

THE MODERATING EFFECT OF SAFETY CLIMATE ON THE RELATIONSHIP BETWEEN JOB INSECURITY AND EMPLOYEE SAFETY OUTCOMES

By Jaclyn J. Tucker

To date, little research has been done in regard to the stressor-strain relationship between job insecurity and employee safety outcomes. The aim of the present study was to investigate this link further while incorporating the moderator of employee safety climate and addressing the gaps in the literature by utilizing non-self-report data in addition to the self-report data. Data was obtained for a 12-month time period from five locations within the same manufacturing facility and analyzed at the individual level in regard to self-report data and at the group level for non-self-report data. Results indicate mixed support in regard to individual level data and suggest a mixed model approach in regard to safety outcomes. Although further investigation is needed in regard to the job insecurity-employee safety outcomes relationship and other potential moderators to this relationship, results do indicate that safety climate may still play an important role within organizations.

THE MODERATING EFFECT OF SAFETY CLIMATE ON THE RELATIONSHIP
BETWEEN JOB INSECURITY AND EMPLOYEE SAFETY OUTCOMES

by

Jaclyn J. Tucker

A Thesis Submitted
In Partial Fulfillment of the Requirements
For the Degree of

Master of Science-Psychology

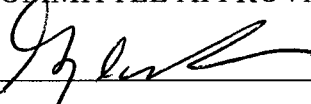
Industrial/Organizational Psychology

at

The University of Wisconsin Oshkosh
Oshkosh, WI 54901-8621

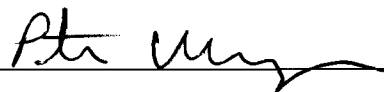
May 2010

COMMITTEE APPROVAL



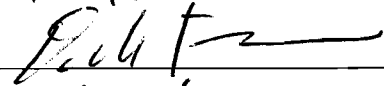
5/27/10 Date Approved

Advisor



5/26/10 Date Approved

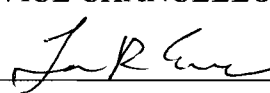
Member



5/26/10 Date Approved


Member

PROVOST
AND VICE CHANCELLOR



6/2/2010
Date Approved

FORMAT APPROVAL



5/12/2010
Date Approved

ACKNOWLEDGEMENTS

This thesis would not have been possible without the support and guidance of my advisor and teacher, Dr. Gary Adams. Thank you for supporting me in my thesis and interests despite not holding a personal interest in some of the topics themselves. Further, thank you for continuing to believe in me and support my interests even when they changed throughout this adventure, for this I am grateful. Also, thank you to Dr. Dale Feinaur and Dr. Peter Meyerson for agreeing to be on my thesis committee and for all of your feedback and knowledge.

Also, I would like to acknowledge and thank the organization that participated in my thesis with a special thank you to Suhas Apte (Vice-President, Sustainability), Gregg Clark (Manager, Global Occupational Safety & Hygiene), Maria Clough (Administrative Assistant, Global Occupational Safety & Hygiene), Steve Simon (Global Safety Leader, Nonwovens Sector) and Don F. Smith (Nonwovens Safety Leader, Neenah Nonwovens Sector). Without all of your continual help and willingness to take a gamble on a graduate student's dream this thesis would not have been able to be completed. Thank you for helping this graduate student actually graduate.

Finally, I would like to thank my Mother (Sue), Father (Tom), Stepfather (Don), Stepmother (Kathy) and Sissybabe (Jen) for being there to support me when I decided to further my education and being there for every stressful situation I encountered along the way. I appreciate you more than you will ever know and I thank you for believing in me, even when I forgot to keep believing in myself.

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	v
LIST OF FIGURES.....	vi
INTRODUCTION.....	1
LITERATURE REVIEW.....	5
Models of Workplace Safety.....	5
Safety Behavior.....	5
Direct Effects Models.....	7
Moderator Model.....	11
Organizational Safety Climate.....	13
Job Insecurity.....	17
HYPOTHESES.....	21
METHOD.....	24
Participants and Procedures.....	24
Measures.....	25
Demographics.....	25
Job Insecurity.....	25
Safety Climate.....	25
Safety Compliance.....	26
Safety Knowledge.....	26
Accidents.....	27
Injuries.....	27
RESULTS.....	28
Self-Report-Data.....	28
Descriptive Statistics and Correlations.....	28
Role of Organizational Safety Climate.....	30
Non-Self-Report Data.....	33
Descriptive Statistics and Correlations.....	33
Role of Organizational Safety Climate.....	35

DISCUSSION.....	36
Job Insecurity.....	37
Organizational Safety Climate.....	39
Limitations and Strengths.....	42
Practical Implications.....	45
APPENDIX: Workplace Environmental Survey.....	48
REFERENCES.....	53

LIST OF TABLES

	Page
Table 1. Descriptive Statistics and Scale Reliabilities for Self-Report Data.....	28
Table 2. Inter Correlations of Study Variables for Self-Report Data.....	29
Table 3. Summary of Moderated Regression Analysis (β) for Self-Report Data.	31
Table 4. Descriptive Statistics and Scale Reliabilities for Non-Self-Report Data.....	34
Table 5. Inter Correlations of Study Variables for Non-Self-Report Data.....	34
Table 6. Summary of Moderated Regression Analysis (β) for Non-Self-Report Data.....	35

LIST OF FIGURES

	Page
Figure 1. Abbreviated Version of the Framework for Conceptualizing Climate and Safety Behavior (Neal & Griffin, 2004).....	8
Figure 2. Abbreviated Integrative Model of Workplace Safety (Christian et al., 2009).....	9
Figure 3. Abbreviated Version of the Barlow and Iverson (2004) Model of Workplace Safety.....	11
Figure 4. Interaction Showing the Attenuating Effect of Safety Climate on the Negative Outcome of Job Insecurity on Safety Knowledge.....	32
Figure 5. Interaction Showing the Attenuating Effect of Safety Climate on the Negative Outcome of Job Insecurity on Safety Compliance.....	33
Figure 6. Supported Model of Workplace Safety.....	40

INTRODUCTION

In 2007 more than 4 million nonfatal occupational injuries and illnesses were reported with approximately 3.8 million (94.8%) of these incidents representing injuries. One-half of these injuries and illnesses reported nationally were more serious in nature involving days away from work, job transfer or restriction (Bureau of Labor Statistics, 2007). Safety incidents such as sprains, strains, cuts and lacerations are both prevalent in the workplace and costly to organizations. According to the 2008 Liberty Mutual Workplace Safety Index, in 2006 the estimated direct workers' compensation costs in the United States for the most disabling workplace injuries and illnesses accounted for \$48.6 billion dollars. In 2007, the National Safety Council estimated the costs of unintentional workplace injuries to be approximately \$33.4 million. Due to the prevalence of workplace injuries as well as the high dollar amount that safety incidents can cause an organization to incur, ways to increase employee safety are of ongoing interest (Cooper & Phillips, 2004; Zhou, Fang, & Wang, 2008; Turner, Chmiel & Walls, 2005; Krause, Seymour & Sloat, 1999).

A considerable amount of research on safety has been conducted over the years and several conceptual models of safety performance have been advanced. Some of these models have been developed by Burke et al. (2002), Barlow and Iverson (2004), Neal and Griffin (2004) and Christian et al. (2009). Although all of these models have their own unique structure, each of them propose relating some work environment characteristic or individual difference to some safety related outcome such as accidents, injuries, or unsafe behaviors. While the four models stated above are not the only models of safety that have

been proposed, they are among some of the most commonly cited and referenced in the literature to date.

There has also been a considerable amount of empirical research regarding predictors and different safety related outcomes. Studies have been done regarding individual differences such as personality (Forcier, Walters, Brasher & Jones, 2001; Clarke & Robertson, 2005) and environmental factors such as safety climate (Probst, 2004; Evans et al., 2005; Pousette, Larsson & Torner, 2008), job insecurity (Probst, 2002; Storseth, 2006) and leadership (Zohar, 2002). These factors have been related to outcomes such as injury rate under-reporting (Probst, Brubaker & Barsotti, 2008; Probst & Estrada, 2009), safety motivation (Neal & Griffin, 2006), safety performance (Wu, Chen & Li, 2008; Griffin & Neal, 2000; Probst, 2004) and microaccidents (Zohar, 2000). Researchers have also identified many potential moderators, including the important environmental factor of safety climate, which refers to the individual perceptions of the value of safety in the work environment (Neal et al., 2000). It is the most well-known and commonly investigated moderator relating to workplace safety (Hofmann et al., 2003 as cited in Barlow & Iverson, 2004). In fact, Probst has done multiple research projects on the moderating effect of organizational safety climate on safety outcomes (Probst, Brubaker & Barsotti, 2008; Probst & Estrada, 2009) and using the environmental variable of job insecurity, which refers to an individual's overall concern about the continued existence of their job in the future (Sverke, Hellgren & Naswall, 2002) as an antecedent (Probst, 2004).

Despite being a relatively new field of research, interest in job insecurity has risen due to the economic changes during the recent years. According to the United States Bureau of Labor Statistics (July, 2009) job losses increased as unemployment reached an all time high of 9.5% for the month of June, 2009 with up to 15.2% unemployment in the state of Michigan. Much of the previous research on job insecurity has focused on job-related criterion variables such as satisfaction, commitment, trust, and turnover intent, etc. (Cheng & Chan, 2008); however, the relationship between job insecurity and safety has been studied far less often (i.e., Probst & Brubaker, 2001; Probst, 2002; Probst, 2004; Probst et al., 2007; Storeth, 2006).

In a study conducted by Probst in 2004, it was found that a strong organizational safety climate attenuated the negative effects of job insecurity on self-reported safety outcomes such as knowledge of safety, compliance, accidents and injuries. This is anticipated to have occurred due to the organization displaying clear signs demonstrating the importance of safety, which sends the message to them to work safely to retain their employment. Overall, the results suggest that an organization's safety climate has a key moderating influence on the negative consequences of job insecurity on safety outcomes. Unfortunately, like many studies, it had the limitation of relying only on self-report measures. The current research attempts to contribute to the literature by using not only self-report safety data, but also archival data, or non-self-report measures (as suggested by Probst, 2004 as well as Probst & Estrada, 2009). The non-self-report measures will be in the form of reported "near misses" (close calls) and microaccidents (accidents requiring only basic first aid treatment (Zohar, 2000) as called for in Christian et al.,

2009, as well as actual safety incidents that were recorded during a 12-month period in the organization. The purpose of this study is to provide a constructive replication of Probst's study by including non-self-report measures. Thus, consistent with previous findings (Probst, 2004) we expect to use the additional means of collecting data to further support that an organizations safety climate will have key moderating effects on the negative safety consequences caused by stressors such as job insecurity. The goal of the present research is to take the stressor-strain relationship between job insecurity and employee safety outcomes and use the moderator of organizational safety climate to determine if it can aid in alleviating the negative relationship between job insecurity and employee safety outcomes.

