

## INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

**The quality of this reproduction is dependent upon the quality of the copy submitted.** Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.

ProQuest Information and Learning  
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA  
800-521-0600

**UMI<sup>®</sup>**



Safety-specific Transformational Leadership: An Experimental Study

Jane Mullen

Saint Mary's University

In partial fulfillment of the requirements  
for the degree of Doctor of Philosophy

© Jane Mullen, 2005

September 12, 2005

Examining Committee

Supervisor: Kevin Kelloway, Ph.D.

Supervisory Committee: Vic Catano, Ph.D.  
Lori Francis, Ph.D.  
Catherine Loughlin, Ph.D.

External Examiner: Alan Okros, Ph.D.



Library and  
Archives Canada

Bibliothèque et  
Archives Canada

0-494-06981-3

Published Heritage  
Branch

Direction du  
Patrimoine de l'édition

395 Wellington Street  
Ottawa ON K1A 0N4  
Canada

395, rue Wellington  
Ottawa ON K1A 0N4  
Canada

**NOTICE:**

The author has granted a non-exclusive license allowing Library and Archives Canada to reproduce, publish, archive, preserve, conserve, communicate to the public by telecommunication or on the Internet, loan, distribute and sell theses worldwide, for commercial or non-commercial purposes, in microform, paper, electronic and/or any other formats.

The author retains copyright ownership and moral rights in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

**AVIS:**

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque et Archives Canada de reproduire, publier, archiver, sauvegarder, conserver, transmettre au public par télécommunication ou par l'Internet, prêter, distribuer et vendre des thèses partout dans le monde, à des fins commerciales ou autres, sur support microforme, papier, électronique et/ou autres formats.

L'auteur conserve la propriété du droit d'auteur et des droits moraux qui protègent cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

---

In compliance with the Canadian Privacy Act some supporting forms may have been removed from this thesis.

Conformément à la loi canadienne sur la protection de la vie privée, quelques formulaires secondaires ont été enlevés de cette thèse.

While these forms may be included in the document page count, their removal does not represent any loss of content from the thesis.

Bien que ces formulaires aient inclus dans la pagination, il n'y aura aucun contenu manquant.

  
**Canada**



**Saint Mary's  
University**

Halifax, Nova Scotia  
Canada B3H 3C3

Patrick Power Library

tel 902.420.5534

fax 902.420.5561

web [www.stmarys.ca](http://www.stmarys.ca)

## **Research Ethics Board Certificate Notice**

The Saint Mary's University Research Ethics Board has issued an REB certificate related to this thesis. The certificate number is: \_\_\_\_\_

A copy of the certificate is on file at:

Saint Mary's University, Archives  
Patrick Power Library  
Halifax, NS  
B3H 3C3

Email: [archives@smu.ca](mailto:archives@smu.ca)

Phone: 902-420-5508

Fax: 902-420-5561

For more information on the issuing of REB certificates, you can contact the Research Ethics Board at 902-420-5728/ [ethics@smu.ca](mailto:ethics@smu.ca) .

## Abstract

Jane Mullen

### Safety-specific Transformational Leadership: An Experimental Study

September 12, 2005

A model of safety-specific transformational leadership and passive safety leadership was developed and empirically evaluated based on a sample of young workers. The results of structural equation modeling illustrated that safety climate and safety compliance mediated the relationship between safety-specific transformational leadership and safety-related events and injuries. Passive safety leadership predicted safety climate and accounted for variance in the safety climate variable over and above the variance attributed to safety-specific transformational leadership. The generalizability of the model was examined in a second study in which the theoretical propositions of the model were validated in a sample of long-term health care employees. The nature of the safety-specific transformational leadership construct was examined and results of confirmatory factor analysis indicated that safety-specific transformational leadership and general transformational leadership are empirically distinct constructs. Studies 3 and 4 build on the established model by assessing an intervention aimed at enhancing safety-specific transformational leadership. The leadership intervention was assessed using a field experiment in which 21 long-term health care organizations and their leaders were randomly assigned to general transformational leadership training, safety-specific transformational leadership training or a control group. In Study 3, the effects of the training on leaders' self-reported attitudes toward safety, self-efficacy and intent to promote safety were assessed. Manager safety attitudes and self efficacy were significantly higher in the safety-specific condition than they were in either the general or control conditions. In Study 4, the effects of training on subordinates' perceptions of leader safety-specific transformational leadership, passive safety leadership, safety climate, safety participation, safety compliance, safety-related events and injuries were assessed. The analysis revealed an effect of leadership training for the safety-specific transformational leadership and safety climate outcomes.

## Acknowledgements

I thank Kevin Kelloway for being an outstanding supervisor throughout this process. Kevin exceeded my expectations and he was always available to answer my questions or to provide guidance. For that I am greatly appreciative. I also thank Vic Catano, who in addition to serving as a committee member also supervised my Master's thesis. There are certain people who have a strong influence over your academic career, in terms of the direction you choose, and both Kevin and Vic have had a major influence over my academic choices. I continue to learn from them and look forward to working with them in the future.

I also thank Lori Francis, Catherine Loughlin and Al Okras for their feedback and guidance throughout this process. They were very helpful and great to work with, making the experience very positive.

I thank my husband, Jason, for being 100% supportive throughout this experience and for making sure that we had some fun during these stressful and busy times. Jason, although you have never complained, I know that you have made huge sacrifices in order to support me and our family. It's time to reverse the roles and I'm here for you now. I owe you big! Thank you and I love you.

I also want to express my love and thanks to mom and dad, Joan and John Veinotte, and my brother, Josh. They expressed interest in my work on a daily basis. Thank you for all of your support that has come in many forms over the years. It's hard to even imagine how I could have done it without you. Josh, you were the primary inspiration for this research. I truly hope that research of this nature leads to major

improvements of safety in the workplace so that people don't have to go through the same experiences you faced.

Thank you Nancy Johnson, and the NSAHO staff. I appreciate all of your assistance with recruiting participants from the health care industry and your support throughout the project.

Finally, I dedicate this thesis to the memory of Greg Gallivan.

## Table of Contents

Acknowledgments.....	ii
List of Tables.....	vii
List of Figures.....	ix
Introduction.....	1
Study I. Introduction.....	11
Method.....	26
Results.....	29
Discussion.....	43
Study 2. Introduction.....	49
Method.....	55
Results.....	57
Discussion.....	70
Study 3. Introduction.....	77
Method.....	84
Results.....	89
Discussion.....	93
Study 4. Introduction.....	100
Method.....	101
Results.....	103
Discussion.....	108
General Discussion.....	114
Appendix A. Informed consent form.....	140

Appendix B. Items used to measure subordinate perceptions of leader safety-specific transformational leadership.....	141
Appendix C. Items used to measure subordinate perceptions of leader passive safety leadership.....	142
Appendix D. Items used to measure subordinate perceptions of safety climate.....	143
Appendix E. Items used to measure subordinate perceptions of safety participation.....	144
Appendix F. Items used to measure subordinate perceptions of safety compliance.....	145
Appendix G. Items used to measure subordinate perceptions of safety-related events.....	146
Appendix H. Items used to measure subordinate perceptions of injuries.....	147
Appendix I. Nova Scotia Association Health Organization letter of support sent to potential participating long-term health care organizations.....	148
Appendix J. Recruitment letter sent to potential participating long-term health care organizations.....	149
Appendix K. Long-term health care worker informed consent form.....	150
Appendix L. Items used to measure subordinate perceptions of general transformational leadership.....	151
Appendix M. Items used to measure subordinate perceptions of safety-related events.....	152
Appendix N. Items used to measure subordinate perceptions of injuries.....	153

