such as employee or management unwillingness to report incidents or pressure to not report such incidents. These subjective variables can lead to low confidence levels in the data (Toellner, 2001). The author further points out the dichotomy of the OSHA belief in reporting even in doubt and organizational human resources belief in reporting only when absolutely required. Leading indicators can assist in reassessing safety climate (Bergman, Payne, & Taylor, 2014). Reassessment of organizational safety climate can take place even though there is an absence of workplace safety incidents. A lagging or trailing indicator such as in the framework of this research is represented by the standard OSHA 300 reporting form. If leadership style can show statistically significant positive results in workplace safety, it can act as a leading indicator to potential risk. At the 2003 conference of U.S. and European Union Cooperation of Workplace Safety and Health, the definitions of leading and lagging indicators were listed. Lagging indicators measure events from the past. Leading indicators can be utilized, and as is their intended purpose, to be able to predict the events of the future (US - EU Cooperation on Workplace Safety and Health, 2003). These same conference proceedings reported that leading indicators should be measurable, be measurable consistently by all involved, have the ability to predict future outcomes, focus on successes or positives, encourage desirable activities, be data driven, be useful to all stakeholders, and be adaptable to all sizes of workplace organizations. The proceedings also reported that lagging indicators should also be

measurable, be measurable consistently by all involved, be data driven, be useful to all stakeholders, and be adaptable to all sizes of workplace organizations.

Heinrich's Pyramid

In the context of incident rates and DART rates, it is important to offer a review of Heinrich's Pyramid. Heinrich's Pyramid posits that there exists a consistent ratio among near misses, minor injuries and major industries in the workplace. Heinrich's research from the 1930's proposed a ratio that indicates for every 300 incidents or near hits, there will be 29 minor injuries and one major injury (Rebbitt, 2014). Thus, this ratio takes the form of a pyramid. This context can lead to the assumption that reducing or eliminated near misses or minor injuries can lead to a reduction of major injuries (Dunlop, 2013). Manuele (2011) discussed what he referred to as two myths relevant to Heinrich's theory. The first myth suggests that unsafe acts by workers are the principal reason for workplace injuries. The second myth suggests that reducing workplace injuries will reduce severity of injuries in proportion. In an investigation of Heinrich's pyramid ratio, Gallivan, Taxis, Franklin and Barber (2008) found the ratio theory to be lacking. Nash (2008) indicated that the Bureau of Labor Statistics information also fails to support Heinrich's Pyramid Theory. An examination of data from the three studies conducted by Boroughf (2012), Nolte (2016), and Steensma (2010), on which this study is based, also indicates the lack of ratio between incident rates and rates of severity. While supervisors in those studies reported rates of incidents, some reported zero severity or DART rates. The rates of severity were not consistently related to rates of incident. Indeed, Williamsen (2003) indicated that focusing on fundamentals at all employee levels, including management, defining correct behaviors, training employees regarding that behavior, assessing the implementation and compliance with the behaviors, and

rewarding those positive behaviors can positively impact workplace injury and rates of injury severity.

Related Research

There have been three recent studies that dealt with transformational leadership and organizations involved in manufacturing processes. These studies are relevant to the objective of this study. Boroughf (2012) conducted research to establish if a relationship exists linking transformational leadership tendencies and safety outcomes in non-union automotive manufacturing related organizations. Boroughf's study focused on plant managers as rated by their subordinates. She measured OSHA incident rates and OSHA lost time rates in an attempt to find an association between those rates and transformational leadership qualities of management. There is a subtle difference in the Buroughf study as compared to this study. While this study utilized DART (Days away, Restricted or Transfer) as a measure of severity rates, her study only focused on *days away*, which she referred to as lost time. This represented only one of the three components of DART. Her study results indicated that her hypothesis suggesting that higher transformation leadership scores exhibited by plant managers are connected to lower OSHA incidence rates did not indicate a relationship of statistical significance. Her second hypothesis that higher mean scores of transformational leadership exhibited by those plant managers are associated with lower OSHA frequency rates also indicated lack of statistical significance. Steensma (2010) conducted research on transformational leadership and safety in steel mills. His sample was employees of non-union steel mills. His study attempted to measure if a relationship exists linking transformational leadership behaviors of unit managers and OSHA injury rates. He further attempted to measure if a relationship exists linking transformational leadership behaviors of unit managers and OSHA severity rates. His study determined a statistically

significant relationship exists linking supervisory scores of transformational leadership and rates of recordable injury. Additionally, his study indicated that there was no statistically significant link between supervisory transformational leadership scores and OSHA severity rate. He further hypothesized that there was a difference of statistical significance existing in mean score of transformational leadership between managers whose departments or plants experienced an injury rate of zero as measured against those who experienced an injury rate higher than zero. This information produced results that indicated a difference of statistical significance in mean ratings of transformative leadership between managers with zero injury rates versus those with non-zero rates, with the zero rate managers rating more highly. However, in hypothesizing a relationship between mean scores of transformational leadership among managers whose departments or plants had an injury severity rate of zero as compared to those who had an injury severity rate higher than zero, the subsequent test results indicated no statistically significant difference existed between an injury severity rate of zero and an injury severity rate higher than zero. However, as 38 of the 46 supervisors in the study reported a severity rate of zero, this lack of statistical significance could be attributable to the disproportionately high amount of supervisors reporting zero severity rates (Steensma, 2010).

Nolte (2016) conducted research on transformational leadership styles of front-line supervisors as rated by non-union subordinates. The industry utilized for his study was the metal scrap processing industry. Nolte found that there were negative correlations between transformational leadership scores and both OSHA recordable rates and lost workday rates. Nolte indicated the negative correlation between transformational leadership and OSHA recordable incident rate was reported as moderate, and as evidenced by a Pearson correlation of

-0.507, the linear relationship was strong. The linear relationship offered a significant regression equation, indicating a strong linear regression (R^2=0.26). Nolte also reported the negative correlation between transformational leadership and OSHA lost workday rates was moderately strong, as evidenced by a Pearson correlation of -0.567. The linear relationship offered a significant regression equation, indicating a strong linear regression (R^2=0.32). Thus, based on this information, as transformational leadership scores increase, the rate of recordable safety incidents and also lost workday rates will decrease. While studies on supervisory transformational leadership attributes and their impact on safety show a correlation, the strongest correlations involved front line supervisors rather than leaders higher up in the organization (Nolte, 2016). These studies are pertinent in that they offer important results in a non-union organizational setting. Each of the prior three studies recommended that a union based organization be researched in the future. A union based PPP organization was the context for this study.

Research by Zohar (2002) determined that a positive relationship exists linking transformational leadership and organizational culture. Further his study indicated that leadership and culture of safety were influenced more by the priorities of immediate supervisors rather than higher level organizational leaders.

Theoretical Basis for this Research

This research study sought to discover if workplace safety incidence and its connection to supervisory transformational leadership characteristics differs between a unionized workforce and a non-unionized workforce. The study involved a unionized workforce. By comparing the findings of this study with results of previous studies of non-union workforce applications, knowledge may be gained as to the existence of a relationship, if any, between transformational

leadership style and OSHA safety incidence in the union context. The unionized setting, in turn, may have implications for further investigation beyond this study. One such example could potentially be the nature of leading OSHA indicators in union shops.

The Unionized Workforce

As Godard and Frege (2013) indicated in their study, unions bring a democratization to the workplace based on their influence on employer practices. In doing so, the union may alter conditions under which employers exercise authority. Unions and the organizations have a dynamic that differs from a non-union organizational setting. The workplace voice is generally described by Kaufman (2014) as a combination of communication and influence over any action on that communication. Collective bargaining can impact in the form of greater influence in a unionized workforce. Poehler and Luchak (2014) in their research on High Involvement Work Practices (HIWP) indicate that common goals of HIWP and unions include the promotion of efficiency and equity in the workplace. This can lead to a sense of empowerment. Employees that work for transformational leaders feel a sense of empowerment based on research by Ismail, Mohamed, Sulaiman, Mohamad and Yusuf (2011).

Labor unions offer collective action. This collective action allows for the group to achieve desired results. Individually, workers have little agency or power. However, the more individuals enjoin for a common interest, the more power the group enjoys (Reichart & Durrenberger, 2010).

Union member dual loyalty. Organizations are dynamic, evolving entities as pointed out by Morgeson, Mitchell and Liu (2015) in their discussion on Event Systems Theory. Organized labor has been part of that dynamic evolution through consistent and effective change. Increased wages and benefits along with increased attention to safety are benefits of union interaction with

organizational leaders. Union membership is positively related to such tangibles as higher wages, safe working conditions and job security (Malinowski, Minkler & Stock, 2015).

For the purposes of this research study, a discussion of dual loyalty among union members toward the union and the employer organization is offered. While research related to union member loyalty to the union such as those by Bamberger, Kluger and Suchard (1999), Conlon and Gallagher (1987), and Sverke and Kuruvulla (1995) have offered more important information on leader and subordinate dynamics, this study was directed more so with the union member loyalty to the employer. As far back historically as 1954 (Dean), studies have indicated that union loyalty can and does coexist with loyalty to the employer. Purcell (1954) indicated that union workers want a dual loyalty arrangement. They want the organization to give unions the right to bargain, while accepting that management has a right to manage. As early as 1964, Boyd, in his work on utility-union relations in San Francisco reported that a concern on the part of the utility that union loyalty would cause disruption did not materialize. This was due in part to the facts that the city offered proper working conditions and pay (Boyd, 1964). Unions can be engaged in multiple loyalties. Public utilities are regulated by Public Utility Commissions (PUC's). These PUC can have regulatory responsibilities. Employee objectives, worker safety and regulatory requirements offer overlapping situations where the union influences can be presented at both the regulatory table and the bargaining table. Such legacy union concerns as safety and appropriate manpower are intertwined with the public utilities' ability to provide effective consumer service. These internal protection needs and the public utilities' responsibilities to the consumer can be a part of the PUC's authority to regulate. PUC's can regulate staffing levels and other factors impacting consumer rate structures (Strauss & Mapes, 2012). Strauss, and Mapes (2012) also suggest that employee entities such as unions can

approach PUC's proactive issues such as the aging out of older the generation of workers without suitable replacement available.

Magenau, Martin and Peterson (1988) in their study on dual and unilateral commitment of union members and stewards suggested that dual loyalty can be served by unions that base decisions on members' acceptance level of them and the organizations that make work more satisfying to the union members. Indeed, while unions and the employer organization may be viewed as competitors, the relationship can bring about positive organizational citizenship behavior (Deery et al., 2014). These authors further pointed out that the collective nature of unions eliminates the individualized concerns of the employee while also offering opportunity to build solutions to negative workplace situations.

Union member employees differ from non-union member employees in that while union members have loyalty to the union itself, they also require a level of loyalty to the employer. By nature of a lack of union existence in a non-union setting, non-union employees have no such dual loyalty. Roles carry identities that members of organizations are required to assume. This is particularly impactful in the duality of roles that union members must play. The union member has responsibility to do what is best for the employer organization and also what is best for the union. Roles also carry influence, and influence can equate to power. This dynamic builds a sense of meaningfulness to the employee in relation to his place in the workforce (Kahn, 1990).

Union/management relationships. Leader member exchange (LMX) theory is premised on the concept that leaders develop relationships at varying levels with their subordinates (Naidoo, Scherbaum, Goldstein, & Graen, 2011). While this theory may support validation among a non-union workforce in which the dynamic is between the superior and her or his subordinate, a union based workforce may call additional dynamics into play. The relationship

among union members may enter into the equation of any relationship toward non-union superiors. Matta, Scott, Koopman and Conlon (2015) found that employees were more prone to be engaged when they and their supervisors were more in alignment or agreement in the leader-member exchange quality and an understanding of their individual roles. Barrick, Thurgood, Smith and Courtright (2015) reported the three conditions necessary for employee engagement. These are psychological meaningfulness, safety, and availability. In evaluating the three factors that indicate organizational investment, which are motivating work design, HRM practices and transformational leadership existing at the top management level, the authors found the three factors listed above in combination, increase collective employee engagement.

Barrick, Mount, and Li (2013) in their study of purposeful work behavior, offered information regarding unionized workforces and the multiple roles that can exist among and with each union employee. They concluded that a worker's motivation and behavior is influenced not only by their personality but also by their social roles and task attributes. Union based workplace situations offer differing social roles. These are the roles of a union member and as that of an employee of the company.

Union-management relationships can impact attitudes and receptiveness to management styles. Martin and Biasatti (1979) offered several important elements for healthy union-management relations. These included the perception by both parties that collective bargaining is important, the conception that the union must be strong enough to effect a balance of power, that each party respects each other's goal, and the parties understand they have some common goals. Further, Martin and Biasatti offered that management must have a strong labor relations program, that communications between the parties are well developed, that negotiations carry a spirit of a goal to achieve results, that contracts administration is done in good faith, that both

parties continue to evaluate the efficacy of the relationship and that union members can feel a sense of participation in the system process.

Unions and Organizational Safety

"American unions are seen as very pragmatic organizations that seek to improve the economic and social conditions of their members, focusing on improving the conditions of employment in the short run, primarily through collective bargaining" (Kochan, 1979, p.23). This improvement of conditions includes not only wages and benefits but also the safety of the workplace. Morantz (2013) reported conflicting information on union workers and safety. In a research study of United Mine Workers coal mines, she indicated that scholarly evidence points to ways unions contribute to a safe work environment while other scholarly works report that safety outcomes show no statistically significant evidence of the effect of union membership on safety. Ceniceros (2012) reported that unions have consistently been champions of safety throughout their history. Further the author pointed out that this attention to safety can create positive collaboration with employers to improve safety and reduce risks.

Control of organizational assets such as human resources resides with management in a typical organization. Leadership and direction can take place through written policy, verbal information or even attitudes of managers. This conveyance of information reflects the commitment of the leadership. This information can facilitate safety attitudes of an organization and individual workers (Yorio, Wilmer, & Haight, 2014).

Clark et al. (2014) reported that social exchange has been employed to explain organizational citizenship behavior by many researchers. Reciprocity takes place when, for example, subordinate employees will increase efforts when superiors act in positive ways. Conversely, subordinates react negatively when superiors act in kind. Practices of safe working

conditions will cause the employee to increase positive efforts. In their study that examined team based psychosocial climate relative to worker health and safety, Idris, Dollard and Tuckey (2015) found that valuing such worker health and safety can create additional positive motivations on the part of the workers. Such information can be applicable to union/management labor relations. One such way to create positive motivation is to encourage employee safety voice. Safety voice is defined by Conchie, Taylor and Donald (2012) as "...behaviors that seek to improve safety by identifying current limitations and possibilities for positive change" (p.105). In their study of a union based organization Tucker, Chmiel, Turner, Hershcovis and Stride (2008) determined that employee perceptions of organizational and coworker support for proper safety measures influenced the individual employee safety voice. The study further indicated that while both the perceived organizational support for safety and also the coworker perceived support for safety had influence on the individual employee safety voice, the perceived coworker support for safety had a much larger affect on individual safety voice. The influence of union members may be impactful toward that finding.

Supervisory actions have strong effects on subordinate safety matters in the workplace. Transformational leadership offers a positive influence on this interaction. Transformational leadership increases the subordinate's trust in the supervisor and thus positive organizational citizenship behavior is demonstrated by the subordinate (Conchie & Donald, 2009). Conchie and Donald go on to point out that trust is the degree of willingness a person possesses to rely on another that workforce performance is based on safety as a priority. Tension among factions in the workplace can have opposite consequences. In research by McGonagle, Walsh, Kath and Morrow (2014) it was determined that higher levels of workplace tension will lead to more incidence of unsafe work practices.

Organizational and Union Innovation

Innovation and management of technology by an organization can offer positive effects on union/management interaction. The extent of innovation in non-union workplaces is positively correlated to avoiding union organization within the workplace (union avoidance), while being negatively correlated to the percentage of workforce organizations that are unionized. Union organizations on the other hand show a negative correlation between innovation and union avoidance while showing a positive correlation to percentage of the workforce that is unionized (Kochan et al., 1986). In other words, innovation and management of technology is positively affected by union avoidance in non-union locations and also positively affected by unions in a union setting. Firms that effectively compete in innovation also invest in human and social capital. This high road strategy includes a multiplicity of effective practices. One of these practices is the establishment of labor/management partnerships where employees have collective bargaining status (Kochan, 2012). As unions are effective at negotiating gains, some of these gains can include identification of safety hazards and involve training to minimize risks. As such, the union can have substantial positive effect on safety and reduction of injury risks (Barling et al., 1992). Such competitive issues as technological advancement and innovation, globalization, and deregulation bring with them the necessity to respond quickly. From a human capital perspective, one such means is through high performance work systems (HPWS) (Luthans & Sommer, 2005). High performance work systems offer distinct but related human resource applications that empower the employees to work with superiors to call attention to and correct conditions or behaviors that may conflict with organizational or legal safety standards (Leffakis & Schoff, 2012). The empowerment and autonomy of union employees offer a good fit for transformational leadership and HPWS. Transformational leadership allows

for employee problem solving. As such, union members work toward problem solving solutions (Cooke, 1994; Liu, Guthrie, Flood, & MacCurtain, 2009). Additionally, organizational implementations such as high performance work systems create mutual trust between union laborers and supervisors (Kim, Kim, & Ali, 2015).