LITERATURE REVIEW

The literature review will begin with a review of the most prominent safety models along with descriptions of each of these. These models will introduce the idea of safety performance as well as identify some of the antecedents and consequences for each. The models are reviewed with attention given to the role of safety climate having either a direct effect or a moderating effect on safety performance. The section on safety performance will be followed with the empirical literature relating safety climate to safety performance. Lastly, the literature relating job insecurity to safety performance will be reviewed. These sections will all lead to the presentation of the hypotheses.

Models of Workplace Safety

In the section that immediately follows, four of the most prominent and recent models of workplace safety are reviewed. Each of these safety models will be described in terms of its various parts such as antecedents, consequences and mediators/moderators, and will be presented with regard to their use of safety climate in the model. The purpose of this section is to provide a brief overview and situate the topic of safety climate within a broader array of safety related variables.

Safety Behavior

Burke et al. (2002) developed and empirically evaluated a model of general safety performance intended to be applicable to safety performance in many work domains. In the research it was stated that the purpose of making it applicable to most work domains

was to provide a starting point for future research on the dimensionality of general safety performance to other types of work. The specification of the 4-factor model of general safety performance (actions or behaviors exhibited to promote health and safety) was based on several basic assumptions. First, Burke et al. (2002) assumed that general safety behaviors could be scaled with respect to the frequency that employees engage in the behaviors. In this model it was also assumed that safety behaviors co-vary in meaningful ways and that general safety performance factors are distinguishable from other variables (such as accidents and illnesses).

The Burke et al. (2002) model is composed of four factors, or antecedents of safety performance, which were labeled: (a) using personal protective equipment (i.e. safety glasses, guards, etc.); (b) engaging in work practices to reduce risk; (c) communicating health and safety information; and (d) exercising employee rights and responsibilities. The four factors and behaviors that compose the domain of general safety performance are closely associated within the safety performance domain (Burke et al., 2002). This study occurred within an organization with a strong safety culture that valued continuous safety education, exhibiting of safe behaviors and concern for the health and well-being of the employees indicating the effect of the safety culture on the factors. This model further supports the safety knowledge-safety performance relationship showing how the workers' training experiences contribute to safety performance. These factors comprising the model were said to be consistent with performance constructs specified in the job performance literature as well as the literature on safety climate and safety culture.

This model of general safety performance aids in showing the importance of fostering a strong organizational safety climate to encourage employees to engage in safe behaviors. In past research (Turner & Parker, 2004) it has been shown that having health and safety committees is a way to reduce workplace injuries through their positive impact on safety climate. An effective safety and health committee can increase the amount of communication among supervisors and workers, further showing how the supervisor values the worker doing their job safely and increasing the overall positive safety climate of the organization. While Burke et al.'s (2002) model of general safety performance aids in showing organizational safety climates effect on safety behavior, the next models will aid in showing both its direct effects and moderating effects in regard to safety outcomes.

Direct Effects Models

A two dimensional model of safety performance based on theories of job performance that distinguishes between performance components, determinants of performance and performance antecedents was presented by Neal and Griffin in 2004 (abbreviated model shown in Figure 1). This model's framework centers on the safety related behavior of the individual. In this model the focus was on the role of safety climate as an organizational antecedent to individual safety behavior. Neal and Griffin suggested that antecedents (safety climate or personality) directly influence safety motivation and knowledge, which in turn directly influence safety performance behaviors, which then directly related to safety outcomes (accidents and injuries).

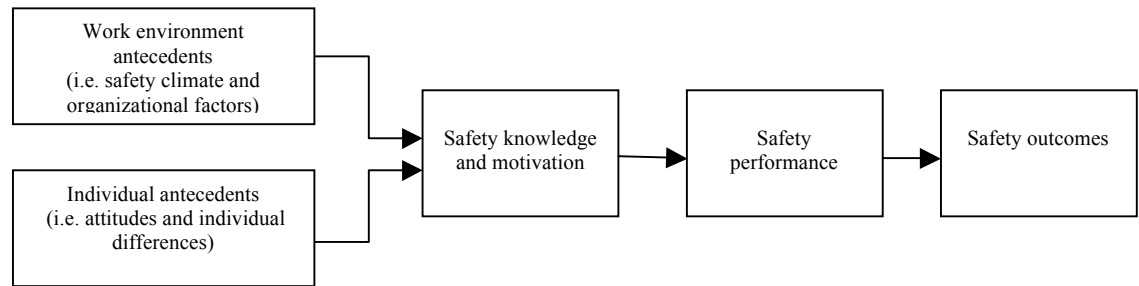


Figure 1. Abbreviated Version of the Framework for Conceptualizing Climate and Safety Behavior (Neal & Griffin, 2004).

The work environmental antecedents consisted of safety climate as well as organizational factors such as supervision and work design. Neal and Griffin (2004) focused their review on the shared perceptions of safety in the workplace. This shared perception indicates that the psychological climate perceptions of safety in the particular work environment were shared among the employees, which then allow the climate to be able to be defined at the group or organizational level. The individual antecedents of safety included different attitudes and individual differences. The attitudes can consist of traits such as organizational commitment or safety attitudes. The individual differences include personality traits such as conscientiousness and neuroticism. Neal and Griffin (2004) stated that these antecedents of performance represent the more distal factors that then affect their behavior through their effects on knowledge, skill and motivation.

The determinants of safety performance, safety knowledge and motivation, then lead to safety performance (behaviors that contribute to safety in the workplace) and ultimately result in safety outcomes. This model incorporates two dimensions of safety performance: compliance and participation. Neal et al. (2000) defined safety compliance

as adhering to safety procedures and carrying out work in a safe manner. Safety compliance includes behaviors such as obeying safety regulations, following the correct procedures and using appropriate equipment. Safety participation was defined as behavior that does not directly contribute to an individual's personal safety but that does support safety in the greater organizational context. Safety participation included acts such as demonstrating initiative and volunteering to go to a safety meeting. Safety performance then ultimately leads to different safety outcomes or results of the safety performance. This two dimensional model of safety performance has since been used by multiple researchers (Probst, 2004; Real, 2008) and was the base for the integrated model proposed by Christian et al. (2009).

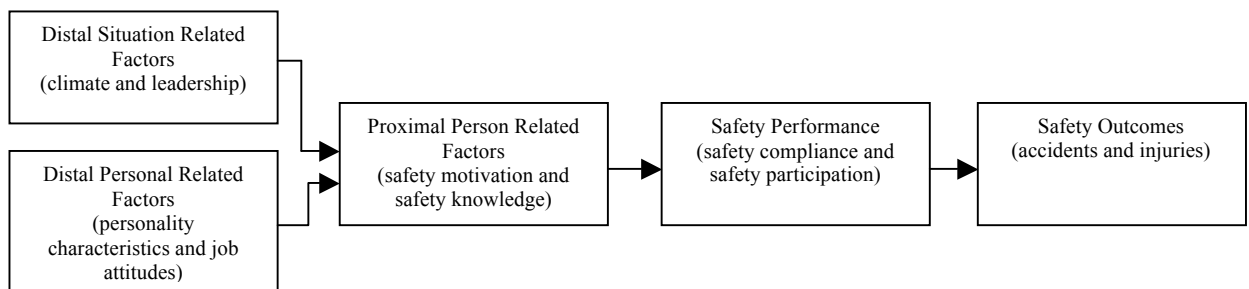


Figure 2: Abbreviated Integrative Model of Workplace Safety (Christian et al., 2009).

The most recent safety model that was found in the literature was in a meta-analysis by Christian et al. (2009). This integrated model (abbreviated version located in Figure 2) shows the process through which situations and individual difference factors influence safety performance behaviors and outcomes and built upon Neal and Griffin's (2004) model of workplace safety. In this modified model, Christian et al. (2009) hypothesize that situational factors, individual differences, and attitudes are distal in their

relationships with safety performance and are even more distally related to safety outcomes. It was suggested that these factors are expected to impact more proximal states or self-regulatory processes that directly affect safety performance behaviors.

The distal antecedents in Christian et al.'s (2009) model referred to both person related factors and situation related factors. The person related factors were personality characteristics (conscientiousness, neuroticism, extraversion, locus of control and propensity for risk taking) and job attitudes (safety attitudes and job attitudes). The situation related factors were those of safety climate (management commitment, HRM (human resource management) practices, safety systems, supervisor support, internal group processes, job risk and work pressures) and leadership. A positive safety climate is thought to encourage safe actions through either reward (an incentive for working safely) or social exchange (perhaps acknowledgement for working safely). Safety climate was divided into psychological safety climate (individual perceptions) and group-level safety climate (when the perceptions are shared among individuals in a particular group or organization). Leadership was said to refer to perceptions of how a manager behaves, enacts and achieves organizational or group objectives. The proximal antecedents consisted of both safety motivation and safety knowledge, in agreement with Neal and Griffin (2004). It was stated that as a general rule, proximal factors were anticipated to yield larger relationships with safety performance than the distal factors.

All of the antecedents in the model are indirect in that they operate through two categories of safety performance behaviors rather than directly affecting the safety behaviors. The safety performance behaviors are safety compliance (following

procedures, using protective equipment and practicing risk reduction) and safety participation (communication/voice, helping, stewardship, exercising rights/whistle blowing, civic virtue and initiating safety-related change). These safety performance behaviors then in turn are said to influence the safety outcomes of accidents and injuries. Christian et al. (2009) stated that this framework informs not only the magnitude of the relationships we expect to observe between various antecedents of safety criteria, but also the processes through which workplace accidents and injuries occur.

Moderator Model

The last model of safety performance that will be discussed is the model of workplace safety developed by Barlow and Iverson (2004). It was stated in the review that the effects of stressors within the causal factors leading to workplace injuries are not always clear and that most studies reflect the direct link of cause and effect (injury). The model of workplace safety (abbreviated version shown in Figure 3) demonstrates the direct and indirect effects via occupational stress and also incorporates moderators into the model.

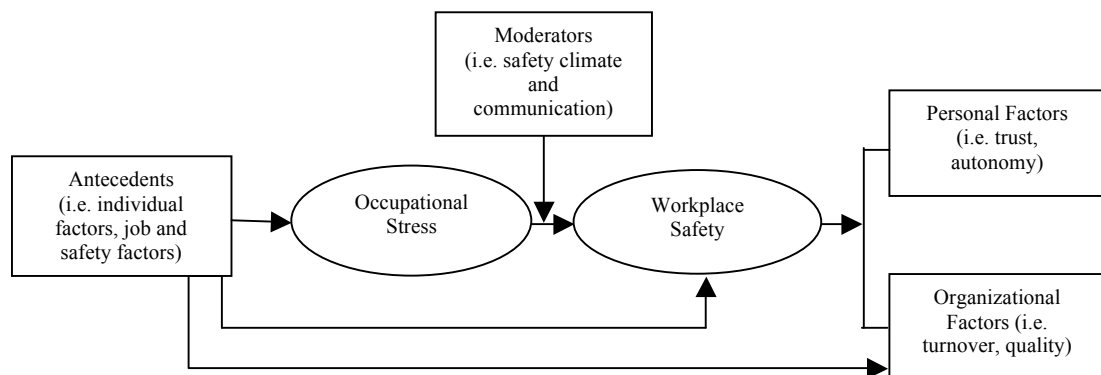


Figure 3. Abbreviated Version of the Barlow and Iverson (2004) Model of Workplace Safety.