Appendix O. Leader informed consent form.....154

Appendix P. Items used to measure leader safety attitudes.....155

Appendix Q. Items used to measure leader perceptions of intent to  
promote safety.....156

Appendix R. Items used to measure leader perceptions of self efficacy.....157

## List of Tables

Table 1.	Descriptive statistics, inter-item correlations, and reliabilities.....	30
Table 2.	Standardized parameter estimates for the safety-specific transformational leadership and passive safety leadership oblique two factor model.....	32
Table 3.	Fit indices for the three models.....	35
Table 4.	Hierarchical regression analyses ( $R^2$ ) showing the incremental contribution of passive safety leadership in the prediction of safety climate.....	43
Table 5.	Descriptive statistics, intercorrelations, and reliabilities of the study variables at pre-test.....	58
Table 6.	Fit indices for the unidimensional and two factor models.....	60
Table 7.	Standardized parameter estimates for the safety-specific transformational leadership and general transformational leadership oblique two factor model.....	61
Table 8.	Hierarchical regression analyses ( $R^2$ ) showing the incremental contribution of safety-specific transformational leadership in the prediction of safety climate.....	62
Table 9.	Hierarchical regression analyses ( $R^2$ ) showing the incremental variance of safety-specific transformational leadership in the prediction of safety participation.....	62
Table 10.	Hierarchical regression analyses ( $R^2$ ) showing the incremental variance of safety-specific transformational leadership in the prediction of safety compliance.....	63

Table 11.	Hierarchical regression analyses ( $R^2$ ) showing the incremental variance of safety-specific transformational leadership in the prediction of safety-related events.....	63
Table 12.	Hierarchical regression analyses ( $R^2$ ) showing the incremental variance of safety-specific transformational leadership in the prediction of injuries.....	64
Table 13.	Hierarchical Regression Analyses ( $R^2$ ) showing the incremental contribution of passive safety leadership in the prediction of safety climate.....	65
Table 14.	Fit indices for the three models.....	68
Table 15.	Pre-test and post-test inter-item correlations, and reliabilities.....	90
Table 16.	Descriptive statistics of the study variables at pre-test and post-test for the intervention and control groups.....	91
Table 17.	Intercorrelations, and reliabilities of the variables at pre-test and posttest.....	104
Table 18.	Descriptive statistics of the study variables at pre-test and post-test for the intervention and control groups.....	105

## List of Figures

Figure 1. Model linking safety-specific transformational leadership, passive leadership and safety outcomes.....	13
Figure 2. Revised fully mediated model linking safety-specific transformational Leadership, passive safety leadership and safety outcomes.....	36
Figure 3. Partially mediated model linking safety-specific transformational leadership, passive leadership and safety outcomes.....	37
Figure 4. Non-mediated model linking safety-specific transformational leadership, passive leadership and safety outcomes.....	38
Figure 5. Partially mediated model linking passive leadership and safety outcomes.....	39
Figure 6. Non-mediated model linking passive leadership and safety outcomes.....	40
Figure 7. Standardized parameter estimates for model linking safety-specific transformational leadership, passive leadership and safety outcomes.....	42
Figure 8. Standardized parameter estimates for model linking safety-specific transformational leadership, passive leadership and safety outcomes.....	69
Figure 9. Experimental design.....	87
Figure 10. Training intervention timeline.....	87

## Safety-specific Transformational Leadership: An Experimental Study

Evidence supporting the notion that organizational leaders influence workplace safety has significantly increased over the past two decades. Early investigations of occupational safety and causes for major accidents, such as the Westray mine explosion (Westray Mine Public Inquiry, 1997) and the Walkerton water crisis (Walkerton Inquiry, 2002), typically raised leadership as a key contributing factor. Recent prescriptive articles based on anecdotal evidence also suggest that organizational leaders strongly influence the safety outcomes within organizations (e.g., Hansen, 2004; Pater, 2005; Smith & Dyson, 2004). The empirical data support these anecdotal reports as recent studies suggest that leadership behaviours are related to a variety of attitudinal and behavioural safety outcomes (e.g., Barling, Loughlin & Kelloway, 2002; Kelloway, Mullen & Francis, in press; Mullen, in press). Despite these consistent findings, our understanding of how leadership affects safety outcomes is still limited. For example, while previous researchers examined the effects of both general and safety-specific styles of transformational leadership independently (e.g., Barling et al., 2002; Zohar, 2002), no empirical studies compared the effects of both styles of leadership on safety outcomes. In addition, research examining the impact of passive, or uninvolved leadership, is also very limited and remains an area that requires attention from researchers. Furthermore, most of the findings reported in the safety leadership literature are based on cross-sectional data, and there are no data evaluating the effectiveness of transformational leadership based interventions on safety outcomes, thus, limiting any causal inferences. The purpose of my research is to address these limitations that are evident in the safety literature.

Specifically, four studies were conducted to address the gaps that were identified in the safety leadership literature. In the first study, a model of safety-specific transformational leadership and passive leadership was developed and empirically evaluated based on a sample of young workers. The generalizability of the model was tested in a second study in which the theoretical propositions of the model were validated in a sample of long-term health care employees. The nature of the safety-specific transformational leadership construct, in comparison to general transformational leadership, was also examined in Study 2. Studies 3 and 4 build on the established model by assessing an intervention aimed at enhancing safety-specific transformational leadership. The intervention was assessed using a field experiment in which organizations and their leaders were randomly assigned to general transformational leadership training, safety-specific transformational leadership training or a wait-list control group. In study 3, the effects of the training on leaders' self-reported attitudes toward safety, self-efficacy and intent to promote safety were assessed. In study 4, the effects of training on subordinates' perceptions of leader safety-specific transformational leadership, passive safety leadership, safety climate, safety participation, safety compliance, safety-related events and injuries were assessed.

### Transformational Leadership

Despite numerous leadership theories presented in the literature, the theory of transformational leadership (Bass, 1985; Burns, 1978) has received more attention in recent organizational leadership research than all other theories of leadership combined (e.g., path-goal theory, servant leadership, etc; Judge & Bono, 2000; Judge & Piccolo, 2004). Transformational leadership is broadly defined as influencing subordinates by

“broadening and elevating followers’ ” goals and providing them with confidence to perform beyond the expectations specified in the implicit or explicit exchange agreement” (Dvir, Eden, Avolio, & Shamir, 2002, pg. 735; Shin & Zhou, 2003).