Kim and Bae, (2005) described two modes of production. These are lean mode and team production. Lean mode is typically characterized by a paternal or top-down management style. Team production is best suited for union type situations due to its decentralization style of operation. This decentralization utilizing union involvement can lead to high performance work systems. Trmal, Bustamam and Mohamed (2015) indicated that the attributes associated with transformational leadership of idealized influence, inspirational motivation, intellectual stimulation and individualized consideration can produce behaviors and attitudes that are consistent with high performance work systems. In an in-depth review of Freeman's and Medoff's 1984 report on unions in the workplace, Lewin (2005) discussed HPWS and its link to unions and collective bargaining. He indicated that along with the high performance production and management processes, employee security, training, and formal dispute resolutions can be included as components in these systems. This can produce the effect of some typical union bargained benefits in non-union applications.

The European Agency for Safety and Health at Work (2013), which is similar to OSHA in scope and purpose, has listed four priorities for research in workplace safety as offered in a report discussing safety research priorities. These four research priorities are globalization and workplace changes, demographic changes in the workforce, new safe technologies and addressing the occupational exposure risks of chemical and biological agents. Unionized workforces represent the opportunities to address these research recommendations. Demographic

changes relative to generational, multicultural and technological advancement are pertinent in union organizations and also non-union organizations.

With the technologically advanced economy of today, change is a constant. Dychwald, Erickson and Morison (2006) offered a list of trends to expect in the technology driven economy. These include ageism, multicultural diversity, a shortage of workers, a shortage of skills and experience, pressure on training and development, and a strain on organizational coherence. Not only are these issues applicable to employers, they are also applicable to the labor union structure. Labor unions face multigenerational issues as does the employer. Older members of the workforce possess tacit knowledge that is valuable. This knowledge can be effectively transferred. By definition, it can include ways of doing things that are not codified. These can include safer work practices. Tacit knowledge has value when managed properly. One such value is in ways it may be used to find problems, solve problems and predict future problems (Harlow, 2008). Harlow further indicated that tacit knowledge can lead to quantum shifts in knowledge rather than incremental shifts that accompany explicit knowledge transfer.

Multigenerational differences in attitudes toward loyalty also are a real condition in the technologically driven economy of today. Venneberg and Eversole (2010) pointed out that older workforce members such as Baby Boomers, defined as those born between 1946 and 1964, hold attitudes of loyalty that are stronger than those of Gen X, those born between 1965 and 1979. This difference can affect union and organizational cohesiveness and also knowledge transfer motivation.

Theories of Organizational Leadership

Such structural differences in organizations as a unionized workforce and exponential technological change require these organizations to concentrate on human resource development

and training strategies. Leadership theories play an important role in those HRD strategies and their connection to technology management. New knowledge of the applications of those theories as appropriate can allow for strategic organizational HRD decisions.

As technology and research allow for refinement of existing organizational theories, and discovery of new organizational theories, management of this information can have key impacts on organizational health. In a research study by Miner (2003) organizational behavior theories were reviewed by scholars and assigned an organizational behavior rating and a total rating. The study discussed 73 total theories with 17 of these being leadership theories. The process divided leadership theories into two sections. These were first generation and second generation leadership theories (see Table 2.2).

Table 2. 2 Organizational Leadership Theories

First Generation Theories	**Authors**
Cognitive Resource Theory	Fiedler and Garcia
Consideration & Initiating Structure Theory	Hemphill, Stogdill and Shartle
Contingency Theory of Leadership	Fiedler
Influence Power Continuum	Heller
Leader Member Exchange Theory	Graen
Leadership Pattern Choice Theory	Tannebaum and Schmitt
Managerial Grid Theory	Blake, Mouton
Normative Decision Process	Vroom and Yetton; Vroom and Jago
Path-Goal Relationship Theory	Evans
Path-Goal Theory of Leadership Effectiveness	House
Situational Leadership Theory	Hersey and Blanchard
Theory X and Theory Y	McGregor
Second Generation Theories	**Authors**
Charismatic Leadership	House
Implicit Leadership Theories	Lord and Maher
Romance of Leadership	Meindl
Substitutes for Leadership	Kerr
Transformational & Transactional Leadership	*Bass*

Based on Miner (2003).

It is beyond the scope of this paper to discuss all the types of the leadership theories listed. Of importance to note, as part of Miner's study, each theory listed in Table 2.2 was rated by the participating scholars. Each scholar rated the leadership theories on a scale from 1 (low) to 7 (high) on total importance and organizational behavior. Variables to consider were:

- usefulness of theory in understanding, explaining and predicting organization behavior;
- generation of significant research on the theory;
- practical application and adaptation of the theory;
- any other criteria the respondents consider useful or applicable.

In comparing the ratings of all 73 theories, including the 17 organizational leadership based theories, transformational leadership scored 21st highest among all 73 organizational behavior theories on total importance with a mean score of 4.70. Additionally, the organizational based rating indicated that transformational leadership had a mean score of 5.06 which ranked 12th out of 73 theories.

In the category specific to leadership theories, which consisted of 17 theories, transformational leadership mean scores of 4.70 in total importance and 5.06 in organizational rating ranked first. Thus the study indicates transformational leadership theory is an indicator of importance and influence on organizational behavior. As such, it is well suited for research studies such as this.

Transformational Leadership

Engagement of the workforce is the characteristic that is essential to safety. Transformational leadership can be the key to that engagement (Fulwiler, 2011). The two essentials of power are motive and resources (Burns, 1979). As Burns further explained, leadership is power. Power is manifested through a motivation to attain a goal. The process to attain the goal requires resources such as human resources. As motivation is a human trait, the power it generates can move human organizations toward goals. Human resources are the vehicles that allow for goal establishment and achievement. Transformational leadership as conceptualized by Burns (1978), defined transforming leaders as having several characteristics. These are the capacity to raise followers' consciousness regarding the significance of results, the skill to convince followers of the benefit of transcending their self-interest for the interest of the whole, and to raise the followers' level of need on Maslow's Hierarchy of Needs.

As described by Bass and Riggio (2006), there are four components that make up transformational leadership. These are Idealized Influence (II), Inspirational Motivation (IM), Intellectual Stimulation (IS) and Individualized Consideration (IC). Bass and Riggio defined these four components as follows. In Idealized Influence, transformational leadership manifests itself in the way leaders are admired, respected and trusted. Followers or subordinates desire to emulate the qualities of their leader. Inspirational Motivation manifests itself through the leader's ability to offer challenges and also meaning to the tasks and followers. Intellectual Stimulation as allowed by the leader, offers followers the opportunity to be creative and innovative. Questions and challenges regarding the way things are accomplished are welcomed by leaders emulating Intellectual Stimulation. Individualized Consideration allows each follower or subordinate to achieve and grow at her or his individual pace. Further, Bass and Riggio indicated that this can create a sense of autonomy in the individual worker that further assists in developing skills.

Transformational leadership model. The dynamic concept of transformational and transactional leadership was developed by Burns (1978). In his book on leadership, he discussed the differences between transactional and transformational leadership. He stressed that a relationship that develops linking a transformational leader and his or her followers is one that offers mutual stimulation and growth that allows for followers to become leaders. These followers can become future leaders or they can assume autonomy in their currently existing follower roles through their involvement in the processes of attaining the common goal. Burns (1979) further discussed moral leadership. He indicated that leaders and their followers have not only a relationship of power but also of "mutual needs, aspirations, and values" (p. 4). He furthered his points by explaining that followers, while having a relationship with leaders, must also be aware of alternatives to their leader and maintain the ability to choose between those

options. A third point Burns (1979) made is that effective transformational leaders have an obligation to follow through on commitments they make to their followers. In the above descriptions, lies the emphases of Burns' (1979) definition of moral leadership.

Transactional-transformational leadership continuum or augmentation. Burns originally assumed the transformational/transactional leadership components existed on a continuum (Avolio & Bass, 2004). However Bass indicated that further studies posit the concept of augmentation. This augmentation has its basis on the idea that transformational leaders build on transactional characteristics by motivating followers in a way that will motivate them to perform at a higher level through the transformational leadership attributes of the four I's, represented by Idealized Influence (II), Inspirational Motivation (IM), Intellectual Stimulation (IS) and Individualized Consideration (IC) exhibited by the leader.

Leadership models as illustrated by Bass and Riggio (2006) offer a range of management styles. As discussed, the full transformational leadership model consists of a span of leadership styles. The four I's represent effective transformational leadership. Bass and Riggio offer a definition representing transactional leadership characteristics which signifies more transactional approaches to leadership. Such transactions include Contingent Reward (CR), Management by Exception (MBE), and Laissez Faire Leadership (LF). Contingent Reward provides an agreement that exchanges a reward for completion of a prescribed set of goals or tasks. Management By Exception offers a management style that is focused on exceptions to standards. MBE can be either active (MBE-A) or passive (MBE-P). Leadership in Active MBE consistently monitors activity to look for exceptions. Passive MBE does not actively look for exceptions but takes corrective actions after the exception has occurred. The final form of transactional leadership, as defined, is Laissez Faire Leadership (LF). This leadership category is passive in

nature and involves little leadership involvement. As such, LF offers limited direction. The leader practices avoidance and is uninvolved. The leader acquiesces authority. As Bass and Riggio also pointed out, the categories of transformational leadership and also transactional leadership are indicated by the above management styles in the order explained. Transformational leadership presented in its strongest form is built on the four I's. Consistent with transactional leadership are Contingent Reward (CR) followed by Management by Exception (MBE) and Laissez Faire (LF) management.

Initially it was thought that there were three categories representing transformational leadership (Bass & Riggio, 2006). These components were charismatic-inspirational, intellectually stimulating and individually considerate. Later factor analysis of data indicated that charismatic factors were separate from inspirational. Thus the charismatic factor evolved into Idealized Influence (II) and separated from Inspirational Motivation (IM). Bass posited that while transactional and transformational leadership offered separate and distinct characteristics, leaders possessed both transactional and transformational leadership qualities (Judge & Piccolo, 2004). Bass (1990) suggested that transformational leadership can be learned and may be effective as a component of organizational training. Transformational leaders have been shown to have subordinates who received higher ratings of performance and are more productive (Den Hartog, Van Muijen, & Koopman, 1997; Hater & Bass, 1988). Bass and Riggio (2006) indicated that highly transactional and contractual organizations are more focused on self-interest. As such, short term goals and protecting individual codes are priorities. An organized labor setting potentially offers these dynamics.

Wofford, Whittington and Goodwin (2001) reported transformational leadership behaviors can be manifest toward all members of the subordinate group but can also be used with

some subordinates more than others. Thus leaders may use a multi-level approach or an individual level approach. Bass and Riggio (2006) found that followers possessing greater autonomy desires and the wish to be empowered were more positively influenced by transformational leaders. Followers exhibiting high need for leadership were positively influenced by transformational leaders. Also, Bass and Riggio noted a 1991 study by Loden and Roesner that researched the influence offered by transformational leaders in a multi-culturally diverse workforce. Multicultural variables may influence leader/follower dynamics. While multicultural diversity may be manifest in ethnicity or country of origin, a unionized workforce may represent another type of cultural diversity. Differences in workplace culture may exist between union workforces and non-union workforces. Such factors as dual loyalty of union members may offer differing dynamics.

Transformational leadership and safety in a unionized workplace. While all of the presented studies add information impacting the body of knowledge regarding transformational leadership's relationship to workforce followers, none of the studies relate to the interaction and attitudes of an organized labor follower group. This study deals with such an organized labor union setting.

Transformational leadership is needed in the contexts of rapid and important decision making as it relates to safety and other important factors. Safety and crisis situations demand transformational leaders (Bass & Riggio, 2006). The capability of leaders to provide clear direction with confidence is a trait of transformational leadership.

Individually, each of the four components representing transformational leadership, idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration is linked to safety (Barling et. al., 2002). In two studies conducted by Barling et al.

(2002), they found that safety specific transformational leadership is associated indirectly with occupational safety. In a research study of safety specific transformational leadership, Sivanathan, Turner and Barling (2005) discovered transformational leadership had positive association with safety compliance and safety participation among swimming instructors.

Transformational leadership can predict the emergence and the strength of a climate of safety through social group networks based on a study of military subjects (Zohar & Teene-Gazit, 2008). While the Zohar and Teene-Gazit study holds true in general, the social implications and dynamics of a union based organization may or may not exist at the similar level in a union as it does in a military environment.

In a study of leaders' safety attitudes, Mullen and Kelloway (2009) determined the leader attitudes were rated higher among those who received safety based transformational leadership training than those who received the basic transformational leadership training. Mullen, Kelloway and Teed (2011) reported a recent focus on management styles in organizational safety applications in addition to such effective safety measures as job redesign. To further the value of the positive influence of transformational leadership, Kelloway, Mullen and Francis (2006) determined that passive avoidance behaviors of managers had a negative effect on safety in the workplace.

In a review of several studies, Avolio and Bass (2004) noted several characteristics common to leaders in these studies. These are: transformational leaders inspire the followers, transformational leaders practice individualized consideration by developing higher order processes in followers, transformational leaders encourage followers to view their world from new perspectives, and transformational leaders gain the trust of their followers. Transformational leaders also generated higher compliance from followers.

As Avolio and Bass (2004) pointed out, there are contingent issues in transformational leadership. One such issue is the authenticity of the leader. Leaders who are not authentic may present themselves as transformational leaders while their true motives are self-serving. Transformational leaders can have contingent impact in organizations. This contingent impact of transformational leaders can influence worker attitudes. For example, if true transformational leaders view employees or followers as assets rather than costs, followers will recognize their own value. A further contingent benefit is the ability of followers of transformational leaders to generate innovative ideas.

Contingency theories of leadership are supported by various theories and research (Bass & Riggio, 2006). The Contingency Model of Leadership Effectiveness Theory as introduced by Fiedler is built on the premise that group interaction is contingent upon leadership methods and the positive or negative dynamics of the situation for the leader. Group performance is contingent on the connection of control and influence to the perception of the least favored coworker (Fielder, 1970). Fiedler further posited that group performance is contingent on the interaction of styles of leadership and situations that are favorable to the leader (Da Cruz, Nunes, & Pinheiro, 2011). Additionally, Fiedler's theory suggests the process of leaders exerting influence is a three variable function. These are leader and member relations, the structure of the task, and power position (Hill, 1969). The effectiveness of the leadership is contingent on these three major constructs (Mitchell, Biglan, Oncken, & Fiedler, 1970). The leader-member relations may be influenced by the status of the leader or supervisor in relation to their role in a non-union position or other organizational status. This can impact leader-member relations with the subordinate union employee. Power position may also create relationship dynamics between non-union supervisors and unionized subordinates that may differ from a non-union setting.

Path-goal theory as indicated by House (1996) concerns relationships between supervisors and subordinates. It is didactic in that it deals with the effects of superiors on subordinates rather than groups. This individual relationship allows for specific instruction. Additionally, this type of theory deals with the superiors' rating of leaders rather than subordinate rating. Such research indicated that leaders creating structure for subordinates rate higher than leaders that are limited in structure creation (House, 1971). This theory is contingent on the specific relationships of a supervisor to his or her individual subordinate instead of the group. Environmental contingencies can include variables of consequence (Bass & Riggio, 2006). One such environmental contingency as it relates to this study is the influence of loyalty to the union and its potential relationship to the employer. The dynamic of collectivism and individualism within the employment culture can factor into leader-follower relationships.

Northouse (2016) discussed four strategies utilized by leaders in transformative organizations that he based on the 1985 work of Bennis and Nanus. These four strategies or characteristics were that the leader offered a clear vision of the organization in the future, the leader acted as a social architect for the organization, the leader created trust within the organization through clearly stated goals and adherence to those goals, and the leader utilized effective deployment of self that included an accurate self-assessment of personal strengths and weaknesses. Bennis and Nanus (2007) distinguish leadership from management. They indicated that leadership also can include empowerment. These characteristics and others are attributes of transformational leadership in the industrial safety realm. A transformational leader is more interested in determining why a subordinate acted in an unsafe manner unlike the transactional leader that can take punitive action by focusing on the unsafe act itself (Nolte, 2015). Clarke (2013) in her study of safety leadership, developed a model of safety leadership which shows

that both transformational and transactional leadership styles are important features of effective safety leadership. She further pointed out that leadership styles do have different influences on safety compliance and participation. This study can assist by supplying information that can further safety leadership as a discipline.

Industry of Interest for the Study

The North American Industry Classification System (NAICS) "is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy" (United States Census Bureau, 2016). The NAISC system was developed in 1997 and replaced the Standard Industrial Classification Code (SIC).

The utilities sector is the specific area of interest relevant to this study. This study was conducted by utilizing unionized public private partnership utilities classified in the NAISC 221 industrial classification code.

