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Relationship Between Safety Climate, Job Tenure, and Job Satisfaction Among Railroad Workers

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Maurice Etheridge

MBA, Argosy University, 2006

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Researchers have reported that corporations in the United States incur hundreds of billions of dollars of annual direct and indirect costs from workplace injuries. Employing a theoretical framework underpinned by the job characteristics theory, this correlational study examined the relationships between task identity, safety climate, and job satisfaction to assist transportation managers with information for improving workers' job satisfaction for increasing productivity and organizational performance. Three validated survey instruments (Safety Climate, Job Characteristics Inventory, and Job Satisfaction) and one demographic instrument were distributed to railroad workers in the eastern region of North Carolina (n = 80). The survey response data provided the basis for identifying the significant predictors, moderators, and mediators of workers' job satisfaction. Structural equation modeling and partial least squares software indicated a significant ($p < .001$) positive correlation between the indicator variables of Employees' Task Identify, Safety Climate, and Job Tenure and the dependent variable of Job Satisfaction. Although there was a significant positive correlation between railroad employees' job tenure and job satisfaction, job tenure did not significantly ($p > .05$) moderate the relationship between railroad workers' task identity and job satisfaction. The findings may be of value to railroad transportation managers developing new initiatives to improve safety climate for increasing employee job satisfaction. Improving safety climate and job satisfaction could effect beneficial social change by decreasing accidents affecting both railroad worker and public safety.

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Section 1: Foundation of the Study

The safety climate of an organization reflects the workers' shared perceptions of policies, procedures, and practices relating to safe working practices (Nielsen, Eid, Mearns, & Larsson, 2013). Railroad employees in particular must be aware of personal safety climate, because the railroad-working environment is dangerous (Giles, 2011). In many organizations, the workers' perceptions of the safety climate have an impact on attitudes those employees' hold toward their jobs, work-related activities, and environment (Blewett, Rainbird, Dorrian, Paterson, & Cattani, 2012). Lin (2012) reported that employee job satisfaction increased when the dangers of injuries in the work environment decreased. Lin found that an expected strong and respected safety climate influenced underlying worker job satisfaction. Vazquez (2014) asserted, however, that managers in the railroad industry might lack a well-developed understanding of the job satisfaction level of railroad workers and its correlation with job characteristics. Vazquez suggested that for preventing accidents within the railroad industry, managers need to understand the relationships between job satisfaction, the safety climate, and job characteristics. A key job characteristic is task identity, the extent to which workers do an entire or whole piece of work, and can clearly identify the results of efforts (Sims, Szilagyi, & Keller, 1976). A better understanding of the relationships among employees' task identify, safety climate, job tenure and job satisfaction could potentially help railroad industry leaders tailor strategies to improve the safety climate, reduce injuries and costs, increase worker job satisfaction, and improve performance. The goal for this study was to examine and understand the extent to which railroad workers perceive safety climate

through the lens of job characteristics theory (JCT). The premises of the JCT are that job characteristics (implying the design and implementation of workplace tasks) influence the attitudes of employees, including their levels of motivation, and job satisfaction (Guerrero & Singh, 2013; Shultz & Shultz, 2010). Because workers' personal characteristics vary among individual employees, the relationships between job characteristics and work-related outcomes do not influence the attitudes of all employees in the same way. The propositions of JCT have implied that a correlation should exist between job characteristics associated with the safety climate and employee job satisfaction (Nahrgang, Morgeson, & Hofmann, 2011).

Background of the Problem

Surveys' results revealed that employees who expressed higher job satisfaction were more likely to have higher positive perceptions of safety climate, were more committed to safety management policies, and had lower rates of accident involvement (Nielsen, et al., 2013). When managers fail to understand that developing a safety climate can result in reducing costs, employees may not develop and enforce effective safety standards (Clarke, 2013). Leaders who use a compliance-based safety method can fail to prevent accidents (Clarke, 2013). Issues associated with safety incident trends, such as injuries, reach farther than just the employees, and can have a profound negative influence on their families as well (Lawrence, Halbesleben, & Paustian-Underdahl, 2013). Gilkey, et al. (2012) concluded that a better safety climate and an improved safety culture correlated with lower injury and illness rates.

Problem Statement

Heinrich (2015) reported that work related accidents and injuries in the United States included 440,560 sprains, strains, and tears; 97,540 bruises and contusions, and 130,900 injuries per year. Workplace injuries cost United States organizations more than $300 billion annually in direct and indirect compensation (O'Keefe, Brown, & Christian, 2014). Leaders can reduce workplace accidents and injuries through the proper implementation of safety programs (Hallowell & Calhoun, 2011). The general business problem is that accidental injuries have resulted in billions of dollars in lost revenue and industrial productivity (Hymel et al., 2011). The specific business problem is that limited information is available for railroad transportation managers to determine and address how safety climate relates toward employees' job satisfaction in improving safety, increasing productivity, and profitability.

Purpose Statement

The purpose for this quantitative study was to examine how safety climate relates to employees' job satisfaction for railroad transportation managers' use in improving safety, increasing productivity, and profitability. I used Structural Equation Modeling (SEM) to examine the relationship between the indicator variables for Employees' Task Identify, Safety Climate, and Job Tenure and the dependent (outcome) variable, Job Satisfaction. The SEM model reflected Safety climate as a potential mediating variable and Job tenure as a potential moderating variable. The population for this study consisted of railroad workers located in the eastern region of the state of North Carolina. Understanding the relationship between railroad workers' task identity, safety climate, job tenure, and job satisfaction can effect social change by providing a safer environment

for the public while ensuring railroad employees have steady employment for supporting their families and communities.

Nature of the Study

Using a quantitative methodology and correlational design enabled identifying the extent to which the moderating and mediating variables relate to the predictor and outcome variables (Kothari, 2009). I considered other research methodologies, and rejected a mixed-method approach, involving both quantitative and qualitative methodologies, because of the time requirements for exploring and examining both survey and interview data (Frels & Onwuegbuzie, 2013). The mixed-method approach can also be problematic because of paradigm issues, integrating both quantitative and qualitative data in the same study, which could engender tension and contradiction (Greenwood & Terry, 2012; Jogulu & Pansiri, 2011). I therefore deemed that a quantitative methodology was most appropriate for this study.

I chose a correlational design because using a cross-sectional survey enabled an objective analysis of the relationships. I did not choose an experimental design because I was not able too randomly assign the participants into treatment groups.

Research Questions

Chang and Talamini (2011) advised researchers to write straightforward research questions. Martin and Bridgman (2012) concurred and suggested writing research questions that are clear and succinct, so that the reader is completely aware of the problem under study. Accordingly, the principal Research Question 1, and subsidiary research questions SQ1, and SQ3 for the study were:

RQ1: Within the context of the hypothesized SEM path model, what is the relationship between railroad workers' organizational safety climate and railroad workers' job satisfaction?

SQ2: To what extent does safety climate mediate the relationship between railroad workers' task identity and job satisfaction within the hypothesized SEM path model?

SQ3: To what extent does job tenure moderate the relationship between railroad workers' task identity, and job satisfaction within the hypothesized SEM path model?

Hypotheses

To address the research questions, I reflected three hypotheses in the path diagram in Figure 1. This path diagram reflects partial least squares structural equation modeling (PLS-SEM) from Hair, Hult, Ringle, and Sarstedt, (2014).

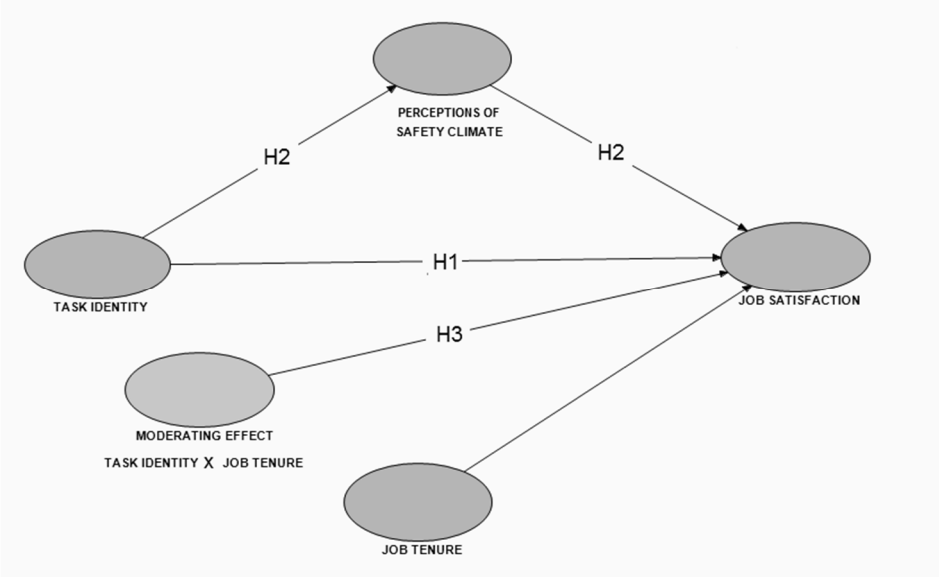

Figure 1. Path model illustrating the three hypotheses (H1, H2, and H3).

Following the symbolism of PLS-SEM (Hair et al., 2014) the path model in Figure 1 depicts Perceptions of Safety Climate at the apex of a triangle between Task Identity and Job Satisfaction, implying that Perceptions of Safety Climate is a potential mediating variable, conjointly correlated with both Task Identity and Job Satisfaction. The model formatting for Job Tenure is as a potential moderating variable, not necessarily correlated with Job Satisfaction. The model formatting for the potential moderating effect is the cross product (interaction) of Task Identity x Job Tenure.

Hurlbert and Lombardi (2009) posited that the classical decision-making theoretical framework underpinning the use of null and alternative hypotheses that Neyman and Pearson formulated nearly a century ago is not always relevant. Some researchers have criticized the terms null and alternative and in many researchers eyes the terms are redundant Orlitzky, 2012). Nevertheless, I chose to use the classical approach of testing null (H_0) and alternative (H_A) hypotheses in this study. The hypotheses I tested were:

$H1_0$: There is no correlation between railroad workers' Task Identity and Job Satisfaction.

$H1_A$: There is a correlation between the railroad workers' Task Identity and Job Satisfaction.

$H2_0$: Perceptions of Safety Climate does not act as a mediator in partial correlation between Task Identity and their Job satisfaction.

$H2_A$: Perceptions of Safety Climate does act as a mediator in partial correlation between Task Identity and their Job satisfaction.

$H3_0$: Job Tenure does not have a moderating effect on the partial correlation between Task Identity and Job Satisfaction.

$H3_A$: Job Tenure does have a moderating effect on the partial correlation between Task Identity and Job Satisfaction.

Theoretical Framework

A theory is an abstraction of reality researchers employ for summarizing and describing the relationships between concepts and propositions, and for providing a framework from which other theories and applications can emerge (Gay & Weaver, 2011). The aphorism that *nothing is as practical as a good theory that* Gay and Weaver (2011) attributed to Lewin (Gay & Weaver, 2011) highlighted that a theory is useful for guiding or informing practice. The theoretical framework of job characteristics theory (JCT) underpinned this study. JCT is one of the first theories regarding research into job satisfaction, which Hackman and Oldham (1975) originated in 1975, and is one of the most cited theories in all of job satisfaction research (Shultz & Shultz, 2010). The JCT continues to be influential in the 21st century (Guerrero & Singh, 2013) and has continued to evolve (Guerrero & Singh, 2013).

JCT researchers have proposed that employees are more motivated to work, and more satisfied, if their jobs include certain core characteristics. These core job characteristics create a working environment, or climate, that allows employees to experience states relating to beneficial personal and work-related outcomes. JCT researchers have posited that there are five core job characteristics: skill variety, task identification, task significance, autonomy, and feedback (Shultz & Shultz, 2010). Skill variety refers to the diversity of talents, abilities, and competencies that an employee

requires to undertake their job. Task identity refers to the extent to which an employee can effectively complete a piece of work from beginning to end. As task identity encompasses the extent to which an employee successfully implements the whole of a safety initiative, task identity is an integral component of the safety climate (Lunenburg, 2011). Task significance reflects the effect an employee's job has on other individuals, both inside and outside the organization. Autonomy refers to the control an employee has over how and when to complete a task, including the amount of freedom the employee has in scheduling work and making decisions. Feedback refers to an employee's knowledge of how effectively a task is accomplished. Feedback implies that an employee needs clear and direct information about job outcomes and performance.

Job characteristics theorists have posited that the five critical job characteristics influence four personal and work-related outcomes: high internal work motivation, high-quality work performance, high satisfaction with the work, and low turnover and absenteeism. The five job characteristics do not influence all employees in the same way. The relationships between the job dimensions and the personal and work-related outcomes can vary with the experiential states of individual employees. Examples of experiential states include the workers' experienced meaningfulness of the work, experienced responsibility for work outcomes, knowledge of the results of work activities, and the intensities of the employee need for growth (Shultz & Shultz, 2010). Figure 2 depicts the concepts and propositions that comprise the JCT.

Figure 2. Conceptual flow diagram of the job characteristics theory (adapted from http://fapedia.blogspot.com/2013/12/job-characteristics-theory.html).

Experienced meaningfulness refers to the extent to which an employee believes the work is important, valuable, and worthwhile. Experienced responsibility refers to the extent to which an employee assumes personally accountability for the outcomes of a job. Knowledge of results refers to the degree to which the employees' understand how effectively workers' are performing their jobs. The importance the employee places on growth and development on the job also moderates the strength of the relationship between the job characteristics and the personal and work-related outcomes. A job with such characteristics facilitates high levels of motivation, performance, and job satisfaction for the employee (Langton, Robbins, & Judge, 2012).

There are clear practical implications of the JCT. First, the more meaningfulness, responsibility, and knowledge that employee's experience and the greater the intensity of the workers' need for growth**,** the better is personal and subsequent work-related

outcomes can be. Second, organizations may be able to increase the motivation, work performance, and satisfaction levels of employees by enriching their jobs through manipulation of the five core job characteristics (Langton et al., 2012).

Operational Definitions

The key operational definitions for my study are:

Class I railroad. A Class I railroad is a large freight company based on operating revenue (Shi, Lem, & Chi, 2011).

Department of Transportation (DOT). DOT is a federal department that institutes and coordinates national transportation programs (Stephenson & Johnson, 2011).

Federal Railroad Administration. The purpose of the Federal Railroad Administration is to create and (a) enforce rail safety regulations, (b) administer railroad assistance programs, (c) conduct research and development in support of improved railroad safety and national rail transportation policy, and (d) consolidate government support of rail transportation activities (Dinçer & Mihalis, 2013).

Interstate Commerce Commission. The Interstate Commerce Commission is a regulatory agency whose purpose is to regulate railroads to ensure fair rates and eliminate rate discrimination (Ely, 2012).

Job satisfaction. Job satisfaction is defined as "the perception of the person towards his or her job, job related activities and environment. It is a combination of psychological and emotional experiences at work." (Mehta, 2012, p. 54).

Maintenance of Way (MOW). MOW is the machinery and design that railroads use to maintain railroad tracks (Johanning, 2011).

Morale. Morale is how a person exhibits confidence, cheerfulness, discipline, and willingness to perform assigned tasks (Haden & Cooke, 2012).

Safety climate. Workers' shared perceptions of safety related policies, procedures, and practices (Nielsen et al., 2013).

Task identity. The extent to which workers do an entire or whole piece of work, and can clearly identify the results of their efforts (Sims et al., 1976).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions are facts believed to be true, but which are unverifiable (Fisher & Stenner, 2011). The main assumption of this study was that the participants would answer the survey questions honestly and openly. Another assumption was that the respondents had the required knowledge and experiences that would permit the partakers to complete the instruments.

Limitations

Limitations in a study are potential weaknesses that researchers have no control over (Simon, 2013). The first limitation was the potential for a shortage of participants due constraints of time, workload, and a perceived lack of importance of the research. The second limitation was the level of understanding of the participant as it related to the duties of the job, the experience level, and type of job. The third limitation was the possibility of questionnaire fatigue, meaning that if the survey was too long, the respondents' answers may be biased (Hess, Hensher, & Daly, 2012). A common cause of survey fatigue is long questionnaires (North & Giddens, 2013). In a long questionnaire, skipping questions, and spending less time and effort can show in responses to the

survey's later questions. The survey included a total of 63 closed-ended items (6 in the Demographic Questionnaire + 17 in the Safety Climate Survey + 4 in the Job Characteristics Inventory + 36 in the Job Satisfaction Survey).

A fourth limitation was that findings from a correlational design could not prove the existence or direction of cause and effect relationships. The correlation of two variables does not mean that one is the cause of the other (Kothari, 2009). This limitation implies that although task identity, safety climate, and job satisfaction may statistically correlate, the variables are not necessarily causally related. Empirical models resulting from self-reported response data collected in a survey can only explain the extent to which predictor; outcome, mediator, and moderator variables are quantitatively interrelated. However, examining such models cannot explain *why* the variables are interrelated, in terms of causes and effects. Therefore, I was not able to determine if high levels of task identity and perceptions of safety climate are causal factors for high levels of job satisfaction.

One of the other critical limitations of this (and all other studies involving the collection and analysis of self-reported responses to questionnaires) is that the response data could be biased or distorted to such an extent that the results are invalid. Keeping the contributors anonymous and confidential in this study encouraged the participants to provide honest answers, resulting in accurate information. With the assurance of anonymity, workers are more inclined to express true perceptions, either negative or positive, without fear of losing employment (Merianos, King, & Vidourek, 2013). Nevertheless, Zikmund et al. (2012) outlined sources of response bias that may potentially invalidate the self-reported answers to individual questionnaire items in

surveys for business and organizational research. Potential sources of bias for my study include respondents distorting answers to avoid varying from the prevailing perceptions of their group, and the respondents not providing answers with which they think the researcher will disagree. Furthermore, the respondents could provide answers overemphasizing desirable behavior, but underreport undesirable behaviors. Finally, since the respondents can be busy or distracted, they may not have time to concentrate on the real meaning of the items. Self-report bias can threaten the validity of research conducted in all business settings and can hinder the development of theories of organizational behavior (Zikmund et al., 2012).

Social desirability bias is one of the most controversial, and complex type of response bias, referring to the respondents' desire, at a conscious or a subconscious level, to present a favorable image of themselves, and/or their organizations (Grimm, 2010). Socially desirable responding (SDR) results in unreliable and inconsistent responses to questionnaire items, and is prevalent in the responses of individuals to surveys on organizational or business performance (Grimm, 2010). SDR confounds research findings by creating false relationships or obscuring relationships among variables (Grimm, 2010). The extent to which the railroad employees' potentially biased perceptions contaminated my study's findings is unknown.

The final limitation of this study was the potential threat to model validity of the relationships between the independent (predictor) and outcome (dependent) variables confounding with unknown mediating and/or moderating variables. One of the problems researchers face in conducting mediation and moderation analysis is compromising results if the statistical models by the researcher are not correct. Omitting one or more

variables could potentially affect the model's validity (Edwards & Lambert, 2007). I needed to consider inadvertently excluding potentially significant variables from the PLS path models for this study. I have discussed this issue under the heading *Recommendations for Further Research* in Section 3.

Delimitations

Delimitations refer to the bounds or scope of the study (Simon & Goes, 2013). For the purpose of this study, the eastern portion of the state of North Carolina was the only setting for the research. I recruited participants from only one railroad organization in North Carolina.

Significance of the Study

The significance of this study is that it might have both practical implications for the railroad industry and theoretical implications for social science. The practical implications are that the railroad industry can increase the job satisfaction levels of its employees, by enriching employees' knowledge and experience of safety initiatives. From a social change perspective, reflecting on the results could enable management to develop strategies to improve employee job satisfaction. The potential significance of this study for social science was the possibility for expanding the job characteristics theory for determining if task identity implicitly embeds, or needs to explicitly incorporate, job tenure and employee perceptions of safety climate as predictors of job satisfaction within the railroad industry.

Contribution to Business Practice

Demonstrating relationships between task identity, safety climate, job tenure, and job satisfaction could catalyze managers to improve (a) job design, (b) communication,

and (c) worker involvement, which could (a) improve working conditions, (b) reduce workplace accidents, (c) increase the job satisfaction of employees, and (d) effect increases in employee productivity. A negative correlation between task identity and job satisfaction could imply that employers do not completely inform employees of the reasons for, and the effectiveness of, safety programs. A negative correlation would justify a review of the implementation and concomitant communications processes of safety initiatives to enable managers to more fully engage and protect their workers.

Implications for Social Change

From a social change perspective, the findings could stimulate managers to develop more effective strategies for the (a) planning, (b) deployment, and (c) execution of safety initiatives to decrease workers' injuries, and enable continue supporting employees' families and communities.

Review of the Professional and Academic Literature

The purpose of this literature review was to provide a historical perspective on the development of safety initiatives in the railroad industry and an empirical framework, based on the findings of published research studies, underpinned by the Job Characteristic Theory. Empirical research highlights a focus on the relationships between job characteristics (specifically the job characteristics associated with the safety climate), personal and work-related outcomes (specifically job satisfaction) and the importance of the length of employee experience. Following a brief description of the search strategy, Figure 3 presents an outline of the structure of this review.

Search Strategy

The information in this review was derived from database searches including scholarly and peer reviewed journals from (a) Business Source Complete, (b) Academic Search Complete, (c) ABI Inform Global, (d) ProQuest, (e) Google Scholar, and (f) professional books and dissertations. The majority of the references came from Elton B. Stephens Company (EBSCO).