The antecedents proposed to lead to occupational stress and workplace safety are individual factors (gender, personality, etc.), substance abuse (use of tobacco, alcohol and drugs), organizational leadership (quality and level), job and organizational factors (work-related environmental conditions) and safety factors (knowledge, motivation, etc.). An important difference in this model of workplace safety is that safety climate is viewed as a moderator. The moderators in the model are composed of safety communication, stress tolerance and safety climate. Safety communication refers to the quality of safety communication that occurs between managers and employees. The study states that the more concern expressed by managers for employees the greater the promotion of safety as a priority in the organization. The individual level moderator of stress tolerance was referred to as the ability of an individual to contend with the stress of a situational and temporary nature. The final moderator of safety climate is a commonly investigated moderator relating to workplace safety (Probst, 2004; Probst, Brubaker & Barsotti, 2008) and the moderator of interest in the present study.

The antecedents and moderators then lead to the outcome of workplace safety and workplace safety then leads to consequences of workplace safety. The consequences of workplace safety due to occupational injuries consisted of both personal and organizational factors. In regard to personal factors, Posttraumatic Stress Disorder, trust, autonomy, job satisfaction and organizational commitment were presented. Organizational factors were absenteeism and turnover as well as production and quality. The current research will use a modified version of this model of workplace safety.

Overall, it can be seen throughout the models that organizational safety climate plays an important role. The models discussed have shown the effect of safety climate in the form of its direct effects (Neal & Griffin, 2004; Christian et al., 2009) and its moderating effect (Barlow & Iverson, 2004). Throughout all of the models presented the common underlying theme was that of the stressor-strain relationship. The goal of the present research is to take the stressor-strain relationship and use the important moderator of organizational safety climate to show how it can aid in alleviating the negative relationship between job insecurity and employee safety outcomes.

Organizational Safety Climate

Next, the literature focusing more specifically on safety climate is reviewed. Organizational safety climate has been studied often and different definitions have been developed throughout the years. In 1980, Zohar was the first to introduce the concept into the literature. More recently, Zohar and Luria (2005) state that the core meaning of climate relates to socially construed indications of desired role behavior, originating simultaneously from policy and procedural actions of top management and from supervisory actions exhibited by shop-floor or frontline supervisors. Neal et al. (2000) define safety climate as a specific form of organizational climate that describes the individual perceptions of the value of safety in the work environment. They reported a range of factors that have been identified as being important components of safety climate. The factors consist of management values (management's extent to place high priority on safety), safety communication (how open the exchange is regarding safety

information), safety training (how accessible, relevant and comprehensive training is) and safety systems (how safety procedures are viewed in regard to being effective in preventing accidents). In this study, Neal et al. (2000) also developed a measure of safety climate based on the above stated definition that according to a recent meta-analysis, has been used in many studies since its creation (Clarke, 2006). This definition as well as the safety climate survey will be utilized in the present research as well.

As for models of safety climate, a multilevel model of climate was proposed (Zohar, 2000) in which the author stated that policies define strategic goals and means of goal attainment, whereas procedures provide tactical guidelines related to these goals and means. Therefore, the model has two levels of analysis, policies and procedures that relate to the organizational level of analysis and supervisory practices that relate to the group level. Griffin and Neal (2000) also developed their own model of safety climate and performance that shows safety as a higher order factor comprised of more specific first-order factors. They state that the first order factors should reflect perceptions of safety-related policies, procedures and rewards. The higher order factor of safety climate should reflect the extent to which employees believe that safety is valued within the organization. This safety climate taxonomy was also utilized by Christian et al. (2009) in their workplace safety model and will also be utilized in the present research.

Organizational safety climate is an important variable and has been studied often in terms of both its direct effects (Cooper & Phillips, 2004; Nielsen, Rasmussen, Glasscock & Spangenberg, 2008; Melia, Mearns, Silva & Lima, 2007) as well as its interactional or indirect effects (Neal, Griffin & Hart, 2000; Probst & Estrada, 2009; Wu.

et al., 2008) in regards to the stressor-strain relationship. Across all of the research, climate has been shown to play an important role. A meta-analysis by Clarke (2006) found support for the hypothesis that organizational safety climate was related to employee safety performance both directly and indirectly. This upholds the contention that improving safety climate will have a significant effect on the improvement of employee safety performance and also accident prevention.

Safety climate as a moderator has been studied less frequently, but has shown to have a positive relationship on the stressor-strain relationship. As can be seen in Figure 3, a number of antecedents have been shown to be linked to occupational stress. These antecedents can be individual factors, substance abuse, organizational leadership, job and organizational factors and safety factors. These factors then contribute to occupational stress, which then has a negative impact on workplace safety. However, by incorporating the moderator of positive safety climate this can help to alleviate some of the negative influence of the stressor in question. A meta-analysis by Christian et al. (2009) looked at incidents of using safety climate as a moderator and found a significant positive correlation with accident involvement. In more recent studies, safety climate was also found to be an important moderator in the relationship between proactive personality and work performance (Baba et al., 2009) and also shown to play a moderating effect on the transfer of safety training which in turn led to reduction in accidents and injuries (Burke et al., 2008). Safety climate was also found to moderate the relationship between leader member exchange (LMX) and safety citizenship role definitions (Hofmann, Morgeson & Gerras, 2003). The above stated research further support safety climates moderating

effect in regard to safety outcomes, indicating that the more positive the safety climate, the more likely this variable is to weaken or strengthen a relationship between two variables. In the research (Baba et al., 2009; Burke et al., 2008; Hofmann et al., 2003) using safety climate as a moderator aids employees in viewing safety behaviors as part of their role responsibilities and thus leading to more positive relationship outcomes.

Probst has done multiple studies using safety climate as a variable. One such study examined safety climates direct effects in terms of supervisory layoff decisions (Probst & Brubaker, 2007). Most recently Probst and colleagues have conducted research regarding the moderating impact of organizational safety climate and injury rate underreporting (Probst, Brubaker & Barsotti, 2008) as well as the moderating impact of psychological safety climate on supervisory enforcement of safety practices on accident under-reporting (Probst & Estrada, 2009). The results from both of these studies revealed the moderating impact of safety climate, indicating that the poorer the safety climate, the higher the accident under-reporting. These findings further support the importance of a positive safety climate in regards to employee safety outcomes. The study performed that is most pertinent to the current research is the Probst study previously mentioned from 2004. In this study, Probst found that when employees perceived that the organizational safety climate was weak, it moderated the relationship between job insecurity and other factors resulting in lower levels of safety knowledge, less employee safety compliance, a greater number of employee accidents, more near-misses, a greater likelihood of workplace injury, and a greater incidence of repetitive motion injuries. The results from

the study further supported that organizational safety climate does have a key moderating effect on the negative consequences of the stressor of job insecurity.

Organizational safety climate has been studied both in terms of its direct effects and its moderating effects. In the literature that was reviewed, it was always shown to have significant impact on the variables in question. In regards to the stressor-strain relationship, the studies reviewed have shown that it does play a key moderating role. Although there are numerous stressors that have been studied in regard to organizational safety climate, the stressor of job insecurity is the variable of interest in the present study.

Job Insecurity

In this next section, the literature in regards to job insecurity will be reviewed. Job insecurity has been a variable of research since around 1980. Throughout the years, as with most variables, multiple definitions have emerged. For example, some studies have multidimensional definitions that encompass factors such as threats to job features (career opportunities) and a powerlessness to counteract such effects (Sverke, Hellgren & Naswall, 2002). Results from a meta-analysis (Sverke, Hellgren & Naswall, 2002) revealed that most researchers have adopted a global view and described job insecurity as an overall concern about the continued existence of the job in the future.

As research shows, job insecurity is a stressor and it may have as detrimental consequences as job loss itself (Sverke et al., 2002). Results from a recent meta-analysis by Cheng and Chang (2008) found that job insecurity was negatively related to job satisfaction, organizational commitment, work performance, trust and job involvement

and positively related to turnover intent. This same meta-analysis also found that job insecurity was negatively related to psychological health and physical health. These results were all in agreement with the previous meta-analysis from Sverke et al. (2002) with the addition of the negative association between job insecurity and work performance. From these results the stressor-strain relationship is upheld, showing the negative impact that job insecurity can cause.

As stated above, job insecurity has been linked to negative outcomes in the form of individual consequences as well as organizational consequences. The individual level consequences are in the form of immediate reactions as well as long term reactions that affect job attitudes. A review of the literature (Sverke & Hellgren, 2002) found an immediate reaction was that job satisfaction was consistently found to be reduced due to job insecurity. A long term individual reaction has been shown to come in the form of mental health consequences (Naswall, Sverke & Hellgren, 2005) and a review of the literature also showed that job insecurity reduces well-being (Witte, 1999). Further, it has been shown that as the unemployment rate rises, employees who still have jobs tend to smoke more, drink more and exercise less (Miller, 2009). Short term organizational consequences of job insecurity include organizational attitude variables such as organizational commitment (Rosenblatt, Talmud & Ruvio, 1999) and quality of the output (Probst, 2002). The long term work related behavior consequences of job insecurity include variables such as performance, as shown in a recent meta-analysis from Gilboa, Shrirom, Fried and Cooper, (2008) and job dissatisfaction (Lim, 1996; De Cuyper, Notelaers & De Witte, 2009).

In addition to these, another organizational consequence of job insecurity that has been researched is that of organizational safety outcomes. Surprisingly, in the meta-analyses that were found during this literature review, analyses concerning job insecurity and safety outcomes were not provided. However, perhaps a reason is because in a study done by Storseth (2006), it was stated that Probst and Brubaker (2001) were among the first to draw attention to the almost overlooked possibility of an association between job insecurity and negative safety outcomes in the work context. In that study, Probst and Brubaker found that employees who reported higher levels of job insecurity exhibited decreased safety compliance and motivation, which in turn were related to higher levels of workplace injuries and accidents. This study was then followed up by Probst (2002) in a laboratory experiment in which participants who were threatened with layoffs committed significantly more safety violations than those who were not. Finally, there is the research from 2004 from Probst, which is the most pertinent to the current research, in which job insecurity was also found to have a negative impact on safety outcomes.