The Occupational and Safety and Health Administration (OSHA) has the governmental responsibility to monitor workplace safety. OSHA was created through a Congressional act of the 91st Congress in 1970 and was signed into law by United States President, Richard Nixon on December 29, 1970. Its stated purpose was:

> To assure safe and healthful working conditions for working men and women; by authorizing enforcement of the standards developed under the Act; by assisting and encouraging the States in their efforts to assure safe and healthful working conditions; by providing for research, information, education, and training in the field of occupational safety and health; and for other purposes. (OSH Act of 1970, 1970)**.**

Three Research Study Models

This study of transformational leadership and its possible relationship to OSHA rates of injury and rates of severity in unionized public private partnership utilities attempted to replicate and build on prior studies of transformational leadership and its relationship to OSHA rates of injury and rates of severity in non-union manufacturing applications. Steensma (2010) studied these relationships in non-union steel mills. Boroughf (2012) studied these relationships in non-union automotive product manufacturing facilities. Nolte (2016) studied these relationships in non-union metal scrap processing applications. An important differentiation between the study by Boroughf and those of Steensma and Nolte is fact that the Boroughf study focused on transformational leadership style of higher management personnel whereas the other two studies focused on transformational leadership style of front line supervisors. The nature of this study, like those of Steensma and Nolte focused on transformational leadership styles of front line supervisors and its relationship with OSHA incident and severity rates. The major difference between this study and the three studies being modeled is that the previous studies focused on non-union workplace settings whereas this study was focused on the transformational leadership scores of non-union front line supervisors as rated by their union member subordinates and compared to OSHA safety incidents and severity. All of these prior studies attempted to establish if a relationship existed between transformational leadership style and OSHA injury incidence and severity.

The methodology employed by the three previous studies mentioned above was consistent. These prior studies all utilized the MLQ-5X survey form. Subordinate employees completed the MLQ-5X in the context of rating their superiors. As mentioned previously, the Boroughf study consisted of employees rating their plant managers rather than their immediate

supervisors. The Steensma and Nolte studies consisted of employees rating their immediate supervisors.

The MLQ-5X form measures transactional and transformational leadership scores of managers along a nine factor scale. At the transformational leadership end of the scale Idealized Attributes (IA) represents the higher end of the scale. Moving down the scale toward transactional leadership, IA is followed by Idealized Behavior (IB), Inspirational Motivation (IM), Intellectual Stimulation (IS) and Individualized Consideration (IC). On the transactional leadership section of the scale Contingent Reward (CR) is followed by Management by Exception- Active (MBE-A), Management by Exception-Passive (MBE-P) and finally Laissez-Faire (LF) leadership. These nine factors are measured by 45 Lickert type questions that comprise the MLQ-5X Leadership Questionnaire. Twenty of the 45 Lickert type questions relate to transformational leadership. All of the previous survey methods consisted of having subordinates complete the 45 question Lickert type survey, while only utilizing the results from twenty specific questions that dealt with transformational leadership qualities.

Each study then called for the collection of injury data and severity (DART) data from each participating organization's OSHA 300 log. The OSHA 300 supplies information relevant to incidence and severity of OSHA injuries and also the incidence and severity rates. Each of the incidents indicated in the OSHA 300 logs were then assigned to the supervisor in charge of the injured employee at the time, in the cases of the Steensma and Nolte studies or the plant manager on duty at the time in the case of the Boroughf study. This OSHA information was then compared to transformational leadership scores to establish if a relationship existed linking transformational leadership scores and OSHA incident and severity rates. In all three studies, some work teams and their superiors in the organizations experienced zero incidents or severity

rates during the reviewed time period. Due to this factor, the studies attempted to determine if there was a difference in mean transformational leadership scores between those teams that had a zero incident and severity rate and those teams that did not have a zero incident and severity rate. The Nolte and Steensma studies indicated a statistically significant relationship between higher transformational leadership scores and lower severity rate injury in some or all of the research questions. This study was modeled after those studies. The major difference being that this study utilized a unionized workforce, whereas the three previous studies utilized non-union workforces.

This literature review presented a discussion and overview of organizational leadership theories. Many studies have been conducted on transformational leadership theory and its impact on such variables as safety climate and OSHA injury and severity rates, among others. These studies indicate a positive relationship between transformational leadership methods and organizational health. Miner's (2003) study indicated that transformational leadership ranked high in importance among scholars. Organizational relationships and dynamics such as union versus non-union organizations may offer differing outcomes in studies. Such factors as dual loyalty among union members and also organizational culture may influence manager/subordinate interaction. Human resource development strategies can offer competitive advantages to organizations. Structural changes in labor markets as well as exponential technological change requires managers to focus on HRD strategies (Cascio, 2014). Such is the advanced, evolving state of technology management. There was a gap in the literature addressing transformational leadership style and OSHA incidence and severity rates in a unionized labor force. This study addressed that gap.

This research attempted the exploration of the effect of transformational leadership scores among front line non-union supervisors on OSHA safety incidents and severity. Recent prior studies (Steensma, 2010; Boroughf, 2012; Nolte, 2016), have been conducted in non-union settings. While the results of the Nolte and Steensma studies indicate a correlational relationship linking the two variables, this study in a union based organizational setting offered differing results.

CHAPTER 3

METHODOLOGY

This study attempted to establish if a relationship exists linking transformational leadership style of non-union front line supervisors and OSHA incident rates and of incident severity rates in a union-based public private partnership utilities setting. The study utilized simple linear regression to ascertain if a statistically significant relationship exists between those two variables.

According to Avolio and Bass (2004), effective and strong leadership drives subordinates to strive for the common good at levels of individual, team and society. Such attributes are consistent with the precepts of transformational leadership theory and practical applications. These attributes lead to forces that offer transformational shifts in organizational or individual direction consistent with the vision of the organizational leader. Bass's model indicates that transformational leadership can present unique variance in ratings above what is accounted for in transactional leadership (Avolio & Bass, 2004).

Restatement of the Problem

Workplace safety is stated as a top priority in organizations. This is evident through information available in many corporate communications. Establishing effective leading, rather

than lagging indicators, can mitigate the risk of workplace injuries, lost time incidents and fatalities.

Many relevant studies have been conducted to establish whether a link exists between leadership style and workplace safety. Studies have recently been completed to establish if a relationship exists linking transformational leadership to incidents and severity of OSHA recordable safety events in non-union manufacturing settings (Boroughf, 2012; Nolte, 2016; Steensma, 2010). Studies have also been completed in reference to transformational leadership and its impact on safety culture in organizations (Krouse, 2009; Zohar, 2002).

Previous research has studied transformational leadership in the management of union members (Cregan et al., 2009; O'Connor & Mortimer, 2013; Spector, 1987; Twigg et al., 2008). However the aforementioned studies differ from this study in that these previous studies dealt with the relationship between the union members and the trade union managers.

This study focused on the dynamics of non-union front line supervisors and union-member subordinates. Specifically, the study focused on transformational leadership characteristics of non-union front line supervisors as rated by their union-member subordinates and those transformational leadership characteristics' relationship to OSHA injury and severity rates. This study can offer information as it relates to human resource development and industrial training as a specialization in the discipline of technology management. Such information may lead to a better understanding of these union/non-union dynamics. This further information may lead to strategic management methods to reduce workplace safety incidence.

While many of the studies noted in the few preceding paragraphs above dealt with transformational leadership in some respects, to date such a study utilizing a labor union based

public private partnership utilities setting had not yet been conducted. Thus until this study, a gap existed in the current body of knowledge in this regard.

This study endeavored to establish if a relationship exists between management style consistent with transformational leadership and the incidence and severity of OSHA recordable injuries in the public private partnership utility industry. If such a relationship does exist, it can offer direction in corporate strategy for developing effective management styles and training and in doing so, reduce the organizational OSHA recordable safety incidents and severity of them. Specifically, this study endeavored to determine if a relationship exists between transformational leadership management style among non-union front line supervisors and OSHA incident and severity rates, in the management of a union workforce in the public private partnership utilities industry.

Because a gap existed in the literature, the significance of the study allowed for contribution to the existing body of knowledge. If transformational leadership management style of non-union front line supervisors is a predictor of workplace safety incidents in unionized workforces, then addressing, implementing, training, or making supervisory hiring and retention decisions regarding such specific management style may assist in reducing workplace safety risks. Safety outcomes and ways to improve safety in a highly hazardous industry such as public private partnership utilities can be of substantial benefit to organizations, economics and individuals involved directly and indirectly. Therefore, this study is significant from a technology management standpoint and also human resource development and training. Evolvement of organizations in such areas as globalization, the aging workforce, and union/management relations will require continuous change and adaptability by those

organizations (Kitt & Howard, 2013). Effective management styles such as transformational leadership can offer positive organizational development.

Procedures and Methods

The procedures and methods for this study consisted of conducting a survey of transformational leadership styles of supervisors utilizing the Multifactor Leadership Questionnaire 5X (MLQ-5X) as developed by Avolio and Bass (2004). This survey was administered to union member subordinates of the non-union front line supervisors. The population of raters was specific to only unionized personnel due to the specific nature of the study. These raters rated their non-union front line supervisors on the transformational leadership scale. These ratings were then compared to OSHA incident and severity rates to determine if a relationship exists between transformational leadership style and safety incidents in the workplace. A minimum of three raters per supervisor were required for the sample to be utilized in the study as recommended by Avolio and Bass. These scholars report that while no optimum maximum number of raters per supervisor is specified, a minimum of three raters per supervisor is suggested.

The model created to measure transformational leadership attributes, the MLQ-5X, is a list of 45 Lickert type items that the raters completed. The MLQ-5X contains 45 items related to leadership. Twenty of these items are relevant to transformational leadership. As such, while the survey participants completed the 45 items, only the 20 items associated with transformational leadership were utilized in the analysis of the data.

The Multifactor Leadership Questionnaire (MLQ-5X)

The Multifactor Leadership Questionnaire (MLQ-5X) has been used in a broad range of organizational studies and setting. These include for-profit organizations, labor union based

settings, age related organizational settings and sports teams, among others (Avolio & Bass, 2004).

This study was conducted as a quantitative, non-experimental, descriptive, correlational design. The study attempted to discover links, if any between transformational leadership style of supervisors and OSHA recordable incident rates in a unionized public private partnership utility organization. The methodology consisted of conducting a survey to measure rating scores of transformational leadership styles of supervisors utilizing the Multifactor Leadership Questionnaire 5X (MLQ-5X) as developed by Avolio and Bass (2004). This survey was administered to union member subordinates of the front line supervisors. The population of raters was specific to only unionized personnel, which was consistent with the intent of the study. The MLQ-5X, created to measure transformational leadership attributes, is a list of 45 items Lickert type items that the raters complete. It allows for categorization of the leadership style of the supervisor on a transformational leadership scale. This scale consists of nine leadership components. These components are "measured by four highly inter-correlated items that are as low in correlation as possible with items of the other eight components" (Avolio & Bass, 2004, p. 13). The raters rate the supervisor by frequency or degree the supervisor exhibits certain behaviors. The MLQ-5X was created to replace the MLQ-5R. The MLQ-5R was found to have created substantial criticism from scholars regarding its construct validity (Avolio & Bass, 2004).

The sample selected for this study consisted of employees of a unionized public private partnership utility organization in the Midwest United States.

Non-union front line supervisors were rated by their union member subordinates on the attributes of transformational leadership. The union member subordinate raters utilized the MLQ-5X survey. Mindgarden is the publisher of the Multifactor Leadership Questionnaire

Manual and Review Copy by Avolio and Bass (2004). The survey was administered by email through the Qualtrics platform. These survey participants rated their superiors utilizing a Lickert type scale consistent with the MLQ-5X process. The results offered a categorized management style as it relates to transformational leadership. These results created a mean transformational leadership score per non-union supervisor. These scores were then compared to OSHA incident and severity (DART Days rates) for each team over the previous 12 months to establish if a statistically significant relationship existed between the two variables. Front line supervisors employed in their position for at least one year constituted the sample rated group due to annualized OSHA incident and severity rate information. Additionally, a criterion for the raters is the requirement that they also be employed as a subordinate of the front line supervisor for a least one year and during the period of the specific OSHA incident and severity information. As such, each survey participant was asked an additional question as to whether their supervisor had been their supervisor for the previous twelve months. If the survey respondent answered 'No', they were exited from the survey.

The MLQ-5X has been utilized as a method of measurement in many research studies, dissertations and theses throughout the world (Avolio & Bass, 2004). It shows strong evidence of construct validity and reliability (Antonakis, Avolio, & Sivasubramaniam, 2003). Reliability scores as they relate to intercorrelations among MLQ scores among raters that are subordinate to the supervisor being rated are strong. The five transformational leadership categories rated between 0.83 and 0.70. The four transactional leadership rated categories rated between 0.74 and 0.70 (Avolio & Bass, 2004).Thus this indicates acceptable to good internal consistency. External validity has been established as documented by four meta-analyses of military establishments and other literature that confirm transformational leadership offers stronger and more positive

performance than transactional leadership (Avolio & Bass, 2004). In studies previously conducted that are similar to this researcher's, after dropping the 25 unneeded survey responses, the following results were reported: Steensma's (2010) research on transformational leadership and safety in non-union steel mills attempted to measure if a relationship exists linking transformational leadership behaviors of unit managers and OSHA severity rates. His study determined a statistically significant relationship existed linking supervisory scores of transformational leadership and rates of recordable injury. Conversely, his study indicated that there was no statistically significant link between supervisory transformational leadership scores and OSHA severity rate. Additionally, Steensma determined that there was a statistically significant difference in mean score of transformational leadership between managers whose departments or plants experienced an injury rate of zero as measured against those who experienced an injury rate higher than zero. The managers with zero injury rates rated higher on transformational leadership score. However, when analyzing the mean scores of transformational leadership among managers whose departments or plants had an injury severity rate of zero as compared to those who had an injury severity rate higher than zero, Steensma's subsequent test results indicated no statistically significant difference existed between mean scores of managers with teams experiencing an injury severity rate of zero and those teams experiencing an injury severity rate higher than zero. This could be attributable to the disproportionately high amount of supervisors reporting zero severity rates, with OSHA data on 38 of the 46 supervisors in the study reporting a severity rate of zero. Nolte's (2016) study on transformational leadership styles of front-line supervisors as rated by non-union subordinates in the metal scrap processing industry, found that there were negative correlations between transformational leadership scores and both OSHA recordable rates and lost workday rates. While Nolte reported the negative

correlation between transformational leadership and OSHA recordable incident rate was reported as moderate, and as evidenced by a Pearson correlation of -0.507, the linear relationship was strong. The linear relationship offered a significant regression equation, indicating a strong linear regression (R^2=0.26). Nolte also reported the negative correlation between transformational leadership and OSHA lost workday rates was moderately strong, as evidenced by a Pearson correlation of -0.567. The linear relationship offered a significant regression equation, indicating a strong linear regression (R^2=0.32). Thus, based on this information, in the Nolte study, as transformational leadership scores increase, the rate of recordable safety incidents and also lost workday rates will decrease. This study offered contradictory results when compared to the Steensma and Nolte studies. The sample sizes of supervisors rated in the three studies were comparable (Nolte, N=40; Steensma, N=46; Schoff, N=41). While studies on supervisory transformational leadership attributes and their impact on safety show a correlation, the strongest correlations involved front line supervisors rather than leaders higher up in the organization (Nolte, 2016). These studies are pertinent in that they offer important results regarding transformational leadership and OSHA incident and severity rates in a non-union organizational setting. These prior studies recommended that other union based organizations be researched in the future. A union based public private partnership utility organization was the context for this study.

The Multifactor Leadership Questionnaire (MLQ-5X) was determined to be the appropriate survey and interpretation means for this type of study. The MLQ has been utilized extensively in research to study transformational, transactional and passive avoidance leadership styles. It also is an appropriate tool to identify candidates for potential leadership or supervisory

roles. The MLQ-5X can provide appropriate measures that are linked to individual and organizational success.

The MLQ-5X categorizes the results into nine areas of leadership style. Idealized Influence is divided into two subcategories of attributed idealized influence and behavior idealized influence. The remaining categories of transformational leadership include Inspirational Motivation, Intellectual Stimulation and Individualized Consideration. The transactional leadership categories are Contingent Reward, Management By Exception (Active), Management By Exception (Passive), and Laissez-Faire Leadership.

Protection of Human Subjects

The researcher submitted an application to the Institutional Review Board and received approval to conduct the research in an ethical manner as prescribed by the IRB. The confidentiality of the survey participants was protected throughout the process. The specific survey data was utilized by the researcher for compilation purposes only and will not be shared. The data results are presented in this document as compiled data and specific participants are unidentifiable. The overall non-identifiable results will be shared as requested with the participants. There were no incentives being offered to the participants in the research.

Restatement of Research Questions and Hypotheses:

Consistent with the purposes and development of the design of this study, the following research questions and hypotheses are again offered.

Research Question 1: Are lower OSHA incident rates related to mean scores of transformational leadership of non-union front line supervisors, as rated by union member subordinates in a public private partnership utility?