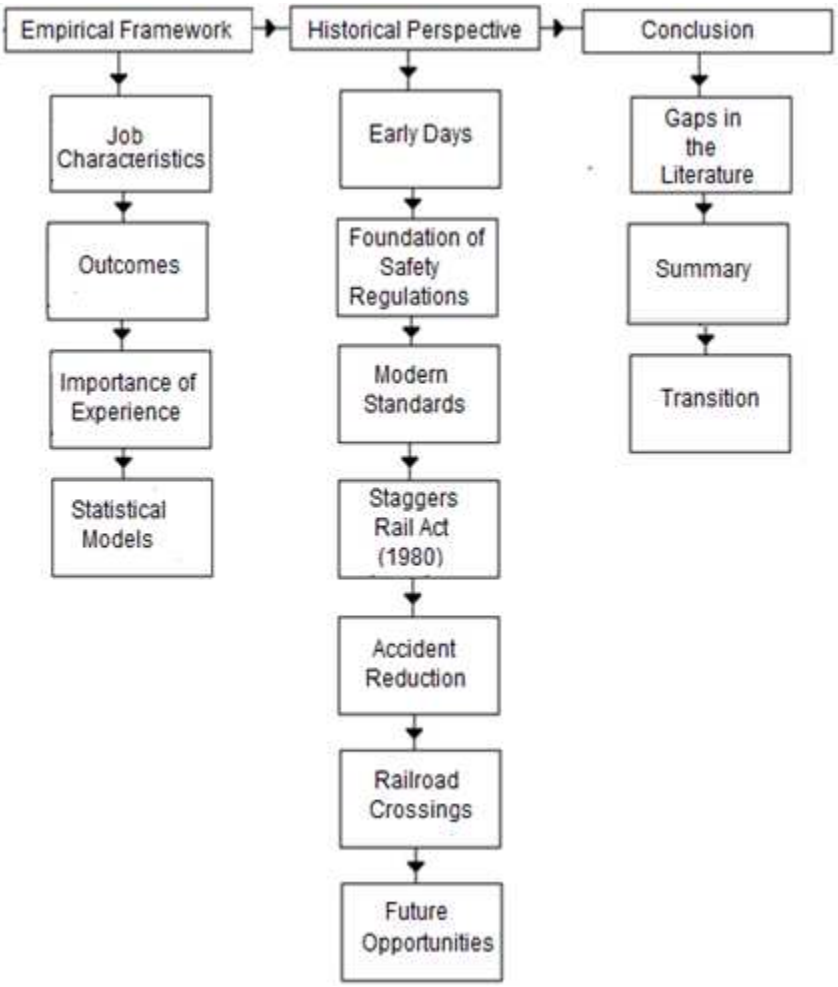

Figure 3. Outline of literature review.

Empirical Framework

In the subsequent sections of this literature review, I focused on empirical research that refers to the concepts and propositions of the JCT (as represented diagrammatically in Figure 2). Researchers have defined job characteristics to include all aspects of the working environment that identify the nature of the work itself, the working conditions, and the relationships with colleagues and supervisors (Langton et al., 2012). Researchers have also noted that job characteristics encompass the safety climate, as it relates to task identity (Nielsen et al., 2013). Due to the assumption implicit in the JCT that job characteristics (specifically, the safety climate that can influence how work-related tasks are performed) are correlated with personal and work-related outcomes, including job satisfaction (Shultz & Shultz, 2010), I selected empirical studies as the most appropriate for this review. In the following review, I have discussed previous research on job characteristics in the context of the safety climate, using the core concepts of the JCT (i.e., skill variety, task identity, task significance, autonomy, and feedback) as sub-headings.

Mathieu, Hoffman, and Farr (1993) were the first researchers to examine and demonstrate that the five-core job dimensions expressed in the JCT positively correlated with job satisfaction. Morris and Venkatesh (2010) constructed an empirical model indicating that enterprise resource planning (ERP) systems acted as moderators, altering the strengths of the correlations between the five core job constructs and job satisfaction (see Figure 4).

Previous researchers have established correlative relationships between task identity, safety climate, and job satisfaction. A theoretical framework using the JCT is

consistent with the stated hypotheses for the current study. However, relatively limited empirical evidence exists in the literature to confirm or refute the existence of the hypothesized relationships in Figure 1. As explained in the following literature review, I located no previous research on statistical modeling relating job satisfaction to task identity, safety climate, and job tenure. There was an apparent gap in the literature, highlighting a direction and rationale for this study.

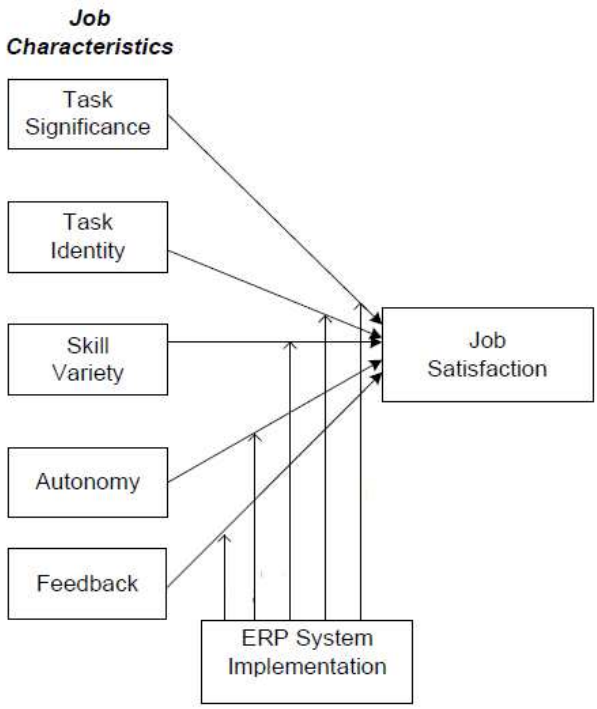

Figure 4. Relationships between Job Characteristics and Job Satisfaction (adapted from Morris & Venkatesh, 2010).

Task identity. Task identity is the extent to which an employee can effectively complete a piece of work from beginning to end (Sims et al., 1976; Shultz & Shultz, 2010). It is currently difficult for railroad workers to achieve task identity. The problem is

that railroad dispatching is an around-the-clock operation, which can require dispatchers to work off-hours and make key decisions in a time-sensitive manner. The fact that some work schedules make night shifts permanent due to limited staffing may make task identity a safety issue (Gertler & Nash, 2004). Inadequate staffing can lead to excessive overtime and the use of staff on off-duty days. Staffing inefficiency means a loss of recovery time for employees, and that company stakeholders are paying premium rates for potentially fatigue-impaired performance by employees who cannot effectively complete a piece of work from beginning to end.

An additional safety consideration of the reduction in task identity is the hidden costs arising from excessive overtime, including (a) personal injury, (b) absenteeism, and (c) turnover. Gertler and Nash (2004) found that dispatchers reported higher levels of fatigue throughout all shifts of their work, and especially on night shifts. The authors also found that dispatchers routinely work night shifts and report waking up tired during days or evenings, thus reducing the dispatchers' ability to achieve task identity. Most night shift workers use *split sleep* and naps to gain rest, but still experience fatigue on the job.

To offer further insight into the dispatcher fatigue problem, Gertler and Nash (2004) examined scheduling strategies railroad company leaders use for night shift dispatcher work, and focused on the impact of these schedules on worker fatigue and quality of life. The authors found that most companies had three categories of jobs: (a) regular, (b) relief, and (c) extra board. Regular jobs consist of working five days straight on the same shift, with two days off. Employees doing relief jobs fill in for regular dispatchers and thus rotate through different shifts. Extra board dispatchers fill in for regular and relief dispatchers and do not always work a regular schedule. Gertler and

Nash concluded that this staffing model exposed the extra board dispatchers physically to depleted or small shift changes, occurring on a rapid and constant basis. The Hours of Service Act (U. S. DOT, 2014) contained legislation addressing the role of these relief or extra board dispatchers, and the same Act constrains the options available to schedulers in filling vacancies in dispatching, requiring schedulers to find solutions at short notice, further reducing task identity. It is evident that task identity is a major issue facing railroad workers.

Skill variety. Skill variety is a concept of the JCT that refers to the diversity of talents, abilities, and competencies an employee requires to perform their job (Shultz & Shultz, 2010). One of the most important aspects of skill variety current railroad employees' face is advances in technology. By comparing the technology of the railroad industry today with the technology available to railroads'' managers a few decades ago, it is clear that stakeholders have implemented a variety of safety innovations stemming from new technologies. These innovations have provided new functional capabilities, and integrated different functions to advance locomotive control systems and operational safety practices, and thereby have reduced the variety of skills railroad workers require (U.S. DOT, 2012a). Technological innovations in transportation systems increase overall safety while reducing operating costs. However, technological innovations eliminate skill variety by automating work. Technological advances not only reduce skill variety, but also increase perceptions that technological advances endanger jobs, which may result in reduced worker job satisfaction (Arunchand & Ramanathan, 2013).

Task significance. Task significance refers to the effect that an employee's job has on other individuals both inside and outside the organization (Shultz & Shultz, 2010).

Many job satisfaction problems in modern work environments involve management decisions that affect other individuals (Maylett & Nielsen, 2012). When employees see a dangerous work environment, reflecting a poor safety climate, workers can attribute the dangerous work environment to a lack of concern on the behalf of management. Employees who perceive managers as valuing productivity over safety may view the work place as unsafe, which leads to a decrease in employee job satisfaction (Morrow et al., 2010).

Autonomy. Autonomy within JCT refers to the control an employee has over how and when to complete a task, including the amount of freedom the employee has in scheduling work and making decisions (Shultz & Shultz, 2010). A number of technological systems appear to keep railroad industry workers from exercising control over their jobs, resulting in reducing task identity (Baum, 2013). Railroad industry leaders are using new technologies such as new reporting programs, investigation procedures, and new safety initiatives to improve safety (Morrow et al., 2010). For example, the use of modern alert systems (alerters) ensures there is a mechanical backup when a locomotive engineer fails to conduct the operation of the locomotive properly. Federal legislation requires using alerters to prevent locomotives from derailing in the event that something happens to the engineer during operation. Engineers report that they feel they have lost control over the locomotives.

The increased use of automation in the railroad industry reduces the autonomy of the labor force (Brynjolfsson & MacAfee, 2012). The implementation of automated systems, in conjunction with changes in technology, can leave workers isolated or unemployed, affecting job security and satisfaction. Brynjolfsson and MacAfee

concluded that a growing concern exists among the labor force regarding the extent to which automated safety initiatives affect their autonomy. The authors posited that the best way to address lack of autonomy is to adopt a positive attitude. However, workers generally worry about their job security when employees see so many technological advances encroach on their jobs. Some workers believe that they could ultimately lose their livelihoods to machines, resulting in reduced job satisfaction. For example, Positive Train Control is a technology for avoiding collisions by reducing human error and Positive Train Control has reduced millions of dollars in accident costs. Positive Train Control is another safety initiative that further distances workers from how and when they complete a task, including the amount of freedom to make decisions (Hovland, 2013). Such technology, by eliminating autonomy, has made employees' work more monotonous and less engaging within the railroad environment, and has had a negative effect on job satisfaction (Clarke, 2013).

Feedback. Feedback refers to an employee's knowledge of how effectively the worker accomplishes a task. Worker knowledge plays a key role in workers' job satisfaction (Bowie, Skinner, & de Wet, 2013). Informing workers about the results of their work activities can help ease some of workers' concerns regarding changes in technology and safety practices threatening their positions within railway organizations.

Schumacher (2011) argued that leaders could improve job satisfaction if employees receive feedback, if management involves them in decision-making, and if workers receive rewards for doing a good job.

Worker knowledge plays a crucial role in how well new technologies fit the underlying framework of the safety climate within the railroad industry (Morrow et al.,

2010). Strict requirements and audits are in place to keep workers' knowledge current with the increasingly complex systems within which they are working. The Federal Railroad Administration and other state agencies regulating railroad industry operations require employees to undergo regular training to update their knowledge (U.S. DOT, 2012a). After such training, assessment examinations, and audits provide feedback, to determine if employees have a sufficient level of knowledge to keep their positions within the rail industry.

Worker knowledge is crucial for building teams of efficient employees (Maruta, 2012). Employees must have knowledge of the safety process while on the job. Employees who understand how effectively they accomplish a task are better able to respond quickly and correctly to assure worker safety (U. S. DOT, 2012a). Workers with increased job knowledge and skills become a greater asset to improving the safety climate. Essentially, workers trust the safety climate more if they believe that managers have a commitment to safety and the managers uphold safety initiatives (Morrow et al, 2010). Schumacher (2011) suggested that providing feedback to employees and increasing workers' knowledge help to strengthen employees' understanding of the relationship between safety initiatives, productivity and thus can increase job satisfaction. When workers understand that feedback provided is to help them personally, and not just to increase profitability, then they are more comfortable knowing that managers are working to improve their working conditions.

To assist employees in working safely, focus should be on providing feedback to improve existing processes (Schumacher, 2011). For example, most accidents are associated with trips, slips, and falls, which happen when a conductor or an engineer

dismounts or mounts a freight car or locomotive, or when walking on uneven surfaces. Reducing slip, trip, and fall injuries by providing feedback encourages railroad employees not to dismount moving equipment and to use proper lighting, has led to a reduction of injuries. In keeping safety at the forefront, leaders encourage employees to use safety software for preparing reports, and helping to prevent hazards. Feeding back the results of safety audits to the employees encourages agreement among employees to carry out additional peer-to-peer audits that identify solutions for unsafe behaviors (Meyer, 2012). Cross-departmental feedback also increases the awareness of road crew safety. The awareness accomplishments of road crews' safety through initiatives that include feedback to (a) trainmasters, (b) terminal superintendents, (c) agreement workers, and (d) local safety committees (GAO, 2010). The success of cross-departmental feedback comes from improving workers' compliance with the prescribed safety practices (Agwu, 2012).

Outcomes

JCT researchers' have posited that the five core job characteristics (i.e., skill variety, task identity, task significance, autonomy, and feedback) stimulate internal psychological rewards that sustain high levels of motivation, performance, and job satisfaction (Langton et al., 2012). The following subheadings provide insights on the relationships between job characteristics and job performance.

Motivation. Motivation stimulates employees to take action to engage and exert effort for achieving a specific task. When workers possess a greater experienced knowledge of safety initiatives and the reasons behind the initiatives, employees can improve the quality of their work environment through increased levels of engagement,

motivation and job satisfaction (Morrow et al., 2010). A combination of motivation, engagement, and job satisfaction reinforces employees' links to their duties or roles (Bang, Ross, & Reio, 2012) and is essential for catalyzing productivity (Arunchand & Ramanathan, 2013). Bang, Ross, and Reio (2012) identified a significant correlation between motivation, engagement, and turnover rates. Employees who are motivated and engaged perceive opinions to be more valuable, and feel included in a collaborative and open environment. Motivated employees are engaged in the business and engage other colleagues to improve their job performance (Schumacher, 2011).

Performance. Schultz and Schultz (2010) posited that job characteristics have an influence on high-quality work performance. In the railroad industry, safety initiatives can cause a significant drop in some workers' performance, and affect organization performance. For example, the need to increase the frequency of periodic inspections can decrease employee time on primary tasks, reducing engagement and performance levels (U.S. DOT, 2012a). A lack of understanding among managers exists regarding the problem of worker job satisfaction and its correlation with performance, including effecting lost time, and increasing costs (Vazquez, 2014). Gertler and Viale (2006) reported that fatigue is an industry-wide job characteristic that reduces performance and job satisfaction. The industry's management has identified that fatigue influences train and engine crews, right-of-way production and maintenance workers. Gertler and Viale suggested that fatigue might result from staff shortages, seasonal work needs, and expansion of territories by the railroad, and responses to emergencies. Such changes can affect job characteristics, lead to longer hours, greater staff fatigue, and reduce levels of performance.

Worker stress is another job characteristic that affects performance in the railroad industry. Employees who psychologically and physiologically experience stress have exhibit reduced job performance (Ostan, Poljšak, & Axelsson, 2011). Stress can cause loss of focus, which, in turn, can adversely affect organizational safety and performance. Ostan et al. suggested that, given the amount of stress experienced by railroad workers as an integral component of the job, to improve performance it is important for employees to recognize when stress is compromising work tasks. Training can enable fatigued workers to recognize a problem, and to seek relief.

Job satisfaction. Schultz and Schultz (2010) asserted that job characteristics have a strong influence on job satisfaction. Researchers have identified relationships between job characteristics and job satisfaction. Mathieu, Hoffman, and Farr (1993) demonstrated that the five-core job dimensions described in the JCT positively correlated with job satisfaction. Morris and Venkatesh (2010) constructed an empirical model indicating that enterprise resource planning (ERP) systems acted as moderators, altering the strengths of the correlations between the five core job dimensions and job satisfaction. The relationship between job characteristics and job satisfaction has demonstrated that job demands can hinder both employee engagement and production (Nahrgang et al., 2011). In contrast, results from studies of positive job characteristics have shown that safe working conditions have the potential to motivate employees and increase job satisfaction (Nahrgang et al., 2011).

Employee job satisfaction correlates with job characteristics and it is important to understand the effect that job characteristics and job satisfaction can have on worker performance (Judge, Thoresen, Bono, & Patton, 2001). Employee attitudes and job

satisfaction can vary with work expectations and job characteristics (Chen, Ployart, Thomas, Anderson, & Bliese, 2011). There are certain drivers of job satisfaction that directly affect job performance characteristics (Kumar, Dass, & Topalogu, 2014). Furthermore, job satisfaction and characteristics of workers correlate with employee retention and turnover (Chen et al., 2014).

Safety climate is a job characteristic that can affect employees' perceptions of their work environment, which in turn, links to job satisfaction, motivation, and productivity (Clarke, 2013). Safety climate is beneficial as it contributes to the prevention of work-related deaths, injuries, and illnesses (Perlman & Leppert, 2013). When workers believe in the efficacy of their safety climates, they are more committed to reaching organizational goals (Crossman, 2008). Safety climate is not just the regulations put in place by an organization, but also includes workers' perceptions, understanding, and attitudes toward the basic safety strategy of organizations (Clarke, 2013). A strong safety climate inspires tangible benefits, including productivity, increased trust, and commitment from workers, leading to job satisfaction.

In the railroad industry has complicated work environment, a number of factors can affect the relationship between the job characteristics associated with the safety climate and employee job satisfaction. Many factors, such as communication, working conditions, and roles of supervisors entail a connection between a strong safety climate that is functioning properly and strong worker job satisfaction within the same organization (Crossman, 2008). Crossman outlined some of the major contributing factors in the environment of railway maintenance, including (a) communication, (b) information dissemination, (c) use of feedback, (d) roles of supervisors, (e) working

conditions and hours, (f) perceptions of safety, and (g) capacity of workers as some of the major elements to address through a competent safety climate. When these factors balance between workers' concerns and regulations, there is a greater worker perception that organizational leaders are committed to their well-being, leading to greater job satisfaction (Clarke, 2013).

Behm (2009) reported that industrial safety and decreased injuries on the job are key factors in ensuring a high level of worker job satisfaction in manufacturing and transportation fields. Employees feel dissatisfied if the level of organizational support does not effectively attenuate accidents. Behm determined that companies with higher reputations for safety and stronger safety records tended to have increased employee job satisfaction compared to companies with more negative reputations for safety. Using a survey based on the Great Place to Work Index, Edman (2012) similarly demonstrated a clear connection between safety climate and job satisfaction. Organizations that scored high in safety tended to have more positive survey responses from their respective employees. By analyzing employees' survey responses, Lauver, Trank, and Huy (2011) concluded that employee dissatisfaction causes an increase in employee turnover rates within the railroad industry. The authors' conclusion supported the proposition of the JCT that job characteristics closely link to both employee job satisfaction and turnover.

Importance of Experience

Schultz and Schultz (2010) noted that the relationships between job characteristics and personal or work-related outcomes could reflect the experiential states of individual employees. The authors noted that workers' perceptions and experienced values of the work, the degree of responsibility for work outcomes, and knowledge of the

results of work activities could affect job outcomes (Schultz & Schultz, 2010). I hypothesized that the length of experience or job tenure of employees is a potential moderator between perceptions of safety initiatives and job satisfaction (see Figure 2). There was, however, limited information in the literature to support the hypothesis that length of experience can affect the relationship between job characteristics and job satisfaction.

Markus et al. (2002) suggested that educating and involving employees in safety initiatives creates knowledgeable workers who understand and contribute to the operational practices within the organization by using their intuition and experience. Lin (2012) posited that when employees become more aware of the reasoning behind safety initiatives, and more experienced in the implementation of safety initiatives, support for coworkers improves, and can strengthen the safety climate, productivity and job satisfaction. Williams (2012) concluded workers tend to respond positively when they understand and have practical experience with safety initiatives. If there is a weak safety climate within an organization, then low job satisfaction, high turnover rates, and a pervasive environment of cynicism are more likely to prevail. In contrast, when leaders inform and collaborate with workers regarding the implementation of safety initiatives, there is a positive correlation between employee job satisfaction and the likelihood of successful implementation of the safety initiatives.