Following the studies done by Probst and Brubaker (2001) and Probst (2002, 2004); Storseth (2006, 2007) then presented two studies based on Probst and Brubaker's work on the job insecurity and negative safety outcome link. In the first study (Storseth, 2006) found that job insecurity was significantly related to risk taking behavior (the extent to which employees take chances and break rules) among employees. In his next study (2007), he found that affective job insecurity (a more emotional response to job insecurity) also influences safety outcomes at work, indicating a more uncontrolled element in job insecurity influencing occupational safety. In the most recent study that

was found relating job insecurity to risk taking behavior (Rundmo & Iversen, 2007), further support was found for the causal link showing that job insecurity leads to dissatisfaction which in turn relates to on-the-job risk taking behaviors.

Job insecurity is a major stressor and has been a much researched topic of interest in the literature. The effect of job insecurity is far reaching from personal consequences as well as organizational consequences. Also, despite being a relatively new field of research in regard to the job insecurity-strain relationship, it has been shown multiple times that job insecurity does have detrimental effects on employee safety outcomes. The goal of the current research is to add to the newly researched relationship between job insecurity and employee safety outcomes while incorporating the moderator of safety climate.

HYPOTHESES

In regards to the stressor-strain relationship, the literature reviewed has shown that organizational safety climate does play a key moderating role in attenuating the negative effects of job insecurity on employee safety outcomes. Also, despite being a relatively new field of research in regard to the job insecurity-strain relationship, it has been shown multiple times that job insecurity does have detrimental impact on employee safety outcomes. The goal of the present research is to take the stressor-strain relationship between job insecurity and employee safety outcomes and use the moderator of organizational safety climate to determine if it can aid in alleviating the negative relationship between job insecurity and employee safety outcomes. The current study is a replication and extension of the Probst, 2004 study. It is an extension of this study due to the additional measures consisting of non-self-report data that will be used in the research. Probst (2004) found support for the hypotheses and accordingly, the following are again predicted:

Hypothesis 1a (replication): Safety climate will be positively related to safety knowledge.

Hypothesis 1b (replication): Safety climate will be positively related to safety compliance.

Hypothesis 1c (replication): Safety climate will be negatively related to employee reported accidents and injuries.

Hypothesis 2a (replication): Safety climate will moderate the relationship between job insecurity and safety knowledge where safety knowledge will be higher when climate is more positive.

Hypothesis 2b (replication): Safety climate will moderate the relationship between job insecurity and safety compliance where safety compliance will be higher when climate is more positive.

Hypothesis 2c (replication): Safety climate will moderate the relationship between job insecurity and employee self-reported accidents and injuries where self-reported accidents and injuries will be lower when climate is more positive.

The extension to the Probst (2004) study consists of the use of non-self-report data in regard to occupational injuries. To date there has been a sparse amount of research that utilized non-self-report measures in regard to safety incidents (Zohar, 2000; Neilsen et al., 2008; Probst & Estrada, 2009). Zohar (2000) used microaccidents (recorded by the medical staff at the organization) to show that climate perceptions significantly predicted microaccidents. Research done by Probst and Estrada (2009) showed that accident under reporting of safety incidents was higher in working environments with poorer organizational safety climate or where supervisory support was inconsistent. The need for the addition of non-self-report data has been called for in multiple studies (Probst, 2004; Probst & Estrada, 2009; Pousette et al., 2008) and stated in a recent meta-analysis by Christian et al. (2009). In essence, the use of non-self-report data was not done in the Probst (2004) study and is thus a unique measure to be used in

the present research. The following relationships between job insecurity, safety climate and safety outcomes are hypothesized:

Hypothesis 3: Safety climate will be positively related to non-self-reported accidents and injuries.

Hypothesis 4: Safety climate will moderate the relationship between job insecurity and non-self-reported accidents and injuries where non-self-reported accidents and injuries will be lower when climate is more positive.

As stated in the literature review, not many studies have been done regarding the effect of job insecurity on employee safety outcomes. Therefore, based on the limited amount of previous studies, the following relationships are hypothesized:

Hypothesis 5a: Job insecurity will be negatively related to safety knowledge.

Hypothesis 5b: Job insecurity will be negatively related to safety compliance.

Hypothesis 5c: Job insecurity will be positively related to self-reported accident and injuries.

Hypothesis 5d: Job insecurity will be positively related to non-self-reported accidents and injuries.

METHOD

Participants and Procedures

The surveys were administered to 204 production employees in five different manufacturing plants under the same organization. One of the 204 survey respondents was removed because it was apparent that it was not valid or filled out properly (i.e. they circled 1 for all answers and stated they worked 150 hours a week). Therefore, the resulting number of respondents was 203. The manufacturing plants were located throughout the United States (Wisconsin (21.7%), North Carolina (19.7%), Georgia (13.3%), Indiana (25.1%) and West Virginia (20.2%). Respondent's gender consisted of 66% male and 22.2% female (the remainder of which chose not answer). The majority of respondent's were in the 45-49 year old age range (36%), followed most closely by 50-54 (15.3%), 40-44 (12.3%) and 55-59 (10.3%) with the least represented age group consisting of 18-24 (0.5%) followed by 25-29 (1.0%), 30-34 (2.5%) and 60-64 (3%). Of the 203 respondents, 196 fell into 26 specific workgroup departments within the organization defined by departmental affiliation as well as manufacturing plant location. There was only one shift schedule; therefore it was all first shift employees completing the survey. Employees were told about the survey and allowed to fill it out either during their lunch break or off the clock and they were made available in the employee lunchroom. The survey was open for 5 full days to allow the employees adequate time to complete the questionnaire. The survey was labeled as a Workplace Environmental Survey (Appendix A) and contained the following measures:

Measures

Demographics

All employees were asked demographical information, which consisted of the basic questions of gender and age. They were also asked more specific occupational demographical information consisting of questions in relation to their employment within the manufacturing facility (i.e. average hours worked per week ($m = 43.02$, $SD = 4.28$), manufacturing plant location and department in which they work (Towel, Brake, PC Board, Extrusion, Final Assembly or Shipping departments).

Job Insecurity

Nine items from the Job Insecurity Index (JSI) were used to measure employee perceptions of job insecurity. The JSI measures an individual's cognitive appraisal of the future of their job with respect to the perceived level of stability and the continuance of their job (Probst, 2003). The nine items were chosen by Probst (2004) from the original 18 items and consist of a series of adjectives or short descriptive phrases (i.e. unpredictable, sure, stable, etc.). The respondent is then to chose the extent to which the adjectives or phrases describe the future of their job on a three point scale (yes, ?, no). The responses were scored such that a higher number reflects more job insecurity. The nine items used in the present research were taken from the Probst et al. (2007) study and the Cronbach's reliability of the scale was .92.

Safety Climate

Employee's rating of safety climate was assessed with three items taken from research performed by Neal and Griffin (2006) that was adapted from the Neal et al. (2000) study. The items were measured on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The three items used to measure safety climate are as follows: management places a strong emphasis on workplace health and safety, safety is given a high priority by management and management considers safety to be important. Safety climate assessed the degree to which the employees felt safety was valued by the organization. The Neal et al. (2006) study found the reliability of the scale to be .95 (year two) -.94 (year four).

Safety Compliance

Safety compliance was used to assess safety behavior and consisted of three items from research performed by Neal and Griffin (2006) that was adapted from the Neal et al. (2000) study. All of the items were measured on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Neal and Griffin (2004) state that safety compliance consists of adhering to safety procedures and carrying out work in a safe manner (i.e. I use all the necessary safety equipment to do my job). The Neal and Griffin (2006) found the reliability of the scale to be .93 (year two) -.92 (year four).

Safety Knowledge

Probst (2004) used four items to assess safety knowledge, which were taken from Neal et al. (2000). The items are used to determine employee's knowledge of safety practices and procedures (i.e. I know how to perform my job in a safe manner; I know

how to use safety equipment and standard work procedures). The items were scored such that a higher number reflects more knowledge on the 5-point scale (1-strongly disagree to 5-strongly agree). The reliability of the scale was shown to be .90 (Neal et al., 2000).

Accidents

Two items were used to assess self-reported workplace accidents. The items are from a measure developed by Smecko and Hayes (1999). The items asked employees to report how many safety accidents they reported to their supervisor over the past 12 months and how many “near misses” they were involved in for the same 12-month period. Non-self-reported accidents in the form of “near misses” were also taken from organizational records for the same 12-month period. These files contained documentation of near misses so the organization could work on remedying the situations that caused the near misses so that the situation did not result in a more severe injury.

Injuries

Self-reported measures for occupational injuries consisted of asking the frequency in which each specific injury had occurred over the 12-month period on a 5-point scale from 1 (never) to 5 (frequently). The measure was taken from Barling, Loughlin and Kelloway (2002) and consisted of eight specific injuries (i.e. strains or sprains, cuts or lacerations, burns, etc.) that are possible for an employee in the manufacturing setting to experience. Non-self-reported injuries were taken from organizational records for the same 12-month period, which consisted of documented first aid injuries as well as recordable injuries.

RESULTS

Self-Report Data

Descriptive Statistics and Correlations

Table 1 presents the descriptive statistics as well as scale reliabilities. The mean of job insecurity was 1.49 from a 0-3 scale with a higher score indicating more job insecurity. Safety climate, safety compliance and safety knowledge all had overall means of 4.63-4.65 indicating overall high means on the 1-5 point scales. There was no evidence of range restriction among any of the scales. Accidents ranged from 0-12 reported with a mean of .32, near misses reported ranged from 0-20 with a mean of 1.08 and workplace injuries consisted of 8 items ranked on a 1-5 scale with a mean of 1.50. This indicates an overall low report in regard to accidents, near misses and workplace injuries. All of the scale reliabilities were over .90 and therefore all scales were reliable (job insecurity $\alpha = .92$, safety climate $\alpha = .93$, safety Compliance $\alpha = .95$ and safety knowledge $\alpha = .91$). A value of .90 is considered to be outstanding (Nunnally & Bernstein, 1994).

Table 1
Descriptive Statistics and Scale Reliabilities for Self-Report Data

Variable	Item	Range	M	SD	α
Job insecurity	9	0-3	1.49	1.08	.92
Org. Safety climate	3	1-5	4.63	.72	.93
Safety compliance	3	1-5	4.65	.62	.95
Safety knowledge	4	1-5	4.65	.59	.91
No. of accidents	1	0-12	.32	1.32	N/A
No. of "near misses"	1	0-20	1.08	2.97	N/A
Workplace injuries	8	1-5	1.50	.57	N/A

Hypotheses 1a-1c and 5a-5c addressed the relationship between safety compliance and safety knowledge, safety compliance and self-reported safety outcomes and were all tested with the Pearson correlation coefficient to determine the strength and direction of the relationships. Table 2 presents the correlations among the study variables with significant correlates noted in the table. For the first set of hypotheses, safety climate was found to be significantly positively related to both safety knowledge ($r = .67$, $n = 202$, $p < .01$) and safety compliance ($r = .53$, $n = 202$, $p < .01$). This finding supports hypothesis 1a and 1b. For hypothesis 1c, safety climate was not shown to have a relationship with self-reported accidents ($r = -.01$, $n = 198$, $p = .84$), near misses ($r = -.05$, $n = 193$, $p = .46$) or workplace injuries ($r = -.03$, $n = 193$, $p = .66$). Therefore, the findings do not support hypothesis 1c.