Research Question 2: Are lower OSHA lost workday incident rates (DART Days rates) related to mean scores of transformational leadership of non-union front line supervisors, as rated by union member subordinates in a public private partnership utility?

Research Question 3: Are mean score ratings of transformational leadership of non-union front line supervisors, as rated by their union member subordinates, among those specific managers who experienced zero OSHA incidents statistically significantly different than those specific front line managers who experienced OSHA incidents exceeding zero in a public private partnership utility?

Research Question 4: Are mean score ratings of transformational leadership of non-union front line supervisors as rated by their union member subordinates, among those specific managers who experienced zero severity (DART Days) incidents statistically significantly different than those specific front line managers who experienced OSHA severity (DART Days) incidents exceeding zero in a public private partnership utility?

Similar studies have found that as transformational leadership ratings increase, OSHA incident and severity rates decrease. Thus the following hypotheses, tested at the 0.05 level of significance and relating to the above research questions are as follows:

H_{10}: There will be no statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA incident rates.

H_{1A}: There will be a statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA incident rates.

H_{20}: There will be no statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA lost workday incident rates (DART Days rates).

H_{2A}: There will be a statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA lost workday incident rates (DART Days rates).

H_{30}: There will be no statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA incidents and non-union front line supervisors with above zero OSHA incidents.

H_{3A}: There will be a statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA incidents and non-union front line supervisors with above zero OSHA incidents.

H_{40}: There will be no statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA lost workday (DART Days) incidents and non-union front line supervisors with above zero OSHA lost workday (DART Days) incidents.

H_{4A}: There will be a statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA lost workday (DART Days) incidents and non-union front line supervisors with above zero OSHA lost workday (DART Days) incidents.

Sample Selection

The sample selected consisted of employees of a union based public private partnership utility organization in the Midwest United States. After the data were collected and responses were eliminated due to not being complete or being representative of less than three team members per supervisors, the respondents included in the study consisted of 140 union member subordinates reporting to 41 non-union supervisors. Each of the front line non-union supervisors was rated by a minimum of three of their union member subordinates on the attributes of transformational leadership. Avolio and Bass (2004) have indicated that a minimum of three raters per manager is sufficient in providing adequate results. The raters utilized the MLQ-5X survey as administered by Qualtrics. The researcher secured permissions through communications with human resource and executive personnel at a union based public private partnership utility organization, as well as executives from the appropriate union. This included securing access to OSHA incident and severity rate records.

Questionnaire Administration

The questionnaire was administered electronically utilizing the Qualtrics website. Each rater utilized the Multifactor Leadership Questionnaire Rater Form (MLQ-5X). Information regarding the study was fully explained to all relevant organizational personnel through formal letter. This information was also included in the online survey form. It was stressed in the correspondence that participation is voluntary and any participant may withdraw at any time. Raters were informed of the importance of fully completing the questionnaire to limit the risk of questionnaires not being scored due to incompletion. Also, the raters were informed that honest, accurate and fully completed surveys are necessary to ensure accurate research results. Additionally, the researcher imparted information that gave the assurance of strict

confidentiality. Such confidentiality was assured by the study's design, which reports aggregate data and not individual information. The union member subordinate employees completed the surveys individually through accessing their individual corporate emails.

Data Collection

The data collected from the MLQ-5X transformational surveys were compiled and a mean transformational leadership score was calculated for each of the 41 specific non-union front line supervisor. The appropriate OSHA logs were reviewed for OSHA recordable injuries and each incident was assigned to the applicable front line supervisor responsible for the crew in attendance during the OSHA recordable incident. The period of data review was the previous 12 months. This OSHA recordable information was compared to the transformational leadership score in an attempt to establish a relationship to the OSHA safety incidents and rates along with the severity (DART day) and rates. OSHA recordable incidents and DART incidents differ from OSHA incident rates and DART rates. An OSHA recordable incident is a "work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid" (OSHA, 2007 p. 811). A days away, restricted or transfer (DART) incident is an incident of such severity that it requires lost time or days away from the job, restricted duty, or transfer to another duty. These incidents are recorded as raw numbers of workplace incidences.

Incident rates and DART rates are annualized calculations based on a formula that adjusts for various sizes of organizations classified in comparable workplace injury risk industries. Each of these incident rates and DART rate calculations results in a ratio of illness or injury to total number of employee hours worked. As such, these rates can be compared to comparable risk industries of various sizes. For the purpose of this study the DART cases are statistically treated

differently than OSHA records and referred to as DART Days. While OSHA quantifies each DART case as per incident, the measure of DART cases in this study is quantified by impact as in the actual days away, restricted, or transferred due to the specific OSHA incident. This takes into account the additional severity of the DART incident when compared to a less impactful OSHA recordable incident. As such, for the purpose of this study, DART Rate is referred to as DART Days Rate.

For the purposes of this study the independent variable was the composite scores of leadership attributes on the transformational leadership scale of front line supervisors as rated by their union member subordinates. The dependent variables were based on the OSHA recordable workplace safety records of OSHA safety incident rates and DART Day rates for the individual front line supervisors. The values for the dependent variables of OSHA safety incident rates and DART Day rates for the individual front line supervisors were calculated based on information from the OSHA recordable safety logs for each supervisor and their subordinate employees.

Data Analysis and Interpretation

To address the study, the following research questions were explored.

Research Question 1: Are lower OSHA incident rates related to mean scores of transformational leadership of non-union front line supervisors, as rated by union member subordinates in a public private partnership utility?

Research Question 2: Are lower OSHA lost workday incident rates (DART Days rates) related to mean scores of transformational leadership of non-union front line supervisors, as rated by union member subordinates in a public private partnership utility?

Research Question 3: Are mean score ratings of transformational leadership of non-union front line supervisors, as rated by their union member subordinates, among those specific managers who experienced zero OSHA incidents statistically significantly different than

those specific front line managers who experienced OSHA incidents exceeding zero in a public private partnership utility?

Research Question 4: Are mean score ratings of transformational leadership of non-union front line supervisors as rated by their union member subordinates, among those specific managers who experienced zero severity (DART Days) incidents statistically significantly different than those specific front line managers who experienced OSHA severity (DART Days) incidents exceeding zero in a public private partnership utility?

The following hypotheses, tested at the 0.05 level of significance and relating to the above research questions are as follows:

H_{10}: There will be no statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA incident rates.

H_{1A}: There will be a statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA incident rates.

In testing the above hypothesis and its alternative, the study endeavored to uncover whether supervisory transformational leadership scores can show a relationship to OSHA incident rates of the work team. The front line supervisors were rated on the transformational leadership scale by a minimum of three of their union member subordinates through the use of the MLQ-5X survey. Each subordinate completing the survey must have been employed as a team member subordinate of the specific supervisor for at least the preceding 12 months. The transformational leadership scores resulting from the survey were then compared to the OSHA incident rates for that specific work team for the previous 12 month period as calculated using

the OSHA Recordable Rate calculation formula. The data was then collected and regression analysis of the independent and dependent variables was employed. The independent variable of mean transformational leadership score was measured on a Lickert type scale of 0.0 to 4.0 for each front line supervisor as rated by their union-member subordinates. This linear regression analysis reported the regression coefficient or the extent to which the independent variable, transformational leadership composite rating, is a predictor of OSHA incident, and the analysis reported descriptive statistics such as frequency, central tendencies, and variance.

H_{20}: There will be no statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA lost workday incident rates (DART Days rates).

H_{2A}: There will be a statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA lost workday incident rates (DART Days rates).

In testing the above hypothesis and its alternative, the study endeavored to uncover whether supervisory transformational leadership scores can show a relationship to OSHA lost workday incident (DART rates) of the work team. The front line supervisors were rated on the transformational leadership scale by a minimum of three of their union member subordinates through the use of the MLQ-5X survey. Each subordinate completing the survey must have been employed as a team member subordinate of the specific supervisor for at least the preceding twelve months. The transformational leadership scores resulting from the survey were then compared to the OSHA lost workday incident rate (DART rates) for that specific work team for the previous twelve month period as calculated using the DART Days Rate calculation formula. The data was collected and regression analysis of the independent and dependent variables was

employed. The independent variable of mean transformational leadership score was measured on a Lickert type scale of 0.0 to 4.0 for each front line supervisor as rated by their union-member subordinates. This linear regression analysis reported the regression coefficient or the extent to which the independent variable, transformational leadership composite rating, is a predictor of OSHA lost workday (DART rates), and the analysis reported descriptive statistics such as frequency, central tendencies, and variance.

H_{30}: There will be no statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA incidents and non-union front line supervisors with above zero OSHA incidents.

H_{3A}: There will be a statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA incidents and non-union front line supervisors with above zero OSHA incidents.

In testing the above hypothesis and its alternative, the study endeavored to uncover whether the mean supervisory transformational leadership scores differ among those supervisors that have zero OSHA incidents and those supervisors who have higher than zero OSHA incidents of the work team. The front line supervisors were rated on the transformational leadership scale by a minimum of three of their union member subordinates through the use of the MLQ-5X survey. Each subordinate completing the survey must have been employed as a team member subordinate of the specific supervisor for at least the preceding twelve months. The mean transformational leadership score resulting among those supervisors recording zero OSHA incidents were compared to the mean transformational leadership score of those supervisors

recording OSHA incidents higher than zero. The data was collected and linear regression was conducted. The independent variable of mean transformational leadership score was measured on a Lickert type scale of 0.0 to 4.0 for each front line supervisor as rated by their union-member subordinates. This linear regression reported whether or not there is a statistically significant difference between mean transformational leadership ratings for supervisors with zero OSHA incidents and those with above zero OSHA incidents.

H_{40}: There will be no statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA lost workday (DART Days) incidents and non-union front line supervisors with above zero OSHA lost workday (DART Days) incidents.

H_{4A}: There will be a statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA lost workday (DART Days) incidents and non-union front line supervisors with above zero OSHA lost workday (DART Days) incidents.

In testing the above hypothesis and its alternative, the study endeavored to uncover whether the mean supervisory transformational leadership scores differ among those supervisors that have a zero OSHA lost workday (DART Days) incidents and those supervisors who have higher than zero OSHA lost workday (DART Days) incidents of the work team. The front line supervisors were rated on the transformational leadership scale by a minimum of three of their union member subordinates through the use of the MLQ-5X survey. Each subordinate completing the survey must have been employed as a team member subordinate of the specific supervisor for at least the preceding twelve months. The mean transformational leadership score resulting among those supervisors recording zero OSHA lost workday (DART Days) incidents

were compared to the mean transformational leadership score of those supervisors recording OSHA lost workday (DART Days) incidents above zero. The data was collected and linear regression was conducted. The independent variable of mean transformational leadership score was measured on a Lickert type scale of 0.0 to 4.0 for each front line supervisor as rated by their union-member subordinates. This linear regression reported whether or not there was a statistically significant relationship between mean transformational leadership ratings of supervisors with zero OSHA lost workday (DART Days) incidents and those with above zero OSHA lost workday (DART Days) incidents.

As stated previously, due to the possibility of managers having zero incident rates versus other managers having non-zero incident rates (binary/dichotomy) as indicated in hypotheses 3 and 4, linear regression was utilized to address these hypotheses. As some front-line supervisors had experienced zero incident or severity rates over the researched period, while others recorded more than zero incident or severity rates, this type of regression is appropriate.

CHAPTER 4

FINDINGS

The purpose of this study was to determine if there is a relationship between leadership styles of managers and OSHA safety incidence among a unionized workforce. Specifically, the study endeavored to measure the transformational leadership qualities of non-union supervisors as measured by their union member subordinates and then compare those measures to OSHA injury incident rates. Previous studies have been conducted in non-union high hazard employment settings (Boroughf, 2012; Nolte, 2016; Steensma, 2010), dealing with transformational leadership management style and its relationship with OSHA injury incidence and severity. This study addressed a gap in the literature in that no study has investigated transformational leadership and its impact on OSHA injury and severity rates in a high hazard, public private partnership utility unionized workforce.

Background

This study explored a possible relationship between transformational leadership scores of non-union front line supervisors as rated by their union member subordinates and OSHA recordable safety incidents and DART Days rates. These mean transformational leadership scores were then compared to OSHA incidence and OSHA DART Days rates to determine

possible relationships regarding OSHA incidence and severity of incidence. If relationships were found, it could lead to identifiable factors to improve safety in the workplace.

The study attempted to address the following research questions and hypotheses.

Research Questions and Hypotheses

In developing the design of the study, the following research questions along with supporting hypotheses were offered.

Research Question 1: Are lower OSHA incident rates related to mean scores of transformational leadership of non-union front line supervisors, as rated by union member subordinates in a public private partnership utility?

Research Question 2: Are lower OSHA lost workday incident rates (DART Days rates) related to mean scores of transformational leadership of non-union front line supervisors, as rated by union member subordinates in a public private partnership utility?

Research Question 3: Are mean score ratings of transformational leadership of non-union front line supervisors, as rated by their union member subordinates, among those specific managers who experienced zero OSHA incidents statistically significantly different than those specific front line managers who experienced OSHA incidents exceeding zero in a public private partnership utility?

Research Question 4: Are mean score ratings of transformational leadership of non-union front line supervisors as rated by their union member subordinates, among those specific managers who experienced zero severity (DART Days) incidents statistically significantly different than those specific front line managers who experienced OSHA severity (DART Days) incidents exceeding zero in a public private partnership utility?

The following hypotheses, tested at the 0.05 level of significance, and relating to the above research questions are as follows:

H_{10}: There will be no statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA incident rates.

H_{1A}: There will be a statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA incident rates.

H_{20}: There will be no statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA lost workday incident rates (DART Days rates).

H_{2A}: There will be a statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA lost workday incident rates (DART Days rates).

H_{30}: There will be no statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA incidents and non-union front line supervisors with above zero OSHA incidents.

H_{3A}: There will be a statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA incidents and non-union front line supervisors with above zero OSHA incidents.

H_{40}: There will be no statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA lost workday (DART Days) incidents and non-union front line supervisors with above zero OSHA lost workday (DART Days) incidents.

H_{4A}: There will be a statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA lost workday (DART Days) incidents and non-union front line supervisors with above zero OSHA lost workday (DART Days) incidents.

Demographics

The population participating in this study consisted of 140 union member subordinates of 41 non-union front line supervisors in a large unionized public private partnership utility in the Midwest U.S. The business entity was chosen due to the high hazard nature of the job duties of the employees in the study. All participants were at least 18 years of age. As a requirement for effective data collection information, each union member subordinate must have been employed as a direct report to his immediate supervisor for at least the previous 12 months.

Instrument

The survey instrument utilized was the MLQ-5X. This instrument has been utilized as a method of measurement in many research studies, dissertations and theses throughout the world (Avolio & Bass, 2004). It shows strong evidence of construct validity and reliability (Antonakis, Avolio, & Sivasubramaniam, 2003). The license for use of the survey was purchased by the researcher through Mindgarden. Three or more participants per supervisor are recommended. A minimum of three raters are recommended due to potential confidentiality risks of participants in teams of

fewer than three raters. However, larger numbers of raters per supervisor may influence variability in MLQ ratings as the number of raters increase (Avolio & Bass, 2004).

Confidentiality risks associated with utilizing less than three raters may exist in situations where entities employ the survey for human resource purposes and wish to share results with supervisory personnel. The design of this study does not present those risks as the results are confidential to the researcher and are presented as compiled data in this document. The MLQ-5X consists of 45 questions that measure attributes on a Likert type scale from 0 to 4. The survey results place the reviewed subject on the above referenced 0 to 4 scale. The higher the subject's numerical score, the closer their rating is to the transformational leadership end of the scale. Conversely, the lower the subject's ratings score is, the closer the rating is to the Transactional end of the scale. Thus, the more transformational attributes are scored, the closer the scores are to the higher numerical end of the scale. The more transactional attributes are scored, the closer the scores are to the lower numerical end of the scale. Although all these 45 Lickert type questions relate to all of the nine attributes on the transformational to transactional scale, only 20 of these questions relate only to the transformational leadership side of the scale. While the union member subordinates were asked to complete all 45 questions, only the 20 questions referring to transformational leadership were utilized in the study.

Data Collection

The survey instrument was administered as an online survey through Qualtrics website. The data were collected from the Qualtrics website by the researcher. To prevent coding errors, the data were entered twice and compared. Appropriate safety information and reporting data were secured from the employer. Information regarding the OSHA incidence and DART days was gathered from the employer's OSHA 300 logs. Data was collected over a period of nine

months in order for the researcher to obtain adequate response rates. There were 525 union member subordinates invited to participate in the study and complete the survey. Of those invited, 224 responded, for a response rate of 42.7%. After eliminating surveys that were incomplete or constituted less than a minimum set of three surveys per supervisor, there were 140 union member subordinate surveys representing 41 non-union supervisors utilized in the study.