Schumacher (2011) suggested that the higher a worker's experience knowledge, the more active and engaged the employee becomes, and increasing job satisfaction can result. Organizational leaders benefit when the length of their employees' experience is high. In a survey of railroad workers, researchers found the most experienced workers

were more likely to identify the detrimental impact of weak safety climates (Alm, Gärling, Bonnevier, & Danielsson, 2012). Less experienced workers, however, failed to identify the negative effects of a weak safety climate within their respective organizations, even after training (Read, Lenne, & Moss, 2012). These findings provide the rationale for hypothesizing that length of experience could be a moderator in the relationship between perceptions of safety climate and job satisfaction.

A weak safety climate can result in an increase in accidents because the length of experience of safety regulations of the workers is limited, ultimately leading to decreased rates of job satisfaction and productivity (Mazumdar, Haloi, & Mazumdar, 2011). Crossman (2008) posited that high-risk industries should focus less on safety climate as merely meeting required compliances. Instead, the unique variations and elements within the railroad industry require a specific knowledge base collected from experienced workers who have a deep understanding of the scenarios that cause a higher rate of incidents. This knowledge base pertaining to safety climate establishes what Crossman called a *people-based* safety system, where the workers are the main concern, not formal regulations. More personalized safety initiatives based on the experienced knowledge and responsibility of individuals who have worked protractedly in high risk environments may increase workers' positive perceptions of the job climate in a variety of industries (Böckerman & Ilmakunnas, 2012). People-based safety systems are capable of improving job satisfaction, productivity, and the quality of work (Chen & Jin, 2012). More tailored investigations into individuals with a long organizational experience of safety issues could possibly improve comprehension of task identity and the safety climate within organizations. People-based safety systems may be more costly in terms of up-front

investment, yet they appear to be a powerful means for increasing employee job satisfaction. Grounded on the assumption that workers are more motivated and satisfied in environments that they deem to be safer, increases in productivity may stem from personalized safety climates. These safety climates base experience and responsibility on the employees, rather than safety regulations alone. The assumption that employees' are more motivated and satisfied in environments they deem safer increases productivity provides the rationale for further research.

Statistical Models

JCT, as outlined diagrammatically in Figure 2, is a conceptual model, meaning that it consists of ideas or vehicles of thought rather than measurable entities; however, JCT has acted as a springboard from which many researchers have developed and tested hypotheses using statistical models. The difference between a conceptual model and a statistical model is that conceptual models contain relationships, whereas employing statistical models requires computational formulae and equations (Mould & Upton, 2013). I applied two types of statistical models based on empirical data collected in cross-sectional surveys to predict the relationships between job characteristics and job satisfaction, underpinned by the JCT, specifically multiple linear regression (MLR), and structural equation modeling (SEM).

MLR is a classical first generation technique, devised nearly 100 years ago, which, depending upon the purpose and research questions, may not be as useful as second-generation techniques such as SEM (Alavifar, Karimimalayer, & Annar, 2012). Nevertheless, several researchers have used MLR in the last five years to predict job satisfaction, (e.g., Aydogdu & Asikgil, 2011; He, 2012; Lumley, Coetzee, Tladinyane, &

Ferreira, 2011; and Olorunsola, 2013). SEM is a more sophisticated modeling approach for evaluating relationships among variables, which in the context of correlational designs based on survey data, involves the operationalization of latent variables from questionnaire item scores using factor analysis (Omar & Hussin, 2013). The use of SEM in recent modeling studies to predicts job satisfaction. Omar and Hussin (2013) used SEM to analyze the relationships between the multidimensional facets of employee job satisfaction and employees' perceptions of their working environment. Recent studies' have related job satisfaction to safety climate through SEM analyses (e.g., Chinomona, & Sandada, 2014; Ciavolino, & Mariangela, 2013; Ismael, Sani, & Mohamad, 2014; Lee, Chen, & Tsui, 2014; Rubel & Kee, 2014). None of these models, however, was directly relevant to examining safety issues and job satisfaction within the railroad industry.

Historical Perspective

A historical perspective regarding the development of safety initiatives in the railroad industry is important, because in social science, hindsight may enrich foresight. Historical events provide the rationale to justify current and future directions of social change, particularly concerning the development of evidence-based social policies (Higgitt & Wisdon, 2013). I began this historical perspective by considering the unsafe working conditions in the early days of the railroad, leading to the foundation of safety regulations. I described the development of modern standards of safety, including the Staggers Rail Act (1980), which resulted in accident reduction, through the implementation of safety initiatives, such as railroad crossings, by the industry leaders. This historical perspective concludes with a consideration of future opportunities, in

which it posits that many areas of the railroad industry still require continuous improvements in safety standards to prevent and reduce accidents.

Early days. In the early days of the railroad, jobs were very dangerous, and the general perception was that workers' safety was only minimally important to the bottom line. Furthermore, railroad workers received no benefits, such as (a) positive working environment, (b) overtime pay, (c) insurance, or (d) job security (Dempsey, 2012). The poor working conditions were often major factors, which contributed to injuries or deaths. These dangerous conditions existed because of a lack of labor laws at the time, which meant train crews had to work long hours as management required (Giles, 2011).

Before the introduction of safety initiatives, employees in the railroad industry accused each other in a blame-based climate. The industry and its employees viewed regulators as incapable of enforcing reforms and argued that the guidelines were rigid. Managers in the railroad industry focused mainly on making a profit, with little or no concern about the safety of the workers. Accusations and counter-accusations further strained labor relations in the industry (Dempsey, 2012). Existing regulatory systems perceived as litigious, cultivates the climate of placing the blame on each other. During that time, the industry had an unfavorable reputation, with many employees claiming it was inefficient. Workers accused the railroad industry of abusing competitive advantages to increase shareholder wealth while neglecting the safety of workers (Giles, 2011).

Foundation of safety regulations. Reforms in the industry were not quickly forthcoming, largely because of uncertainties surrounding the effects of change implementation. The unpredictable nature of injuries sustained by workers while in the line of duty was often the cause of these uncertainties (Evans, 2011). For example, while

a no-fault system was a competitive reform option, the costs would increase in the industry because of lost wages. A system as such would mean a reduced cost in litigation for the industry. From an employee perspective, a no-fault system provided fewer benefits in comparison with the benefits under the Federal Employer's Liability Act (Giles, 2011).

In addition to the aforementioned regulatory and safety issues, the federal regulatory authority depended on the industry for recording and reporting safety incidents. Often, the industry would take an excessive amount of time relaying the details of such incidences to the regulatory authority; consequently, these occurrences would make it difficult to follow up and devise a solution (Kumar, 2012). Eventually, forceful actions caused the Federal Railroad Administration to introduce a National Rail Safety Action Plan, which placed an emphasis on the most frequent causes of risks in railroad incidences. The National Rail Safety Action Plan also increased mitigation research precisely and effectively, and focused the resources of the federal regulatory authority to ensure equitable developments in the railroad. Railroads implemented other initiatives to enhance safety in the industry, such as fitting locomotives with cameras to record the images of the crew at work and to record the locomotive's immediate environment.

The new safety measures resulted in an enormous public outcry as the working conditions remained the same in that railroads continued to provide a very dangerous environment (Giles, 2011). Congress wanted better working conditions for railroad employees. The protests for workers' safety in the railroad industry became a significant challenge, with many citizens recognizing the labor issue as a greater priority than the important mode of economical transport the railroads provided. This display of support

for the railroad workers started the negotiations for better safety measures that identified and analyzed railroad (a) operating rules, (b) infrastructure, (c) rail crossings, and (d) railroad signs (Bade, 2011). Increasing safety measures helped resolve the issue, and despite continual demands to cut costs, the railroad industry has been showing positive improvements in (a) implementation, (b) design, (c) allocation, and (d) leveraging organizational strategies (Gorman, Crook, & Sellers, 2011).

In 2012, with the new safety initiatives, railroad stakeholders were seeing an improvement as the railroad industry was safer than ever before. In 2012, the employee injury rate was 51% down from 2000 and 85% down from 1980 (Soares, Jacob, Andres, & Wade, 2011). The railroad industry management is aware of the never-ending safety challenges, and although management is proud of the improvements in the railroad industry, management constantly strives to improve rail safety. Railroad management must constantly implement and develop new technologies for assuring safety to ensure that rail safety continues to improve (Wang, Tsai, Chen, & Wang, 2011).

In the wake of demands for a safer climate for railroad workers, the Interstate Commerce Act of 1887 was one of the first pieces of federal legislation to provide more stringent safety requirements (Spychalski, 2011). The design of the Act allowed for the battling of monopolies on railroads, but also had the impact of providing regulation by the federal government that would continue to dominate the nature of safety initiatives in the industry. The Interstate Commerce Act of 1887, also known as the Erdman Act, established a trend wherein those who run the railroads be held to higher standards. The intent of this law was to serve railroad workers and their concerns regarding safe work

environment. The Erdman Act solidified a new emphasis on safety for all workers (Dempsey, 2012).

The Erdman Act sought to create a positive impact on the working conditions of railroad employees, and such legislation brought attention to other issues (Spychalski, 2011). As more employees became involved with the new safety measures, lead to the creation of the railroad union, which sought to help workers effect difficult changes in the workplace. The different railroad unions became important for workplace safety, but over time, the unions expanded their operations into various other areas, such as pay and benefits (Milloy, 2012). Another major measure that changed because of the Erdman Act was the implementation of the 8-hour workday, which unions supported to curtail the past policies that had previously resulted in overwork of railroad employees (Dempsey, 2012).

The Federal Railroad Administration is now the dominant regulatory body of the railroad industry. The Federal Railroad Administration designs and enforces safety initiatives and conducts continuous research into safety needs as the requirements change with innovations in technology. The Federal Railroad Administration also (a) monitors and oversees rail funding, (b) ensures that the regulations are for the safety of the employees, and (c) ensures that leaders do not implement new requirements with the same practices that have caused previous harm or injuries (U. S. DOT, 2012b).

Modern standards. The Federal Railroad Safety Act of 1970 provided the federal government the power to enforce a more standardized and thorough set of safety requirements to provide for a safer working environment for (a) railroad employees, (b) travelers, and (c) members of communities connected to railroad systems (U. S. DOT, 2012a). Today, the Locomotive Safety Standards outline the most current safety

requirements the organization managers within the railroad industry must follow. Title 49 of the Code of Federal Regulations augmented the statutes provided by the Federal Railroad Safety Act in the 1980s, which further strengthened the government's ability to regulate safety compliance and initiatives in the contemporary railroad industry, as operating procedures change with technologies.

Changes within safety compliance requirements continued to complicate the nature of safety initiatives in the contemporary railroad industry (Giles, 2011). In 2009, a revision of the Locomotive Safety Standards attempted to keep regulatory systems up-to-date and reflective of the working environment. Revision became a necessity to combat the chain reaction of accusations, which frequently occurred after an accident (Molkova & Hruban, 2013). The DOT managers outlined new adjustments to analyze the safety of new locomotive electronic systems (U. S. DOT, 2012a), which resulted in an increase in safety regulations and an overhaul of existing systems that had fallen behind the increasingly complex technologies used in the contemporary industry. The railroad industry involves (a) the performance and capabilities of signaling systems, (b) allowable operating speeds, (c) employee certification, and (d) stringent regulation of the Federal Railroad Administration regarding equipment and track inspections (Schartung, Lesales, Human, & Simpson, 2011).

Inspection regulations increased dramatically with the revisions of the Locomotive Safety Standards adjustments of 2009. Requirements for inspections became increasingly complex and multi-faceted, especially for automated systems and other elements of locomotive electronics, which have become popular in the modern industry environment (DOT, 2012a). In 2009, requirements for (a) the design, (b) operations of

remote control locomotives, and (c) maintenance allowed significant savings by altering start times (Andersen, Christiansen, Crainic, & Gronhaug, 2011). Leaders updated locomotives in areas such as (a) automatic engine start switches, (b) auxiliary power units, and (c) dynamic brakes, making it crucial for railroad organizations' management to retrain employees to keep them knowledgeable of the new requirements and adjustments to preexisting statutes (Railway Association of Canada, 2011). Moreover, the 2009 changes diversified regulations for electronic record keeping and alerters; the adjustments by management proved necessary but further complicated the railroad-working environment.

Despite upfront costs needed to stay within the compliance guidelines, administrators at the DOT forecast that such new regulations would eventually save organizations in the industry approximately $385 million by reducing downtime for locomotives and lowering accident rates (U. S. DOT, 2012a). The federal and state agencies' administrators in charge of regulating safety requirements addressed the safety initiatives' effect on productivity and profit as well as the development of a strong and effective safety climate. When management changed regulations, it affected emergency services. The nature of the approach to safety by emergency services within the railroad industry itself is an issue that could eventually affect the overall cost of operations for other organizations (Silla & Kallberg, 2012). An understanding of railroad accidents from an emergency response perspective is necessary to save lives, and to reduce costs.

Staggers Rail Act. After the public demanded stricter regulations, the managers and employees within the railroad industry witnessed the strength of the federal government's influence on the industry. The Staggers Rail Act of 1980 initiated changes

within the industry that facilitated developments in technology and modern work environments (Brown, 2014). The Act marked a dramatic evolution in the United States' railroad industry by eliminating, or greatly reducing, federal regulatory control over virtually every aspect of rail freight operations (Stich & Miller, 2012). The reduction of federal control benefitted the railroad organizations, as industry leaders set pricing and obtained more control over daily operations. Because of the reduction of governmental control, competition from airlines and highway traffic decreased, which initially caused many railroad companies to go out of business (Stich & Miller, 2012).

The Staggers Rail Act of 1980 helped free the railroad industry from some of the outdated and cumbersome regulations based on obsolete safety and operational circumstances (Brown, 2014). As a result, industry leaders were able to overturn their historical loss of traffic, which eventually increased profits (Stich & Miller, 2012). The Staggers Rail Act not only benefited the railroad industry and its employees, but also played a prominent role in supporting the nation in its economic recovery while providing a competitive advantage to the entire world, as the railroad companies have become financially stronger (Stich & Miller, 2012).

When the use of technology began to change how freight ships via railways, the government loosened control to allow the industry to make autonomous decisions regarding operations. Essentially, in an era of more conservative fiscal policies, this deregulation aimed at increasing overall productivity, and provided the United States' railroad industry with a more economical means to compete in an increasingly globalized world (Brown, 2014). Developments in technology have complicated the safety climate, but the deregulation that occurred over the same period has also allowed railroad

organizations' leaders to have more control in regulating their own safety measures (Giles, 2011). Hazards in the industry have significantly attenuated compared with other competing industries that did not undergo full deregulation with the addition of new technology (Baum, 2013).

Accident reduction. In the current railroad system, safety in transportation is a prime concern (U.S. DOT, 2012B). Trains' accident rates decreased by 80% between the years of 1980 and 2012; accidents also decreased by 44% between the years of 2000 and 2012. The injury rate of the employees decreased by 85% between 1980 and 2012, and by 51% between 2000 and 2012; the collision rate of grade crossing was 82% down since 1980 and 45% down from 2000 (U. S. DOT, 2012b). In 2012, each of the above categories represented record lows. Although railroads' managers are proud of the developments, it is clear that the challenge of safety never ends. Rail safety improvement is necessary; achievement of this necessity occurs through working together with (a) suppliers, (b) employees, (c) customers, (d) Federal Railroad Administration regulators, and (e) development and implementation of operating practices and new technologies (Stone & Landry, 2012).

Naveh, Katz-Navon, and Stern (2011) noted that safety initiatives are necessary for organizations' employees to perform work safely and organizational leaders develop structures that support safety initiatives. In an environment where workers' vulnerability is high, based on prior industry leaders' behavior, workers often remain skeptical about organizational changes. A better understanding of the elements of employee job satisfaction is necessary to comprehend how the elements relate to safety initiatives.

Concerning the importance of the properly engaged employee, modified managerial strategies encourage increased morality and commitment within employees as a driving force to meet organizational goals (Clarke, 2013). The psychological well-being of employees has shown a strong correlation with high-levels of employee engagement and elevated job performance (Schumacher, 2011). Employee job satisfaction plays a significant role in human capital (Iverson & Zatzick, 2011). When the labor force is contented and engaged, employees tend to show greater levels of personal productivity. Goulmy, Stern, and Eggenkamp (2013) examined another hazardous industry, the airline industry, and demonstrated how strategies to increase employee engagement helped increase employee job satisfaction, boost employee performance, and lead to higher employee productivity.

With more innovations in technology and more freedom for railroad companies' leaders to implement these innovations, safety initiatives have resulted in successes in terms of reducing accident rates (Duranton & Turner, 2012). Technology continues to drive safety initiatives that are more effective as transportation continue to increase, even across highways (Duranton & Turner, 2012). Most railroad companies' managers embrace innovations in technology to help implement improved safety practices (Giles, 2011). Overall, the accident rate since the Staggers Rail Act has reduced significantly, as railroad company leaders took greater control over railroad operations (Brown, 2014). As such, the environment of the railroad industry is safer than it was just a few generations ago.

In Canada, railway safety and the body charged with implementing the regulations, acts, and rules is Transport Canada. These stringent rules include (a) track

maintenance, (b) track inspection, (c) equipment maintenance, and (d) thoroughly enforced inspections in the country. The Transportation Safety Board members of Canada investigate all incidents regarding railway transport (Railway Association of Canada, 2011). The leaders of the Safety Management Systems (SMS) reinforce the existing railway safety rules as well as the regulations in Canada (Railway Association of Canada, 2011). The leaders of SMS added an extra layer of security to Transport Canada's current policies and regulations regarding railway transport. The leaders of SMS shifted the railway sector from the program framework, where regulatory interventions were the key measure to a risk management climate in which safety performance was the key measure of results (Railway Association of Canada, 2011).

The SMS's new safety requirements for the railway sector have several objectives for reducing the accidents in the industry. First, the SMS required the reporting of accidents to Transport Canada. Second, the SMS required the maintenance of the existing policies beyond the threshold requirements (Railway Association of Canada, 2011). Third, the SMS required all the railway companies' managers to monitor, track, and measure the defects as well as the hazards associated with the railway industry. The fourth SMS requirement was the development of necessary processes to facilitate the awareness of the employees about the existing regulations in the country (Evans, 2010). For the safety initiatives to be effective in reducing accidents, both the employees and management needed to participate actively in the entire process (Lallemand, 2012). Therefore, the SMS required the railway companies' management to solicit input from the employees to mitigate hazards to reduce or eliminate railway risks (Railway Association of Canada, 2011).

The efforts made by the SMS have led to increased safety for Canadian railways since 2002 (Railway Association of Canada, 2011). The railway accident rates decreased to a low of 2.41 accidents per Billion Gross Ton Miles (BGTM), which is Canada's lowest recorded accident rate in the railway industry since 2000 (Railway Association of Canada, 2011). The statistics for the analysis of safety performance by the Railway Association of Canada (RAC) and the Canadian Transportation Safety Board (TSB) revealed a significant decrease in accident rates (Railway Association of Canada, 2011). In the year 2010, total Canadian railway accidents, as reported to the country's transportation safety board, were 1,076. This figure decreased by 5% in 2011, when the total reported accidents were 1,023 (Railway Association of Canada, 2011).

Efforts by the Railway Association of Canada resulted in the development of better couplers as well as brakes for the freight cars (Turk, 2011). The hard work led to the establishment of automatic car couplers and the modification of air brakes for the passenger trains. The creation of the automatic car couplers and the modification of the air brakes improved railway work safety. The United States' Safety Appliance Act mandated better railway operating equipment before the publication of the railway accident statistics by the Interstate Commerce Commission (ICC) related to the potential risks to the trainmen (Turk, 2011). The Federal Railroad Administration, in conjunction with the labor and railroad management, boosted efforts by implementing techniques to minimize cross-grade accidents.

Management for East Japan Railway Company (JR East) prioritizes the safety of its passengers through several safety initiatives. The Higashi-Nakano Station accident, which occurred in 1988, prompted the move toward various comprehensive safety

initiatives (Shimbunsha, 2011). Presently, 40% of the company's capital investment is dedicated to enhancing railway safety (Shimbunsha, 2011). The company's leadership also intends to formulate new safety measures based on new technologies. The company's managers have developed a Safety Research Laboratory with a mission of conducting research on railway safety issues. The initiatives made by JR East management have drastically reduced the number of rail accidents in Japan (Shimbunsha, 2011).

Railroad crossings. One of the most successful safety initiatives by the railroad industry leaders has been railroad crossings. Companies installed automated warning devices at dangerous crossings, which were prone to frequent accidents (Silla & Luoma, 2012). Most of the accidents occurred because of the recklessness of the drivers, although some accidents were due to negligence when operating near the rails. To avoid more deaths at the crossings, railroad managers installed horns in trains that would sound at a distance to warn pedestrians and motorists near railroad crossings.

A 44.7% decline in accidents at railway crossings occurred from 1994 to 2007, which signifies that these installations at some dangerous railroad crossings were successful (Tey, Ferreira, & Wallace, 2011). The introduction of modern trains led to the improvement of the services offered by the railroad companies. Although these trains require sophisticated technology for control, which is expensive, the advantages of positive train control exceed the costs (Horton, 2009). Safety of both train passengers and motorists remain an important goal of railroad management when implementing rail operations. The rate of accidents decreased with the implementation of safe operations,

which directly translated into less spending on costs related to treatment of accident victims (Hallowell & Calhoun, 2011).