Table 2
Inter Correlations of Study Variables for Self-Report Data

Variable	1	2	3	4	5	6	7
1. Job insecurity	-	.16*	.04	.04	-.15*	.06	-.18*
2. Org. safety climate		-	.53**	.67**	-.01	-.05	-.03
3. Safety compliance			-	.78**	-.04	-.08	-.12
4. Safety knowledge				-	-.04	-.06	-.03
5. No. of accidents					-	.17*	.13
6. No. of "near misses"						-	.02
7. Workplace injuries							-

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

The outcomes for hypothesis 5a and 5b (relating job security to safety knowledge and safety compliance) were not consistent with previous findings. Job insecurity was not shown to have a relationship with either safety knowledge ($r = .04$, $n = 197$, $p = .62$)

or safety compliance ($r = .04$, $n = 197$, $p = .61$). It is of interest that hypothesis 5c (relating job insecurity to employee safety outcomes) did reach statistical significance, however it was in the opposite direction as hypothesized. The results showed a significant correlation indicating that higher levels of job insecurity results in lower employee reported accidents ($r = -.15$, $n = 193$, $p = .04$) and employee reported injuries ($r = -.18$, $n = 190$, $p = .01$). However higher levels of job insecurity did not have a significant impact in regard to employee reported near misses ($r = .06$, $n = 190$, $p = .39$). Therefore, hypotheses 5a, 5b and 5c were all not supported, with 5c reaching partial support, but in the opposite direction as hypothesized.

Role of Organizational Safety Climate

Moderated multiple regression analysis was performed to examine both the main and interactive effects of job insecurity and organizational safety climate. The results are summarized in Table 3. The results of the analysis showed significance and supported hypotheses 2a and 2b. Hypothesis 2a was supported showing that organizational safety climate did moderate the relationship between job insecurity and the outcomes of safety knowledge, where safety knowledge will be higher when the safety climate is more positive. The first step of the regression was significant from zero, $F(2,194) = 80.83$, $p < .01$, $R^2 = .46$. Then, the interaction term was added which significantly improved the equation $F_{\text{change}}(3,193) = 105.64$, $p < .01$, improving the R^2 to $.62$, $\Delta R^2 = .17$. Further, when looking at the individual interaction at each step, the moderator did have a significant impact, $t = 9.23$, $p < .01$. This analysis indicates that adding the moderating variable of organizational safety climate into the equations does have a significant impact

on the relationship between job insecurity and safety knowledge, therefore hypothesis 2a was supported.

Table 3
Summary of Moderated Regression Analysis (β) for Self-Report Data

Variables	Safety Compliance		Safety Knowledge		Injuries		Hurt Reports		Near Misses	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
Job Insecurity	-.05	-.06	-.08	-.08	-.18*	-.17*	-.16*	-.16*	.07	.07
Safety Climate	.54**	.62**	.68**	.76**	-.02	-.05	.03	.01	-.06	-.07
Job Insecurity X Safety Climate		.40**		.42**		-.08		-.06		-.03
R ²	.29	.45	.46	.62	.02	.03	.03	.04	.01	.01
ΔR^2		.16**		.17**		.00		.00		.00

* $p < .05$ ** $p < .01$

Hypothesis 2b was also supported showing that organizational safety climate did moderate the relationship between job insecurity and the outcome of safety compliance, where safety compliance will be higher when the safety climate is more positive. The first step of the regression was significant from zero, $F(2,194) = 39.07$, $p < .01$, $R^2 = .29$. Then, the interaction term was added which significantly improved the equation $F_{\text{change}}(3,193) = 51.55$, $p < .01$, improving the R^2 to .45, $\Delta R^2 = .16$. Further, when looking at the individual interaction at each step, the moderator did have a significant impact, $t = 7.41$, $p < .01$. This analysis indicates that adding the moderating variable of organizational safety climate into the equation does have a significant impact on the relationship between job insecurity and safety compliance. The procedure for plotting significant

interactions developed by Jose (2004) and modified by Shackman (2005) was used to visually depict the findings of both hypothesis 2a (Figure 4) and 2b (Figure 5).

Hypothesis 2c was also tested using a moderated multiple regression. The addition of the interaction term only accounted for an additional 0.4% of the variance in regard to employee reported injuries ($\Delta R^2 = .004$, $p = .37$), only 0.3% of the variance in regard to employee reported accidents ($\Delta R^2 = .003$, $p = .42$) and only .01% of the variance in regard to employee reported near misses ($\Delta R^2 = .001$, $p = .65$). Thus, organizational safety climate did not moderate the relationship between job insecurity and employee injuries and accidents. Therefore, hypothesis 2c was not supported.

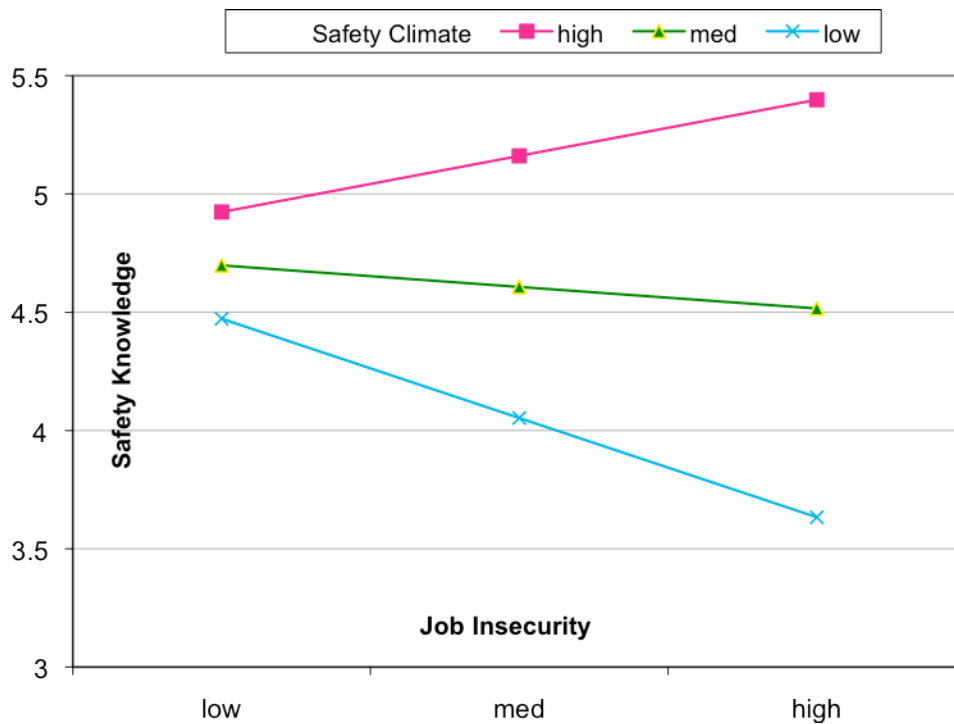


Figure 4: Interaction showing the attenuating effect of safety climate on the negative outcome of job insecurity on safety knowledge.

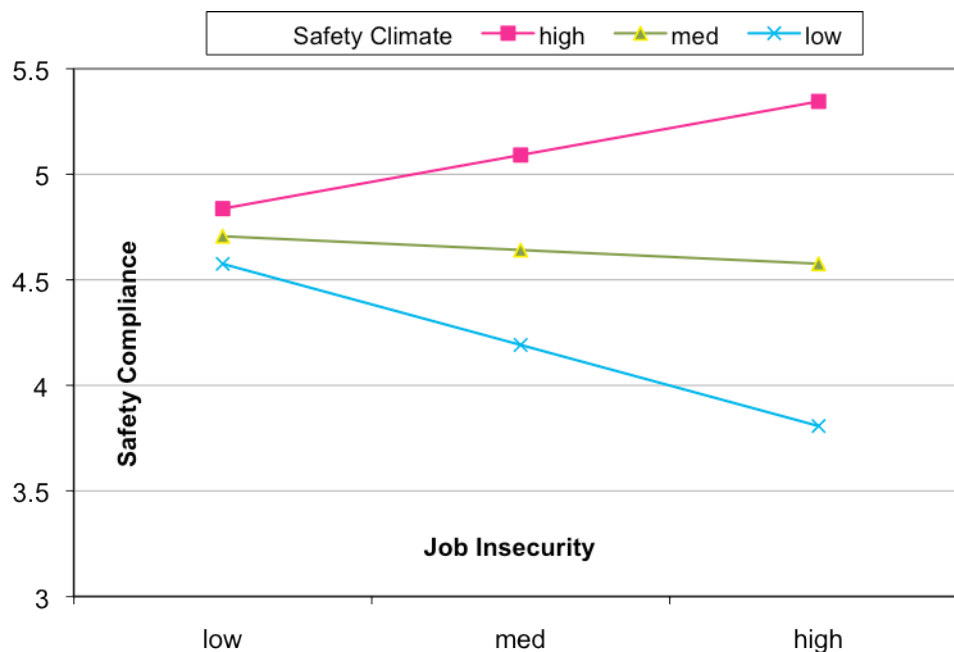


Figure 5: Interaction showing the attenuating effect of safety climate on the negative outcome of job insecurity on safety compliance.

Non-Self-Report Data

Archival data was received from each of the five locations and broken down into the relevant workgroups. Archival data was made available from all locations, with the exception of two first aid incidents for the Raleigh location that were never received. The data depicts the first aid incidents and near misses for the year used in the analysis. Recordable injuries were also to be included in the analysis, however none of the five sites had any recordable injuries for the year used in this study and therefore this variable was not included in any analysis.

Descriptive Statistics and Correlations

Table 4 presents the group level descriptive statistics as well as scale reliabilities. The mean of job insecurity was 1.45 from a 0-3 scale with a higher score

indicating more job insecurity. Company reported accidents (first aid reports) ranged from 0-3 reported with a mean of .52 and company reported near misses ranged from 0-321 with a mean of 112.81.