Bass’ (1985) transformational leadership theory states that transformational leadership is composed of four dimensions: idealized influence, inspirational motivation, individualized consideration, and intellectual stimulation. Idealized influence is defined as providing a vision of the future and a sense of mission. It includes behaviours such as setting a personal example and demonstrating high ethical standards. The second dimension, inspirational motivation, involves articulating an optimistic and inspiring vision of the future. Although inspirational motivation is a unique construct, Bass (1988) later combined this factor with idealized influence to comprise charisma, as the two factors were often not empirically distinct. The third dimension of transformational leadership, individualized consideration, includes developing employees by providing support, encouragement, and coaching to employees. Finally, intellectual stimulation involves behaviours that increase employees’ awareness of problems and encourages them to challenge the status quo (Bass & Avolio, 1993).

Many researchers combined the four dimensions of transformational leadership (idealized influence, inspirational motivation, individualized consideration, and intellectual stimulation) into a single higher order dimension (Barling, Weber, & Kelloway, 1996; Barling et al., 2002; Carless, Wearing, & Mann, 2000; Howell & Hall-Merenda, 1999; Judge & Bono, 2000; Judge & Piccolo, 2004; Kelloway et al., in press). Judge and Piccolo (2004) reported that the mean correlation between the four dimensions was .93, providing support for the combination of the four dimensions into a

unidimensional factor. Furthermore, the four dimensions of transformational leadership have very similar relationships with various criteria including subordinate organizational commitment, subordinate performance, subordinate intentions to leave an organization, and subordinate satisfaction with their leader (Bycio, Hackett, & Allen, 1995). Based on the empirical support presented for a single, higher order dimension of transformational leadership, the current study also used the combined unidimensional factor.

#### Effects of Transformational Leadership on Performance and Employee Attitudes

Bass' (1985) transformational leadership theory has generated significant empirical research interest over the past decade. Empirical evidence suggests that transformational leadership, or the dimensions, predict positive performance outcomes in field experiments (Barling et al., 1996; Dvir, Eden, Avolio, & Shamir, 2002), field studies (Hater & Bass, 1988; Keller, 1992; Howell & Avolio, 1993), laboratory studies (Howell & Frost, 1989; Kirkpatrick & Locke, 1996), and meta-analytic studies (DeGroot, Kiker & Cross, 2000; Fuller, Patterson, Hester, & Stringer, 1996; Lowe, Kroeck, & Sivasubramaniam, 1996). In fact, more than eighty-seven studies report positive relationships between transformational leadership and organizational outcomes (Judge and Piccolo, 2004) and this empirical evidence continues to accumulate.

Recent studies of transformational leadership examined the relationship between leader transformational behaviours, employee attitudes, and performance at both the individual and unit level. For example, in a study of 520 nurses, Avolio, Zhu, Koh and Bhatia (2004) examined the effects of transformational leadership on followers' organizational commitment. Psychological empowerment mediated the relationship between transformational leadership and follower organizational commitment.

Furthermore, structural distance between the leader and follower, or the extent in which leadership was direct or indirect, also mediated the relationship between transformational leadership and followers' organizational commitment.

Barling et al. (1996) also examined the effects of transformational leadership on follower organizational commitment. In an experimental study that examined both individual and unit level outcomes, Barling et al. (1996) demonstrated that enhanced transformational leadership through training yields higher subordinate ratings of organizational commitment, improved perceptions of leaders' transformational leadership, and sales performance in banks.

Walumbwa, Wang, Lawler, and Shi (2004) further investigated the underlying processes by which transformational leadership influences followers, by examining the mechanisms through which transformational leadership influences subordinates' organizational commitment, job satisfaction, and work withdrawal. A sample of 402 CEOs and HR managers from Chinese and Indian financial firms participated in the study. Collective efficacy, defined as "each individual's assessment of his or her group's collective capability to perform job related behaviours" (Walumbwa et al., 2004, p.515), moderated the relationship between transformational leadership and work attitudes and behaviour. Transformational leadership predicted higher ratings of follower perceptions of collective efficacy. Collective efficacy fully mediated the relationship between transformational leadership and followers' withdrawal behaviour, and partially mediated the relationship between transformational leadership and follower job satisfaction and organizational commitment. The findings suggest that transformational leadership plays a positive role in increasing collective efficacy among followers, which in turn has a

positive impact on job satisfaction and commitment and reduces withdrawal and turnover intentions. The findings also provide empirical support for the generalizability of transformational leadership across various cultures.

An interesting study conducted by Kelloway, Barling, Kelley, Comtois and Gatién (2003), examined remote transformational leadership, defined as “leadership interactions that are characterized by electronically mediated communication (email and video/teleconferencing) between geographically and physically isolated leaders and followers” (p. 164). In a laboratory study of 105 university students, the effects of remote transformational leadership (intellectual stimulation and charisma) on follower motivation and performance were assessed. Email messages that contained intellectually stimulating and/or charismatic leadership characteristics resulted in increased individual and group motivation and group task performance. The findings suggested that the positive impact of face-to-face transformational leadership on subordinate attitudes and performance (e.g., Barling et al, 1996) may also be achieved through remote transformational leadership and the use of email communication. These findings transcend the traditional notion of effective leadership and suggest that managers do not always need to engage in face-to-face interaction with subordinates in order to be perceived as transformational leaders. Moreover, Kelley (2005) found that the positive organizational outcomes associated with transformational leadership, such as job satisfaction and commitment, can be achieved in both remote and proximal environments, as long as the leader is perceived by the subordinate as being transformational.

The observation that most studies of transformational leadership and performance were conducted in settings that were relatively stable, lead Bass, Avolio, Jung, and Berson (2003) to examine the relationship between leadership and performance within units that operated under high levels of stress and uncertainty. In a sample of 72 light infantry rifle platoons, the researchers examined how transformational and transactional leadership, unit potency (unit confidence to perform tasks), and unit cohesion (teamwork) predicted performance on a training platoon mission. The results indicated that both transformational and transactional leadership ratings of sergeants and platoon leaders positively predicted unit performance. This observed relationship was partially mediated by soldier ratings of unit potency and unit cohesion. These findings suggest that the positive effects of transformational leadership may be generalized to stressful and challenging work settings, in addition to relatively stable environments.

Finally, in a recent meta-analysis, Judge and Piccolo (2004) reported that when other types of leadership were statistically controlled for (e.g., transactional leadership), transformational leadership was a stronger predictor of subordinate satisfaction with their leader, subordinate motivation, and subordinate ratings of leader effectiveness. The estimated true score correlation between transformational leadership and performance was  $r = 0.44$ . Similar findings were reported by Kirkpatrick and Locke (1996), Shamir, House and Arthur (1993), and Bass and Avolio (1993) in their earlier meta-analyses studies of transformational leadership.

Overall, a review of the empirical research indicates that the effects of transformational leadership on performance and employee attitudes are well established in the literature. In sum, the combined results of these observational (e.g., Judge &

Piccolo, 2004) and experimental (e.g., Barling et al., 1996) studies provide support for the validity of transformational leadership outcomes and suggest that the effects on performance and employee attitudes are generalizable across a variety of organizational settings.