Horton (2009) found a relationship among these different variables. Horton theorized that the correlation occurred because of various improvement programs developed during the period, and suggested that a clear relationship exists between improved safety conditions and reduced incidents. Horton posited that increased safety had substantial positive influences on job satisfaction as revealed by data he analyzed. Horton used a regression approach by categorizing factors and examining relationships within a statistical context. Horton outlined the use of several factors, which are beneficial for the current research. These factors include (a) locomotive conspicuity, (b) commercial driver safety, (c) grade crossings, (d) maintenance, (e) sight lines clearance, (f) motor vehicles that are more reliable, (g) pedestrian safety, and (h) freight car reflectorization (Horton, 2009). United States' railroad companies' leaders spend $100 million annually on road crossings and for work with local authorities to close unneeded crossings (Peng & Ouyang, 2012). In spite of various challenges, a progressive reduction in the number of accidents occurred because of the safety designs added to railroad crossings (Scuitto, 2010).

Future opportunities. Guler (2012) posited that many areas of the railroad industry require continuous improvements in safety standards to prevent and reduce accidents. Guler acknowledged that the failure of railroad management to oversee track inspection and maintenance was a major cause of accidents and unsafe working conditions. Guler reported that 25% of the nation's rail assets exhibit marginal or poor conditions that can result in accidents, which, in turn, compromise employee safety.

Wang et al. (2011) recommended improving safety by requiring an automated system for use in inspecting and monitoring the rail transit infrastructure. The automated system described by Wang et al. utilizes (a) ground-penetrating radar, (b) lasers, and (c) Global Positioning System (GPS) to check and collect surface and subsurface data on (a) track and steel, (b) concrete ties, (c) fastening systems, and (d) ballasts.

The automated system contains software tools, including algorithms, to interpret data, and to locate defects, and safety hazards. Stakeholders also included a decision support system to assist employees in interpreting track inspection results as well as using specialized rail cars to identify track defects (Wade, 2011). Managers will test the developed system in the St. Louis, Missouri and Boston, Massachusetts subway systems in 2017. Although railway transport is often safer than other modes of transport (Railway Association of Canada, 2011), opportunities still existed for further improvements in the safety of railways (Wade, 2011). Authors of a report by the United States Government Accountability Office (GAO, 2010) defined safety as the product of the gravity of harm and the probability of the harm occurring. In the case of railway transport, the risks include transport delay and fatalities resulting from crossing accidents, track defects, and hazards (Evans, 2010).

Evans (2010) noted that accidents in the railway sector occur because of a combination of factors such as (a) excess number of trains, (b) passengers and freight, and (c) a lack of safety equipment for signaling and speed control, (d) human errors, and (e) surrounding environment. The combination of factors can cause accidents such as (a) collisions, (b) fire during maintenance works, and (c) derailment. Evans proposed that to minimize platform collisions and pedestrian accidents, the installation of warning

systems on trains that detect pedestrians and other trains is necessary. Of essential importance for the improvement of safety is the training and certification of railway staff, especially the train drivers. This training should cover (a) rules of operation, (b) emergency procedures, (c) route knowledge, and (d) the signaling system (Feng, Yang, & Lan, 2013).

The safety of the railway system could improve if railroad leaders would analyze and model accidents to determine the degree of influence of certain factors on the probability of occurrence of a particular accident (Profillidis, 2006). Before railroad leaders can conduct a thorough safety analysis, the leaders need accurate and sufficient data to proceed with complex statistical methods. Analysis and modeling should help determine the appropriate means for reducing accidents.

In addition to increasing safety, railway crossings help ease congestion of road traffic and reduce noise impacts on the roads (Evans, 2010). An example of a major railroad crossing is the San Gabriel Trench in California, which is a virtual pipeline where trains diverge underneath (a) Ramona Street, (b) Mission Road, (c) DelMar Avenue, and (d) San Gabriel Boulevard in San Gabriel. The state and federal governments funded the overall project. Because of the increasing overcrowding of urban areas, the use of pipeline crossings of infrastructure links of highways and railway crossings has led to the use of trenchless technology (Stone & Landry, 2012). Successful design of a tunnel requires a high-level of communication among the designer, project owner, and authorities granting permits in order to boost safety on the railways (Sciutto, 2010).

Sciutto (2010) noted that railway crossings could be extremely dangerous. If the level crossing, as opposed to a crossing on a hill, has no technical protection, the train speed limits of the subsequent lines should be 120 km/h (approximately 75 mph). Management should also eliminate level crossings where there is (a) slow moving or heavy traffic, (b) crossings rarely used or private crossings, (c) pedestrian crossings, and (d) crossings with heavy vehicle traffic at a statistical frequency (Sciutto, 2010). The managers implemented recommended safety measures for railway crossings, which include full barriers, half barriers, or road light signaling (Sciutto, 2010). Stakeholders should implement the use of automatic warning devices, and the type of warning equipment should vary with the speed of oncoming trains and the vehicles crossing (Profillidis, 2006).

Profillidis (2006) posited that railroad management should implement automatic equipment and road light signals in exceptional cases and for train speeds below 140 km/h (approximately 87 mph). Half-barriers close off part of the road in the direction of driving and paired with road light signaling for train speeds not exceeding 160 km/h (approximately 100 mph). For train speeds above 160 km/h the recommendations of implementing automatic equipment and signals point to the use of full-barriers, this shut off the entire width of the road and the road light signaling devices.

In 2014, the federal policies for regulation are much more flexible, which allow for changes depending on developments within the industry. As such, safety initiatives have a relationship with changes in the modern railroad industry (Lallemand, 2012). Exploring changes in the industry helps researchers understand the nature of new

measures and adjustments and to comprehend worker reactions to various measures, both in a positive and negative context.

Gaps in Research

I identified relatively few studies in which researchers examined the relationships between the core concepts of the JCT, and how these concepts relate to the safety climate in the contemporary railroad industry. In contrast, there has been a plethora of research on the importance of strong safety climates on worker job satisfaction in other industries. Therefore, there is a lack of understanding of the degree and nature of the correlation between a strong safety climate and job satisfaction. The findings from the proposed study are expected to provide railroad managers with an increased understanding of the relationships between safety environment perceptions, job tenure (length of experience), and employee job satisfaction in the railroad industry.

Summary and Transition

In Section 1, I discussed the impact that safety initiatives have on employee job satisfaction within the railroad industry including: (a) background of the problem, (b) general and specific business problem, (c) purpose statement, (d) nature of the study, and (e) research questions. Section 1 contained discussions of the (a) hypotheses, (b) theoretical framework, (c) assumptions, limitations, and delimitations, and (d) the significance of the study, (e) an implication for social change. Section 1 concluded with a literature review focusing on the history of safety initiatives in the railroad industry, empirical studies underpinning the concepts and propositions in the JCT, and the impact that safety initiatives can have on railroad employees' job satisfaction.

In Section 2, as the researcher, I focus on the research methodology. I provide an overview of (a) the participants, (b) research methods, (c) research design, (d) population and sampling, and (e) ethical research. Section 2 also contains a description of the (a) data collection instruments and technique, (b) data organization techniques, (c) data analysis, (d) reliability, and (e) means for assuring study validity. In Section 3, I present the statistical evidence for answering the research questions from testing the hypotheses, a discussion of the findings, interpretation of the findings in the context of the theoretical framework and literature, implications for social change, recommendations for further research, and overall conclusions.

Section 2: The Project

The purpose of Section 2 is to describe the research project by reviewing the purpose statement, and describing the role of the researcher, the participants, the research method and design. This section also contains descriptions of the population and sampling, ethical research, data collection instruments, data organization technique, and data analysis methods. Section 2 concludes by addressing the issues of study validity and reliability, and with a summary and transition to Section 3.

Purpose Statement

The purpose for this quantitative study was to examine how safety climate relates to employees' job satisfaction for railroad transportation managers' use in improving safety, increasing productivity, and profitability. I used Structural Equation Modeling (SEM) to examine the relationship between the indicator variables for Employees' Task Identify, Safety Climate, and Job Tenure and the dependent (outcome) variable, Job Satisfaction. The SEM model reflected Safety climate as a potential mediating variable and Job tenure as a potential moderating variable. The population for this study consisted of railroad workers located in the eastern region of the state of North Carolina. Understanding the relationship between railroad workers' task identity, safety climate, job tenure, and job satisfaction can effect social change by providing a safer environment for the public while ensuring railroad employees have steady employment for supporting their families and communities.

Role of the Researcher

For the purpose of this study, I adopted the positivist or objectivist paradigm, positing that there is an objective reality, which researchers can determine from

examining sensory experiences through recording participants' numerical responses. Positivism starts with research hypotheses, and then uses the analysis of numerical data to reject or support the hypotheses (Creswell, 2014). Accordingly, I used highly structured methods of quantitative data collection, presentation, and statistics to provide new information about the research topic. My epistemological position was that of a silent, objective and unbiased observer, not influenced by personal, social, political, religious, or economic pressures to interpret the data in a specific way. Because of the nature of my employment at the setting of this study, I distributed the questionnaires via email to potential participants. I followed the suggestion of Al-Atiyyay and Badr Nag (2014) that positivist researchers should dedicate themselves to objective quantitative measures to evaluate an organizational climate without disrupting it. I followed the recommendation that a quantitative researcher's approach to objectivity is not to influence the participants' responses to the instruments used to measure the variables of interest (Kothari, 2009). Accordingly, the characteristics of the behavior and phenomena in this study occurred without my influence. The data reflected the factors that might occur with or without my presence.

My key role as an objective positivist researcher was to avoid contamination of the data with personal viewpoints, and to conduct the study and report the findings as accurately and precisely as possible (Kothari, 2009). Having expressed my support for the positivist paradigm, I am also aware of the post-positivist paradigm, positing that the subjective values, experiences, and possibly biased perspectives of a researcher may potentially influence the outcomes of research in organizational management (Johnson, &

Duberley, 2003). I therefore reflexively expressed my own personal subjective viewpoints regarding the outcomes of this study in Section 3.

Participants

Railroad employees comprised the population of interest for this study. The participants represent a significant portion of the labor force from one railroad organization in North Carolina. The participants included engineers, conductors, and maintenance-of-way employees. I used a random sampling method because the process provides assurance that each employee had an equal chance of responding to the survey and address the assumption of arbitrary selection for the purposes of inferential statistical analysis (Meeden, 2012).

The participant recruitment process took place online through the distribution of emails to randomly selected participants who qualified for inclusion in the study. The inclusion criteria for the participants included (a) 18 years old and above, (b) working currently (part time or full time with the selected railroad organization, and (c) designated as a railroad worker. Before participation in the study, all the participants reviewed and signed an informed consent form, which contained information about the research design, and the assurance of the absence of any possible repercussions (see Appendix A).

Research Method and Design

To facilitate success in terms of collecting and analyzing the data, the research method and design required selection, thorough planning, and execution (Jogulu & Pansiri, 2011; Connelly, 2012) as follows:

Research Method

Achievement of the study's purpose occurred through the collection of numerical survey responses from participants. I recorded the statistical analysis results of the participants' responses. For this study, I used the quantitative method to develop and examine findings. The quantitative method is generally more appropriate to nomothetic aims (Rubin & Babbie, 2011). Quantitative researchers use statistical tools as the basis for addressing research questions (Slevitch, 2011).

Both quantitative and qualitative methods require specific types of data. The quantitative methodology required quantifiable components to evaluate the correlations among the three variables (predictors: safety climate perceptions and length of employment; response: employee job satisfaction). The goal for quantitative methods is to produce data to measure the evidence supporting a given hypothesis, as compared to the more abstract constructs of qualitative methodology. Quantitative research methods require deductive reasoning using specific data to examine the problem and address the purpose of the study. Most analysts recognize quantitative studies as the methodology of choice for examining relationships among variables (Borden, 2013). The quantitative method is a useful to identify complex relationships among seemingly unrelated familiar variables of interest, whereas qualitative researchers focus on identifying themes and potential factors, which can help researchers identify variables unknown and undefined at the start of the data collection (Wisdom, Cavaleri, Onwuegbuzie, & Green, 2012).

A quantitative approach is the foundation for descriptive research. I employed a quantitative methodology to examine the relationship among the three variables (predictor: safety climate and length of employment; dependent: job satisfaction) to help

stakeholders understand the nature of the relationships. Employee perceptions about the safety environment within their organization can affect the safety climate (Andotra & Harleen, 2012).

It is common to conduct social science research for studies, which are descriptive in nature (Slevitch, 2011). Social science researchers have described the abstract phenomena occurring within an increasingly complex working environment, an environment that can constantly be changing, because of evolving safety regulations and increasing demands for higher productivity. Relatively few authors have addressed the relationship between job satisfaction and safety within the context of the railroad industry (Crossman, 2008; Morrow, 2010). Using a quantitative correlational design enabled me to examine the relationship, as it existed for the defined population at the time of the study without influencing the system's status. Because of the time involved for data collection and analysis, I rejected the mixed methods approach (Cameron, 2011). In addition, the mixed-method approach can be challenging because of the (a) difficult design, (b) paradigm issues, (c) integration, and (d) length of explanations required in the text (Greenwood & Terry, 2012).

Research Design

I used a correlational design to evaluate the statistical relationships among four variables, and to test the hypothesis I used PLS-SEM. A correlational design requires the use of inferential statistics to evaluate the strengths of the associations between two or more variables (Kothari, 2009; Cameron, 2011). A correlational design does not require data from multiple sources to generate reliable conclusions, and therefore, I was justified to use the results of a cross-sectional survey based on data drawn from one population.

Because I was unable to manipulate any of the variables to explore possible cause and effect relationships, I could not use an experimental design requiring the random assignment of participants into groups, including a control group, or a quasi-experimental design, requiring the non-random assignment of participants into groups.

Population and Sampling

The railroad worker populations service trains across the globe. The general population from which the sample was drawn consisted of four major railroads within North America, employing 175,940 union workers (Dempsey, 2012). The target population for this study consisted of workers in one railroad organization in the eastern region of North Carolina. Over 800 employees were qualified to participate. Sampling a subset of a population in social science enables researchers to draw inferences regarding the status of a population (Meeden, 2012). In this study, I used a random sample of N = 80 railroad employees (i.e., approximately 10% of the target population) because a random sample would provide representative data that could be generalized to the population.

The sample size of N = 80 was not based on the results of a power analysis. If I had used multiple linear regression to test the stated hypotheses, then I would conduct an a priori power analysis (e.g., using G*Power software; Beck, 2013) to compute the minimum number of participants. This would assure the desired level of power to avoid a Type II error (i.e., not rejecting the null hypothesis when, in fact, it should be rejected). A power analysis was not necessary, however, because one of the advantages of using PLS-SEM is that it "is insensitive to sample size considerations...PLS is particularly useful in generating estimates even with very low sample sizes as low as 30" (Hair,

Anderson, Babin, & Black, 2010; p. 776). Hair et al. (2012) posited that PLS-SEM has minimum demands regarding sample size and generally achieves high levels of statistical power. Because PLS-SEM is still an emerging data analysis method, some researchers have disputed that "PLS is insensitive to sample size considerations." For example, Wong (2013) concluded that the minimum sample size for PLS-SEM is related to the maximum number of arrows pointing at a latent variable in the path diagram, assuming that in practice, the researcher should have a significance level of 5%, a statistical power of 80%, and R^2 values of at least 25% (Marcoulis & Saunders, 2006). I utilized Wong's Table 1 to estimate the minimum sample size for this study. Because four arrows lead into Job Satisfaction, the minimum sample size to construct a PLS path model in this study should be at least $N = 65$ (i.e., less than the achieved sample size of $N = 80$).

Ethical Research

Before the commencement of data collection, I obtained the approval of Walden's IRB as well as the railroad organization representatives' approval to survey their employees. Before proceeding with the data collection, I acquired IRB approval and the informed consent of the participants. The risk to the participants was minimal and the employees' identities and responses remained anonymous. As a manager within the organization, I informed the participants that responses would not negatively affect the partaker in any way when conducting daily management duties. I used only a numerical code to identify each respondent. The assurance of anonymity expects to promote honesty within participant responses (Connelly, 2012). Informing the survey respondents' that keeping the data anonymous and confidential encourages accurate honest answers, while seeking to obtain credible information (Merianos, King, & Vidourek, 2013). With

the assurance of anonymity, workers may be more inclined to express their true perceptions, be they negative or positive, without fear of losing their jobs.

The selection of the required railroad workers for this study is a key objective for ensuring reliable and trustworthy results. Participation was voluntary and the employees within the study provided their informed consent (see Appendix A). Informing the participants about the nature of the study may help address the participants' concerns and obtain a higher participation rate for the purpose of this research (Meeden, 2012). Consent forms provided to participants required the participants' returned signature prior to enabling the employees to complete the survey instruments. Honesty is necessary from both the standpoint of the participant and the researcher to assure the results' validity. It is important for researchers to be honest and forthcoming regarding the need for the participants' response data to achieve the study's purpose (Zikmund et al., 2012). Participants being honest and forthcoming facilitated participants' understanding and helped to ensure their positive contributions to the research. Once the participants understand the purpose of the study, they can make an informed decision as to whether or not they want to participate. When a researcher withholds the purpose and scope of the research, participants may be contributing unknowingly to a study with which they may disagree.

Participants were able to withdraw from the study at any time without fear of reprisal, or if they did not want to answer because one or more questions made them feel uncomfortable, I did not pressure the respondent to answer specific questions, but allowed them to continue answering following questions (Zikund et al., 2012). I will store and safeguard the response data for a minimum of five years from the completion of the

study, and thereafter all information pertaining to the research study destroyed to protect the rights of the participants. All documents and computer files pertaining to the research study obtained by me also destroyed. Participants did not receive any incentives to participate in this study.

Data Collection Instruments

I administered the four survey instruments listed in Appendix B, C, D, and E respectively, as follows (1) the Demographic Questionnaire (devised by me); (2) the Safety Climate Survey (SCS; Sexton, Helmreich, Pronovost, & Thomas, 2003) and the (3) Job Characteristics Inventory (JCI, Sims et al., 1976); and (4) the Job Satisfaction Survey (JSS, Spector, 1997). Instrument reliability was a decisive criterion for my choice of these survey instruments (Struwig & Struwig, 2001). Internal consistency reliability defined as "an index that calculates the extent to which the test items all reflect the same attribute" (Struwig & Struwig, 2001, p. 132). Cronbach's reliability coefficient (α) is a standard measure for an instrument's internal consistency at one time frame. Pearson's correlation provides an estimate of test-retest reliability between two different periods (Creswell, 2014). Reliability coefficients greater than .60 generally indicate instruments with adequate reliability (Kines, Lappalainen, & Kim, 2011). I provided the empirical evidence of the instruments' reliability within the following headings.

Demographic questionnaire. The demographic survey (see Appendix B) is a seven-item instrument that I devised to identify the participants' demographic characteristics, including gender, job tenure (years as a railroad employee); job category, and race/ethnic background. Gender, race/ethnic background, and job category were nominal variables, whilst age and job tenure were ordinal categories.

Safety Climate Survey. The Safety Climate Survey (SCS; Sexton et al., 2003) contains seven items for assessing the degree to which individuals perceive a genuine and proactive commitment to safety by their organization (see Appendix C). The single dimensional scale is used to gauged the extent to which personnel (a) feel safe while working, (b) receive adequate feedback regarding their performance, (c) learn from the mistakes of others, (d) feel that leaders handle mistakes appropriately, (e) feel that personnel frequently break the rules, and (f) feel encouraged to and know how to report safety concerns. All questions reflected positive formatting, meaning that low scores implied low agreement with the safety climate while high scores meant high agreement with the safety climate. The SCS uses a Likert-type format to scale the items where 1 = *strongly disagree*, 2 = *disagree*, 3 = *slightly disagree*, 4 = *slightly agree*, 5 = *agree*, and 6 = *strongly agree*. The SCS scaled score resulted from summing each participant's response scores to all seven questions, and then dividing by seven to obtain an average score. Accordingly, the scaled scores ranged from a minimum of one to a maximum of six. Colla, Bracken, Kinney, and Weeks (2005) reported a high level of internal consistency reliability (Cronbach's $\alpha = .86$) and test-retest reliability (Pearson's $r = .92$) for the SCS.

Job Characteristics Inventory. The Job Characteristics Inventory (JCI, Sims, Szilagyi, & Keller, 1976) is a 30-item instrument to capture workers' perceptions about their job characteristics (see Appendix D). Six subscales serve to indicate the extent to which a job involves task identity, variety, autonomy, interaction with others, and friendship. Being that I used only four of the JCI items to measure Task Identity overlap was not a problem. The reason I extracted Task Identity from the JCI was this variable

positively correlated with job satisfaction (Mathieu, Hoffman, & Farr; 1993; Morris & Venkatesh, 2010). Task Identity, expressed in terms of the ability of workers to complete a piece of work from beginning to end, is an expectation that they should hold regarding the safety climate of their organization (Nielsen et al., 2013). Task Identity was measured using a 5-point Likert scale, indicating the frequency of working behaviors, where 1= *very little*, 2 = *sometimes,* 3 = *moderate amount*, 4 = *quite a lot*, 5 = *very much*. The subscale operationalized with a range of 1 to 5 by averaging the scores. Sims et al. (1997) reported an adequate internal consistency reliability for this scale (Cronbach's α = .76).