Table 4
Descriptive Statistics and Scale Reliabilities for Non-Self-Report Data

Variable	Range	n	M	SD	α
Job insecurity	0-3	27	1.45	.58	.92
Org. Safety climate	1-5	27	4.60	.32	.93
First Aid Reports	0-3	21	.52	.68	.91
Near Miss Reports	0-321	26	112.81	77.92	N/A

Hypothesis 3 and hypothesis 5d were tested with the Pearson correlation coefficient to determine the strength and direction of the relationship. Table 5 presents the correlations among the group level study variables with significant correlates noted in the table.

Table 5
Inter Correlations of Workgroup Study Variables for Non-Self-Report Data

Variable	1	2	3	4
1. Job insecurity	-	.39*	.37	.23
2. Org. safety climate		-	-.05	.23
4. First Aid Incidents			-	.33
5. Near Miss Reports				-

* Correlation is significant at the 0.05 level (2-tailed).

For hypothesis 3 (relating safety climate to non-self-reported safety outcomes) safety, climate was not found to be significantly related to any of the non-self-report safety outcomes (first aid ($r = -.05$, $n = 21$, $p = .84$), near misses ($r = .20$, $n = 26$, $p = .34$)). This finding does not support hypothesis 3. Hypothesis 5d (relating job insecurity to

non-self-reported safety outcomes) revealed no significant relationship between job insecurity and the non-self-report safety outcomes (first aid incidents ($r = .37$, $n = 21$, $p = .10$), near miss reports ($r = .23$, $n = 26$, $p = .26$)). Therefore, hypothesis 5d was also not supported.

Role of Organizational Safety Climate

Hypothesis 4 was tested with a moderated multiple regression analysis using the non-self-report data for injuries as the outcome variable to determine both the main and interactive effects of job insecurity and organizational safety climate. The results of this analysis are shown in Table 6.

Table 6
Summary of Moderated Regression Analysis (β) for Non-Self-Report Data

Variables	First Aids		Near Misses	
	Step 1	Step 2	Step 1	Step 2
Job Insecurity	.41	.43	.18	.21
Safety Climate	-.15	-.08	.13	.03
Job Insecurity X Safety Climate		.14		-.29
R^2	.16	.17	.07	.14
ΔR^2		.01		.08

The results of the analysis did not support hypothesis 4. The addition of the interaction term only accounted for an additional 0.1% of the variance in regard to non-self-report first aid injuries ($\Delta R^2 = .01$, $p = .60$) and only 0.8% of the variance in regard to non-self-report near misses ($\Delta R^2 = .08$, $p = .18$). Thus, organizational safety climate did not moderate the relationship between job insecurity and employee injuries and near misses. Therefore, hypothesis 4 was not supported.

DISCUSSION

The goal of the present study was to examine the stressor-strain relationship between job insecurity and employee safety outcomes and to examine organizational safety climate as a potential moderator of this relationship. Job insecurity and safety have been studied quite often, however, the relationship between job insecurity and safety has been studied far less often (i.e., Probst & Brubaker, 2001; Probst, 2002; Probst, 2004; Probst et al., 2007; Storeth, 2006). The current research is an extension of the Probst, 2004 study and attempts to contribute to the literature by using the addition of non-self-report measures (as suggested by Probst, 2004 as well as Probst & Estrada, 2009). The non-self-report data (or archival data) is in the form of recordable injuries, first aid incidents and near misses for the 12-month period of the year 2009 and was aggregated at the group level of analysis.

The current study was accomplished by using previously developed measures to determine job insecurity (Probst, 2004), safety climate (Neal & Griffin, 2006), compliance (Neal and Griffin, 2006), safety knowledge (Neal et. Al, 2000) and specific occupational injuries (Barling, Loughlin and Kelloway, 2002). The archival data was provided from 5 manufacturing locations in regard to reported near misses, first aid reports and recordable injuries from the year 2009. The results of the analysis are discussed in detail below starting with job insecurity results and then the organizational safety climate findings.

Job Insecurity

Based on the results of the present research we have found that the effect of job insecurity on other variables is mixed, as is the rather limited literature in this area. It was expected that job insecurity would be negatively related to safety knowledge and safety compliance. This finding was not upheld, and job insecurity was not found to have a significant relationship with either safety knowledge or safety compliance. However, it was noticed that in other studies (i.e. Probst & Brubaker, 2001 and Probst, 2004) this correlation was not always significant as well. It is important to note, however, that safety climate was determined to moderate the relationship between job insecurity and safety knowledge and job insecurity and safety compliance. This supports a moderating relationship showing that the predictor variable (job insecurity) has no relationship with the dependent variable (safety knowledge and safety compliance) once the moderator (safety climate) is removed. This finding upholds more of a moderated model of workplace safety (example shown in Figure 3).

It was also expected to find that high levels of job insecurity would be related to more employee reported accidents, injuries and near misses than those employees who had lower levels of job insecurity. However, the hypothesis was not supported and in fact it was found that high levels of job insecurity were significantly related to less reported accidents and injuries, which was the reverse of what was hypothesized. Goldenhar et al. (2003) also hypothesized a positive relationship between job insecurity and the safety outcomes of injuries and near misses and results of that study also indicated a direct relationship in the reverse direction as hypothesized in agreement with

the present study results. Perhaps a reason for this is that employees are afraid to report because they do not want a potential safety incident to make the organization believe they are a liability and result in a possible job loss, causing them to work more safely. Also, job insecurity was not found to have a relationship with self-reported near misses or non-self-reported accidents and near misses. Based on the results we now know that job insecurity appears to have no direct relationship with group level non-self-report safety outcomes or self-reported near misses, but it does have a negative relationship with self-report accidents and injuries.

As stated earlier, the literature in regard to the relationship between job insecurity and safety outcomes is very sparse, and with mixed results. In fact, the most recent meta-analysis (Cheng & Chan, 2006) did not include safety outcomes in their analysis of the literature. This is most likely due to the fact that at the time the meta-analysis was performed there were only around four studies that could be found relating job insecurity to employee safety outcomes (i.e. Probst & Brubaker, 2001; Probst, 2002; Probst, 2004; Storeth, 2006), with no studies showing a true causal relationship. Given the fact that research has supported both positive and negative relationships with employee safety outcomes, further research is needed to explore possible moderating factors as mixed results indicate that this may be playing a role in this relationship. For this reason, safety climate was then entered into the analysis to determine possible moderating effects.

Organizational Safety Climate

This study was expected to replicate previous findings indicating that organizational safety climate would be positively related to safety compliance as well as safety knowledge. As expected, a significant correlation was found between safety climate and both safety compliance and safety knowledge indicating that higher levels of safety climate were related to higher levels of safety compliance and safety knowledge. It was also expected that organizational safety climate would positively moderate the relationship between job insecurity and safety compliance and safety knowledge where the outcomes of safety compliance and safety knowledge would be higher when the safety climate is more positive. The results support these hypotheses as well.

A strong organizational safety climate was also hypothesized to be negatively related to self-report and non-self-reported safety outcomes of accidents, injuries and near misses. The results did not indicate a significant relationship between organizational safety climate and self-reported accidents, injuries and near misses or non-self-reported injuries and near misses. Despite the fact that the present study results did not support the stated hypotheses, they were found to be primarily in support of the direct effects models of workplace safety. As Neal and Griffin (2004) stated, an individual's work environment (such as safety climate) directly influence safety knowledge, which directly influences safety performance behaviors (such as safety compliance), which is then directly related to safety outcomes (i.e. accidents, injuries and near misses). A visual depiction of this model is located in Figure 1.

It was also expected that safety climate would positively moderate the relationship between job insecurity and safety outcomes of both self-reported and non-self-report accidents, injuries and near misses where safety outcomes would be lower when climate is more positive. These hypotheses were not supported, indicating no moderating relationship of safety climate. The overall results of the present research support more of a combined safety model involving both a direct effect model and a moderating effect of safety climate (Figure 6).

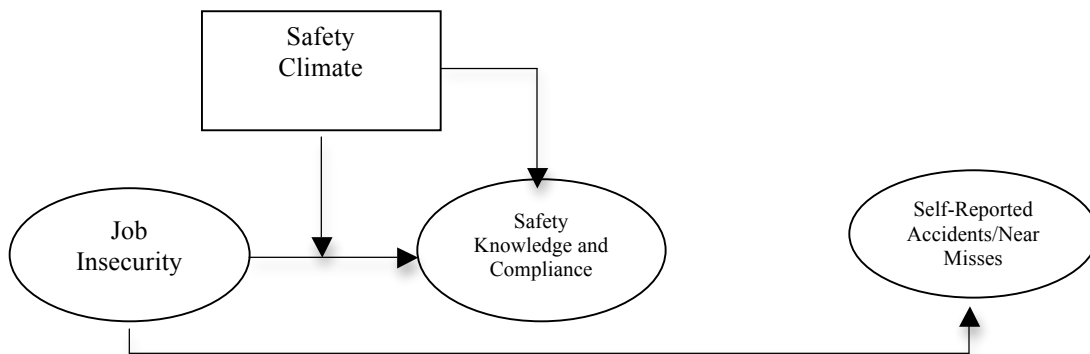


Figure 6. Supported Model of Workplace Safety.

It is possible that another variable could be moderating the relationship between job insecurity and employee safety outcomes, as previous studies have supported other factors. Further research should look into incorporating other possible moderators in the stress-strain relationship between job insecurity and safety outcomes since the literature in this area is quite sparse. A studies by Lim (1996, 1997) showed that work based support (supervisor support and colleague support) moderated the relationship between job insecurity and noncompliant job behaviors. Other potential moderators, as shown in

the Barlow and Iverson's (2004) model of workplace safety are composed of safety communication and stress tolerance.

A meta-analysis by Clarke (2006) indicated that safety climate did not show a significant positive correlation with accident involvement in terms of retrospective designs (such as the present research), but that the relationship between safety climate and accident involvement was found to be moderated by the research design, such that only prospective designs (accident involvement is measured following safety climate) demonstrated validity generalization. Further studies should utilize this research design; however the time needed was beyond the scope of the current research. It is of interest, however, that the most recent meta-analysis (Christian et al., 2009) did support the relationship between organizational safety climate (regardless of level of analysis) and safety outcomes (most likely due to the larger sample size), however with few of the primary studies (12/90) being longitudinal studies it limits the ability to determine causality.

Also, the literature states that the recall of workplace accidents and injuries may only extend back 4 weeks (Landen & Hendricks, 1995 as cited in Probst, 2004) and therefore future research should also look at other forms of accident/injury tracking such as having employees keep journals in which to accurately record accidents, injuries and near misses as they occur. However, it is of interest that in the present organization the average near misses that were reported to the organization was 112.81 (SD = 77.92) with an average first aid of .52 (SD = .68) and no recordable injuries. It would be of interest to determine why there are so many near miss reports ("close calls"), but so few first aid

reports. With near misses being so prevalent, it is of wonder why the first aid reports are so low when accidents are “that close” to occurring. In the future it would be interesting to determine what is going on internally with the employee thinking that would have so many near misses being reported, yet so few first aid incidents when according to OSHA standards can be as miniscule as using a nonprescription medication at nonprescription strength, cleaning, flushing or soaking a surface wound, butterfly bandages or wound coverings or even hot and cold therapy for example.