### Passive Leadership

Bass (1985) contrasted transformational leadership to a more traditional style of managing known as transactional leadership. Transactional leadership is defined as the exchange of valued rewards for meeting set standards of performance (Bass, 1985). Transactional leaders identify the needs that are valued by employees and provide employees with the necessary resources if they meet specified performance objectives. This differs from the notion of transformational leadership in that transactional leaders focus on clarifying performance objectives, exchanging rewards and resources for meeting performance objectives, and providing corrective feedback when performance standards are not met (Bass, 1998). Alternatively, transformational leaders focus on providing a vision of the future and bringing about change (Judge & Piccolo, 2004). Transformational leadership behaviours are aimed at “broadening and elevating followers” goals and providing them with confidence to perform beyond the expectations specified in the implicit or explicit exchange agreement” (Dvir, Eden, Avolio, & Shamir, 2002, pg. 735; Shin & Zhou, 2003). In contrast, transactional leadership behaviours are aimed at monitoring and controlling subordinates through the exchange of valued resources, and maintaining the status quo (Bass, 1985).

Transactional leadership comprises three distinct forms of leadership. The first two are active forms of leadership and the third is considered a passive form of

leadership. The first form of active transactional leadership is contingent reward, whereby the leader provides subordinates with rewards for meeting performance objectives (Hater & Bass, 1988). Secondly, management by exception – active, involves leadership behaviours such as monitoring subordinate behaviour, anticipating performance problems before they occur and taking corrective action before performance problems become serious (Howell & Avolio, 1993). Finally, in its more passive form, the management by exception – passive style is characterized by leaders waiting until performance issues become serious before they take corrective action. Leaders fail to intervene, make decisions, and take action until subordinate performance issues create such problems that they can no longer be avoided.

In addition to management by exception – passive leadership, researchers distinguished another form of passive leadership, known as laissez faire leadership (Avolio, 1999; Bass, 1985, 1998; Kelloway et al., in press). Laissez faire leadership is the absence of leadership (Judge & Piccolo, 2004). Laissez faire leader behaviour is characterized by inaction, being unavailable when needed by subordinates, failure to clarify performance expectations, and avoidance of both decision making and leadership responsibilities (Bass, 1990; Hater & Bass, 1988; Judge & Piccolo, 2004). This form of passive leadership is generally considered the most ineffective form of leadership (Bass & Avolio, 1994).

Due to the similarities found between Bass and Avolio's (1990) management by exception – passive leadership, and laissez faire leadership, researchers have combined the dimensions into a single higher order passive leadership dimension (Den Hartog, Van Muijen, & Koopman, 1997; Kelloway et al., in press). The higher order passive

leadership dimension is empirically distinct and negatively correlated with transformational leadership (Kelloway et al., in press). Furthermore, passive leadership contributes incrementally, over and above the variance attributed to transformational leadership, in the prediction of organizational outcomes (Kelloway et al., in press). Thus, for the purpose of the current study, the single higher order dimension of passive leadership will be used.

Although passive forms of leadership are generally considered to be ineffective styles of leadership (Avolio, 1999; Bass & Avolio, 1994), few researchers have empirically examined the impact of passive leadership on subordinate performance (Kelloway et al., in press). Howell and Avolio (1993) found that passive leadership was negatively correlated with business-unit performance. In a recent meta analysis, Judge and Picollo (2004) found that passive leadership was negatively correlated with subordinate job satisfaction, subordinate satisfaction with the leader, and leader effectiveness. The findings of the meta analysis suggest that the absence of leadership (i.e. passive leadership) is as important as the presence of other forms of active leadership. Kelloway et al.'s (in press) recent study provided further empirical support for the importance of passive leadership. Their study showed that passive leadership and transformational leadership have equal and opposite effects on safety outcomes. The findings suggest that when leaders take a passive approach to managing subordinates, they actively destroy the safety climate in organizations. Therefore, it is critical that future safety research examines the impact that passive leadership has on safety outcomes, as it is largely being overlooked in the literature. Due to the scarce empirical research that examines the impact of passive leadership on safety outcomes, the current

studies aim to examine the impact of both transformational and passive forms of leadership on safety outcomes to address this gap in the literature.

## Study I

### Toward a Model of Safety-specific Transformational and Passive Safety Leadership

The purpose of this study is to develop and empirically evaluate a model linking safety-specific transformational leadership and passive safety leadership with occupational injuries. Although the literature concerning leadership has grown significantly, only a small portion of the research has focussed on leadership in a safety context and its prediction of safety outcomes (e.g., Barling et al., 2002; Kelloway et al., 2003; Zohar, 2002). Previous research indicates that leadership is associated with various safety outcomes (e.g., Butler & Jones, 1979; Dunbar, 1975) including safety climate and safety-related events (e.g., close calls) (Barling et al., 2002; Kelloway et al., in press; Mullen, in press), better safety records (Hofmann, Jacobs & Landy, 1995; Zohar, 1980), and safety citizenship behaviour (Hofmann, Morgeson, & Gerras, 2003). The current study examines the impact of safety-specific transformational leadership and passive safety leadership on subordinate safety outcomes.

#### Safety-specific Transformational Leadership.

Unlike studies that examined the relationship between leadership and safety using the general form of transformational leadership (e.g., Williams, Turner & Parker, 2000), the leadership construct used in this study reflects the manner in which leaders specifically manage safety-related issues in the workplace. Thus, the construct that is examined in the theoretical model reflects a safety-specific transformational leadership style. As Barling et al. (2002) described, each of the four components of transformational

leadership are relevant to improving workplace safety. They suggest that idealized influence would encourage managers to become role models by doing what is right (e.g., focussing on safety), rather than what is profitable (e.g., focussing on performance pressures). Furthermore, managers demonstrate inspirational motivation when they challenge individuals to go beyond their needs for the collective good and to achieve a level of safety performance that surpasses the minimum safety standards or that were once perceived to be unattainable. Intellectual stimulation would encourage managers to challenge employees to create innovative ways for approaching and solving safety related issues. Finally, individualized consideration for employees would demonstrate that managers have a personal concern for their safety and well-being.

The theoretical model of safety-specific transformational leadership and passive safety leadership (see Figure 1) discussed below is based on the assumption that safety-specific transformational leadership and passive safety leadership are empirically distinct, and negatively correlated constructs. Previous research indicates that the higher order passive leadership dimension is empirically distinct, and negatively correlated with safety-specific transformational leadership (Kelloway et al., in press). Therefore,

Hypothesis 1: Passive safety leadership is empirically distinct and negatively correlated with safety-specific transformational leadership.

#### Leadership - Safety Climate - Safety-related Events – Injury Mediation Model.

Safety climate is a growing area of interest in the occupational safety literature. Perceptions of safety climate are defined as “shared perceptions of managerial policies, procedures and practices as indicators of concern for employees’ safety” (Zohar, 2002; p.