Job Satisfaction Survey. The instrument I used to measure job satisfaction was the Job Satisfaction Survey (JSS, Spector 1997) This instrument (see Appendix E) is available free of charge for non-commercial educational and research purposes. The JSS Paul Spector developed (1985) is for use in the human service sector, but is applicable to employees in all organizations. The JSS contains 36 items for evaluating the respondents' perceptions regarding nine dimensions of job satisfaction. There are six options per item ranging from 1 = *very much disagree* to 6 = *very much agree*. Items are in both positive and negative directions, so some items reflect reverse scoring (see Appendix F). The nine dimensions of job satisfaction measured using the JSS included Pay (remuneration), Promotion (opportunities), Supervision (with immediate supervisor), Fringe Benefits (monetary and non-monetary) and Rewards (performance based appreciation and recognition for good work). The remaining includes Operating Conditions (required policies, rules and procedures) Coworkers (people worked with), Nature of Work (job tasks undertaken), and Communication (between all members of the organization). The

internal consistency reliability of the nine JSS dimensions tested by the developer was adequate (Cronbach's α = .60 to .82).

Data Collection Technique

To administer the survey, I employed Survey Monkey a secure online survey provider that provides data collection and data analysis which enables users to provide responses anonymously to web-based surveys (www.surveymonkey.com). The data collection procedure I utilized included the following steps:

- Uploading the demographics questionnaire, the Safety Climate Survey, the Job Characteristics Inventory, and the Job Satisfaction Survey to Survey Monkey;
- Emailing each participant a link to the online survey hosted by Survey Monkey, and within 1week;
- Downloading the response data;

To satisfy the requirements for confidentiality and anonymity, identification of each respondent I used a unique alphanumeric code, and not by name.

Data Analysis

Screening and cleaning. I screened the data, checking for missing values and transcription errors. The total number of respondents to the Safety Climate Survey (SCS; Sexton et al., 2003) and the Job Characteristics Inventory (JCI, Sims et al., 1976) was N = 97. There were 15 respondents failed to complete the items in the SCS and the JCI, so I excluded the respondents. The total number of respondents to the Job Satisfaction Survey (JSS, Spector, 1997) which was administered from the other two instruments was

$N = 84$. I found 16 missing values to the JSS items, and following the instructions of Spector, I replaced the missing values with the mean scores for the corresponding items.

Demographic profile. I collected demographic data using categorical variables (gender, ethnicity, job category, age, years of experience, and years with current employer) in the demographic questionnaire. I used the SPSS "Frequency" procedure to generate tables (counts and percentages) to produce a demographic profile of the participants according to the specified categories

Operationalization. I received the responses to the SCS, JCI, and JSS as three separate files. To conduct the data analysis, I combined the three screened and cleaned files into one composite file, making sure that the responses of each coded respondent aligned horizontally into each row of the file. I used the SPSS "Select Cases" procedure to draw a random sample of $N = 80$ respondents from the file. I then used the responses to each item to operationalize the variables defined in Table 1.

Table 1

Conceptual, Functional and Operational Definitions of Variables

Variable	Conceptual Definition	Functional definition	Operational Definition
Job Satisfaction	The perceptions of the participants towards their job, job related activities and environment involves a combination of psychological and emotional experiences (Mehta, 2012).	Outcome	Average scores for each of the nine dimensions in the Job Satisfaction Survey (JSS; Spector, 1997) each measured with a 6-point Likert Scale. Scores range from 1 to 6. Higher scores indicate greater job satisfaction.
Perceptions of Safety Climate	A coherent set of beliefs and expectations that participants have	Predictor	Average score for 7 items, each with a 6-point Likert Scale, in the Safety Climate Survey (JCS;

	regarding safety in their organization (Nielsen et al., 2013)		Sexton et al., 2003). Scores range from 1 to 6. High scores indicate greater safety climate.

Table 1. Continued

Task Identity	The extent to which the participants do an entire or whole piece of work, and can clearly identify the results of their efforts (Sims et al., 1976).	Mediator	Average score for 4 items, each with a 5-point Likert scale, in the Job Characteristics Inventory (JCI; Sims et al., 1976). Higher scores indicate greater task identity.
Years of Experience (Tenure)	How long the participant has been a railroad employee	Moderator	Response to the question "How long have you been a railroad employee?" in the Demographic Questionnaire, to give length of experience measured in years.

Testing of hypotheses. I tested the following hypotheses**:**

$H1_0$: There is no correlation between the railroad workers' Task Identity and Job Satisfaction.

$H1_A$: There is a correlation between the railroad workers' Task Identity and Job Satisfaction.

$H2_0$: Perceptions of Safety Climate acts does not as a mediator in the partial correlation between Task Identity and their Job satisfaction.

$H2_A$: Perceptions of Safety Climate does act as a mediator in the partial correlation between Task Identity and their Job satisfaction.

$H3_0$: Job Tenure does not have a moderating effect on the partial correlation between Task Identity and Job Satisfaction.

$H3_A$: Job Tenure does have a moderating effect on the partial correlation between Task Identity and Job Satisfaction.

I did not use multiple linear regression (MLR) to test the hypotheses because the many theoretical assumptions of MLR could easily be violated (e.g., by multicollinearity, heteroscedasticity, and deviation from residuals' normality). These violations may inflate the standard errors of the regression coefficients to such an extent that the statistical inferences could be misleading (Alavifar et al, 2012). I used a non-based partial least squares structural equation modeling (PLS-SEM) on the classical parametric inferential framework, so it has less restrictive assumptions than MLR (Hair et al., 2010; 2012; 2014). The outlined main assumptions of PLS-SEM are in Table 2. I highlight that one of the criticisms of PLS-SEM is that it does not incorporate an adequate global goodness of fit measure. I also note that PLS-SEM utilizes bootstrapping to test the significance of the path coefficients.

One of the reasons why many researchers do not use PLS path modeling is that dedicated software is relatively limited (Wong, 2013). The software I used in this study was SmartPLS vs 2.0 downloaded from the developers' website (www.smartpls.de), together with user manuals and explanatory videos. The benefits of SmartPLS included a user-friendly graphical user interface (GUI) with tools to edit the layout of the path diagram.

Table 2

Assumptions of PLS-SEM

PLS-SEM unlike CB-SEM focuses on maximizing the explained variance rather than reproducing the empirical covariance matrix.	Bentelr & Huang (2014)
PLS has the advantage that it contains no assumptions about the population or scales of measurement. It works without distributional assumptions (e.g., normality) using nominal, ordinal, and interval scaled variables. PLS is robust in the face of several data inadequacies (e.g. skewness and multicollinearity of the indicators, misspecification of the structural model).	Bentelr & Huang (2014)
The lack of assumptions (with respect to the distributions, the sample size and the measurement scale) is useful for applications where such assumptions are not tenable. On the other side, this suggests an absence of the traditional parametric inferential framework.	Esposito Vinzi et al. (2010)
PLS is impervious to sample size considerations. PLS is can produce estimates even with very small sample sizes (as small as 30)	Hair et al. (2010)
Unlike CB-SEM, there is no procedure to estimate the overall goodness of fit of the data to the model. This problem restricts PLS-SEM's effectiveness for concept testing and for comparing the fit of alternative model configurations to one set of data.	Hair et al. (2012).
Bootstrapping computes the mean value and standard error for each path coefficient. A one sample two-tailed t-test determines if the path coefficient is significantly different from zero at the conventional .05 level.	Hair et al., (2014).

A PLS path model (see Figure 5) consists of two components, the *measurement mod*el, and the *structural model* (Hair et al., 2014). The measurement model comprises reflective indicators (item scores, symbolized by rectangles); formative indicators (demographic variables, also symbolized by rectangles); and latent variables (computed by factor analysis, and represented by oval symbols). I

constructed each variable from (a) at least three reflective indicators (with arrows pointing out of the latent variable) or (b) at least one formative indicator (with arrows pointing into the latent variable. In Figure 5, I define the reflective indicators as the JCI item scores measuring Task Identity (TID01 to TID04), the ten SCS item scores measuring Perceptions of Safety Climate (PCS01 to PCS10), and the nine JSS dimensions measuring Job Satisfaction (Communication, Coworkers, Fringe Benefits, Operating Conditions, Pay, Promotion, Rewards, and Supervision). I included one formative indicator (years of experience, measuring Job Tenure).

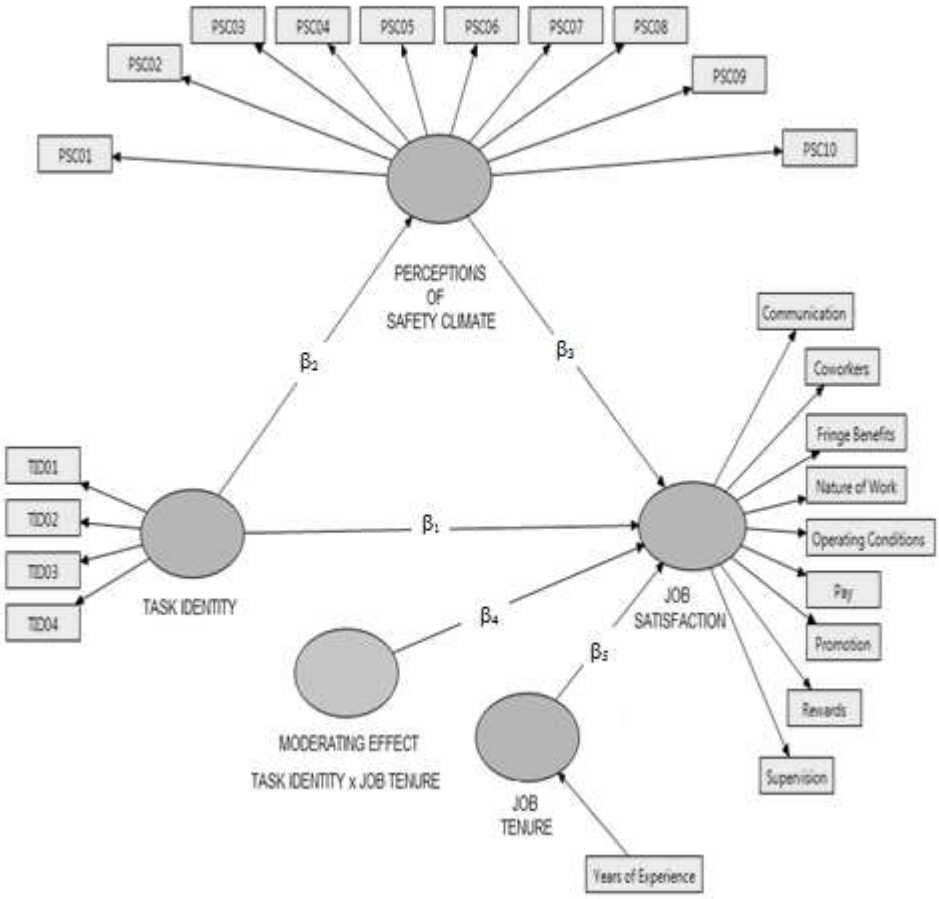

Figure 5. Measurement and structural components of the PLS path model.

I incorporated mediating and moderating effects in the PLS path diagram (Hair et al., 2014). Mediation means that a third variable, called the *mediator* is the *root cause* of the correlation between a predictor variable and an outcome variable (McKinnon, 2007). The term root cause implies that the mediator accounts for or explains the conjoint variance between the predictor and the outcome variable. Complete mediation occurs when the correlation between the predictor and outcome is zero after introducing the mediator. Partial mediation occurs when the correlation between a predictor and outcome reduces in absolute size, but is still significantly different from zero after the introduction of the mediator (McKinnon, 2007). Moderation means that a third variable, called the *moderating variable* increases the strength and/or direction (positive or negative) of the correlation between a predictor variable and an outcome variable (Hayes, 2013). Job Tenure was a moderator in this study. I evaluated the moderating effect by measuring the significance of the interaction between the predictor and moderating variables. I introduced a mediating effect in the PLS path model by entering the hypothesized mediator (Perceptions of Safety Climate) at the apex of a triangle between the predictor (Task Identity) and the outcome (Job Satisfaction). I introduced the moderating effect as the product of the hypothesized moderator (Job Tenure) and the hypothesized predictor (Task Identity).

The structural PLS path model comprised the paths between pairs of latent variables, indicated by unidirectional arrows. I measured the strengths of the relationships represented by the arrows as weighted path coefficients, symbolized by β_1 through β_5 in Figure 5. I interpreted the individual path coefficients of the PLS structural model in the same way as standardized beta coefficients in an ordinary least squares regression model

(Henseler et al., 2009). Unlike ordinary least squares regression, I computed the statistical significance of the regression coefficients by bootstrapping. The Monte Carlo algorithm for case resampling used the bootstrap, assuming that the data provided a reasonable representation of the population from which the sample was drawn (Wolter, 2007). The use of Monte Carlo algorithm for random sampling with replacement, assumes that the size of each bootstrap subsample was equal to the number of cases in the original data set. Accordingly, the bootstrapping procedure sampled and resampled the data to collect 5000 subsamples, with 80 cases in each subsample (because 80 respondents provided the data). Bootstrapping computed the mean, standard error, and the 95% confidence interval for each path (β) coefficient. I followed the convention that the two-tailed t-statistic should be greater than 1.96 for the β coefficient to be statistically significant (i.e., different from zero) at the .05 level of significance (Hair et al., 2014). I then tested the hypotheses by interpreting the path coefficients, using the following procedures.

If, in the absence of Perceptions of Safety Climate, β_1 was statistically significant, then sufficient evidence existed to *reject* $H1_0$, and to support $H1_A$. If I had determined there was no significant correlation between Task Identity and Job Satisfaction, then there could be no mediating effect, and there would have been no need to test H2.

If β_2 and β_3 were both significant (indicating a significant conjoint correlation of Task Identity and Job Satisfaction with Perceptions of Safety Climate), but if β_1 were significantly *reduced* in magnitude after Perceptions of Safety Climate was introduced into the model, then sufficient evidence would exist for rejecting $H2_0$ and to support $H2_A$.

I also used the Sobel test (Sobel, 1986) to examine the significance of the mediating effect of Perceptions of Safety Climate. The Sobel test is a type of *t*-test that

determines if the reduction in the correlation between the predictor and outcome variable is significant, after including the mediator in the model. Confirmation of the mediation effect happens if there is a significant reduction. I computed the Sobel's statistic and *p*-value using the online calculator at https://www.easycalculation.com/other/sobel-test.php.. The Sobel test uses the formula $A * B / \sqrt{(B2 * S_A^2 + A^2 * S_B^2)}$ to calculate the test statistic where (a) A = path coefficient between predictor variable and mediator, (b) B = path coefficient between mediator and predictor variable, (c) S_A= Standard error of A, (d) S_B = Standard error of B.

β_4 represented the strength of the moderating effect. If β_4 had been significant, there was sufficient evidence to reject $H3_0$, and to support $H3_A$. In addition, the employees' Job Tenure (indicated by a significant correlation between the product of Job Tenure x Task Identity and Job Satisfaction) would moderate the correlation between the railroad workers' Task Identity and their Job Satisfaction. A significant moderating effect would have implied that when Job Tenure increases, the positive correlation between Task Identity and Job Satisfaction is strengthened (i.e., β_1 becomes larger).

Reliability and Validity

Internal consistency reliability in the context of PLS-SEM means that multiple reflective indicators in the path model are inter-correlated, and are interchangeable, and aggregated to measure a unidimensional construct in one logical direction (Chandler, DeTienne, McKelvie, & Mumford, 2011). I used Cronbach's alpha to estimate the internal consistency reliability of the variables operationalized by averaging the item scores. I also tested the underlying assumption of internal consistency reliability of the latent variables in the PLS path models using the composite reliability coefficient.

Cronbach's alpha is not an accurate measure of internal consistency reliability in a PLS path model because it depends on assumptions based on the classical parametric framework (e.g., the error variances are not correlated) which are violated when using PLS-SEM (Hair et al., 2014).

Validity is a multidimensional concept, incorporating (among other dimensions) external validity, internal validity, convergent validity, construct validity, and discriminant validity (Creswell, 2014). The external validity of this study meant that the responses of the respondents were representative of and generalizable to the population. Internal validity meant that the relationships between the independent (predictor) and outcome (dependent) variables not confounded by other possible independent variables, acting at the same time, which were not measured or considered in this study. I have discussed threats to internal validity in Section 3. Convergent validity meant that the items that constitute a latent variable in a statistical model must share a high proportion of their variance. I applied the generally used criteria for assessing convergent validity in a PLS path model i.e., (a) the factor loading coefficients for all of the reflective indicators must be strong ($\geq +.5$); (b) the average variance explained by the reflective indicators that comprise each latent variable (AVE) must exceed .5 or 50% (Henseler et al., 2009).

Construct validity is the extent to which a statistical test measures what it claims, or purports, to be measuring, and the degree to which inferences can legitimately be made from the theoretical constructs upon which the operationalization of the variables were based (Creswell, 2014). I used the R^2 value as a measure of the construct validity of the PLS path models constructed in this study. Hair et al. (2012) posited that the primary criterion for the construct validity of a PLS path model is the coefficient of determination

(R^2), which represents the absolute amount of variance in the outcome variables explained by the predictor variables. I used the following criteria for interpreting R^2: 1% - 30% is weak; 31% to 66% is moderate and 67% and higher is large (Henseler et al., 2009).

Discriminant validity means that the latent variables are measured differently using separate instruments and scales from the other latent variables. The measurement of latent variables using similar scales or instruments implies a lack of discriminant validity. Wong (2013) suggested that the square root of AVE for each latent variable should be used to establish discriminant validity in a PLS path model. I established discriminant validity if the squares root of AVE (expressed as a decimal) was larger than the path coefficients between the corresponding pair of latent variables.

Transition and Summary

In Section 2, I described and justified (a) the research design and methods for this study, (b) the data collection instruments, (c) the data organization techniques, (d) data analysis procedures, and (f) methods for addressing ethical assurances, and (g) methods for assuring this study's reliability and validity. In Section 3, I provide an overview of the study followed by a presentation of the findings. I then describe the extent to which the findings confirmed, disconfirmed, and extended my theoretical framework and previous research by comparing the findings with other studies in the context of the literature. I then proceed to present discussions of the applications to professional practice, implications for social change, recommendations for further research and overall conclusions.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose for this quantitative correlational study was to provide railroad transportation managers in the eastern region of North Carolina with the information they need to examine and potentially address the relationship between their organizations' safety climate and railroad employees' job satisfaction.

Presentation of the Findings

The initial findings identified that the majority of the respondents in this study reported high levels of perceptions of the safety climate, as well as high levels of task identity and job satisfaction**.** The survey results indicated that 15% of the respondents replied *very little* or s*ometimes* to the four items concerning Task Identity. Furthermore, 26% of the respondents consistently assigned low scores (< 3.0) for the four JSS items concerning Operating Conditions (referring to low job satisfaction associated with difficulties experienced with rules procedures, and red tape, as well as having too much work to do). About 15% of the respondents *disagreed* with the items concerning the quality of the safety climate. Furthermore, 47% of the employees reporting low levels of task identity, were not conversant with the safety climate, and were dissatisfied with their jobs.

Characteristics of Participants

Table 3 contains a summary of the characteristics of $N = 80$ participants, expressed as the frequencies (counts and perce*nta*ges) in each specified category.

Table 3

Characteristics of Participants

Characteristic	Category	*N*	%
Gender	Male	72	90.0
	Female	8	10.0
Age (Years)	18-20	5	6.3
	21-39	42	52.5
	40-59	33	41.3
Race	Caucasian (White)	45	56.3
	African American	33	41.3
	Other (Not specified)	2	2.5
Years as of experience as a railroad employee (Job tenure)	< 1	18	22.5
	1-5	33	41.3
	6-10	29	36.3
Years with current employer	< 1	25	31.3
	1-5	37	46.3
	6-10	18	22.5
Job Category	Conductor	40	50.0
	Engineer	23	28.8
	Track Man	5	6.3
	Manager	5	6.3
	Administrator	4	5.0
	Supervisor	1	1.3
	Team Leader	1	1.3
	Other (Not specified)	1	1.3

The majority of the respondents (*n* = 72, 90.0%) were male. The respondents ranged in age from 18 to 59 years, and over half (*n* = 42, 52.5%) were 21 to 39 years old. The majority of the respondents described their race as Caucasian/White (*n* = 45, 56.3%) or African American *(n* = 33, 41.3%). Their years of experience as railroad employees (job tenure) ranged from < 1 to 10 years. The most frequent category (*n* = 33, 41.3%) was 1 to 5 years. The respondents had been with their current employer for less than 1 to 40 years. The most frequent category (*n* = 37, 46.3%) was 1 to 5 years. Half of the

respondents defined their job category as conductor (*n* = 40). The next most frequent job category was engineer (n = 23, 28.8%). The remaining approximate one fifth of the respondents defined their job categories as (a) track man, (b) manager, (c) administrator, (d) supervisor, (e) team leader, or (f) not specified.

Descriptive Analysis of Questionnaire Responses

In Table 4, I present the summary descriptive statistics for each primary variable.

Table 4

Descriptive Statistics for Perceptions of Safety Climate and Task Identify

Variable	*N*	*M*	*Mdn*	Mode	*SD*	Skew	Min	Max
Perceptions of safety climate	80	4.74	5.00	5.00	0.80	-1.65	1.90	6.00
Task identity	80	3.78	4.00	4.00	0.78	-0.92	1.00	5.00

Descriptive Analysis of Responses

In Figures 6 and 7, I illustrate the frequency distributions of the averaged scores for Perceptions of Safety Climate and Task Identity.