Several interruptions were encountered over the survey period. These occurred when the employer requested suspension of the survey during periods when the employer conducted their own internal surveys. There were sporadic responses from survey participants due to their field based positions and limited corporate email activity. The survey respondents voluntarily completed the survey by accessing their emails as their schedules allowed, which is their normal business practice. History was not indicated as a threat to validity as evidenced by the fact the response rate was consistent during times the survey was available for completion. Maturation was not a threat to validity because the participants were long term employees, reporting to the same non union supervisor for at least the preceding 12 months. This represented no change in job status. The interruptions requested by the employer did not appear to affect participation in the study or offer internal validity risks. The response rate was consistent with internal surveys of the company based on conversations with HR personnel at the entity utilized for this study.

Data Analysis

Statistical Package for the Social Sciences (SPSS) was utilized to process the data. SPSS is appropriate for use in the social and behavioral sciences (Landau & Everett, 2004). Descriptive statistics, tests of normality, correlations and linear regression were performed. Carifo and Perla

(2008) indicated utilizing Lickert type data such as the MLQ-5X is appropriate in parametric applications such regression.

For the purpose of this study OSHA rates were calculated based upon the number of hours worked by each crew involved in the study. These OSHA rates were calculated by treating each team as if it were a separate entity. The annual hours worked for each crew was supplied by the employer. This information was utilized to calculate the OSHA rate per team based on the OSHA formula outlined in Table 4.1

Each of the front line non-union supervisors was rated by a minimum of three of their union member subordinates on the attributes of transformational leadership.

In exploring the data analysis there are several definitions of terms explained in Table 4.1

Table 4.1 Brief Explanation of OSHA Terminology

OSHA Recordable Rate	The calculation established by OSHA to report workplace incidents such as illness, injury or others. The formula is (#of incidents X 200,000*) / number of hours employees worked per year = OSHA Recordable Rate.
DART Rate	An acronym representing Days Away Restricted or Transferred. It accounts for severity of workplace incidence. The formula is (total # of DART cases X 200,000*) / number of hours employees worked per year = OSHA DART Rate).
DART Days Rate	The calculation used in this study to calculate DART rate scores for the study. A DART day is a day missed from the employee's regular position. The formula for the calculation is (total # of DART days X 200,000*)/ number of hours employees worked per year = OSHA DART Days Rate).

*The 200,000 figure is derived from a benchmark calculation established by OSHA. This benchmark is the number of hours a 100 person workplace entity would work in a typical year (100 employees X 40 hours per week X 50 weeks per year = 200,000 hours).

For the purposes of OSHA reporting, DART cases are reported much like OSHA cases. For OSHA reporting purposes, as stated in the definitions in Table 4.1, the calculations indicate the number of either DART or nonDart incidents. Thus to measure the impact of severity based on that information would be misleading. OSHA monitors the number of reported DART cases

and responds accordingly to employers with higher than normal DART frequencies. For the purpose of this study the DART cases are statistically treated differently. The measure of DART cases in this study is quantified by impact as in the actual days away, restricted, or transferred due to the specific OSHA incident. This takes into account the additional severity of the DART incident when compared to a less impactful OSHA recordable incident. Therefore for the purposes of this study the DART Days Rate terminology and calculations are used.

Results

Descriptive statistics for transformational leadership scores, OSHA recordable rates and OSHA Dart Days rates are listed below.

Regression analysis was conducted to assess whether a correlation existed between transformational leadership Score and OSHA recordable rate. Regression analysis was also conducted to assess whether a correlation existed between transformational leadership Score and OSHA DART Days rates. Further testing was done to determine if there were differences in mean transformational leadership scores between groups who experienced OSHA recordable incidents and those who did not. Testing was also done to determine if there were differences in mean transformational leadership scores between groups who experienced OSHA DART Days incidents and those who did not.

Descriptive Statistics

Descriptive statistics for the transformational leadership score distribution indicate a mean of 1.924 with a standard deviation of 0.776 (on the 0 to 4 point scale). The range was 2.79 with a minimum of .55 and a maximum of 3.34. It has a slightly negative skewness and is leptokurtic (see table 4.2).

Table 4.2 Mean Transformational Leadership Score Distribution Descriptives

			Statistic	Std. Error
Transformational Leadership Score	Mean		1.9240	0.1213
	95% Confidence Interval for Mean	Lower Bound	1.6789	
		Upper Bound	2.1691	
	5% Trimmed Mean		1.9256	
	Median		1.9333	
	Variance		0.603	
	Std. Deviation		0.7764	
	Minimum		0.5500	
	Maximum		3.3390	
	Range		2.7890	
	Interquartile Range		1.1013	
	Skewness		-0.017	0.369
	Kurtosis		-0.858	0.724

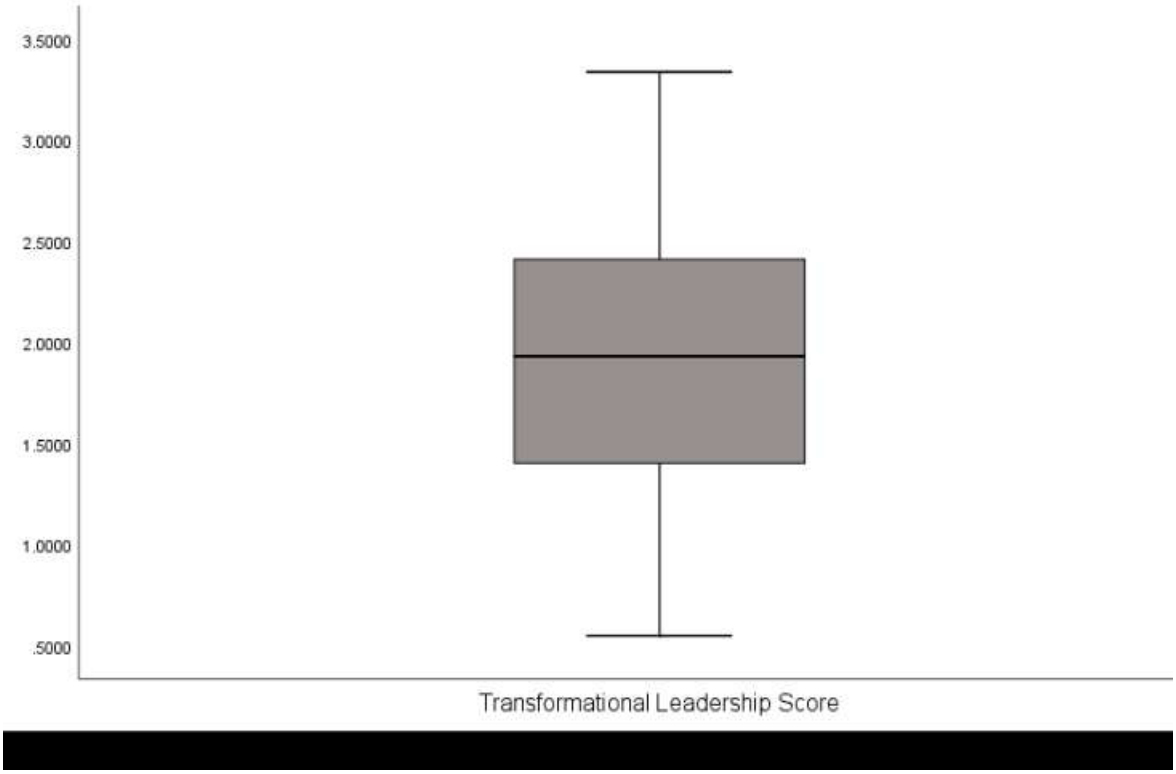

Figure 4.1 Transformational Leadership Mean Box Plot

Descriptive statistics for the OSHA recordable rate distribution indicate a mean of 3.24 with a standard deviation of 4.91. The range was 13.97 with a minimum of 0.0 and a maximum of 13.97. It has a positive skewness and is platykuric (see Table 4.3).

Table 4.3 OSHA Recordable Rate Distribution Descriptives

			Statistic	Std. Error
OSHA Recordable Rate	Mean		3.2416	0.7666
	95% Confidence Interval for Mean	Lower Bound	1.6921	
		Upper Bound	4.7910	
	5% Trimmed Mean		2.8271	
	Median		0.0000	
	Variance		24.097	
	Std. Deviation		4.9089	
	Minimum		0.0000	
	Maximum		13.9740	
	Range		13.9740	
	Interquartile Range		7.2925	
	Skewness		1.128	0.369
	Kurtosis		-0.258	0.724

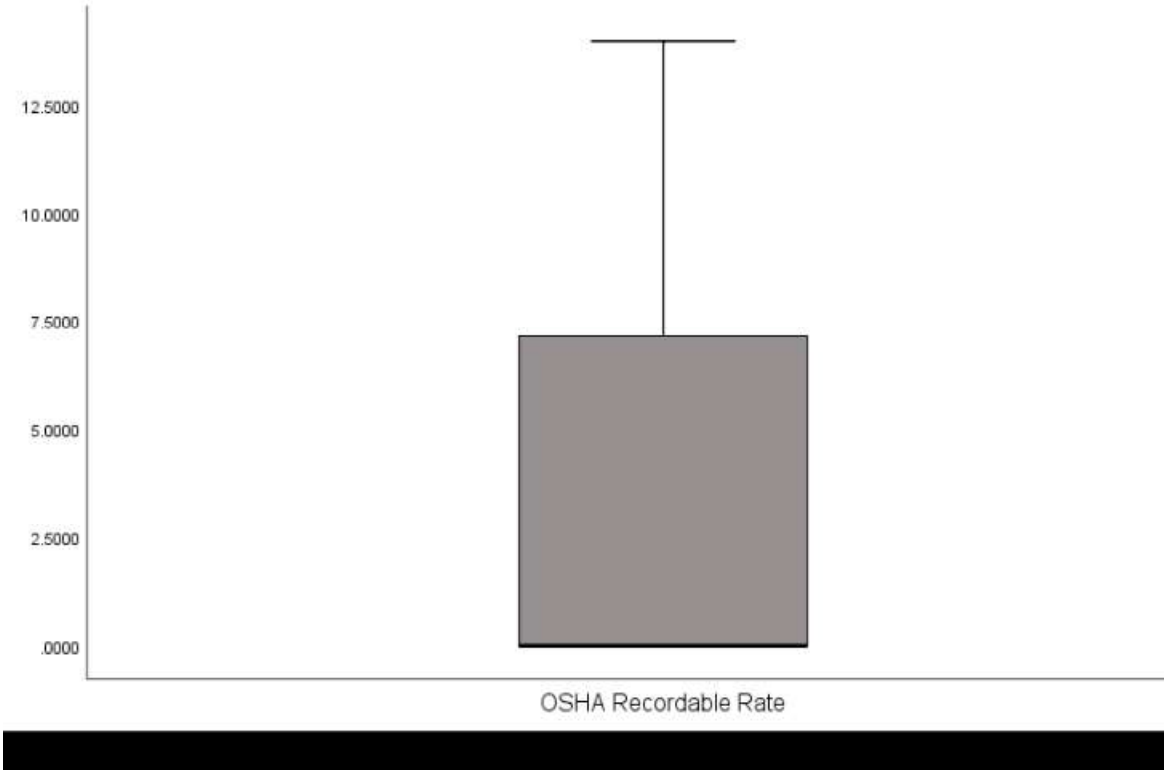

Figure 4.2 OSHA Recordable Rate Box Plot

Descriptive statistics for the OSHA DART Days rate distribution indicate a mean of 132.08 with a standard deviation of 318.99. The range was 1401.12 with a minimum of 0.0 and a maximum of 1401.12. It has a positive skewness and is platykuric (see Table 4.4).

Table 4.4 DART Days Rate Distribution Descriptives

			Statistic	Std. Error
DART Days Rate	Mean		132.0779	49.8181
	95% Confidence Interval for Mean	Lower Bound	31.3917	
		Upper Bound	232.7641	
	5% Trimmed Mean		76.3862	
	Median		0.0000	
	Variance		101755.6587	
	Std. Deviation		318.9916	
	Minimum		0.0000	
	Maximum		1401.1159	
	Range		1401.1159	
	Interquartile Range		13.5355	
	Skewness		2.830	0.369
	Kurtosis		7.867	0.724

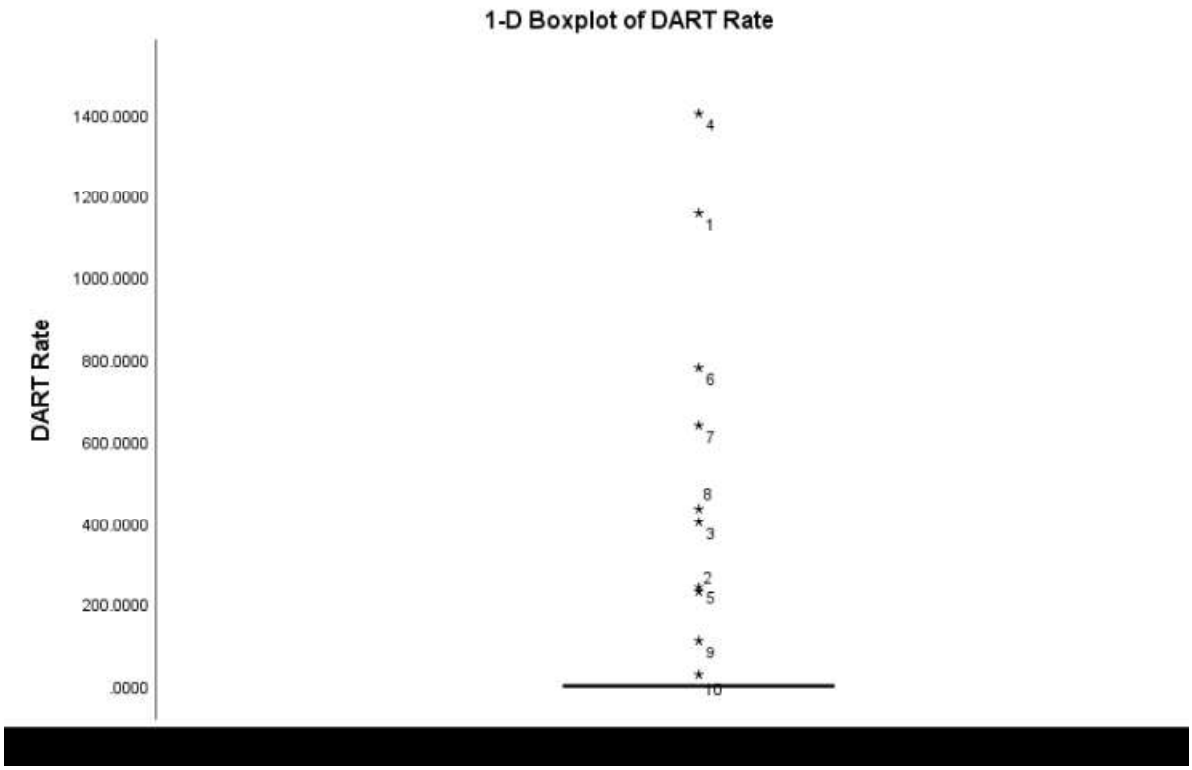

Figure 4.3 DART Days Rate Box Plot

Hypothesis Testing

H_{10}: There will be no statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA incident rates.

The first research question and corresponding hypothesis concerned the possible relationship between transformational leadership scores of front line non-union supervisors as rated by their union member subordinates and OSHA recordable rate. Regression analysis was conducted to assess whether a correlation existed between transformational leadership score and OSHA recordable rate. As Table 4.5 indicates, a weak negative correlation (-0.245) is shown. However, it was not statistically significant; 0.122 ($p>0.05$). Additionally, linear regression was

conducted to predict OSHA recordable rate based on transformational leadership score. This linear regression produced results indicating a negative correlation. The regression equation produced was F(1,39=2.50, p=0.122) (see Table 4.5), R^2=0.06 (see Table 4.7). While a t value of -1.58 indicates a negative slope, the significance level of 0.122 (see table 4.8) indicates lack of statistical significance. Further, R^2 =0.06 indicates the independent variable of transformational leadership can explain 6% of the observed variance of the OSHA recordable rate. Also, the range of the upper and lower bounds of the confidence interval contains zero (Table 4.8). Based on this information hypothesis H_{10} cannot be rejected.