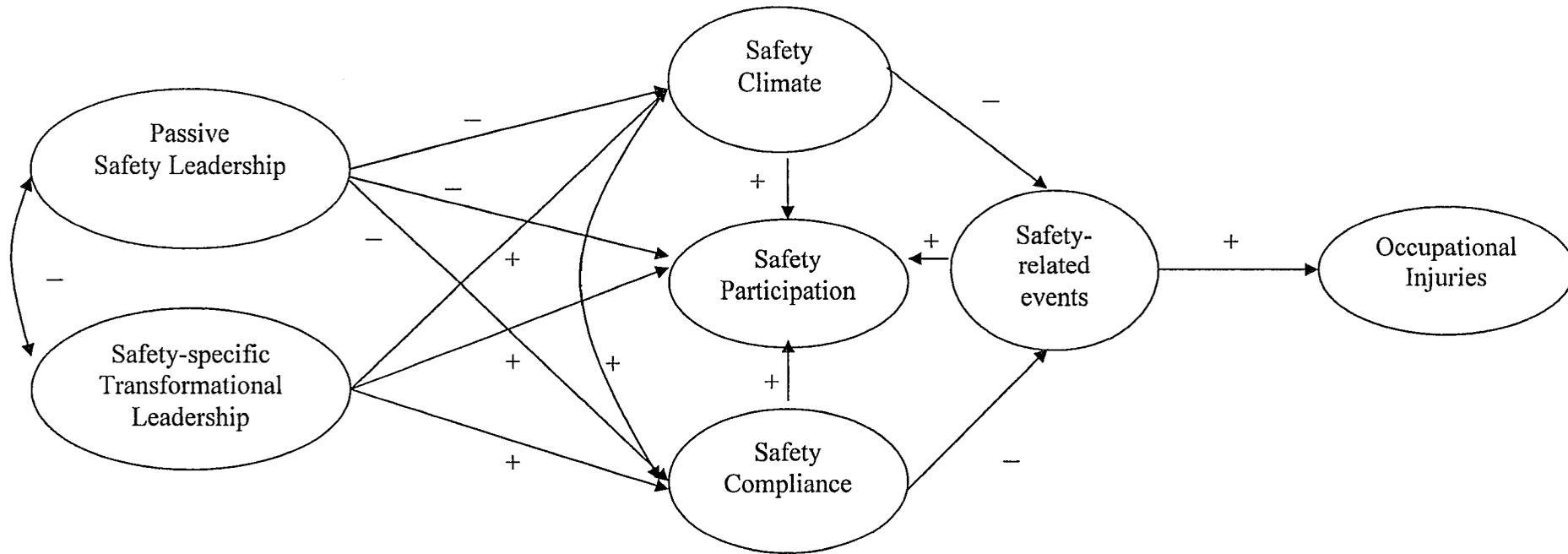


Figure 1.

Model linking safety-specific transformational leadership, and passive safety leadership and safety outcomes.

75; Zohar, 1980). The safety climate literature addresses two main issues, namely the nature of the safety climate construct (e.g., Hayes, Peranda, Smecko & Trask, 1998; Zohar, 1980), and the relationship between safety climate and organizational outcomes such as safety knowledge and motivation (Griffin & Neal, 2000), safety behaviour (e.g., Hofmann & Stetzer, 1996) and workplace accidents (e.g., Zohar, 2000). Researchers have also examined the predictors of safety climate and they suggest that positive safety climates are created when managers demonstrate a commitment to safe practices and policies within an organization (Dejoy, 1985; Zohar, 1980). However, the relationship between safety climate, leadership and safety-related outcomes remains unclear (Neal & Griffin, 2002; Zohar, 2002) and is addressed in the current study.

Leaders play an important role in shaping the perceived safety climate within a workplace (Hofmann & Morgeson, 1999; Zohar, 1980). As defined above, perceptions of safety climate are “shared perceptions of managerial policies, procedures and practices” (Zohar, 2002, p. 75; Zohar, 1980) relating to safety. These shared perceptions influence the employees’ actions and safety behaviour in the workplace (Hofmann & Stetzer, 1996). For example, leaders who act consistently with safety-specific transformational leadership do so by communicating high expectations regarding safety and focus on employee efforts to meet such expectations (e.g., inspirational motivation) (Bass, 1990). Such actions also contribute to an improved safety climate. Furthermore, when leaders emphasize the importance of safety through their own personal commitment and become role models of safety (e.g., idealized influence), individuals’ perceptions of safety climate will also be improved. Showing an active and genuine interest in the safety and welfare of employees (e.g., individualized consideration) enables leaders to enhance the

employees' perceptions of safety climate within organizations. Finally, leaders who encourage employees to develop innovative ways to improve current safety practices and challenge them to confront beliefs about safe practices (e.g., intellectual stimulation) also enhance perceived safety climate. Management commitment to safety can also manifest itself through participation in occupational health and safety committees, safety training, and ergonomic reviews (Zohar, 1980). Thus,

Hypothesis 2: Safety-specific transformational leadership positively and directly predicts subordinates' perceived safety climate.

Alternatively, managers who exhibit passive forms of safety leadership (e.g., management by exception - passive, laissez faire), through such behaviour as failing to intervene until safety problems become serious and require their attention, communicate the message that safety is not important. Employees then develop the perception that safety is not important, and as a result decide not place a strong emphasis on safe work behaviour (e.g., see Hofmann, Jacobs & Landy, 1995; Hofmann & Stetzer, 1996; Kelloway et al., in press). In a sample of 411 production workers, Zohar (2002) examined the effects of perceptions of passive leadership on perceptions of preventative safety actions of leaders. Workers' perceptions of passive leadership negatively predicted perceptions of leader preventative safety actions. Kelloway et al. (in press) suggest that previous research has overlooked the important adverse impact of passive, uninvolved leadership on safety outcomes and provide evidence for the incremental contribution of passive leadership, beyond that of safety-specific transformational leadership, in predicting employee perceptions of safety climate. Thus,

Hypothesis 3: Passive safety leadership negatively and directly predicts subordinates' perceived safety climate; and,

Hypothesis 4: Passive safety leadership contributes incrementally, over and above the contribution of safety-specific transformational leadership, in the prediction of subordinate perceptions of safety climate.

Researchers have discussed the influence of safety climate on workplace accidents (e.g., Dedobbeleer & BeLand, 1991; Niskanen, 1994). In one of the first empirical studies that examined safety-specific transformational leadership and safety outcomes among workers in the food and beverage industry, Barling et al. (2002) found that perceptions of safety climate mediated the relationship between transformational leadership style and safety-related events (e.g., close calls), which in turn predicted occupational injuries. This research indicates that the most immediate predictor of occupational injuries were safety-related events, rather than other organizational conditions such as safety climate or safety compliance. Safety-related events are defined as 'close calls' that occur on the job that may have lead to an occupational injury such as cuts, sprains or pulled back muscle. As Barling et al. (2002) highlighted, previous research on the association between organizational conditions and occupational injuries has revealed only modest relationships (e.g., Shannon, Mayr & Haines, 1997). They attributed these findings to the indirect relationship between various organizational conditions and injuries, and point to the importance of safety-related events as a mediator. Kelloway et al. (in press) replicated these findings in a study of young workers.

Zohar (2000) provided evidence for the group level model of safety climate and the prediction of injuries (e.g., climate perceptions were related to supervisory practices

as opposed to organizational policies and procedures concerning safety). More recently, Zohar (2002) provided support for the mediating role of safety climate in a study of production workers. In the latter study, the effects of transformational leadership on occupational injuries were mediated by three safety climate variables, including the extent to which supervisors took preventative action, the extent to which supervisors were reactive to safety issues, and finally, the supervisor's prioritization of safety.

In a recent longitudinal study, Neal & Griffin (in press) examined the impact of perceptions of safety climate and safety motivation on employee safety behaviour and accidents. Using a sample of 208 hospital workers, the results showed that perceptions of safety climate were relatively stable over a two year period, suggesting that consistency may also be expected in various safety outcomes in organizations. Furthermore, the results provided longitudinal support for mediating role of safety motivation in the relationship between perceptions of safety climate and self-reported safety behaviour and accidents.