Based on the results of the present research we also now know that the group level analyses in regard to the non-self-report measures were not upheld. According to Bliese and Jex (2002), group level variables created through composition processes such as group means (used in the present research in regard to the non-self-report data) tend to share theoretical meaning with their lower level counterparts however, the magnitude of relationships based on individual variables may vary dramatically from the magnitude of relationships. This may have been a factor with the present research.

Limitations and Strengths

The first limitation is in regard to using self-report measures and has to do with survey construction in general. In the present research the survey measures used (job insecurity, safety climate and incidents) were given to assess individual perceptions and not specifically on attributes of the group. This may have reduced the sensitivity of the measure to differences at the group level. Also, with self-report measures social desirability responding is always a concern. To help control for this, questionnaires were

made completely anonymous and employees were made aware that individual level data was not going to be shared with management or the organization. In addition, since the statistics were performed at the group level, to ensure anonymity in this regard no results were reported to the organization if a workgroups number of respondents were fewer than twelve. The discriminating information on the survey was otherwise minimal (i.e. department, gender and age range).

A strength of this study is that it did not rely only on self-report measures, but non-self-report data as well. This additional source of information provided an added check upon reported safety outcomes and therefore aides in controlling for common method variance in that regard. However, even though they are organizational records and are not considered “self-report” measures because they are not a direct survey, it is still self-report in nature because the employee still has to make the personal effort to report the incidents to the organization. In this sense having another form of non-self-report measures would be useful, such as direct observation or having any employee report when they witness a safety incident such as a first aid injury. It could be that many employees do not feel the need to report minor first aid incidents but would be willing if it did not require as much time, so having some sort of easy electronic system (i.e. report the incident via palm pilot study, or press a button on a tracking device) would help track safety issues.

A second limitation of this study is the industry-specific data. A manufacturing location was chosen for the present research due to the fact that it was the source of data from the study that was the inspiration for this project. A strength of this study is that

unlike the previous study (Probst, 2004), the current research incorporates data from five different manufacturing locations from the same organization throughout the United States. Future research should attempt to replicate these findings in multiple organizations and industries such as health care, construction and other industries where safety is of constant concern. Also, it would be of interest to see how this study would have replicated in an organization that was unionized. Perhaps older workers would report more safety incidents (if in fact they were underreporting) because job insecurity would be assumed to be not as high when tenure plays such a large part in job security in a unionized setting.

A third limitation of the present research is the inability to establish temporal precedence. As stated in Storseth (2006), since the hypotheses in this study are based off of previous theory and research and no methodological evidence in terms of causation has been provided it is impossible to show a true causal relationship. In order for causation to be shown, three things must be established: a) temporal precedence (must be able to show that A happens before B), b) A and B must co-vary (you must show that there is some type of relationship between A and B), and c) all other alternative explanations must be explained (another variable or factor could be causing the outcome). Since all three of these things cannot be established, and data was collected only at one time within the manufacturing settings, it was not possible to test the causal relationships. Also, having a true experimental design or even a quasi-experimental design in an organization would be unethical in this case (instilling job insecurity, a known stressor with detrimental impacts). In the future, a more longitudinal approach to

assessment would aid in providing further validation for a causal relationship among the variables in question.

The power of the analysis may have been further restricted by the low base rate of accidents as well as the skewness of the safety outcome data. Further exploration revealed that the safety outcomes in the present research were found to be quite skewed. The issue with skewed data is that the mean value is then not very representative of any score in the distribution. The results from the data analysis indicate that self-reported measures of safety outcomes are not normally distributed (Z_{skew} of accidents = 36.38, injuries = 10.82, near misses = 25.65) and non self-report near misses are also not normally distributed ($Z_{skew} = 3.04$) while first aid reports are extremely close to being considered non-normal ($Z_{skew} = 1.92$). A normal distribution is said to have a Z_{skew} (Skew/ SE_{skew}) under 2. Therefore, the safety data in this study was skewed. For this reason, nonsignificant results in the current research need to be interpreted with caution.

Practical Implications

The results from the current research have implications for both organizations and for practice. First, the results indicate that creating a more positive safety climate does have a relationship with increased safety knowledge and safety compliance. Further, fostering a positive safety climate helps attenuate the negative impacts of job insecurity on safety compliance and knowledge. This indicates that companies that take the extra initiative to work on increasing their safety climate will benefit with seeing an increase in their safety knowledge and safety compliance. As a mixed model of safety outcomes was

supported in the present research, this safety compliance may then directly affect organizational safety outcomes.

As Probst, 2004 found, organizations that display clear signals demonstrating the importance of safety will send the message to employees that they should focus on safety compliance if they wish to retain their employment. Therefore, when a company places a higher emphasis on safety over production, employees will work more on safety despite high levels of job insecurity because they know the organization places more emphasis on safety rather than production needs. The organization in this study places a high priority on safety and this is reiterated in numerous ways throughout the manufacturing environment which may communicate to employees that working safely will aid in retaining their employment rather than working quickly and carelessly and resulting in an accident or injury. The mixed results of this study showed that the stressor of job insecurity resulted in a lower number of self-reported accidents and injuries. Further research should look more closely at this relationship and incorporating other moderators into the link between job insecurity and employee safety outcomes. Perhaps having a cognitive measure to determine how employees decide when to report safety incidents (as they reported a large amount of near misses) and when they decide not to, or looking into intrinsic and extrinsic motivation (perhaps they are not reporting incidents in order to receive a large company incentive) would be an area for future research.

In regard to implications for practice, the results of this study have contributed to the mixed literature further showing that more research is needed in the area of job insecurity and how it relates to employee safety outcomes. Job insecurity was only found

to have a relationship with safety compliance and safety knowledge when the moderator of organizational safety climate was considered. As stated, job insecurity was shown to have a positive impact on employee reported accidents and injuries, but with mixed results a moderator may be impacting this relationship and further research is needed in this area. Overall, safety climate was still shown to be an important variable in this study for both organizations and practice however looking further into the impacts of a positive safety climate (as it was relatively high in the current organization) is of interest for future studies. With the United States Bureau of Labor Statistics (July, 2009) indicating that job losses have only increased as unemployment levels reached an all time high of 9.5%, links showing the negative impact job insecurity has on employee and employer outcome and further research on moderating variables are of utmost interest.

APPENDIX

Workplace Environmental Survey

Workplace Environmental Survey

Dear Participating Employee,

Thank you for your input! Your opinion is greatly valued!

We have a unique opportunity to receive input and learn about our "Safety Culture" relative to our phenomenal 2009 safety results and actually help a university graduate student with their thesis. A University of Wisconsin graduate student developed the survey you are holding. It addresses job security, safety climate and employee safety and how those relative to our safety results for the calendar year of 2009 (reportable injuries/illnesses, OSHA recordable injuries/illnesses, first aids and near misses).

The questionnaire is completely anonymous. The only information we will know is the mill team you work on and even those names have been substituted to protect our (company). You are free to remove yourself from this study at any time without penalty. You do not need to answer any question that you do not want to.

Here is your part. Answer the questions to the best of your knowledge. For fill-in questions, make your best guess. The majority of the questions ask you to rate how much you agree or disagree, again answer honestly.

Once the results are received, we will share them across the sector. For us to continue our successful safety performance, we need to learn as much as we can to help close any gaps and continue with what is working. Injuries are not part of doing business in (our organization). Attaining excellent safety, quality and productivity results are the expectation.

I really appreciate your help with this study.

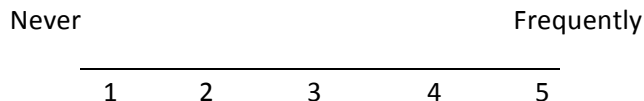
Sincerely,

Steve Simon

What is the FUTURE OF YOUR JOB with this organization like? Circle YES if the item describes the FUTURE OF YOUR JOB. Circle NO if the item does not describe the FUTURE OF YOUR JOB. Circle ? if you cannot decide. Please choose a response for each item.

- SURE.....Yes ? No
- UNPREDICTABLE.....Yes ? No
- UP IN THE AIR.....Yes ? No
- STABLE.....Yes ? No
- QUESTIONABLE.....Yes ? No
- UNKNOWN.....Yes ? No
- MY JOB IS ALMOST GUARANTEED.....Yes ? No
- CAN DEPEND ON BEING HERE.....Yes ? No
- CERTAIN.....Yes ? No

Please read each statement carefully and indicate the frequency in which each event has occurred to you in the **past year (the year of 2009)** by circling the appropriate number on the following scale.



Strains or Sprains	1	2	3	4	5
Cuts or Lacerations	1	2	3	4	5
Burns	1	2	3	4	5
Bruises or Contusions	1	2	3	4	5
Fractured Bone	1	2	3	4	5
Dislocated Joint	1	2	3	4	5
Serious Muscle or Back Pain	1	2	3	4	5
Blisters	1	2	3	4	5

Please answer the following by circling your answer or writing it in the space provided.

How many safety accidents did you report to your supervisor over the past 12 months?

How many “near misses” were you involved in over the past 12 months? _____

Leadership makes sure we receive appropriate rewards for achieving safety targets on the job	1	2	3	4	5
Leadership provides continuous encouragement to do our jobs safely	1	2	3	4	5
Leadership shows determination to maintain a safe work environment	1	2	3	4	5
Leadership suggests new ways of doing our jobs more safely	1	2	3	4	5
Leadership encourages me to express my ideas and opinion about safety at work	1	2	3	4	5
Leadership talks about his/her values and beliefs of the importance of safety	1	2	3	4	5
Leadership behaves in a way that displays commitment to a safe workplace	1	2	3	4	5
Leadership spends time showing me the safest way to do things at work	1	2	3	4	5
Leadership would listen to my concerns about safety on the job	1	2	3	4	5
Leadership avoids making decisions that affect safety on the job	1	2	3	4	5
Leadership fails to intervene until safety problems become serious	1	2	3	4	5
Leadership waits for things to go wrong before taking action	1	2	3	4	5
People in this organization are often afraid of making errors	1	2	3	4	5
In this organization, people get upset and irritated if an error occurs	1	2	3	4	5
Our motto is, "Why admit an error when no one will find out?"	1	2	3	4	5
There are advantages when covering up one's errors	1	2	3	4	5
Employees who admit their errors are asking for trouble	1	2	3	4	5
It can be harmful to make your errors known to others	1	2	3	4	5

What is your gender? a) Male b) Female

In what location do you work? a) New Albany Mill b) Savannah Mill c) Charlotte Mill
d) Raleigh Mill e) Milwaukee Mill