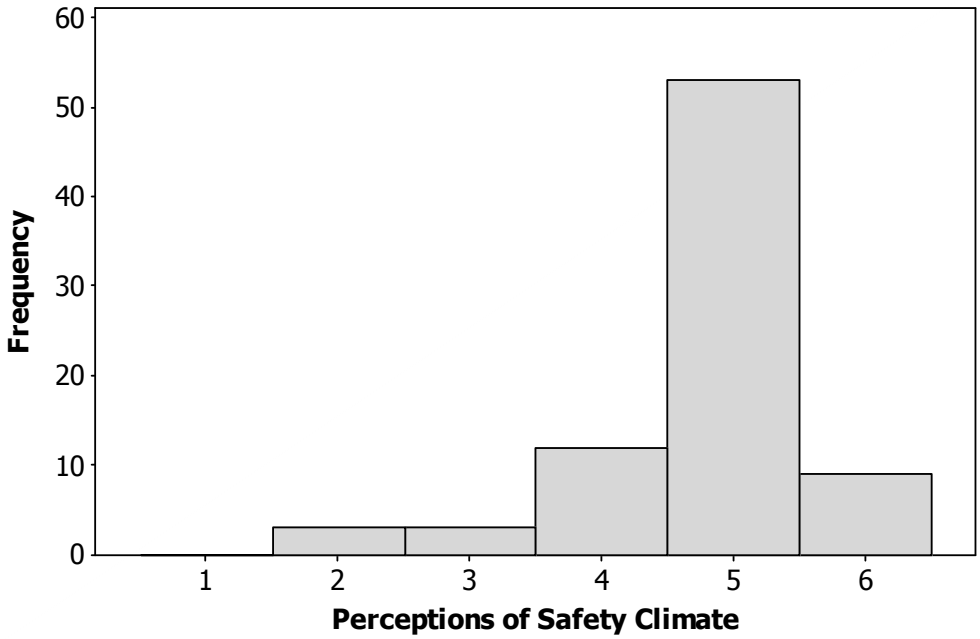

Figure 6. Frequency distribution of respondents' scores for Perceptions of Safety Climate.

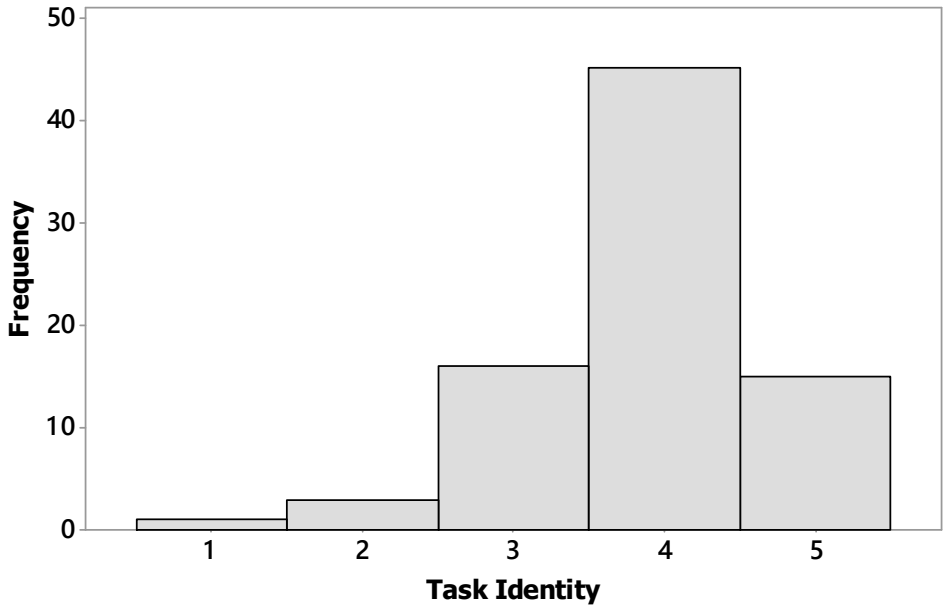

Figure 7. Frequency distribution of respondents' scores for Task Identity.

The frequency distributions of the mean scores skewed negatively and contained modes at the higher ends of the scales. The modes were located at average scores between 4.5 and 5.5 (endorsed by n = 53, 66.3% of the respondents) for Perceptions of Safety Climate and between 3.5 and 4.5 for Task Identity (endorsed by n = 45, 56.3% of the respondents).

As demonstrated in Table 4 and Figures 6 and 7, the descriptive statistics for Perceptions of Safety Climate and Task Identify indicated deviations from normality, with respective by the negative skewness statistics (-1.65 and - 0.92) mean scores (M = 4.74 and 3.78) that were lower than the median scores (Mdn = 5.00 and 4.00 respectively). Consequently, I concluded that that the use the use of parametric inferential statistics (e.g., Pearson's correlation and multiple regression analysis) to test the hypotheses was *not* justified.

Figure 8 illustrates the frequency distributions of the scores for the nine dimensions of job satisfaction. I found that the frequency distributions of the scores for all of the dimensions tended to skew, indicated by modes at the higher end of the scales, between scores of 5 and 6. The skewed distributions reflected the consistently high levels of agreement of the majority of the respondents with the JSS items.

I determined that these variables tended to deviate from normality, indicated by the consistently negative skewness statistics (-0.75 for Pay to -1.21 for Supervision); and mean scores (M = 4.44 for Pay to 5.18 for Nature of Work) that tended to be lower than the median scores (Mdn = 5.00 for all dimensions except 5.25 for Coworkers and Nature of Work).

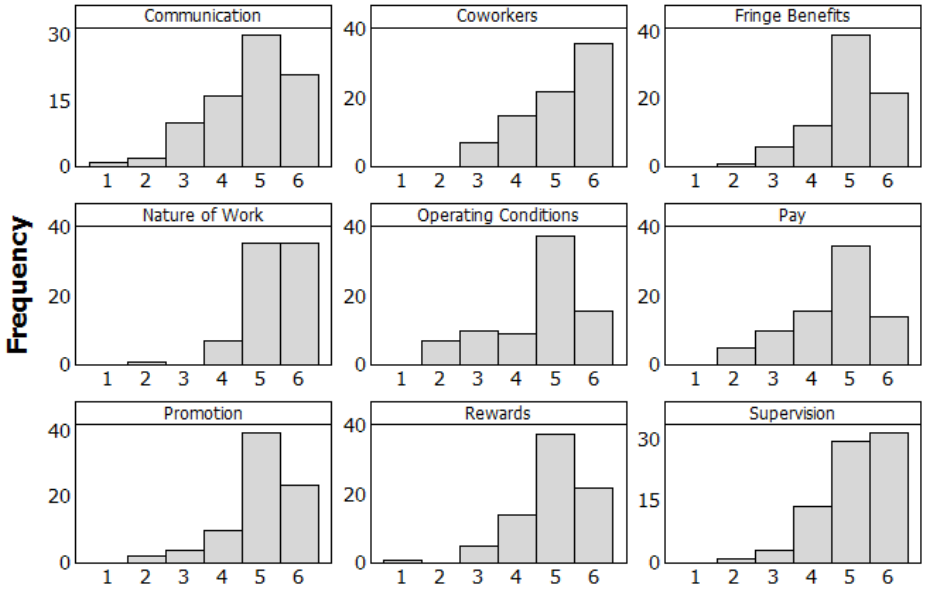

Figure 8. Frequency distribution of scores for nine dimensions of job satisfaction.

Due to the violation of the normality assumption, I could not utilize parametric statistics (e.g., Pearson's correlation and multiple regression analysis) to test the hypotheses. Because the data were not normally distributed, I did not use the classical parametric theoretical framework to compute the mean, standard error, and 95% confidence intervals of the β coefficients, or the *t*-test statistics to infer the significance of the β coefficients. However, the use of PLS-SEM was justified because PLS-SEM is a nonparametric or distribution free method that is insensitive to the distributional characteristics of the variables (Hair et al., 2014). Accordingly, in the following heading I present the findings from using PLS-SEM analysis to address the three research questions.

Evidence to Address the Research Questions

The overarching research question of this study was RQ1: Within the context of the hypothesized SEM path model, what is the relationship between railroad workers' organizational safety climate and railroad workers' job satisfaction? I present the following headings containing the statistical evidence for testing the hypotheses associated with sub-question SQ2: To what extent does safety climate mediate the relationship between railroad workers' task identity and job satisfaction within the hypothesized SEM path model? To address sub-question SQ3, I utilized: To what extent does job tenure moderate the relationship between railroad workers' task identity, and job satisfaction within the hypothesized SEM path model?

Test of $H1_0$: Task Identity and Job Satisfaction

I explored the data using scatterplots, to guide development of SEM path models, and to test the null and alternative hypotheses: $H1_0$: There will not be a statistically significant zero order correlation between the railroad workers' Task Identity and Job Satisfaction; and $H1_A$: There will be a significant zero order correlation between the railroad workers' Task Identity and Job Satisfaction.

In Figure 9, I present a matrix plot containing the scatter plots of the relationships between Task Identity and the nine dimensions of Job Satisfaction. Figure 10 contains the PLS path model that I constructed to test H1.

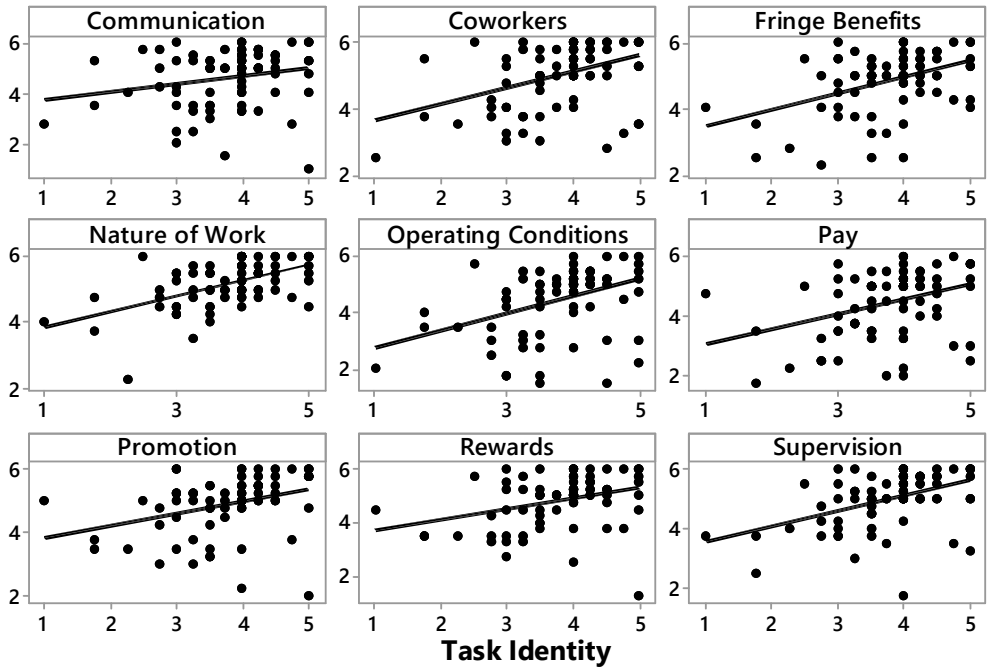

Figure 9. Matrix plot of linear trends between Task Identity and the nine dimensions of Job Satisfaction.

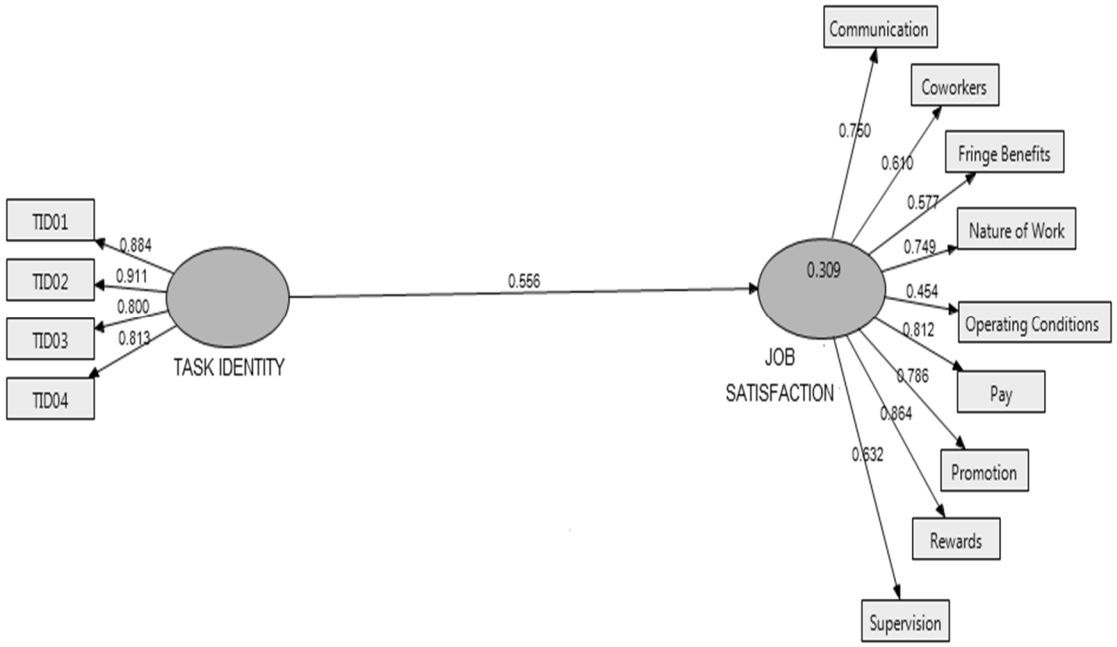

Figure 10. PLS path model constructed to test H1 (GUI output from SmartPLS).

I noted that the factor loading coefficients among the four reflective indicators for Task Identity (λ = .800 to .911) and the nine reflective indicators for Job Satisfaction (λ = .454 to .864) reflected convergent validity of the measurement model (Hair et al., 2014). I noted that the indicators explained more than half of the variance in each latent variable (AVE = 59.5% for Job Satisfaction and AVE = 72.8% for Task Identity) also reflecting convergent validity. The internal consistency of the latent variables indicates by the composite reliability coefficients of .90 for Job Satisfaction and .91 for Task Identity. I also established strong discriminant validity using Wong's (2013) criterion because the square roots of the AVE expressed as decimals (.771 for Job Satisfaction and .853 for Task Identity) were larger than the path coefficient between the two latent variables (β = .566).

The SmartPLS bootstrapping algorithm computes descriptive and inferential statistics to test the three hypotheses (with 5000 subsamples, and 80 cases in each sample). Table 5 contains the bootstrapped mean (*M*), standard error (SE), and *95*% confidence intervals (CI) for the β coefficient, as well as the *t*-test statistics computed to test H1.

Table 5

Bootstrapped Descriptive and Inferential Statistics Used to Test H1

Path	*M*	*SE*	*95% CI*	*T*	*P*
Task Identity → Job Satisfaction	*.556*	*.085*	*.389, .723*	*6.51*	*<.001*

Using bootstrapping, I determined that the positive PLS path coefficient between Task Identity and Job Satisfaction (β = .556, SE = .085) was significantly larger than zero ($t = 6.51$, $p < .001$) providing sufficient evidence to reject $H1_0$ and to support $H2_A$. I concluded that a statistically significant zero order correlation existed between the Task Identity and Job Satisfaction of the participating railroad workers.

I computed an R^2 value**,** of 30.9%, which represented the amount of variance in the outcome variable explained by the predictor variable (Hair et al., 2014). I used the following criteria for interpreting the value of R^2: 1%- 30% is *weak*; 31%- 66% is *moderate* and 67% and higher is *large* (Henseler et al., 2009). The R^2 value indicated that the variance in Task Identity explained a relatively moderate proportion (30.9%) of the variance in Job Satisfaction. I therefore concluded that when Task Identity was high, Job Satisfaction was probably also high. Conversely, when Task Identity was low, Job Satisfaction was probably also low.

Test of $H2_0$: Mediating Effect of Safety Climate

Figure 11 is a scatter plot reflecting a positive linear relationship between Task Identity and Perceptions of Safety Climate. I constructed a PLS path model to test: $H2_0$: Perceptions of Safety Climate does not act as a mediator in the partial correlation between Task Identity and Job satisfaction; and $H2_A$: Perceptions of Safety Climate does act as a mediator in the partial correlation between Task Identity and Job satisfaction. The PLS path model is in Figure 12.

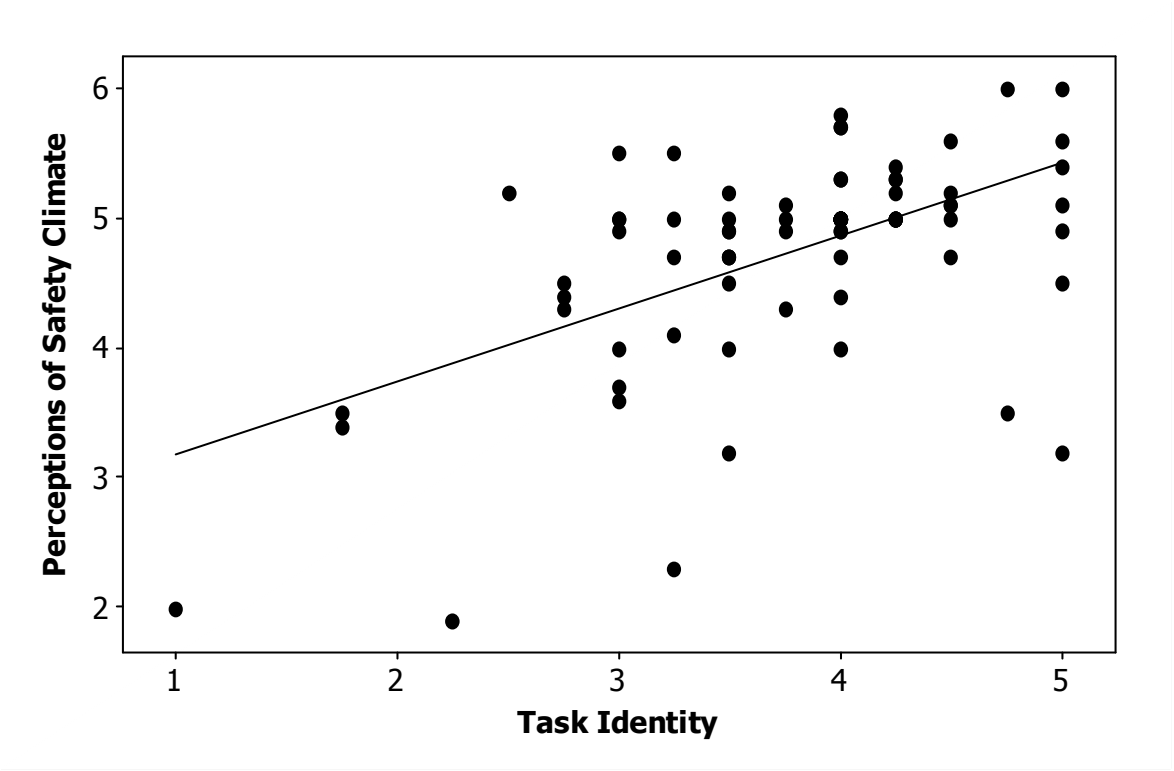

Figure 11. Linear trend between Task Identity and Perceptions of Safety Climate.

To test for mediation, I introduced Perceptions of Safety Climate into the PLS path model at the center of a triangle of arrows between Task Identity and Job Satisfaction. I confirmed the convergent validity of Perceptions of Safety Climate by the strong factor loading coefficients of its ten indicators (λ = .741 to .858) and by the average variance explained (AVE = 72.9%). I also determine that the internal consistency reliability of Perceptions of Safety Climate was high (composite reliability coefficient = .95). Using the criteria for the interpretation of R^2 defined by Henseler et al. (2009) Task Identity explained a relatively moderate proportion (R^2 = 32.6%) of the variance in Perceptions of Safety Climate. I summarized the bootstrapped descriptive and inferential statistics used to test H2 in Table 5.