As discussed above, there is a growing body of data suggesting that a leadership style which emphasises safety (or fails to emphasize safety) predicts perceived safety climate. Safety climate, in turn, leads to positive safety outcomes (e.g., fewer safety-related events and occupational injuries). Thus, the following model path parameters were hypothesised;

Hypothesis 5: Subordinate perceived safety climate mediates the relationship between safety-specific transformational leadership and safety-related events; furthermore, subordinate perceived safety climate mediates the relationship between passive safety leadership and safety-related events.

Hypothesis 6: Experienced safety-related events directly and positively predict occupational injuries.

#### Safety Compliance and Safety Participation

Safety compliance and safety participation characterize two theoretical constructs that have recently drawn attention in the organizational behaviour literature. Based on Borman and Motowidlo's (1993) model of job performance, Neal and Griffin (1997) proposed a model of safety performance that distinguishes between two dimensions of safety behaviour: safety compliance and safety participation. Safety compliance involves carrying out required behaviours that maintain workplace safety such as following safety procedures and wearing protective safety equipment. Safety participation involves behaviours that indirectly contribute to developing a safe work environment such as employee initiative to voluntarily participate in safety activities and programs (Cree & Kelloway, 1997), helping co-workers with safety problems, promoting the safety programs and policies, attending safety meetings (Neal, Griffin, & Hart, 2000) and raising safety issues with managers (Mullen, in press). The important distinguishing factor lies in the fact that compliance is typically mandated whereas participation is usually voluntary and initiated by employees.

The need for employee safety participation is becoming increasingly important as traditional approaches to safety management (ergonomics, safety policies and compliance) may have reached their potential in terms of improving workplace safety. For example, although important safety policies and training programs are legislated in Canada, it does not ensure that employees will comply with the policies or wear the appropriate safety equipment (Kelloway, cited in Belcourt, Bohlander & Snell, 2005;

Mullen, 2003). Employees have the discretion to decide whether or not they comply with the safety rules and policies, particularly when they are unsupervised. Thus, it is an individual's safety initiative or willingness to voluntarily participate in an organization's safety procedures on a consistent basis that becomes central to improving workplace safety.

Very little is known about the factors that lead employees to engage in safety compliance and participatory behaviour. Previous research has found that leadership aimed at enhancing safety compliance (e.g., transactional leadership) leads to better safety performance (Zohar, 2002). However, the effects of particular safety leadership styles (e.g., transformational leadership vs passive leadership) on safety compliance remain to be examined. Furthermore, the effects of safety-specific transformational and passive safety leadership on safety participation is not well established in the literature. The current study addresses these issues by examining the effects of safety-specific transformational leadership and passive safety leadership on employee safety compliance and safety participation.

#### Safety Leadership – Safety Compliance/Participation – Safety-related Events.

Leaders who act consistently in a safety-specific transformational manner do so by communicating high expectations regarding safety, show an interest in the safety of employees, and encourage employees to develop innovative ways to improve current safety practices. All of these actions contribute to the enhancement of perceived safety climate and better safety performance (Barling et al., 2002). Researchers also examined the impact of supportive leadership on task (e.g., safety compliance) and contextual (e.g., safety participation) performance. In a recent study that examined leader-member

exchange relationships and safety citizenship behaviour, Hofmann and Morgeson (2003) found that high quality leader-member relationships resulted in expanded safety citizenship role definitions (e.g., employees' understanding of the safety roles that are expected of them), and safety citizenship behaviour. Similar to behaviours that characterize transformational leaders (Yukl, 1998), high quality leader-member relationships involve a high amount of leader support, openness, loyalty, instilling confidence in employees and providing encouragement (Howell & Hall-Merenda, 1999). In high quality leader-member relationships employees tend to reciprocate the high quality relationship by enlarging their roles beyond normal role requirements (e.g., engaging in safety citizenship behaviours) with the intent of "paying back" their leaders. Thus, not only will employees comply with safety policies by doing what is required, but they will also go beyond the minimum safety requirements and engage in safety citizenship behaviours. Safety citizenship was described as discretionary individual behaviour that is not explicitly recognised by job descriptions or reward systems and is focussed on improving safety performance of other team members and the organization (Hofmann & Morgeson, 2003). Examples of safety citizenship behaviour include voluntarily participating in safety programs, making safety related recommendations about work activities, taking action to protect co-workers from safety hazards, reporting safety violations, and trying to improve safety procedures.

High quality leader-member relationships are associated with fewer safety-related accidents in the workplace (Hofmann & Morgeson, 1999). In a sample of 49 supervisor-group-leader dyads high quality leadership was directly related to safety communication and safety commitment and indirectly related to fewer workgroup accidents. These

findings also support the notion that individuals reciprocate high quality relationships with their leader by expanding their safety citizenship role definitions and by adopting greater safety citizenship behaviours (e.g., safety participation). Similarly, in a manufacturing company, Mullen (in press) found that employees reported a greater willingness to voluntarily raise safety issues with management (e.g., safety participation) when they perceived the managers to be supportive of them and open to listening to their ideas regarding safety issues.

Characteristic of transformational leadership, managers demonstrate inspirational motivation when they challenge individuals to go beyond their needs for the collective good and to achieve a level of safety performance that surpasses the minimum safety standards or that were once perceived to be unattainable. Motivation is another important predictor of both safety compliance and safety participation (Griffin & Neal, 2000; Neal, Griffin, & Hart, 2000). Through inspirational motivation, transformational leaders motivate employees to voluntarily participate in activities that increase the level of safety performance in addition to complying with minimum safety standards. Overall, there is growing evidence supporting the relationship between safety-specific transformational leadership and safety compliance and safety participatory behaviours. Thus, based on the parallels drawn between leader-member exchange theory and transformational leadership, similar relationships are expected between transformational leadership and both task and contextual safety performance.

Hypothesis 7: Subordinate perceptions of safety-specific transformational leadership directly and positively predict subordinate perceptions of safety participation and safety compliance.

The safety outcomes associated with passive leadership are not well established in the safety literature as researchers have typically ignored the impact of passive leadership on safety outcomes. In one of the few studies that examined the passive leadership construct, passive leadership was negatively associated with employee perceptions of transformational leadership, perceptions of safety climate, and employee safety consciousness (Kelloway et al., in press). Furthermore, leaders who are not responsive to the safety concerns of employees negatively impact employee safety outcomes, such that employees are less likely to voluntarily identify safety issues and concerns (Mullen, in press). These studies provide empirical support, suggesting that a passive, uninvolved approach to safety leadership results in negative safety outcomes that extend beyond the absence of the positive effects achieved through safety-specific transformational leadership. In other words, passive leaders intensify negative safety perceptions and behaviours in the workplace.

An understanding, however, of how passive leadership affects safety behaviour (e.g., safety compliance and safety participation) remains unclear, as neither of the previous studies (Kelloway et al., in press; Mullen, in press) examined these relationships directly. For example, although it is expected that passive leadership directly and negatively predicts employee perceptions of safety climate (Kelloway et al., in press; Zohar, 2002), which in turn predicts both safety compliance and participation (Neal and Griffin, 2002), it remains unclear whether passive leadership has direct, negative effects on both forms of the safety behaviour. Based on the above discussion concerning the impact of passive, uninvolved leadership it is expected that passive safety leadership has direct effects on both types of safety performance.