Table 4.5 Transformational Leadership Score and OSHA Recordable Rate Correlations

		OSHA Recordable Rate	Transformational Leadership Score
Pearson Correlation	OSHA Recordable Rate	1	-0.245
Sig. (2-tailed)			0.122
N		41	41
Pearson Correlation	Transformational Leadership Score	-0.245	1
Sig. (2-tailed)		0.122	
N		41	41

Table 4.6 Transformational Leadership Score and OSHA Recordable Rate ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.054	1	58.054	2.499	.122[b]
	Residual	905.837	39	23.227		
	Total	963.890	40			

a. Dependent Variable: OSHA Recordable Rate

b. Predictors: (Constant), Transformational Leadership Score

Table 4.7 Transformational Leadership and OSHA Recordable Rate Regression Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.245[a]	0.060	0.036	4.8194

a. Predictors: (Constant), Transformational Leadership Score

b. Dependent Variable: OSHA Recordable Rate

Table 4.8 Transformational Leadership Score and OSHA Incident Rate of Coefficients of Regression Model [a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	6.227	2.033		3.063	0.004	2.115	10.339
	Transformational Leadership Score	-1.55	0.981	-0.245	-1.581	0.122	-3.537	0.434

a. Dependent Var: OSHA Recordable Rate

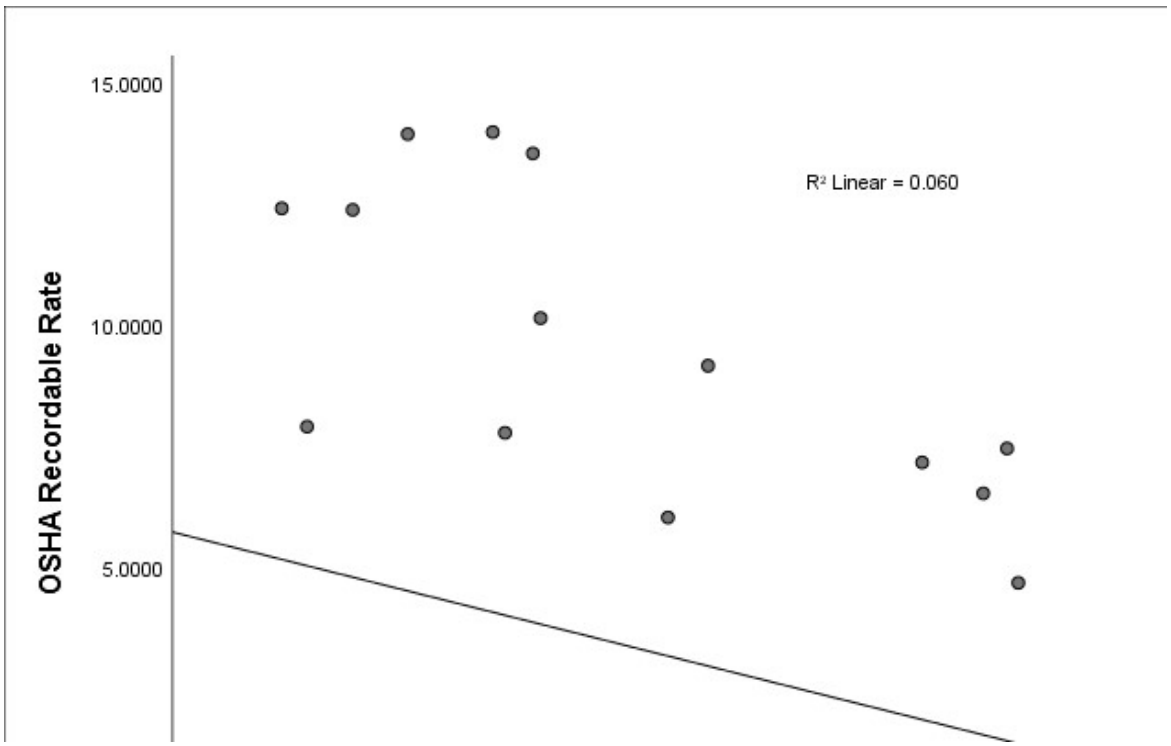

Figure 4.4 Transformational Leadership score and OSHA Recordable Rate Scatter Plot

H_{20}: There will be no statistically significant relationship between mean transformational leadership scores for non-union front line supervisors, as rated by union member subordinates, and OSHA lost workday incident rates (DART Days rates).

The second research question and corresponding hypothesis concerned the possible relationship between transformational leadership scores of front line non-union supervisors as rated by their union member subordinates and OSHA DART Days rates. Regression analysis was conducted to assess whether a correlation existed between transformational leadership score and OSHA DART Days rates. As Table 4.9 indicates a weak negative correlation (-0.298)) was shown. Additionally, a linear regression was conducted to predict OSHA DART Days rate based on transformational leadership score. This linear regression produced results indicating a negative correlation. The regression equation produced was F(1,39=3.79, p=0.059(p >0.05) (see

Table 4.10), R^2= 0.089 (see Table 4.11). While a t value of -1.946 indicates a negative slope, the significance level of 0.059 (see Table 4.12) indicates a lack of statistical significance. Further, R^2= .089 indicates the independent variable of transformational leadership can explain 8.9% of the observed variance of the DART days rate. Also, the range of the upper and lower bounds of the confidence interval contains zero (Table 4.12). Based on this information hypothesis H_{20} cannot be rejected.

Table 4.9 Transformational Leadership Score and DART Days Rate Correlations

		DART Days Rate	Transformational Leadership Score
Pearson Correlation	DART Rate	1	-0.298
Sig. (2-tailed)			0.059
N		41	41
Pearson Correlation	Transformational Leadership Score	-0.298	1
Sig. (2-tailed)		0.059	
N		41	41

Table 4.10 Transformational Leadership Score and DART Days Rate ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	360383.748	1	360383.748	3.789	.059[b]
	Residual	3709842.600	39	95124.169		
	Total	4070226.348	40			

a. Dependent Variable: DART Days Rate

b. Predictors: (Constant), Transformational Leadership Score

Table 4.11 Transformational Leadership Score and DART Days Rate Regression Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.298[a]	0.089	0.065	308.4221

a. Predictors: (Constant), Transformational Leadership Score

b. Dependent Variable: DART Rate

Table 4.12 Transformational Leadership Score and DART Days Rate Coefficients of Regression Model[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	367.289	130.089		2.823	0.007	104.160	630.418
	Transformational Leadership Score	-122.252	62.809	-0.298	-1.946	0.059	-249.29	4.790

a. Dependent Var: DART Days Rate

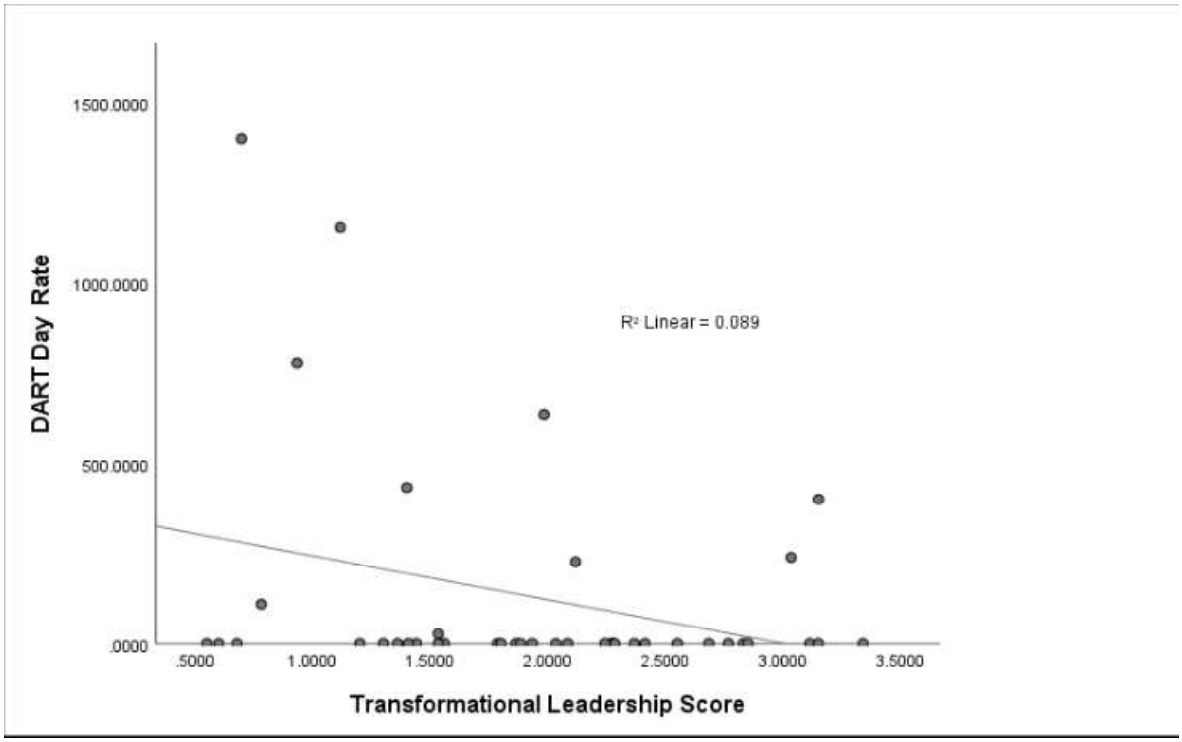

Figure 4.5 Transformational Leadership Score and DART Days Rate Scatter Plot

H_{30}: There will be no statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA incidents and non-union front line supervisors with above zero OSHA incidents.

Further testing was done to determine if there were differences in mean transformational leadership scores between groups who experienced OSHA recordable incidence and those who did not. The mean score with groups experiencing incidence was (mean = 1.83 sd =0.883). The mean score with groups not experiencing an incidence was (mean=1.97, sd=0.729) (see Table 4.13).

The two groups tested were assumed to be independent as one group experienced OSHA recordable incidence while the other group did not. As the Levene's Test indicated, equal

variances should be assumed (F=1.475, p=0.232). The t test results indicated nonsignificant differences between the means of the two groups t(39=-0.525, p=0.603) (p<0.05) (see Table 4.14). Also, the range of the upper and lower bounds of the confidence interval contains zero (Table 4.14). Based on this information hypothesis H_{30} cannot be rejected.

Table 4.13 OSHA Recordable Incident Rate Group Statistics

OSHA Incident Rate	Has team experienced an OSHA recordable incident?	N	Mean	Std. Deviation	Std. Error Mean
Mean Transformational Leadership Score	Yes	14	1.8348	0.8829	0.2360
	No	27	1.9702	0.7288	0.1403

Table 4.14 OSHA Recordable Incident Rate Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		f	sig	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Transformational Leadership Score	Equal variances assumed	1.475	0.232	-0.525	39	0.603	-0.1354	0.2581	-0.6574	0.3865
	Equal variances not assumed			-0.493	22.409	0.627	-0.1354	0.2745	-0.7041	0.4333

H_{40}: There will be no statistically significant difference in mean transformational leadership scores for non-union front line supervisors, as rated by their union member subordinates, with zero OSHA lost workday (DART Days) incidents and non-union front line supervisors with above zero OSHA lost workday (DART Days) incidents.

Testing was done to determine if there were differences in mean transformational leadership scores between groups who experienced OSHA DART Days incidence and those who did not. The mean transformational leadership scores were not significantly different between the supervisors of those groups who experienced a DART Days incident and those who had not. The mean score with groups experiencing a DART Days incident was (mean = 1.67, sd = 0.883). The mean score with groups not experiencing a DART Days incident was (mean =2.00, sd=0.736) (see Table 4.15).

The two groups tested were assumed to be independent as one group experienced OSHA DART Days incidence while the other group did not. As the Levene's Test indicated, equal variances should be assumed (F=0.0635, p=0.430). The t test results indicated nonsignificant differences between the means of the two groups t(39=.-1.174, p=0.247) (p>0.05) (see Table 4.16). Also, the range of the upper and lower bounds of the confidence interval contains zero (Table 4.16). Based on this information hypothesis H_{40} cannot be rejected.

Table 4.15 DART Days Rate Incident Group Statistics

DART Days Rate	Has team experienced a DART Days recordable incident?	N	Mean	Std. Deviation	Std. Error Mean
Mean Transformational Leadership Score	Yes	10	1.6745	0.8834	0.2794
	No	31	2.0045	0.7364	0.1323

Table 4.16 DART Days Rate Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		f	sig	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Transformational Leadership Score	Equal variances assumed	0.635	0.430	-1.174	39	0.247	-0.3300	0.2810	-0.8984	0.2385
	Equal variances not assumed			-1.068	13.286	0.305	-0.3300	0.3091	-0.9962	0.3363

Summary

The purpose of this study was to determine if there is a relationship between leadership styles of managers and OSHA safety incidence among a unionized workforce in a high hazard employment setting. Specifically, the study endeavored to measure the transformational leadership qualities of non-union supervisors as measured by their union member subordinates and then comparing those measures to OSHA injury incident rates.

Mean transformational leadership scores of front line managers at rated by their union member subordinates were utilized as independent variables and OSHA incident and OSHA DART Day Rates were utilized as dependent variables. Correlations and linear regression statistics were calculated. The results indicated a failure to reject the null Hypotheses of 1, 2, 3, and 4.

CHAPTER 5

DISCUSSION AND RECOMMENDATIONS

Summary of Findings

The purpose of this study was to determine if a relationship exists between leadership style and OSHA incident rates and severity of those incidents in a unionized high hazard employment environment. Specifically the study utilized the mean scores of the transformational leadership style of non-union supervisors as independent variables as rated by their union member subordinates. These scores were compared to dependent variables related to OSHA incident rates and OSHA incident severity rates, referred to as DART Day rates. The research questions sought included information to determine if OSHA incidence and DART Day rates were related to mean transformational leadership scores of non-union supervisors as rated by their union member subordinates. Additionally, research questions sought to determine if mean transformational leadership scores of non-union supervisors as rated by their union member subordinates were different between groups experiencing no OSHA incidents or DART Day incidents and those groups who did experienced those incidences.

Research Question 1 asked: : Are lower OSHA incident rates related to mean scores of transformational leadership of non-union front line supervisors, as rated by union member subordinates in a public private partnership utility?

The research test results of Research Question 1 indicated there was no statistically significant relationship between lower OSHA incident rates and mean scores of transformational leadership of non-union front line supervisors, as rated by union member subordinates in a public private partnership utility.

Research Question 2 asked: Are lower OSHA lost workday incident rates (DART Days rates) related to mean scores of transformational leadership of non-union front line supervisors, as rated by union member subordinates in a public private partnership utility?

The research test results of Research Question 2 indicated there was no statistically significant relationship between lower OSHA lost workday incident rates (DART Day rates) and mean scores of transformational leadership of non-union front line supervisors, as rated by union member subordinates in a public private partnership utility.

Research Question 3 asked: Are mean score ratings of transformational leadership of non-union front line supervisors, as rated by their union member subordinates, among those specific managers who experienced zero OSHA incidents statistically significantly different than those specific front line managers who experienced OSHA incidents exceeding zero in a public private partnership utility?

The research test results of Research Question 3 indicated no statistically significant relationship between mean score ratings of transformational leadership of non-union front line supervisors, as rated by their union member subordinates, among those specific managers who

experienced zero OSHA incidents and those specific front line managers who experienced OSHA incidents exceeding zero in a public private partnership utility.

Research Question 4 asked: Are mean score ratings of transformational leadership of non-union front line supervisors as rated by their union member subordinates, among those specific managers who experienced zero severity (DART Days) incidents statistically significantly different than those specific front line managers who experienced OSHA severity (DART Days) incidents exceeding zero in a public private partnership utility?

The research test results of Research Question 4 indicated no statistically significant relationship between mean score ratings on transformational leadership of non-union front line supervisors, as rated by their union member subordinates, among those specific managers who experienced zero OSHA severity (DART Days) and those specific front line managers who experienced OSHA severity (DART Days) exceeding zero in a public private partnership utility.

This study sought to utilize a union based population to ascertain if the results were consistent with previously conducted studies in non-union settings. In doing so, the findings indicated the null hypotheses could not be rejected in any of the proposed research questions. That is to say, the study found no statistically significant relationship between the independent variable of mean transformational leadership score of non-union front line supervisors as rated by their union member subordinates and the two dependent variables of OSHA incidents or severity of incidence, in any of the tests. These results differed from other previous studies. Several studies have been conducted previously in high hazard work environments, measuring mean transformational leadership scores against OSHA incidents and severity rates. There were two studies discussed at length because of similarities to this study. These similarities included a high hazard work environment, transformational leadership rating of direct supervisor by

subordinates, and OSHA incidence and severity rates. Nolte (2016) found statistically significant results in both OSHA incidents and severity in his study in a non-union scrap facility. Steensma (2010) found statistically significant results in OSHA incidents but not in OSHA severity rates in his study of high hazard non-union steel mills. This study differentiated from those studies by utilizing a unionized subordinate population rating their non-union member supervisors. A third recent study referred to in this study was conducted by Buroughf (2012). The Buroughf study differed from this study in that it utilized mean transformational leadership scores of plant managers as rated by non-union member plant workers. The Buroughf study found no statistically significant relationship between mean transformational leadership score and OSHA incident and severity rate. Buroughf could not test the hypothesis that mean transformational leadership score of plant managers was higher in those plants reporting zero OSHA incidents than those reporting higher than zero incidents because no plant recorded zero OSHA incidents. The Buroughf study reported that there was no statistically significant difference between mean transformational leadership score of plant managers as rated by their non-union member plant workers between plant managers whose teams had OSHA incidents of severity and those who did not.

This study focused on the models of three recent previous non-union studies on which the current study is based. There were several specific commonalities. Each of the four studies utilized the MLQ-5X survey to measure transformational leadership attributes. Each study utilized only the 20 questions out of 45 questions on the survey that referred specifically to transformational leadership attributes in their statistical analysis. The Buroughf study surveyed subordinates of plant managers rather than direct supervisors and had a smaller manager sample size (N=17). This study was more closely aligned with replicating the Nolte and Steensma

studies. Each of those two studies, as well as this study, utilized subordinates completing the MLQ-5X surveys as related to their immediate supervisor. The sample sizes of the three studies were comparable (Nolte, N=40; Steensma, N=46; Schoff, N=41). While Nolte found statistical significance in all four hypothesis tests and Steensma found statistical significance in two of the four hypothesis tests in their non union-studies, this study found no statistical significance in any of the four comparable hypotheses tested in a union based setting.