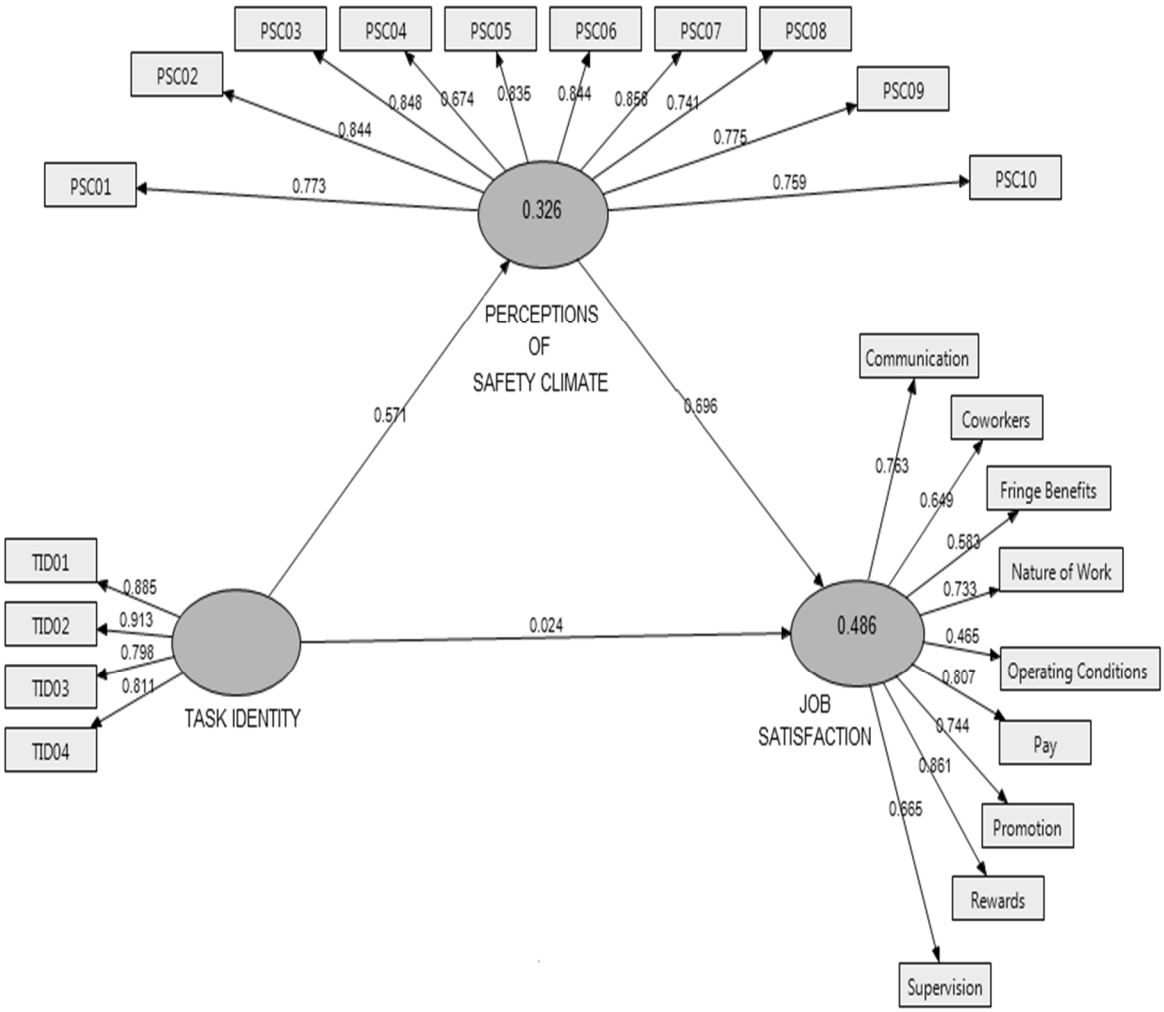

Figure 12. PLS path model constructed to test H2 (GUI output from SmartPLS).

Table 5.

Bootstrapped Descriptive and Inferential Statistics Used to Test H2

Path	*M*	*SE*	*95% CI*	*t*	*P*
Task Identity → Perceptions of Safety Climate	*.571*	*.120*	*.336, .806*	*4.74*	*<.001*
Perceptions of Safety Climate→ Job Satisfaction	*.696*	*.041*	*.616, .776*	*17.52*	*<.001*
Task Identity → Job Satisfaction	*.024*	*.002*	*.020, .028*	*0.49*	*.622*

The results of the *t*-tests indicated that the PLS path coefficient between Task Identity and Perceptions of Safety Climate was significantly larger than zero (β = .571, *SE* = .120; *t* = 4.74, *p* < .001), and the PLS path coefficient between Job Satisfaction and Perceptions of Safety Climate was also significantly larger than zero (β = .696, *SE* = .041, *t* = 17.52, *p* <.001). The two statistically significant path coefficients satisfied the criterion of mediation analysis that the mediator variable correlate significantly with *both* the predictor variable and the outcome variable (McKinnon, 2007).

The square roots of AVE (.771 for Job Satisfaction; .853 for Task Identity, and .853 for Perceptions of Safety Climate) were larger than the two path coefficients (β = .571 and β = .696 respectively) indicating strong discriminant validity (Wong, 2013). Consequently, when Task Identity was high, Perceptions of Safety Climate and Job Satisfaction were also high. Conversely, when Task Identity was low, Perceptions of Safety Climate and Job Satisfaction were also low.

I noted that the PLS path coefficient in Figure 12 between Task Identity and Job Satisfaction (mediated by Perceptions of Safety Climate) was not significantly different from zero (β = .024, *SE* = .002; *t* = 0.49, *p* = .622). This path coefficient (β = .024) was lower than the coefficient when there was no mediation (β = .556, *SE* = .080) in Figure 10). I used Sobel's test of mediation (Sobel statistic = 4.58, *p* < .001) to determine if Perceptions of Safety Climate had a significant mediating effect. Consequently, I concluded that β = .024 (when there was mediation) was significantly lower than β = .556 (when there was no mediation).

Because the path coefficient between Task Identity and Job Satisfaction in Figure 12 (β = .024) was not significantly different from zero, I provided sufficient statistical

evidence to reject $H2_0$ and to support $H2_A$. Perceptions of Safety Climate mediated the partial correlation between Task Identity and Job satisfaction.

Test of $H3_0$: Moderating Effect of Job Tenure

I constructed a PLS path model to test the following null and alternative hypotheses: $H3_0$: Job Tenure does not have a moderating effect on the partial correlation between Task Identity and Job Satisfaction; and $H3_A$: Job Tenure does have a moderating effect on the partial correlation between Task Identity and Job Satisfaction. In Figure 13, I present the PLS path model that I constructed to test $H3_0$. I used one formative indicator to operationalize Job Tenure, using the demographic questionnaire as one categorical variable with three ordinal levels. Because I could use only one indicator, I did not estimate the loading coefficient, convergent validity, discriminant reliability, or internal consistency reliability of Job Tenure. Using the criteria of Henseler et al. (2009) I concluded that Task Identity explained a moderate proportion of the variance in Job Satisfaction when Job Tenure was included in the model ($R^2 = 36.2\%$).

I summarized the bootstrapped descriptive and inferential statistics used to test H3 in Table 6. The positive PLS path coefficient between Task Identify and Job Satisfaction (see Figure 13) was statistically significant ($\beta =. 564$, $SE = .097$, $t = 5.83$, $p < .001$). I also noted the PLS path coefficient between Job Tenure and Job Satisfaction ($\beta = .237$, $SE = .090$, $t = 2.63$, $p = .009$) was significant, and concluded that workers with more experience were generally more satisfied with their jobs.

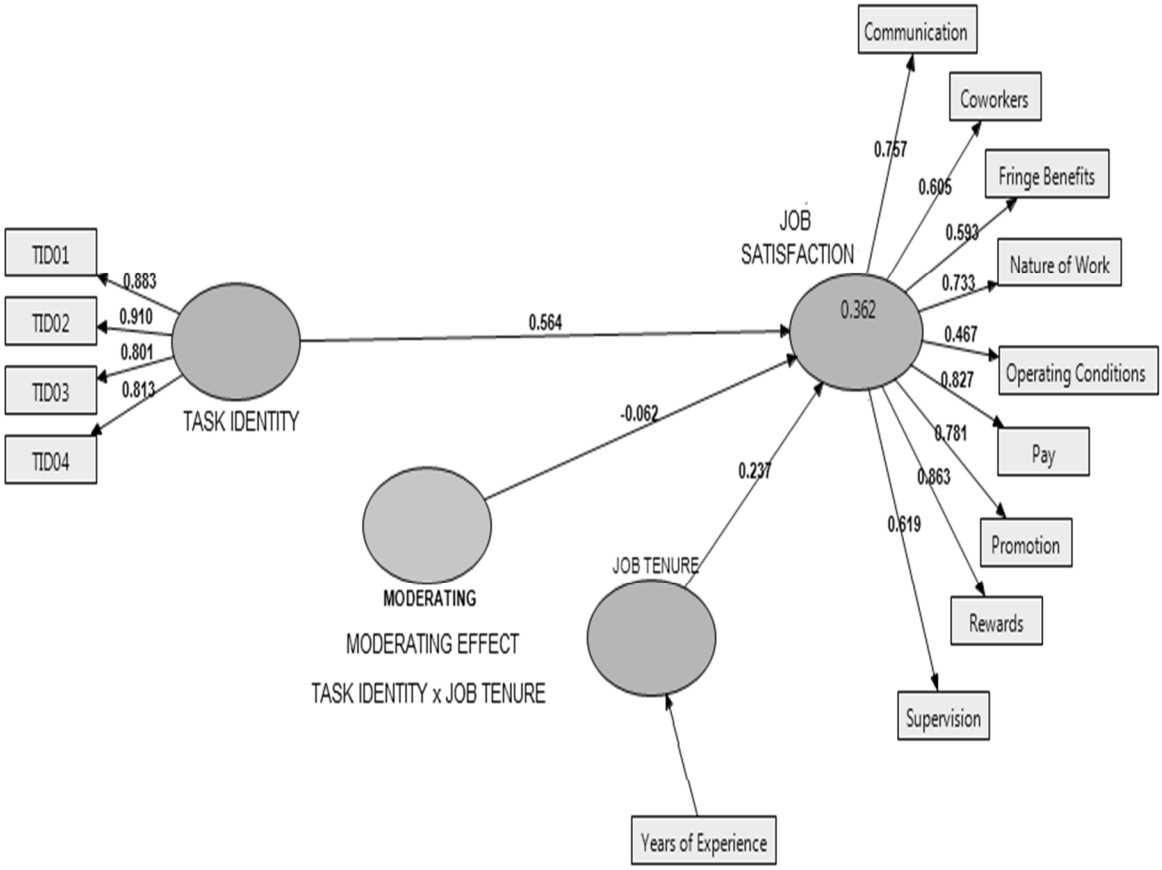

Figure 13. PLS path model constructed to test H3 (GUI output from SmartPLS).

Table 6.

Bootstrapped Descriptive and Inferential Statistics Used to Test H3

Path	*M*	*SE*	*95% CI*	*t*	*P*
Task Identity → Job Satisfaction	*.564*	*.097*	*.374, .754*	*5.85*	*<.001*
Job Tenure → Job Satisfaction	*.237*	*.090*	*.061, .413*	*2.63*	*.009*
Task Identity x Job Tenure → Job Satisfaction	*-.062*	*.046*	*-.152, .028*	*0.75*	*.453*

The moderating effect of Job Tenure on the relationship between Task Identity and Job Satisfaction (expressed as the product of Task Identity x Job Tenure) was not

statistically significant (β = -.062, *SE* = .046, *t* = 0.75, *p* = .453). The non-significant path coefficient (β = -.062) for the moderating effect provided insufficient statistical evidence to reject $H3_0$ or to support $H3_A$. I therefore concluded that Job Tenure did not have a moderating effect on the correlation between Task Identity and Job Satisfaction, and that no significant change in the strength of the correlation between Task Identity and Job Satisfaction occurred with railroad employees' years of experience, and task identity.

Interpretation of Findings in Relation to Research Questions

The findings relates to the three variables: Job Satisfaction, Job Tenure, Task Identity, and Perceptions of Safety Climate. I continue by summarizing and interpreting the evidence to address the research questions for this study:

RQ1: Within the context of the hypothesized SEM path model, what is the relationship between railroad workers' organizational safety climate and railroad workers' job satisfaction?

SQ2: To what extent does safety climate mediate the relationship between railroad workers' task identity and job satisfaction within the hypothesized SEM path model?

SQ3: To what extent does job tenure moderate the relationship between railroad workers' task identity, and job satisfaction within the hypothesized SEM path model?

Job Satisfaction

Job satisfaction referred to the perceptions of the railroad workers regarding their job related activities and environment, involving a combination of psychological and emotional experiences (Mehta, 2012). I operationalized nine dimensions of job satisfaction with adequate to good levels of internal consistency reliability using the 36

responses to the Job Satisfaction Survey (JSS, Spector, 1997). I noted that the frequency distributions of the nine dimensions based on the responses of 80 participants negatively skewed with modes at the higher ends of the scales.

Spector (2011) characterized JSS scores with a mean item response ≥ 4.0 (after reverse scoring the negatively worded items) as reflecting *higher* levels of job satisfaction, and mean responses ≤ 3.0 as representing *dissatisfaction*. Using Spector's criteria, the mean scores reported by the railroad workers revealed consistently high levels for all of the nine dimensions of job satisfaction. The lowest levels of satisfaction were for Pay ($M = 4.44$) and for Operating Conditions ($M = 4.46$). The interpretation of the relatively low scores for items concerning Operating Conditions is relevant to an understanding of the safety climate because *Operating Conditions* refers to required policies, rules and procedures. Although not specifically identified, it is possible that the respondents were referring to the difficulties they experienced in adhering to the very stringent safety rules, and/or to the importance of safety performance as a key measure of performance (Evans, 2011; Giles, 2011; Dempsey, 2012).

Spector (2011) suggested that researchers use a normative approach to compare the sample mean scores obtained for the nine JSS dimensions against U.S. norms. Consequently, I referenced the norms in Table 7. Spector warned, however, that the U.S. norms are not entirely representative of the U.S. population, because the participants in the normative sample represented a relatively small number of occupations and organizations. The normative sample contained an over-abundance of public sector and healthcare workers, who might possibly exhibit lower job satisfaction levels than private sector and other types of employees. I could not confidently determine if the job

satisfaction levels of the railroad employees recruited in the current study were significantly higher in other equivalent professions.

Table 7

Comparison of Job Satisfaction Levels of Railroad Employees vs. US Norms

Dimension of Job Satisfaction	US Norms (Spector, 2011)	Railroad Employees (This study)
Communication	3.63	4.60
Coworkers	4.48	4.98
Fringe Benefits	3.88	4.82
Nature of Work	4.68	5.18
Operating Conditions	3.70	4.46
Pay	3.43	4.44
Promotion	3.30	4.89
Rewards	3.65	4.82
Supervision	4.68	4.99

Task Identity

I measured Task Identity with the Job Characteristics Inventory (JCI, Sims et al., 1976) to determine the extent to which the respondents were able to do an entire or whole piece of work, and could clearly identify the results of their efforts (Shultz & Shultz, 2010). The difficulties that employees experience with *round the clock* work schedules and limited staffing mean that Task Identity is an important safety issue in the railroad industry, providing the rationale for including Task Identity in this study (Gertler & Nash (2004).

The 80 railroad workers who participated in this study generally reported high levels of Task Identity. Over three quarters of the respondents consistently replied *quite a lot* or *very much* too; how often do you see jobs through to completion? How often do

you have the opportunity to complete the work you start? How often do you have the opportunity to do a job from the beginning to the end (i.e., the chance to do a whole job) and How often do you do you do a "whole" piece of work (as opposed to doing part of a job which is finished by some other employee)? The implications are that most of the respondents did not self-report low levels of Task Identity associated with staffing inefficiencies, such as sub-optimal, fatigue-impaired performance, reflected by not being able to effectively complete a piece of work from beginning to end (Gertler & Nash, 2004). The respondents did not report low Task Identity due to fatigue, which is an industry-wide job characteristic for railroad workers. Fatigue reduces performance and job satisfaction (Gertler & Viale, 2006). The majority of the respondents did not self-report low levels of Task Identity associated with the Hours of Service Act (HSA). The HSA constrains the options available to schedulers in filling vacancies in dispatching, and can result in requiring schedulers to find solutions at short notice (U.S. DOT, 2014).

Perceptions of Safety Climate

I operationalized Perceptions of Safety Climate, with a high level of internal consistency reliability, by averaging the constituent item scores for the Safety Climate Survey (SCS; Sexton et al., 2003). The railroad workers who participated in this study generally reported positive perceptions towards their safety climate. Similar to the responses to the Job Satisfaction Survey and the Job Characteristics Inventory, the responses to the items about safety climate skewed strongly toward the higher end of the scale. Over half of the respondents consistently agreed with all of items concerning the beneficial aspects of the safety climate. My finding suggests that the majority of the railroad workers (at least those in the organization used in the setting for this study)

agreed that they had a healthy and positive safety climate. This finding is important because the safety climate in an organization is a job characteristic connected to employees' perceptions of their work environment that are linked to job satisfaction, motivation, and productivity (Clarke, 2013). A strong safety climate is a key factor to ensure a high level of worker job satisfaction in the transportation industry (Behm. 2009).

Correlation Between Task Identity and Job Satisfaction

I operationalized Task Identity as a construct with good internal consistency reliability by averaging the scores for the four JCI items. I found that the frequency distribution of Task Identity negatively skewed and had a conspicuous mode at the higher end of the scale. The frequency distributions of Task Identity reflected the frequency distributions of the nine dimensions of Job Satisfaction. Accordingly, I found that Task Identity correlated significantly positively with Job Satisfaction. The PLS path model provided sufficient statistical evidence to conclude that when Task Identity was high, Job Satisfaction was probably also high. Conversely, when Task Identity was low, Job Satisfaction was probably also low. The R^2 value indicated that a moderate proportion (30.9%) of the variance in Job Satisfaction explained the variance in Task Identity. My findings were consistent with other studies reporting that Task Identity correlated positively with Job Satisfaction (Mathieu, Hoffman, & Farr; 1993; Morris & Venkatesh, 2010).

Hence, I concluded that the majority of the railroad employees self-reported that they were able to do an entire or whole piece of work, and this ability was associated with their high levels of job satisfaction. The evidence indicated that most of the respondents perceived that Task Identity was not a major issue.

Mediating Effect of Perceptions of Safety Climate

I obtained statistical evidence using a PLS path model to address SQ2: To what extent does safety climate mediate the relationship between railroad workers' task identity and job satisfaction? The answer was that I found that the mediating effect of Perceptions of Safety Climate was complete and not partial, because the correlation between Task Identity and Job Satisfaction effectively eliminated by the controlling effect of Perceptions of Safety Climate. Complete mediation meant that Safety Climate was the root cause of the correlation between Task Identity and Job Satisfaction (Beus et al. 2010). I therefore had sufficient statistical evidence to support the research hypothesis that Perceptions of Safety Climate mediated the partial correlation between Task Identity and Job satisfaction. This finding was consistent with Lin (2012) who reported that a strong and respected safety climate expects to influence underlying worker job satisfaction. This finding was also consistent with the suggestion of Beus et al. (2010) that safety climate modeled as a mediating variable. The results of the mediation analysis emphasized Clarke's (2013) suggestion that the safety climate is a job characteristic that connects closely with employees' perceptions of their work environment linked to job satisfaction. When workers believe in the efficacy of their safety climates, they are more committed to reaching organizational goals, because a strong safety climate increases trust and commitment, leading to higher levels of job satisfaction (Crossman, 2008).

Determining that Perceptions of Safety Climate was a statistically significant mediator between Task Identity and Job Satisfaction provided evidence that that complete mediation occurred. Other, perhaps less plausible interpretations is possible (McKinnon, 2007). The mediation analysis would be severely compromised if there was

a reverse causal effect (i.e., if Perceptions of Safety Climate was caused directly Job Satisfaction). A reverse causal effect, however, was unlikely. Perceptions of Safety Climate would not be a significant mediator if I committed a model specification error, meaning that I omitted an important controlling variable from the analysis that could potentially be the root cause of the correlation between Perceptions of Safety Climate and Job Satisfaction. I consider the potential missing variable used to re-specify the model in the section concerning recommendations for further research.

If Perceptions of Safety Climate and Task Identity were not reliably measured, then the mediating effect of Perceptions of Safety Climate could be underestimated and the correlation between Task Identity on Job Satisfaction could be over-estimated (McKinnon, 2007). The predictor and mediator, however, measured very reliably in this study. The source of the correlations between Task Identity, Perceptions of Safety Climate, and Job Satisfaction could possibly be due to a common instrument effect, implying that the three variables were measured using similar scales, and implying a lack of discriminant validity. The three variables were measured using different instruments. The analysis of discriminant validity indicated that a common instrument effect was not a source of error, because the square roots of the average variances explained (AVE) were greater in magnitude than the PLS path coefficients (Wong, 2013).

Moderating Effect of Job Tenure

I provided evidence using a PLS path model to indicate that the job satisfaction levels of the railroad employees' were positively correlated with job tenure, over the range of years of experience from < 1 to 10. These results were consistent with those of Oshagbemi (2003) who found that job satisfaction was low within the first few years of

employment and remained low for several years, after which it increased. As employees became more mature and experienced, their initial expectations declined to levels that are more realistic and making expectations more attainable, coinciding with increased job satisfaction. Mullins (2006) similarly reported that job satisfaction was at low levels among younger employees with limited experience, who were just starting on their career, and for employees at mid-career positions, because they found limited opportunities for promotion or further advancement. Older employees with greater years of experience, however, had more seniority, enabling them to move more easily into more satisfying jobs.

Based upon my analysis of the PLS-path model, there was insufficient statistical evidence to address SQ3: To what extent does job tenure moderate the relationship between railroad workers' task identity, and job satisfaction? I concluded that Job Tenure did *not* have a moderating effect on the correlation between Task Identity and Job Satisfaction. Consequently, if railroad employees exhibited a combination of high years of experience, and high levels of Task Identity, then the strength of their correlation between Task Identity and Job Satisfaction was not significantly changed. My conclusion is also consistent with Schultz and Schultz's (2010) that the relationships between job characteristics and work-related outcomes may or *may not* moderate with levels of their experience. My finding also did not confirm the results of previous surveys of railroad workers, in which participants with the most tenure recognized the influence of their safety climate (Alm et al., 2012) whereas workers with limited experienced failed to understand their safety climate impact (Read et al. 2012).