Hypothesis 8: Subordinate perceptions of passive safety leadership directly and negatively predict subordinate perceptions of safety participation and safety compliance

When individuals comply with safety procedures and policies, it is more likely that they will also engage in participative safety behaviours. Individuals, who comply with safety policies by doing what is required, are also more likely to go beyond the minimum safety requirements and engage in safety citizenship behaviours.

Hypothesis 9: Safety compliance positively and directly predicts safety participation.

The mediating role of safety compliance in the relationship between the safety-specific leadership constructs and safety-related events is also examined in this study. As discussed above, safety-specific transformational leadership is expected to enhance safety compliance. Furthermore, this type of safety performance involves behaviours that directly contribute to developing a safe work environment (e.g., complying with safety policies). Therefore, behaviours that are characteristic of safety compliance will lead to fewer safety-related events in the workplace. For example, individuals who comply with established safety regulations (e.g., using appropriate lift equipment) are less likely to experience safety-related events (e.g., pulling a back muscle while lifting). In contrast, leaders who take a passive approach to safety leadership do not promote safety or communicate the importance of following safe work practices and policies. Thus, subordinates are less likely to comply with the safety policies leading to a higher number of safety-related events experienced in the workplace. Based on this discussion, the following model paths were hypothesized:

Hypothesis 10: Safety compliance negatively and directly predicts safety related events.

Hypothesis 11: Safety compliance mediates the relationship between safety-specific transformational leadership and safety-related events.

Hypothesis 12: Safety compliance mediates the relationship between passive safety leadership and safety-related events.

The relationship between safety participation and safety related events is also examined in this study. Studies on the effect of individual risk perceptions on participation in health and safety programs illustrate that perceived risk directly predicts participation (Cree & Kelloway, 1997; Goldberg, Dar-el, & Rubin, 1991). Individuals who experience close calls or safety-related events, display higher levels of safety participation (Mullen, 2004). Cree and Kelloway (1997) suggest that exposure to workplace accidents or safety-related events strongly influences an individual's risk appraisal such that risk appraisal increases as exposure to the events increases.

The accident history of others also indirectly predicts an individual's participation in safety programs (Cree & Kelloway, 1992). Mullen (2004) found that perceived risks associated with a job tend to be heightened when an individual vicariously experiences or learns about an injury that occurs within the workplace. In such cases it tends to become very clear that an individual is at risk of becoming injured while performing the job. In fact, workers report that a shock or close call raises safety awareness and helps them realize the potential consequences of unsafe behaviour (Mullen, 2004). Often the safety-related events, or close call, resulted in the realization of the importance of safety in the

workplace and increased the likelihood that individuals would voluntarily perform their work safely. Thus, the following model path was hypothesized:

Hypothesis 13: Experience of safety-related events directly predict perceptions of safety participation.

The call for increased research focussed on identifying factors that are associated with safety compliance and participation has also come from Neal and Griffin (2002) in their recent review of the safety climate literature. Findings from several studies supporting the relationship between safety climate and safety behaviour lead researchers to hypothesize a similar relationship between safety compliance and safety participation. For example, like others, Neal and Griffin (2002) suggest that safety climate is one of the potential predictors of safety behaviour. Furthermore, they identified other potential predictors of safety behaviour including supportive leadership and conscientiousness. For these reasons, they expect that climate will also predict safety compliance and safety participation.

Similarly, in their model of safety climate and behaviour, Neal and Griffin (1997) also examined a variety of relationships between safety climate and other organizational factors. The findings of these studies (Griffin & Neal, 2000; Neal & Griffin, 1997) included empirical support for relationships between a variety of factors and safety compliance and participation. For example, Griffin, Burley and Neal (2000) found that conscientiousness predicted safety motivation, safety compliance and safety participation. Furthermore, in a study of seven large mining and manufacturing organizations, Griffin and Neal (2000) found that perceptions of knowledge about safety and motivation to

perform safely significantly influenced self-reports of task and contextual safety performance, namely safety compliance and safety participation. Thus,

Hypothesis 14: Safety climate directly and positively predicts both safety compliance and safety participation.

The purpose of this study was to develop and empirically test a model of safety-specific transformational leadership and passive safety leadership. The model is based on the assumption that safety-specific transformational leadership and passive safety leadership are empirically distinct and negatively correlated constructs. I hypothesized the following model parameters. Perceptions of safety-specific transformational leadership significantly predict safety compliance, safety participation, and safety climate. Furthermore, employee perceptions of their leader's passive leadership predict safety climate, which in turn predict perceptions of both safety compliance and safety participation. Passive safety leadership also directly impacts employee safety participation and compliance behaviours. Employee perceptions of safety climate predict their perceptions of safety compliance and safety participation. Perceptions of safety compliance predict safety participation and safety-related events. Finally, perceptions of safety-related events significantly predict safety participation and occupational injuries.

## Method

### Participants

A sample of 241 university students participated in the study. The sample consisted of 122 women and 119 men from a variety of academic programs. Participants were approximately 20 years of age ( $M = 20.10$ ,  $SD = 2.85$ ) and all held jobs in a variety of industries. Participants worked an average of 21.48 ( $SD = 12.08$ ) hours per week. The

average length of their employment was approximately 2 years ( $M = 2.10$ ,  $SD = 2.96$ ).

### Procedure

Participants received an informed consent form explaining the voluntary nature of the study (See Appendix A) and a survey. The survey contained items that assessed the participant's perception of their direct manager's safety-specific transformational leadership, perceptions of the manager's passive leadership, perceptions of safety climate, perceptions of their safety participation, perceptions of safety compliance, safety-related events, injuries and demographic items.

### Measures

Safety-specific Transformational Leadership. Subordinate perceptions of safety-specific transformational leadership were assessed with Barling et al.'s (2002) 10-item measure. The 10-item scale was adapted from the MLQ-5 (Bass & Avolio, 1990). Examples of the items include, My direct manager "expresses satisfaction when I perform my job safely", and "provides continuous encouragement to do our jobs safely". The Cronbach's alpha for the scale was  $\alpha = .92$ . This is consistent with previous studies (e.g., Barling et al, 2002; Kelloway et al., in press). Respondents indicated their agreement with the statements on a 7-point scale ranging from 1 (not at all) to 7 (frequently or always). (See Appendix B)

Passive Safety Leadership. Subordinate perceptions of passive safety leadership were assessed using Kelloway et al.'s (in press) three item measure of safety specific passive leadership. The items include, my manager "avoids making decisions that affect safety on the job"; "fails to intervene until safety problems become serious", and "waits for things to go wrong before taking action". Respondents indicated their agreement with

the statements on a 7-point scale ranging from 1 (not at all) to 7 (frequently or always). Chronbach alpha's for the scale is  $\alpha = .77$ . This is consistent with previous studies (Kelloway et al., in press). (See Appendix C).