Implications of Findings

Theoretical implications. From a theoretical perspective, this study investigated the relationship between mean transformational leadership scores of non-union front line supervisors as rated by their union member subordinates and OSHA incident and DART or rates of severity in a high hazard employment setting. Studies such as this had been completed in non-union settings previously. The researcher endeavored to determine if the results would be different in a unionized setting. The results of this study indicated no statistically significant relationship between mean transformational leadership score and OSHA incidence or severity. This is not consistent with the results of the Nolte (2016) and the Steensma (2010) studies of non-union employment settings. This can offer incremental knowledge to the theoretical base of the impact of a specific leadership style to safety in a union versus a non-union setting. Specific to the impact of transformational leadership on organizational safety, based on the results of this study, such impact appears minimal. The results of this study are contrary to the results of the non-union employment setting studies noted above.

Theories associated with other types of leadership styles as well as other factors or variables in those relationships can be explored to see if union versus non-union settings offer differing outcomes in research. Additionally, theories as they relate to dynamics of globalization,

workplace standards, organizational managerial dynamics, organizational structure and human resource personnel changes may also be explored to further understand impacts of managerial theories as they relate to safety and other variables. Management theories are plentiful and many are outlined in Chapter 2 of this document. While each style is readily defined, application in practice may not be so clear. This study focused on transformational leadership.

Research implications. While much research has been done on management style and safety or management style and other dependent variables in business, little focus has been on a unionized population. Zohar (2002) determined in his study that a positive relationship exists linking transformational leadership and organizational culture. Further his study indicated that leadership and culture of safety were influenced more by the priorities of immediate supervisors rather than higher level organizational leaders. However, this current study accounted for union influence, which may potentially offer an additional factor. Godard and Frege (2013) in their research discuss democratization in a unionized workforce which empowers them to alter conditions over which their superiors exercise authority. Ceniceros (2012) reported that unions have consistently been champions of safety throughout their history. Further, Ceniceros noted that this attention to safety can create positive collaboration with employers to improve safety and reduce risks. Kaufman (2014) indicated workplace voice offers communication and influence on any action on that communication. These are all examples of other factors that may influence reaction to workplace safety or safety issues rather than, or in addition to, leadership style.

This study offers new information on the impact or lack thereof of leadership style, in this case transformational leadership, on OSHA safety incidence in a unionized workforce. As previously stated, the referenced non-union based studies indicated statistically significant

relationships between mean transformational leadership scores of supervisors as rated by their non-union member subordinates and safety incidents and severity of those incidents. This study indicated no statistically significant relationship between mean transformational leadership scores of non-union front line managers as rated by their union member subordinates and safety incidents and severity. As such, this study offers new areas for research. The role of union participation in safety and how that role interacts with management's role can be of interest when looking for methods to improve safety in the workplace. Additional research can be conducted in areas of different types of management styles other than transformational leadership, the impact of other variables, and the weight of those variables as they relate to safety. Additionally, research can be conducted in areas of impact of variables as they relate to topics other than safety, such as productivity, profitability, or others.

Practice implications. This study indicates differing results than the two studies after which it was modeled. As union based employment settings typically show positive safety histories and this study indicated no statistically significant relationship between mean transformational leadership scores of supervisors and OSHA incidence and severity, other factors must account for the importance of safety. To generalize the results of this study by applying them to all unionized workforces in high hazard employment settings may be inappropriate. The study results are based on a specific set of employees at a specific time. The results are also based on one independent variable of mean transformational leadership score of front line supervisors as rated by their union member subordinates and dependent variables of OSHA incident rates and OSHA DART day rates (severity rates). Many other potential variables could account for safety records. These could include the safety "voice" of the union members, the level of safety importance as projected by the company, the level and adherence to safety

training, and others. Other influences could account for mean transformational leadership scores. These could include the participants' perceptions, which could be relative. Other factors in scores could include the timing of survey completion. Such factors as dual loyalty influences, individual relationships with supervisors, and others may also shape results.

This study offers a framework to understand there is a difference in the results of this study of a unionized workforce in a high hazard employment setting when compared to a non-union workforce in a high hazard employment setting. Application of these results to broader workplace situations may not be appropriate without further study.

Limitations of the Study

The study was limited to a unionized workforce in a high hazard public private partnership utility located in the Midwest U.S. It was also limited to an entity required to comply with OSHA record keeping standards. The study was limited to the transformational leadership characteristics of non-union front line supervisors as rated by their union member subordinates on a Lickert type scale at a static period of time. As with any study of this type, this opens up the potential for confounding and potentially unpredictable variables. These could include fluctuations in management style based for example, on upper management changes in priority, injury incidence, union- management interactions at other levels or other influences. The study addressed a specific gap in the literature. The study is specific to transformational leadership of non-union supervisors in a union based high hazard employment setting. The results are specific only to this study.

The study had limitations in issues of design. The study was an online survey administered through Qualtrics. As such, the survey was taken by the respondent at a static time. The OSHA recordable data utilized to calculate OSHA recordable rate and OSHA DART day

rate were taken from company OSHA 300 logs and were lagging indicators of OSHA incidence. The information given in the survey was thus a snapshot that may or may not be reflective of lagging indicators. The independent variable of transformational leadership score of non-union supervisors was the only independent variable of concern for the study. While this measure was utilized to be able to compare results to previous studies, it is one of many variables that may impact safety and other manager-subordinate relationships in a unionized workspace.

Recommendations for Further Study

Areas of further studies can include a study set up in a time study framework to see if transformational leadership mean scores change with the same population base along with a measure of OSHA incidence of the sample along the same time. A study could also be conducted utilizing different unions to see if differences would potentially exist among them. Also, many other types of independent variable measures could be offered, such as other management styles rather than transformational leadership, management philosophies, impact of top level management philosophies, technology implementation and acceptance, and others.

A readily available source of research topics would be from studies regarding leadership styles in non-union employment settings. Replicating those studies in union employment settings and comparing the results would allow for increased knowledge on whether differences exist. Areas of further study can also include utilizing other variables to determine any relationship to employee attitudes toward measuring supervisory leadership styles and/or safety. These can include but are certainly not limited to timing of contracts, upper management changes that may influence supervisory management styles, corporate profitability, cultural differences, globalization, and others. It is important to note that differences between managers and

subordinates that can alter management style may change over time. Management style, much like employee attitude may not be static.

Areas of further research can also include moderating factors of union membership on workplace relationships such as the freedom to express concerns without fear of management reprisal. Another area of further research can involve labor/management dynamics existing in a unionized setting that may impact safety that may not otherwise exist in non-union settings. Also further research can explore the impact of dual loyalty of union members on safety. Additional areas of study can include determining effective means to measure such factors as changes in management and management philosophies, and impacts of periodic contract negotiations.

Conclusions

While other studies have been conducted in non-union high hazard employment settings (Boroughf, 2012; Nolte, 2016; Steensma, 2010), dealing with transformational leadership management style and its relationship to OSHA injury incidence and severity, this study endeavored to determine if the results would be consistent with those studies in a unionized setting. This study addressed a gap in the literature in that no study had investigated transformational leadership and its impact on OSHA injury and severity rates in a high hazard, public private partnership utility unionized workforce. This study sought to determine if a relationship existed between mean transformational leadership scores of non-union front line supervisors as rated by their union member subordinates in a high hazard work environment and rates of OSHA incidence and severity of OSHA incidence. The study was modeled after the three recent studies listed above, Buroughf, (2012), Nolte, (2016) and Steensma, (2010). The Buroughf study was referenced, however that study was conducted utilizing plant managers as being rated by their subordinates in non-union automotive manufacturing plants rather than front

line supervisors. The results of the Buroughf study indicated no statistically significant relationship between mean transformational leadership score of those plant managers as rated by their non-union front line employees in either OSHA incidence or OSHA severity rates.

Research such as this study exists in high hazard industry in safety as well as employee management relationships. However there are limited studies involving organized labor in this space. Such extraneous and broad variables as dual loyalty and employer/employee relations can cause change and disruption in the work environment. These changes and disruptions can impact safety through attitudes or actions, whether explicit or tacit. As such there are many opportunities for study exploration. A consequence of ignoring this research is to foster the assumption that management style can hold undue influence on safety of work groups in comparable high hazard work environments in a relatively predictable manner. Previous research by Godard and Frege (2013) and Ceniceros (2012) among others has shown organized labor's positive influence on safety and employee voice. The results of this study of a unionized workforce, when compared to the results of a non-unionized workforce, offer further evidence that leadership style has less influence on safety in a union based workplace than a non-union workplace.

As technology continues to evolve, multiple generations occupy the workspace, and globalization impacts the workforce, future studies of this type can influence human resource development and industrial training. The human resources and the strategic and profitability factors of an organization require at times a delicate dance of power and mutual understanding by all to achieve optimal results for all. Understanding the impacts and the degrees of those impacts can inform decision making at all levels of an organization. Preparation for the inevitable changes in technology, globalization, generational and other factors is a must. Research is a necessary part of that preparation.

Other studies of interest to this researcher include the impact of variables of empowerment such as safety voice and others on employee safety and well being. Additionally, this researcher then endeavors to explore employee voice or other variables of empowerment from a perspective of variable impact on a macroeconomic scale. Potential theories of intra-workplace synergies could emerge that would offer efficiencies in safety, productivity, profitability and quality of life among others. These areas of further research offer potential for valuable information in human resource management of our continuously evolving technological world.

Technology management and its relationship to human resource development, training and in the case of this study, safety as we know it today, was not envisioned decades or even, in some cases, a few years ago. It is of interest to see where worker empowerment and voice is positioned in relationship to human resource development and safety over the next decade and beyond. This empowerment voice as it exists in the current organized labor space is one option. Additional options may develop that have not been part of the nature of human resource empowerment, or management of that empowerment to date. These options may present themselves in the future through research. This could enhance not only safety but other areas of human resource development as these options offer additional research opportunities.

REFERENCES

Aguilera, R. V., & Jackson, G. (2003). The cross-national diversity of corporate governance: Dimensions and determinants. *Academy of Management Review, 28*(3), 447-465. doi:10.5465/AMR.2003.10196772.

American Society of Safety Engineers (2013). Survey shows mining executives rank workforce safety as highest priority. *Professional Safety, 58*(3), 15.

Antonakis, J., Avolio, B. J., & Sivasubramaniam N. (2003). Context and leadership: An examination of the nine-factor full-range leadership theory using the Multifactor Leadership Questionnaire. *Leadership Quarterly, 14*, 261-295.

Avolio, B. J., & Bass, B. M. (2004). *Multifactor leadership questionnaire. Manual & review copy. (3rd Ed.)* Menlo Park, CA: Mind Garden.

Bamberger, P. A., Kluger, A. N., & Suchard, R. (1999). The antecedents and consequences of union commitment: A meta-analysis. *The Academy of Management Journal, 42*(3), 304-318.

Barling, J., Fullager, C., & Kelloway, E. K. (1992). *The union and its members. A psychological approach.* NY, NY: Oxford University Press.

Barling, J., Loughlin, C., & Kelloway, E. K. (2002). Development and test of a model linking safety-specific transformational leadership and occupational safety. *Journal of Applied Psychology, 87*(3), 488-496.

Barrick, M. R., Mount, K., & Li, N. (2013). The theory of purposeful work behavior: The role of personality, higher-order goals and job characteristics. *Academy of Management Review, 38*(1), 132-153.

Barrick, M. R., Thurgood, G. R., Smith, T. A., & Courtright, S. H. (2015). Collective organizational engagement: Linking motivation antecedents, strategic implementations, and firm performance. *Academy of Management Journal, 58*(1), 111-135. doi: 10.5465/amj.2013.0227.

Bass, B. M. (1990). From transactional to transformational leadership: Learning to share the vision. *Organizational Dynamics, 18*(3), 19-31.

Bass, B. M. (2008). *The Bass handbook of leadership. Theory, research, & managerial applications. (4th Ed.)* NY, NY: Free Press.

Bass, B.M., & Riggio, R. E. (2006). *Transformational Leadership* (*2nd Ed*.) Mahwah, NJ: Erlbaum Associates.

Bennis, W. G., & Nanus, B. (2007). *Leaders: Strategies for taking charge. (2nd. Ed.)* NY, NY: Harper Collins.

Bergman, M.E., Payne, S.C., Taylor, A.B. (2014). The shelf life of a safety climate assessment: How long until the relationship with safety-critical incidents expires? *Journal of Business and Psychology, 29*(4), 519-540.

Boroughf, B. J. (2012). An examination of the relationship between transformational leadership tendencies and safety outcomes in selected manufacturing settings. (Doctoral Dissertation). Retrieved from ProQuest Dissertations & These Database. (UMI No. 3550198).

Boyd, K. (1964). Utility-union relations in San Francisco. *American Water Works Association Journal, 56*(9), 1117-1120.

Brown, W. (2015). Trade unions in the workplace. *Industrial Relations Journal, 46*(1), 7-11.

Bureau of Labor Statistics. (2017a). Employer reported workplace injuries and illnesses-2016. Retrieved from www.bls.gov/news.release/pdf/osh.pdf.

Bureau of Labor Statistics. (2017b). National census of fatal occupational injuries in 2016. Retrieved from www.bls.gov/news.release/pdf/cfoi.pdf.

Bureau of Labor Statistics. (2017c). Union Members-2016. Retrieved from www.bls.gov/news.release/archives/union2_01262017.pdf.

Bureau of Labor Statistics. (2018a). Industries at a glance, utilities NAICS 22. Retrieved from www.bls.gov/iag/tgs/iag22.htm.

Bureau of Labor Statistics. (2018b). Utilities industry has highest union membership in private sector in 2017. Retrieved from www.bls.gov/opub/ted/2018/utilities-industry-has-highest-union-membership-rate-in-private-sector-in-2017.htm.

Bureau of Labor Statistics. (2019). Employer reported workplace injuries and illnesses-2018. Retrieved from www.bls.gov/news.release/archives/osh_11072019.pdf.

Burns J. M. (1978). *Leadership*. NY, NY: Harper & Row.

Burns, J. M. (1979). Two excerpts from Leadership. *Educational Leadership, 36*(6), 380.

Burns, J. M. (2003). *Transforming leadership.* NY, NY: Grove.

Carifio, J. & Perla, R. (2008). Resolving the 50-year debate around using and misusing Likert scales. *Medical Education, 42*(12), 1150-1152.

Cascio, W. (2014). Investing in HRD in uncertain times now and in the future. *Advances in Human Resource Development, 16*(1), 108-122.

Ceniceros, R. (2012). Unions push harder on worker safety. *Business Insurance, 46*(7), 4-20.

Clark, O., Zickar, M., & Jex, S. (2014). Role definition as a moderator of the relationship between safety climate and organizational leadership behavior among hospital nurses. *Journal of Business and Psychology, 29*(1), 101-110. doi: 10.1007/s10869-013-9302-0.

Clarke, S. (2013). Safety leadership: A meta-analytical review of transformational and transactional leadership styles as antecedents of safety behaviours. *Journal of Occupational and Organizational Psychology, 86*(1), 22-49.

Conchie, S. M., & Donald, I. J. (2009). The moderating role of safety-specific trust on the relation between safety-specific leadership and safety citizenship behavior. *Journal of Occupational Health Psychology, 14*(2), 137-147.

Conchie, S.M., Taylor, P.J, & Donald, I.J. (2012). Promoting safety voice with safety-specific transformational leadership: The mediating role of two dimensions of trust. *Journal of Occupational Health Psychology, 17*(1), 105-115.

Conlon, E. J., & Gallagher, D. G. (1987). Commitment to employer and union: Effects of membership status. *Academy of Management Journal, 30*(1), 151-162. doi: 10.2307/255901.

Cooke, W. N. (1994). Employee participation programs, group based incentives, and company performance: A union-nonunion comparison. *Industrial & Labor Relations Review, 47*(4), 594-609.

Cregan, C., Bartram, T., & Stanton, P. (2009). Union organizing as a mobilizing strategy: The impact of social identity and transformational leadership on the collectivism of union members. *British Journal of Industrial Relations, 47*(4), 701-722.

Da Cruz, M. R. P., Nunes A.J. S., & Pinheiro, P. G. (2011). Fiedler's contingency theory: Practical application of the least preferred coworker scale (LPC). *Journal of Organizational Behavior, 10*(4), 7-26.

Dawkins, C. E. (2012). Labored relations: Corporate citizenship, labor unions and freedom of association. *Business Ethics Quarterly, 22*(3), 473-500. doi: 10.5840/beq201222331.

Dean, L. R. (1954). Union activity and dual loyalty. *Industrial and Labor Relations, 7*(4), 526-536.