In which department do you work?
a) Towel Department b) Brake Department c) PC Board Department d) Extrusion Department
e) Final Assembly Department f) Shipping Department

What is your age range?
a) 18-24 b) 25-29 c) 30-34 d) 35-39 e) 40-44 f) 45-59 g) 50-54 h) 55-59
i) 60-64 j) 65 or older

On average, how many hours do you work each week? _____ hours per week

REFERENCES

- Baba, V.V., Tourigny, L., Wang, X., & Liu, W. (2009). Proactive personality and work performance in China: The moderating effects of emotional exhaustion and perceived safety climate. *Canadian Journal of Administrative Sciences*, 26, 23-37.
- Barling, J., Loughlin, C., & Kelloway, E.K. (2002). Development and test of a model linking safety-specific transformational leadership and occupational safety. *Journal of Applied Psychology*, 87(3), 488-496.
- Barlow, L. & Iverson, R.D. (2004). Workplace safety. In J. Barling, E.K. Kelloway, & M.R. Frone(Eds.), *Handbook of Work Stress* (pp. 247-266). Portland, OR: Book News, Inc.
- Bliese, P.D. & Jex, S.M. (2002). Incorporating a multilevel perspective into occupational stress research: Theoretical, methodological , and practical implications. *Journal of Occupational Health Psychology*, 7(3), 265-276.
- Burke, M., Chan-Serafin, S., Salvador, R., Smith, A., & Sarpy, S. (2008). The role of national culture and organizational climate in safety training effectiveness. *European Journal of Work & Organizational Psychology*, 17(1), 133-152.
- Burke, M., Sarpy, S., Tesluk, P., & Smith-Crowe, K. (2002). General safety performance: A test of a grounded theoretical model. *Personnel Psychology*, 55(2), 429-457.
- Cheng, G., & Chan, D. (2008). Who suffers more from job insecurity? A meta-analytic review. *Applied Psychology: An International Review*, 57(2), 272-303.

- Christian, M., Bradley, J., Wallace, J., & Burke, M. (2009). Workplace safety: A meta-analysis of the roles of person and situation factors. *Journal of Applied Psychology, 94*(5), 1103-1127.
- Clarke, S., & Robertson, I. (2005). A meta-analytic review of the Big Five personality factors and accident involvement in occupational and non-occupational settings. *Journal of Occupational & Organizational Psychology, 78*(3), 355.
- Cooper, M., & Phillips, R. (2004). Exploratory analysis of the safety climate and safety Behavior relationship. *Journal of Safety Research, 35*(5), 497-512.
- De Cuyper, N., Notelaers, G., & De Witte, H. (2009, April). Job insecurity and employability in fixed-term contractors, agency workers, and permanent workers: Associations with job satisfaction and affective organizational commitment. *Journal of Occupational Health Psychology, 14*(2), 193-205.
- Evans, D., Michael, J., Wiedenbeck, J., & Ray, C. (2005). Relationships between organizational climates and safety-related events at four wood manufacturers. *Forest Products Journal, 55*(6), 23-28.
- Forcier, B., Walters, A., Brasher, E., & Jones, J. (2001). Creating a safer working environment through psychological assessment: A review of a measure of safety consciousness. *Journal of Prevention & Intervention in the Community, 22*(1), 53-65.

- Gilboa, S., Shirom, A., Fried, Y., & Cooper, C. (2008, Summer2008). A meta-analysis of work demand stressors and job performance: Examining main and moderating effects. *Personnel Psychology*, *61*(2), 227-271.
- Goldenshar, L.M., Williams, L.J. & Swanson, N.G. (2003). Modelling relationships between job stressors and injury and near-miss outcomes for construction labourers. *Work & Stress*, *17*(3), 218-240.
- Griffin, M., & Neal, A. (2000). Perceptions of safety at work: A framework for linking safety climate to safety performance, knowledge, and motivation. *Journal of Occupational Health Psychology*, *5*(3), 347-358.
- Hofmann, D.A., Morgeson, F.P., & Gerras, S.J. (2003). Climate as a moderator of the relationship between leader-member exchange and content specific citizenship: Safety climate as an exemplar. *Journal of Applied Psychology*, *88*(1), 170-178.
- Krause, T., Seymour, K., & Sloat, K. (1999). Long-term evaluation of a behavior-based method for improving safety performance: A meta-analysis of 73 interrupted time-series replications. *Safety Science*, *32*(1), 1-18.
- Lim, V. (1996, February). Job Insecurity and Its Outcomes: Moderating Effects of Work-Based and Nonwork-Based Social Support. *Human Relations*, *49*(2), 171-194.
- Lim, V. (1997, July). Moderating Effects of Work-Based Support on the Relationship Between Job Insecurity and Its Consequences. *Work & Stress*, *11*(3), 251-266.
- Meliá, J., Mearns, K., Silva, S., & Lima, M. (2008). Safety climate responses and the perceived risk of accidents in the construction industry. *Safety Science*, *46*(6), 949-958.

- Miller, S. (2009). Economic fears increase unhealthy behaviors among employed. *SHRM* Online.
- Naswall, K., Sverke, M., & Hellgren, J. (2005). The moderating role of personality characteristics on the relationship between job insecurity and strain. *Work & Stress, 19(1)*, 37-49.
- Neal, A., Griffin, M., & Hart, P. (2000). The impact of organizational climate on safety climate and individual behavior. *Safety Science, 34(1)*, 99-109.
- Neal, A., & Griffin, M. (2004). Safety climate and safety at work. In J. Barling & M.R. Frone (Eds.), *The psychology of workplace safety* (pp. 15-34). Washington, DC US: American Psychological Association.
- Neal, A., & Griffin, M. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of Applied Psychology, 91(4)*, 946-953.
- Nielsen, K., Rasmussen, K., Glasscock, D., & Spangenberg, S. (2008). Changes in safety climate and accidents at two identical manufacturing plants. *Safety Science, 46(3)*, 440-449.
- Nunnally, J.C. & Bernstein, I.H. (1994). *Psychometric theory* (3rd Edition). New York: McGraw Hill Inc.
- Parboteeah, K., & Kapp, E. (2008). Ethical climates and workplace safety behaviors: An empirical investigation. *Journal of Business Ethics, 80(3)*, 515-529.
- Pousette, A., Larsson, S., & Törner, M. (2008). Safety climate cross-validation, strength and prediction of safety behaviour. *Safety Science, 46(3)*, 398-404.

- Probst, T. (2002). Layoffs and tradeoffs: Production, quality, and safety demands under the threat of job loss. *Journal of Occupational Health Psychology, 7*(3), 211-220.
- Probst, T. (2003, December). Development and validation of the Job Security Index and the Job Security Satisfaction scale: A classical test theory and IRT approach. *Journal of Occupational & Organizational Psychology, 76*(4), 451-467.
- Probst, T. (2004). Safety and Insecurity: Exploring the Moderating Effect of Organizational Safety Climate. *Journal of Occupational Health Psychology, 9*(1), 3-10.
- Probst, T., & Brubaker, T. (2001). The effects of job insecurity on employee safety outcomes: Cross-sectional and longitudinal explorations. *Journal of Occupational Health Psychology, 6*(2), 139-159.
- Probst, T., & Brubaker, T. (2007). Organizational Safety Climate and Supervisory Layoff Decisions: Preferences Versus Predictions. *Journal of Applied Social Psychology, 37*(7), 1630-1648.
- Probst, T., Brubaker, T., & Barsotti, A. (2008). Organizational injury rate underreporting: The moderating effect of organizational safety climate. *Journal of Applied Psychology, 93*(5), 1147-1154.
- Probst, T., & Estrada, A. (2009). Accident under-reporting among employees: Testing the moderating influence of psychological safety climate and supervisor enforcement of safety practices. *Accident Analysis and Prevention*, Retrieved September 17, 2009 (in press).

- Probst, T., Stewart, S., Gruys, M., & Tierney, B. (2007). Productivity, counter productivity and creativity: The ups and downs of job insecurity. *Journal of Occupational & Organizational Psychology*, 80(3), 479-497.
- Real, K. (2008). Information seeking and workplace safety: A field application of the risk perception attitude framework. *Journal of Applied Communication Research*, 36(3), 339-359.
- Rundmo, T. & Iversen, H. (2007). Is job insecurity a risk factor in occupational health and safety? *Int. J. Risk Assessment and Management*, 7(2), 165-179.
- Rosenblatt, Z., Talmud, I., & Ruvio, A. (1999, June). A Gender-based Framework of the Experience of Job Insecurity and Its Effects on Work Attitudes. *European Journal of Work & Organizational Psychology*, 8(2), 197-217.
- Smecko, T. & Hayes, B. (1999). Measuring compliance with safety behaviors at work. Paper presented at the 14th annual conference of the Society for Industrial and Organizational Psychology, Atlanta, GA.
- Storseth, F. (2006). Changes at work and employee reactions: Organizational elements, job insecurity, and short-term stress as predictors for employee health and safety. *Scandinavian Journal of Psychology*, 47(6), 541-550.
- Storseth, F. (2007). Affective job insecurity and risk taking at work. *Int. J. Risk Assessment and Management*, 7(2), 189-204.
- Sverke, M., & Hellgren, J. (2002, January). The nature of job insecurity: Understanding employment uncertainty on the brink of a new millennium. *Applied Psychology: An International Review*, 51(1), 23-42.

- Sverke, M., Hellgren, J., & Näswall, K. (2002). No security: A meta-analysis and review of job insecurity and its consequences. *Journal of Occupational Health Psychology, 7*(3), 242-264.
- Turner, N., Chmiel, N., & Walls, M. (2005). Railing for safety: Job demands, job control, and safety citizenship role definition. *Journal of Occupational Health Psychology, 10*(4), 504-512.
- Witte, H. (1999, June). Job Insecurity and Psychological Well-being: Review of the Literature and Exploration of Some Unresolved Issues. *European Journal of Work & Organizational Psychology, 8*(2), 155-177.
- Wu, T., Chen, C., & Li, C. (2008). A correlation among safety leadership, safety climate and safety performance. *Journal of Loss Prevention in the Process Industries, 21*(3), 307-318.
- Zhou, Q., Fang, D., & Wang, X. (2008). A method to identify strategies for the improvement human safety behavior by considering safety climate and personal experience. *Safety Science, 46*(10), 1406-1419.
- Zohar, D. (2000). A group-level model of safety climate: Testing the effect of group climate on microaccidents in manufacturing jobs. *Journal of Applied Psychology, 85*(4), 587-596.
- Zohar, D. (2002). The effects of leadership dimensions, safety climate, and assigned priorities on minor injuries in work groups. *Journal of Organizational Behavior, 23*(1), 75-92.

Zohar, D., & Luria, G. (2005). A multilevel model of safety climate: Cross-level relationships between organization and group-level climates. *Journal of Applied Psychology, 90*(4), 616-628.