I found that the hypothesized mediating effect of Job Tenure was not statistically significant using a PLS path model does not necessarily imply that Job Tenure was not a moderator. The lack of statistical significance might be because I measured Job Tenure as an ordinal variable (using a 3-point scale) rather than an interval level variable (measured in years). Agresti (2010) suggested that when correlation and regression analysis are conducted using ordinal variables, measured with 5-point scales or less, then the coefficients' sizes may be reduced (i.e., misleadingly low) due to the discrete distributional characteristics of the data. Consequently, if I had operationalized Job Tenure as an interval level variable (in years, from 18 to 65) rather than an ordinal level variable (with three levels), then the PLS path coefficient I computed to estimate the moderating effect of Job Tenure could have been higher and statistically significant.

My findings support the Job Characteristics Theory (JCT) positing that job characteristics, specifically, task identity and the safety climate, can influence performance and correlation of personal and work-related outcomes, specifically job satisfaction in the context of the current study (Shultz & Shultz, 2010). My findings are also consistent with the survey data of Lauver et al. (2011) supporting the proposition of the JCT that closely links job characteristics to employee job satisfaction. The PLS path models that I constructed are consistent with the SEM model constructed by Morris and Venkatesh (2010) underpinned by the JCT, predicting Task Identity as an independent job characteristic that is positively correlated predictor of Job Satisfaction.

Applications to Professional Practice

My finding that Perceptions of Safety Climate is a significant moderator of the relationship between Task Identity and Job Satisfaction has implications for business

practice. This finding implies that railroad transportation managers and employees now have objective evidence to show that their organizations' safety climate relates directly to Task Identity and Job Satisfaction. The implications are that the majority of the employees in this study expressed high levels of Task Identity, Perceptions of Safety Climate, and Job Satisfaction, exhibited positive attitudes, and were more committed to safety management policies. The managers of the railroad organization (at least in the organization that was the setting for the current study) appear to understand the concept that developing a strong safety climate is essential to improve both the Task Identity and the Job Satisfaction of their employees (Blewett et al., 2013; Clarke, 2013).

Although not measured in this study, the high levels of Task Identity, Perceptions of Safety Climate, and Job Satisfaction, may be potentially correlated with a lower rate of accident involvement (Nielsen et al., 2013) and lower injury and illness rates (Gilkey et al., 2012). The results of this study may have demonstrated that leaders within the railroad industry appear to have been working diligently to find ways to improve the safety climate and reduce the risks thereby improving the job satisfaction levels and performance of employees (Vazquez, 2014) which can result in reducing accident rates and thereby improve business performance.

Implications for Social Change

From a social change perspective, the results of the study provided further support for railroad transportation managers' initiatives to improve employee job satisfaction through implementing new programs to improve the safety climate. Railroad leaders should be able to prevent many workplace injuries and accidents through the proper implementation of new safety initiatives (Hallowell & Calhoun, 2011). Ensuring that all

employees are well educated in safety initiatives should create a more knowledgeable and satisfied workforce understanding and contributing to operational practices (Lin 2012; Williams, 2012). To avoid accidental injuries to themselves, their co-workers, and the public, it is essential that all railroad workers be committed to safety issues. Workers must also demonstrate their agreement with the safety climate (a) attending safety meetings, (b) continuing training on safety issues, (c) analyzing all potential job hazards, and (d) weaving safety into the heart of all working tasks (Mandel & Hensen, 2011). Improved understanding of the relationship between Perceptions of Safety Climate, Task Identity and Job Satisfaction may also result in a beneficial social change by reducing accidents and thereby providing a safer environment for the public while ensuring railroad workers have steady employment and an ability to support their families (Lawrence et al., 2014). This improved understanding also supports the legal requirements to support public demands for better and safer conditions for the railroad industry work force (LaRocco & Radek, 2013).

Recommendations for Action

The relationships that I identified between task identity, safety climate, and job satisfaction will catalyze managers to improve (a) job design, (b) communication, and (c) worker involvement, which could (a) improve working conditions, (b) reduce workplace accidents, (c) increase the job satisfaction of employees, and (d) effect increases in employee productivity. The majority of the respondents in this study conveyed positive intensities of perceptions of the safety climate, as well as high levels of task identity and job satisfaction, there are still areas for improvement**.** I therefore recommend railroad leaders require a review of the implementation and concomitant communications

processes of safety initiatives to enable managers to more fully engage and protect a larger number of employees.

Railroad managers need to ensure that employees have a voice as it relates to safety, emphasizing the importance of a more effective communication flow. Leaders can improve job satisfaction if employees receive feedback, if management involves them in decision-making, and if employees receive rewards for doing a good job (Schumacher, 2011). The railroad industry may be able to increase the job satisfaction levels more of its employees, as well as improving operating efficiency, by enriching the employees' knowledge and experience regarding safety initiatives, and by rewarding them for their efforts. I will use the results from this study in developing training programs for enabling railroad companies to better utilize and improve safety programs. Although my organization is making great strides in the area of implementing a positive and strong safety climate, I suggest that the management of railroad workers still have a lot of work to do. This suggestion, however, is my own personal viewpoint, seen through my own lens as a railroad manager. My current subjective values provide a starting point to catalyze further mixed methods research that may ultimately help improve understanding the relationships between tasks identity, safety climate, and job satisfaction in the railroad industry.

Recommendations for Further Research

One of the problems faced by researchers is compromised statistical models results when conducting mediation and moderation analysis. A model contains one or more variables that could potentially be significant predictors, mediators, or moderators (Edwards & Lambert, 2007). To augment the results of this study, future researchers

should consider identifying and adding other potentially significant variables to the PLS path model that I constructed to address the purpose of this study.

There was insufficient statistical evidence to conclude that Job Tenure was a moderating variable in the relationship between Task Identity and Job Satisfaction. Future research to test this relationship should measure Job Tenure as an interval level variable (measured in years). Furthermore, I did not include the employment status of the participants as a potential moderating variable. Employment status means whether the employees were part-time or full-time. Results from previous studies have indicated that employment status is a significant predictor of job satisfaction and other attitudinal variables such as task identity. I recommend that future researchers include both years of experience and employment status as potential moderating variables.

Another variable that I chose not to include in this study is organizational identification, defined generally as the alignment of employees toward organizational reality, specifically the extent to which employees and the organization share the same goals and values. The extent to which organizational identification is a predictor of task identity, perceptions of safety climate, and job satisfaction in the railroad industry is currently unknown.

Although I measured Communication as a dimension of Job Satisfaction, I did not include communication flow as a hypothetical moderator between Perceptions of Safety Climate and Job Satisfaction. Communication flow includes vertical exchanges of information emanating from management, horizontal exchanges of information between peers, and knowledge sharing between teams. Effective communication flow could affect workers' perceptions of safety climate and thereby job satisfaction (Crossman,

2008). Crossman (2008) suggested that effective communication flow results in a connection between a strong safety climate and high levels of worker job satisfaction within the same organization. Future researchers could examine operationalizing Communication as a potential moderator, which could modify the strength of the correlation between Perceptions of Safety Climate and Job Satisfaction. The Job Characteristics Inventory (JCI, Sims et al., 1976) instrument measures communication flow, because the JCI also includes a dimension termed "Interaction with Others". Alternatively, another valid and reliable instrument dedicated to measuring organizational communication flow is the 25-item Organizational Communication Survey (OCS, Putnam & Cheney, 1985).

In addition to additional quantitative research, to improve the quality of empirical statistical models constructed using SEM, I also suggest future researchers utilize qualitative research to identify and explore common themes and factors**.** Initially, I rejected a qualitative methodology, because the focus of this study was *not* to explore the individual experiences, impediments, links, or perceptions of the participants (Savage-Austin & Honeycutt, 2011). Furthermore, when the development of a theory is the researcher's primary focus, then a qualitative approach is applicable (Merriam, 2016). I considered, but excluded a mixed-method approach at the beginning because (a) the extensive time required for the collection and analysis of both qualitative and quantitative data (Frels & Onwuegbuzie, 2013), and (b) the mixed method approach can be problematic, associated with the problems of integrating or triangulating qualitative and qualitative data (Greenwood & Terry, 2012).

In retrospect, I believe that a mixed method approach could provide more empirical and conceptual insight into the potential causal relationships between task identity, safety climate, job tenure, and job satisfaction, and would help to provide more information to develop the Job Characteristics Theory. The reason why I used a mixed method approach is that I could only summarize and extract broad generalizations about the beliefs of the railroad employees using an objective descriptive and inferential analysis of self-reported quantitative data.

I recommend researchers explore the subjective values of the railroad workers in more detail, to explain why each individual responded differentially to each item in the survey instruments, and to explain why each individual's beliefs about task identity and the safety climate may improve (or not improve) the employee's level of job satisfaction. Subjective values include the personal beliefs of individuals about a product, service, or social issue (Merriam, 2016). Mixed method researchers promote the view that that quantitative and qualitative methodologies are in practice, complementary, and not in opposition to each other (Frels & Onwuegbuzie, 2013; Creswell, 2014).

It is more difficult and time consuming to collect and interpret the subjective values of individuals using qualitative methods than it is to summarize the self-reported responses of a group using a quantitative survey method (Creswell, 2014). Despite the extra time and effort involved, I recommend collecting further information using face-to-face interviews rather than self-report questionnaires.

Face-to-face interviews may be less prone to response bias than self-report computer-based instruments (Merriam, 2016). In a face-to-face interview, the researcher is physically present to develop a rapport with the respondent, to ask and clarify

questions, and to encourage answers. In depth, open-ended interviews can offer advantages over questionnaires in terms of the complexity and quality of the data reflecting the subjective values of individuals (Merriam, 2016). I recommend future researchers consider using content analysis to explore themes from interviewing railroad employees. In particular, the interviewees may be able to answer the critical question: Why do individual railroad workers perceive job satisfaction is improved (or not improved) by their perceptions of task identity and the safety climate?

Reflections

As I reflect on my experience within the DBA Doctoral Study process, I realize that I had several preconceived ideas and values prior to completing this study. The ideas and values included believing safety was a mindset of the individual, without other mitigating factors that could affect it. I now realize that I must reflect on my own subjective values. Being a manager in the railroad industry, I have reached the conclusion that the reason why railroad workers perceive an improvement of their job satisfaction by their task identity and their safety climate is that there is a consolidated team effort between management and the employees to improve the safety climate. There is no cognitive disconnect between how management and employees believe that they should collectively achieve overall job satisfaction. I now realize that the job satisfaction levels of railroad industry employees are already high (as reflected by the responses to the Job Satisfaction Survey) due to management's diligent efforts to ensure that employees have a voice as it relates to safety.

The railroads' leaders develop safety initiatives to protect *all* railroad employees. I therefore posit that all railroad workers should comply with all safety initiatives. The

safety rules and programs prevent injuries and deaths, to the public. Being a manager, I believe that all railroad employees should comply with every safety initiative, especially considering the environment that the employees work in. Establishing many of these safety initiatives was to prevent accidents or injury to an employee or to the public. The incorporation of safety initiatives by the employees is vital to the protection of the workers.

Conclusions

The findings, conclusions, and recommendations from my study may provide railroad, and other transportation managers, with catalysts for improving employee safety and job satisfaction. Motivating employees to participate in and support safety initiatives can result in a workforce committed to reducing accidents and improving operational practices benefiting both employees' and the public.

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Appendix A: Consent Form

You are invited to participate in a doctoral study analyzing the relationship between safety initiatives and employee job satisfaction. Railroad workers who are at least 18 years of age and have been employed with this company for at least one year are invited to participate. Your participation is completely voluntary thus no thank you gift(s), compensation, or reimbursement (for travel costs, etc.) will be given. This form is called an Informed Consent Form to describe this study, describe how your rights will be protected during the doctoral study process, and completing the agreement below will indicate your approval to participate in the study. As a participant, you may keep or print a copy of the consent form.

The researcher, Maurice C. Etheridge, an active doctoral student attending Walden University, will conduct this doctoral study. The research data obtained will examine perceptions of railroad employees and the correlation, if any, of imposed safety initiatives that can be used to help develop a framework for a model safety culture.

There are no known risks if you decide to participate in this research study, nor are there any costs for participating in the study. The information you provide will help me understand employee perceptions of the current safety climate in our organization. The information collected may not benefit you directly, but what I learn from this study could provide general benefits to employees, companies, and researchers. I am a manager within the organization, but this study is separate from that role. My only objective is to gather data that will help to understand employees' perceptions of the current safety climate.

This survey is anonymous. No one will be able to identify you as a respondent, nor will anyone be able to determine which department in the organization you work for. No one will know whether you participated in this study or not. Nothing you say on the questionnaire will in any way influence your present or future employment with your company.

Your participation in this study is voluntary and you have the option of discontinuing at any point in the study. Completing this survey and the Job Satisfaction Survey will take an estimated time of one hour or less. As the researcher, I Maurice Etheridge can be reached at maurice.etheridge@waldenu.edu or 770-316-2061.If there are any questions please about your rights as a participant please contact a Walden University representative at 612-312-1210. The IRB approval number is 08-13-15-0266024. This approval expires August 12, 2016.

Sincerely, Maurice Etheridge

Appendix B: Demographic Questionnaire

PLEASE CHOOSE ONE REPLY FOR EACH QUESTION THAT COMES CLOSEST TO REFLECTING YOUR BACKGROUND OR EMPLOYMENT STATUS

QUESTION	REPLY	
1. How long have you been a railroad employee?	1	Less than 1 year
	2	1 to 5 years
	3	6 to 10 years
	4	11 to 20 years
	5	More than 20 years
2. How long have you been with your current employer?	1	Less than 1 year
	2	1 to 5 years
	3	6 to 10 years
	4	11 to 20 years
	5	More than 20 years
4. What is your job category?	1	Administrator
	2	Engineer
	3	Track Man
	4	Conductor
	5	Supervisor
	6	Manager
	7	Team Leader
	8	Executive
	9	Other
5. What is your gender?	1	Female
	2	Male
6. What is your race/ethnic background	1	African American
	2	Asian or Pacific Islander
	3	Caucasian (White)
	4	Hispanic
	5	Native American/Alaskan
	6	Other

Appendix C: Safety Climate Survey

PLEASE CHOOSE ONE REPLY FOR EACH QUESTION THAT COMES CLOSEST TO REFLECTING YOUR OPINION

QUESTION	Strongly Disagree	Disagree	Disagree Slightly	Agree Slightly	Agree	Strongly Agree
7. The culture of this organization makes it easy to learn from mistakes of others.	1	2	3	4	5	6
8. Safety errors are handled appropriately.	1	2	3	4	5	6
9. Management does not compromise safety for productivity.	1	2	3	4	5	6
10. Management listens to my safety concerns.	1	2	3	4	5	6
11. Colleagues listen to my safety concerns.	1	2	3	4	5	6
12. Management is driving us to be a safety-centered organization.	1	2	3	4	5	6
13. My suggestions on safety would be acted upon if expressed.	1	2	3	4	5	6
14. The climate of this organization makes it easy to learn from mistakes of others.	1	2	3	4	5	6
15. Safety errors are handled appropriately.	1	2	3	4	5	6
16. Management does not compromise safety for productivity.	1	2	3	4	5	6
17. Management listens to my safety concerns.	1	2	3	4	5	6

Appendix D continued: Job Characteristics Inventory- Task Identity

PLEASE CHOOSE ONE REPLY FOR EACH QUESTION THAT COMES CLOSEST TO REFLECTING YOUR OPINION

QUESTION	Very Little	Sometimes	Moderate Amount	Quite a Lot	Very Much
18. How often do you see jobs through to completion?	1	2	3	4	5
19. How often do you have the opportunity to complete the work you start?	1	2	3	4	5
20. How often do you have the opportunity to do a job from the beginning to the end (i.e., the chance to do a whole job)?	1	2	3	4	5
21. How often do you do you do a "whole" piece of work (as opposed to doing part of a job which is finished by some other employee)?	1	2	3	4	5

Appendix E: Job Satisfaction Survey

	JOB SATISFACTION SURVEY Paul E. Spector Department of Psychology University of South Florida 	
	PLEASE CIRCLE THE ONE NUMBER FOR EACH QUESTION THAT COMES CLOSEST TO REFLECTING YOUR OPINION ABOUT IT.	Disagree very much Disagree moderately Disagree slightly Agree slightly Agree moderately Agree very much
1	I feel I am being paid a fair amount for the work I do.	1 2 3 4 5 6
2	There is really too little chance for promotion on my job.	1 2 3 4 5 6
3	My supervisor is quite competent in doing his/her job.	1 2 3 4 5 6
4	I am not satisfied with the benefits I receive.	1 2 3 4 5 6
5	When I do a good job, I receive the recognition for it that I should receive.	1 2 3 4 5 6
6	Many of our rules and procedures make doing a good job difficult.	1 2 3 4 5 6
7	I like the people I work with.	1 2 3 4 5 6
8	I sometimes feel my job is meaningless.	1 2 3 4 5 6
9	Communications seem good within this organization.	1 2 3 4 5 6
10	Raises are too few and far between.	1 2 3 4 5 6
11	Those who do well on the job stand a fair chance of being promoted.	1 2 3 4 5 6
12	My supervisor is unfair to me.	1 2 3 4 5 6
13	The benefits we receive are as good as most other organizations offer.	1 2 3 4 5 6
14	I do not feel that the work I do is appreciated.	1 2 3 4 5 6
15	My efforts to do a good job are seldom blocked by red tape.	1 2 3 4 5 6
16	I find I have to work harder at my job because of the incompetence of people I work with.	1 2 3 4 5 6
17	I like doing the things I do at work.	1 2 3 4 5 6
18	The goals of this organization are not clear to me.	1 2 3 4 5 6

	PLEASE CIRCLE THE ONE NUMBER FOR EACH QUESTION THAT COMES CLOSEST TO REFLECTING YOUR OPINION ABOUT IT. 	Disagree very mcuh	Disagree moderately	Disagree slightly	Agree slightly	Agree moderately	Agree very much
19	I feel unappreciated by the organization when I think about what they pay me.	1	2	3	4	5	6
20	People get ahead as fast here as they do in other places.	1	2	3	4	5	6
21	My supervisor shows too little interest in the feelings of subordinates.	1	2	3	4	5	6
22	The benefit package we have is equitable.	1	2	3	4	5	6
23	There are few rewards for those who work here.	1	2	3	4	5	6
24	I have too much to do at work.	1	2	3	4	5	6
25	I enjoy my coworkers.	1	2	3	4	5	6
26	I often feel that I do not know what is going on with the organization.	1	2	3	4	5	6
27	I feel a sense of pride in doing my job.	1	2	3	4	5	6
28	I feel satisfied with my chances for salary increases.	1	2	3	4	5	6
29	There are benefits we do not have which we should have.	1	2	3	4	5	6
30	I like my supervisor.	1	2	3	4	5	6
31	I have too much paperwork.	1	2	3	4	5	6
32	I don't feel my efforts are rewarded the way they should be.	1	2	3	4	5	6
33	I am satisfied with my chances for promotion.	1	2	3	4	5	6
34	There is too much bickering and fighting at work.	1	2	3	4	5	6
35	My job is enjoyable.	1	2	3	4	5	6
36	Work assignments are not fully explained.	1	2	3	4	5	6

Instructions for Scoring the Job Satisfaction Survey, JSS

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The Job Satisfaction Survey or JSS, has some of its items written in each direction--positive and negative. Scores on each of nine facet subscales, based on 4 items each, can range from 4 to 24; while scores for total job satisfaction, based on the sum of all 36 items, can range from 36 to 216. Each item is scored from 1 to 6 if the original response choices are used. High scores on the scale represent job satisfaction, so the scores on the negatively worded items must be reversed before summing with the positively worded into facet or total scores. A score of 6 representing strongest agreement with a negatively worded item is considered equivalent to a score of 1 representing strongest disagreement on a positively worded item, allowing them to be combined meaningfully. Below is the systematic procedure for scoring.

1. Responses to the items should be numbered from 1 representing strongest disagreement to 6 representing strongest agreement with each. This assumes that the scale has not be modified and the original agree-disagree response choices are used.

2. The negatively worded items should be reverse scored. Below are the reversals for the original item score in the left column and reversed item score in the right. The rightmost values should be substituted for the leftmost. This can also be accomplished by subtracting the original values for the internal items from 7.

1 = 6

2 = 5

3 = 4

4 = 3

5 = 2

6 = 1

3. Negatively worded items are 2, 4, 6, 8, 10, 12, 14, 16, 18, 19, 21, 23, 24, 26, 29, 31, 32, 34, and 36. Note the reversals are NOT every other one.

4. Sum responses to 4 items for each facet score and all items for total score after the reversals from step 2. Items go into the subscales as shown in the table.

Subscale	Item numbers
Pay	1, 10, 19, 28
Promotion	2, 11, 20, 33
Supervision	3, 12, 21, 30
Fringe Benefits	4, 13, 22, 29
Contingent rewards	5, 14, 23, 32
Operating conditions	6, 15, 24, 31
Coworkers	7, 16, 25, 34
Nature of work	8, 17, 27, 35
Communication	9, 18, 26, 36
Total satisfaction	1-36

5. If some items are missing you must make an adjustment otherwise, the score will be too low. The best procedure is to compute the mean score per item for the individual, and substitute that mean for missing items. For example, if a person does not make a response to 1 item, take the total from step 4, divide by the number answered or 3 for a facet or 35 for total, and substitute this number for the missing item by adding it to the total from step 4. An easier but less accurate procedure is to substitute a middle response for each of the missing items. Since the center of the scale is between 3 and 4, either number could be used. One should alternate the two numbers as missing items occur.