Deery, S. J., Iverson, R. D., Roderick, D., Buttigieg, D. M., & Zatzick, C. D. (2014). Can union voice make a difference? The effect of union citizenship behavior on employee absence. *Human Resource Management, 53*(2), 211-228. doi: 10.1002/hrm.21549.

Delp, L. & Riley, K. (2015). Worker engagement in the health and safety regulator arena under changing models of worker representation. *Labor Studies Journal, 40*(1), 54-83. doi:10.1177/0160449X15569387.

Den Hartog, D. N., Van Muijen, J. J., & Koopman, P. L. (1997). Transactional versus transformational leadership: An analysis of the MLQ. *Journal of Occupational and Organizational Psychology, 70*(1), 19-34.

Donado, A. (2015). Why do unionized workers have more nonfatal occupational injuries? *Industrial & Labor Relations Review, 68*(1), 153-183. doi: 10.1177/0019793914556244.

Dunlop, L. (2013). Beyond the safety triangle. *The Safety & Health Practitioner, 31*(10), 45.

Dychwald, K., Erickson, T. J., & Morison, R. (2006) *Workforce crisis. How to beat the coming shortage of skills and talent.* Boston, MA: Harvard Business Press.

Fiedler, F. E. (1970). The effects of leadership training and experience: A contingency model interpretation. *Administrative Science Quarterly, 17*(4), 453-470.

Frost, A. C. (2000). Explaining variations in workplace restructuring: The role of local union capabilities. *Industrial & Labor Relations Review, 53*(4), 559-578.

Fulwiler, R. D. (2011). The key to world-class safety. *EHS Today, 4*(6), 33-37.

Gallivan, S., Taxis, K., Franklin, B., & Barber, N. (2008). Is the principle of a stable Heinrich ratio a myth?: A multimethod analysis. *Drug Safety, 31*(8), 637-642.

Godard, G., & Frege, C. (2013). Labor unions, alternative forms of representation, and the exercise of authority relations in U.S. workplaces. *Industrial and Labor Relations Review*, *66*(1), 142-168.

Harlow, H. (2008). The effect of tacit knowledge on firm performance. *Journal of Knowledge Management*, *12*(1), 148-163.

Harmon, R. (2000). Managing the utility of the future. *American Water Works Association Journal, 92*(1), 22.

Hater, J. J., & Bass, B. M. (1988). Superior's evaluation and subordinates' perceptions of transformational and transactional leadership. *Journal of Applied Psychology, 73*(4), 695-702.

Hill, W. (1969). The validation and extension of Fiedler's theory of leadership effectiveness. *Academy of Management Journal, 12*(1), 33-47. doi: 10.2307/254670.

House, R. J. (1971). A path goal theory of leader effectiveness. *Administrative Science Quarterly, 16*(3), 321-339.

House, R. J. (1996). Path-goal theory of leadership: Lessons, legacy, and a reformulated theory. *Leadership Quarterly, 7*(3), 323-352.

Idris, M. A., Dollard, M. F., & Tuckey, M. R. (2015). Psychosocial safety climate as a management tool for employee engagement and performance: A multilevel analysis. *International Journal of Stress Management, 22*(2), 183-206.

Ismail, A., Mohamed, H. A., Sulaiman, A. Z., Mohamad, M. H., & Yusuf, M. H. (2011). An empirical study of the relationship between transformational leadership, empowerment and organizational commitment. *Business & Economic Research Journal, 2*(1), 89-106.

Judge, T. A., & Piccolo, R. F. (2004). Transformational and transactional leadership: A meta-analytic test of their relative value. *Journal of Applied Psychology, 89*(5), 755-768.

Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal, 33*(4), 692-724. doi: 10.2307/256287.

Kaufman, B. E. (2001). An interview with Steelworkers' President Lynn Williams. *Journal of Labor Research, 22*(1), 145-171.

Kaufman, B. E. (2014). Explaining breadth and depth of employee voice across firms: A voice factor demand model. *Journal of Labor Research, 35*(3), 296-319. doi: 10.1007/s12122-014-9185-5.

Kelloway, E. K., Mullen, J., & Francis, L. (2006). Divergent effects of transformational and passive leadership on employee safety. *Journal of Occupational Health Psychology, 11*(1), 76-86.

Kim, D., & Bae, J. (2005). Workplace innovation, employment relations and HRM: Two electronics companies in South Korea. *International Journal of Human Resource Management, 16*(7), 1277-1302.

Kim, Y., Kim, D., & Ali, M. (2015). The effects of mutual trustworthiness between labour and management in adopting high performance work systems. *Industrial Relations, 70*(1), 36-61.

Kitt, M., & Howard, J. (2013). The face of occupational safety and health: 2020 and beyond. *Public Health Reports, 128*(3), 138-139.

Kochan, T. A. (1979). How American workers view labor unions. *Monthly Labor Review, 102*(4), 23-31.

Kochan, T. A. (2012). A jobs compact for America's future. *Harvard Business Review, 90*(3), 64-72.

Kochan, T. A., McKersie, R. B., & Chalyoff, J. (1986). The effects of corporate strategy and workplace innovations on union representation. *Industrial & Labor Relations Review, 39*(4), 487-501.

Kochan, T. A., & Rubinstein, S. A. (2000). Toward a stakeholder theory of the firm: The Saturn partnership. *Organization Science, 11*(4), 367-386.

Krouse, J. E. (2009). Leadership characteristics identified within successful safety cultures: A study of transformational, transactional and passive/avoidant leader behaviors. (Doctoral Dissertation). Retrieved from ProQuest Dissertations & These Database. (UMI No. 3409994).

Landau, S. & Everitt, B. (2004). *A Handbook of Statistical Analyses using SPSS.* Boca Raton, FL: CRC Press.

Lazes, P., & Savage, J. (1996). A union strategy for saving jobs and enhancing workplace democracy. *Labor Studies Journal, 21*(2), 96-121.

Leahy, J. T. (2001). Making room for labor in business ethics. *Journal of Business Ethic, 29*(1-2), 33-34.

Leffakis, Z., & Schoff, R. (2012). Stop doing things dangerously: High performance work systems can increase employee safety. *Industrial Engineer Magazine, 44*(6), 48-53.

Leigh, J. P. (2011). Economic burden of occupational injury and illness in the United States. *Milbank Quarterly, 89*(4), 728-772.

Leroy, H., Diernynck, B., Anseel, F., Simons, T., Halbesleben, J. R., McCaughey, D., Savage, G.T., & Sels, L. (2012). Behavioral integrity for safety, priority of safety psychological safety, and patient safety: A team-level study. *Journal of Applied Psychology, 97*(6), 1273-1281.

Lewin, D. (2005). Unionism and employment conflict resolution: Rethinking collective voice and its consequences. *Journal of Labor Research, 26*(2), 209-239.

Liu, W., Guthrie, J. P., Flood, P. C., & MacCurtain, S. (2009). Unions and the adoption of high performance work systems: Does employment security play a role? *Industrial & Labor Relations Review, 63*(1), 109-127.

Luthans, K. W., & Sommer, S. M. (2005). The impact of high performance work on industry level outcomes. *Journal of Managerial Issue, 17*(3), 327-345.

Magenau, J. M., Martin, J. E., & Peterson, M. M. (1988). Dual and unilateral commitment among stewards and rank-and-file union members. *Academy of Management Journal, 31*(2), 359-376. doi: 10.2307/256552.

Malinowski, B., Minkler, M., & Stock, L. (2015). Labor unions: A public health institution. *American Journal of Public Health, 105*(2), 261-271. doi: 10.2105/AJPH.2014.302309.

Manuele, F. A. (2009). Leading and lagging indicators. *Professional Safety, 54*(12), 28-33.

Manuele, F.A. (2011). Reviewing Heinrich: Dislodging two myths from the practice of safety. *Professional Safety, 56*(10), 52-61.

Martin, J. (2015). A union opportunity. *America, 213*(8), 4.

Martin, J. E., & Biasatti, L. L. (1979). A hierarchy of important elements in union-management relations. *Journal of Management, 5*(2), 229-240.

Matta, F. K., Scott, B. A., Koopman, J,. & Conlon, D. E. (2015). Does seeing "eye to eye" affect work engagement and organizational citizenship behavior? A role theory perspective on LMX agreement. *Academy of Management Journal, 58*(6), 1686-1708.

Maxfield, D. (2010). Workplace safety is the leading edge of a culture of accountability. *EHS Today, 3*(6), 39-44.

McCarthy, W.E.J. (1963). The challenge facing British trade unions. *Annals of American Academy of Political and Social Science, 350*, 129-137.

McCarthy, W. E. J., & Clifford, B. A. (1966). The work of industrial courts of inquiry. *British Journal of Industrial Relations, 4*(1), 39-58.

McGonagle, A. K., Walsh, M., Kath, L. M., & Morrow, S. L. (2014). Civility norms, safety climate, and safety outcomes: A preliminary investigation. *Journal of Occupational Health Psychology, 19*(4), 437-452.

McKnight, R. (2015). Leading actions & lagging events: Finding the right balance. *Professional Safety, 60*(5), 65-67.

Miner, J. B. (2003). The rated importance, scientific validity and practical usefulness of organizational behavior theories: A quantitative review. *Management Learning & Education, 2*(3), 250-268. doi: 10.5465/AMLE.2003.10932132.

Mitchell, T. R., Biglan, A., Oncken, G. R., & Fiedler, F. E. (1970). The contingency model: Criticism and suggestions. *Academy of Management Journal, 13*(3), 253-267.

Morantz, A. D. (2013). Coal mine safety: Do unions make a difference? *Industrial & Labor Relations Review, 66*(1), 88-116.

Morgeson, F. P., Mitchell, T. R., & Liu, D. (2015). Event system theory: An event-oriented approach to the organizational sciences. *Academy of Management Review, 40*(4), 515-537. doi: 10.5465/amr.2012.0099.

Mullen, J. E., & Kelloway, E. K. (2009). Safety leadership: A longitudinal study of the effects of transformational leadership on safety outcomes. *Journal of Occupational Psychology, 82*(2), 253-272.

Mullen, J. E., Kelloway, E. K., & Teed, M. (2011). Inconsistent style of leadership as a predictor of safety behavior. *Work & Stress, 25*(1), 41-54.

Naidoo, L. J., Scherbaum, C. A., Goldstein, H. W., & Graen, G. B. (2011). A longitudinal examination of the effects of LMX, ability, and differentiation on team performance. *Journal of Business and Psychology, 26*(3), 347-357.

Nash, J. (2008). Preventing death on the job. Did Heinrich get it wrong? *Industrial Safety and Hygiene News,42*(11), 18.

Nolte, R. (2015). Leading to safety. *Scrap, 72*(6), 50-58.

Nolte, R. (2016). The relationship between transformational leadership and safety outcomes: A quantitative study in scrap metal recycling facilities. (Unpublished Doctoral Dissertation).

Northouse, P. G. (2016). *Leadership theory and practice. (4th Ed.)* Thousand Oaks, CA: Sage Publications.

OSH Act of 1970. (1970). U.S. Department of Labor/OSHA. Retrieved from https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=oshact&p_id=2743.

OSHA. (2007). *OSHA Standards for general industry 29CFR 1910 with amendments (2nd ed.)* Chicago, IL: CCH.

O'Connor, C., & Mortimer, D. (2013). Union leadership: What is transformational leadership and can it make a difference. *International Employment Relations Review, 19*(2), 62-77.

O'Connor, P., Cowan, S., & Alton, J. (2010). A comparison of leading and lagging indicators of safety in naval aviation. *Aviation, Space and Environmental Medicine, 81*(7), 677-682.

Poehler, D. M., & Luchak, A. A. (2014). Balancing efficiency, equity, and voice: The impact of unions and high involvement work practices on work outcomes. *Industrial & Labor Relations Review, 67*(4), 1063-1094. doi: 10.1177/0019793914546295.

Publications Office of the European Union (2013). *Priorities for Occupational Safety and Health Research in Europe: 2013-2020.* Luxembourg: Publications Office of the European Union. doi:10.2802/25457.

Purcell, T. V. (1954). The worker speaks his mind on company and union. *Harvard Business Review, 32*(4), 132.

Rebbitt, D. (2014). Pyramid power. A new view of the great safety pyramid. *Professional Safety, 59*(9), 30-34.

Reichart, K. S., & Durrenberger, E. P. (2010). *The anthropology of labor unions.* Boulder, CO: University Press of Colorado.

Rubenstein, S. A. (2001). A different kind of union: Balancing co-management and representation. *Industrial Relations, 40*(2), 163-203.

Schiavi, A. B. (2014). Safety audits as leading indicators. *Safety, 59*(4), 13.

Sivanathan, N., Turner, N., & Barling, J. (2005). Effects of transformational leadership on employee safety performance: A quasi-experiment study. *Academy of Management Annual Meeting Proceedings. 2005,* N1-N6. doi: 10.5465/AMBPP.2005.18780756.

Smith, S. (2015). National safety survey. *EHS Today, 8*(8), 16-20.

Southard, K. (2010). U.S. electric utilities: The first public private partnership partnerships? *Contract Law Journal, 39*(2), 395-410.

Spector, B. (1987). Transformational leadership: The new challenge for U.S. unions. *Human Resource Management, 26*(1), 3-16.

Steensma, J.T. (2010). Transformational leadership and safety in steel mills: A quantitative study in a high hazard environment. (Doctoral Dissertation). Retrieved from ProQuest Dissertations & These Database. (UMI No. 3541974).

Strauss, S. & Mapes, K. (2012). Union power in public utilities: Defending worker and consumer health and safety. *New Labor Forum, 21*(2), 86-95.

Sugden, C, Healey, N., Howard K., & Rushton, P. (2010). Safety performance indicators in the explosives sector. *Loss Prevention Bulletin 212, Institution of Chemical Engineers*, 16-21.

Sun, R., & Henderson, A. C. (2017). Transformational leadership and organizational processes: Influencing public performance. *Public Administration Review, 77*(4), 554-565. Doi: 10.1111/puar.12654.

Sverke, M., & Kuruvulla (1995). A new conceptualization of union commitment: Development and test of an integrated theory. *Journal of Organizational Behavior, 16,* 505-532.

Swindell, Jr., J. R. (2014). Transformational leadership, perceived support, organizational commitment, and union citizenship behavior: The effect of cultural diversity. (Doctoral Dissertation). Retrieved from ProQuest Dissertations & These Database. (UMI No. 3646233).

Toellner, J. (2001). Improving safety & health performance: Identifying & measuring leading indicators. *Professional Safety, 46*(9), 42-47.

Trmal, S. A., Bustamam, U. S., & Mohamed, Z. A. (2015). The effect of transformational leadership in achieving high performance workforce that exceeds organisational expectations: A study from a global and Islamic perspective. *Global Business & Management Research, 7*(2), 88-95.

Tucker, S., Chmeil, N., Turner, N., Herschcovis, M. S., & Stride, C. B. (2008). Perceived organizational support for safety and employee safety voice: The mediating role of coworker support for safety. *Journal of Occupational Health Psychology, 13*(4), 319-330.

Twigg, N. W., Fuller, J. B., & Hester, K. (2008). Transformational leadership in Labor organizations: The effect on union citizenship behavior. *Journal of Labor Research, 29*(1), 27-41.

US - EU Cooperation on Workplace Safety and Health. (2003). Qualitative and quantitative indicators-Monitoring and evaluation. Retrieved from http://www.useuosh.org/conference2003/proceedings/topic03.html.

Venneberg, D. L., & Eversole, B. W. (2010). *The boomer retirement time bomb. How companies can avoid the fallout from the coming skills shortage.* Santa Barbara, CA: Praeger.

Verma, A. (2005). What do unions do in the workplace? Union effects on management and HRM policies. *Journal of Labor Research, 26*(3), 415-449.

Walters, M., & Mishel, L. (2003). How unions help all workers. Economic Policy Institute. www.epi.org/publication/briefingpapers_bp143/

Wheatley J. (2015). Leading organizational change with safety. *Professional Safety, 60*(8), 28-31.

Williamsen, M. (2003). Revisiting Heinrich's "accident triangle". *Industrial Safety and Hygiene News, 37*(20), 27.

Wofford, J. C., Whittington, J. L., & Goodwin, V. L. (2001). Follower motive patterns as situational moderators for transformational leadership effectiveness. *Journal of Managerial Issues, 13*(2), 196-211.

Yorio, P. L., Wilmer, D. R., & Haight, J. M. (2014). Interpreting MSHA citations through the lens of occupational health and safety management systems: Investigating their impact on mine injuries and illnesses 2003-2010. *Risk Analysis, 34*(8), 1538-1553.

Zohar, D. (1980). Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology, 65*(1), 96-102.

Zohar, D. (2002). The effects of leadership dimensions, safety climate, and assigned priorities on minor injuries in work groups. *Journal of Organizational Behavior, 23*(1), 75-92. Doi: 10.1002/job.130.

Zohar, D., & Teene-Gazit, O. (2008). Transformational leadership and group interaction as climate antecedents: A social network analysis. *Journal of Applied Psychology, 93*(4), 744-757.