Safety Climate (10 items) was assessed with a short form of Zohar's (1980) safety climate scale<sup>1</sup>. Examples of the items include "My boss is willing to invest money and effort to improve safety in this job", and "Workers who work safely have a better chance of promotion here". Respondents indicated their agreement with the statements on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Cronbach's alpha for the scale is  $\alpha = .70$ . This is consistent with previous studies (Barling et al., 2002; Kelloway et al., 2003). (See Appendix D).

Safety Participation was assessed using Neal et al's (2000) (4 item) safety participation scale. Examples of the items include "I promote safety within the organization", and "I put in extra effort to improve the safety of the workplace". Respondents indicated their agreement with the statements on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Cronbach's alpha for the scale is  $\alpha = .79$ . This is consistent with previous studies (Williams et al., 2000). (See Appendix E).

Safety Compliance was assessed by Neal, Griffin and Hart's (2000) (4-item) safety compliance scale. Examples of items include "I use all the necessary safety equipment to do my job", and "I use the correct safety procedures for carrying out my job". Respondents indicated their agreement with the statements on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Cronbach's alpha for the scale is

---

<sup>1</sup> To assess the effects of item overlap between the safety climate scale and the safety-specific transformational leadership scale, items 1 and 2 on the safety climate scale were removed. The correlation between the two variables did not change as a result of removing the items, thus they were retained and included in the analyses.

$\alpha = .90$ . This is consistent with previous studies (Williams et al., 2000). (See Appendix F).

Safety-related Events were assessed using a 16 item scale developed by Barling et al. (2002). Items include, While performing my job I... ‘had something fall on me’, and ‘overextended myself lifting or moving things’. Respondents indicated the frequency in which the events occurred on a 7-point scale ranging from 1 (rarely) to 7 (frequently). Cronbach’s alpha for the scale is  $\alpha = .93$ . This is consistent with previous studies (Kelloway et al., in press). (See Appendix G).

Injuries were assessed with 8-items developed by Barling et al. (2002). The measure was based on Castillo’s (1999) description of the types of injuries that young workers experience. Examples of injuries include strains or sprains, cuts or lacerations, and bruises or contusions. Respondents will indicate the frequency in which the events occurred on a 7-point scale ranging from 1 (rarely) to 7 (frequently). Cronbach’s alpha for the scale is  $\alpha = .85$ . This is consistent with previous studies (Kelloway et al., in press). (See Appendix H).

## Results

Descriptive statistics, intercorrelations and scale reliabilities for all variables are presented in Table 1. Given the nature of the sample (approximately 50.6% females and 49.4% males), MANOVA was conducted to assess differences attributed to gender. With the use of Wilks’ criterion, the combined DV’s were not significantly affected by gender,  $F(8, 229) = 1.953, p > .05$ .

---

Table 1.

Descriptive Statistics, Inter-item Correlations, and Reliabilities

Subscale	1	2	3	4	5	6	7
	Participants (n = 241)						
1. Safety-specific leadership	(.92)	-.33	.57	.39	.54	-.17	<b>-.09</b>
2. Passive leadership		(.77)	-.41	-.26	-.17	.28	.11
3. Safety climate			(.70)	.52	.48	-.29	-.17
4. Safety compliance				(.90)	.51	-.29	-.26
5. Safety Participation					(.79)	<b>.05</b>	<b>.02</b>
6. Safety-related events						(.93)	.72
7. Safety injuries							(.85)
Mean	4.16	2.89	4.54	5.38	4.50	2.28	1.93
Standard Deviation	1.38	1.40	0.88	1.21	1.25	1.07	0.87

Note. Correlations in bold are non-significant at the .05 level. Remaining correlations are significant at the  $p < .01$  level. Reliabilities for each scale are presented on the diagonal in parentheses.

Confirmatory Factor Analysis

The hypothesis that safety-specific transformational leadership and passive safety leadership are empirically distinct constructs was tested using a set of two confirmatory factor analyses. The analyses were estimated with maximum likelihood estimation using LISREL 8.53 (Joreskog & Sorbom, 2002). The fit of the models are assessed through the examination of the fit indices provided by LISREL including the Goodness of Fit Index (GFI), Normed Fit Index (NFI), Comparative Fit Index (CFI), Parsimonious Normed Fit Index (PNFI) and the Root Mean Squared Error of Approximation (RMSEA). The GFI, NFI and CFI all range from 0 to 1, and values that exceed 0.90 indicate a good fit to the data (Kelloway, 1998). The PNFI also ranges from 0 to 1 and higher values indicate a more parsimonious fit. The RMSEA ranges from 0 to 1 and smaller values indicate a better fit. Steiger (1990) suggests that values less than .10 indicate a good fit to the data.

The first confirmatory factor analysis assessed a unidimensional model on which all items were expected to load. The unidimensional model was compared to a model

with two correlated, yet empirically distinct factors on which the items load. The models are nested, thus the  $\chi^2$  difference tests the null hypothesis that the correlation between the two factors is 1.00. A significant  $\chi^2$  difference allows for the null hypothesis to be rejected, indicating that the factors are empirically distinct, and the two factor model provides a significantly better fit than the unidimensional model.

The unidimensional model did not provide a good fit to the data,  $\chi^2(65) = 376.67, p < .01$ ; GFI = 0.80; NFI = 0.90; CFI = 0.91; PNFI = 0.75; RMSEA = 0.14. In contrast, the two factor model provided a better fit to the data,  $\chi^2(64) = 169.85, p < 0.01$ ; GFI = 0.90; NFI = 0.95; CFI = 0.97; PNFI = 0.96; RMSEA = 0.08;  $\chi^2_{\text{difference}}(1) = 206.82, p < 0.01$  (see Table 6). The standardized parameter estimates for the two factor model were all significant ( $p < 0.01$ ) and are presented in Table 2. The disattenuated correlation between the two factors is  $r = -.43, p < 0.01$ . This indicates that the two factors are empirically distinct and negatively correlated as hypothesized.

#### Establishing model validity.

To assess the proposed models (effects of safety-specific transformational leadership and passive safety leadership on safety outcomes illustrated in Figure 1), the covariance matrix of the variables served as the input to the maximum likelihood estimation procedures of LISREL 8 (Joreskog & Sorbom, 1996).

Table 2

Standardized Parameter Estimates for the Safety-specific Transformational Leadership and Passive Safety Leadership Oblique Two Factor Model.

<u>Variable</u>	<u>Safety-specific</u>	<u>Passive</u>
1. Expresses satisfaction when I perform my job safely	.70	
2. Makes sure that we receive appropriate rewards for achieving safety targets on the job	.71	
3. Provides continuous encouragement to do our jobs safely	.83	
4. Shows determination to maintain a safe work environment	.80	
5. Suggests new ways of doing our jobs more safely	.80	
6. Encourages me to express my ideas and opinion about safety at work	.71	
7. Talks about his/her values and beliefs of the importance of safety	.74	
8. Behaves in a way that displays a commitment to a safe workplace	.71	
9. Spends time showing me the safest way to do things at work	.75	
10. Would listen to my concerns about safety on the job	.52	
11. Waits for things to go wrong before taking action		.83
12. Fails to intervene until safety problems become serious		.90
13. Avoids making decisions that affect safety on the job		.48

The theoretical model in Figure 1 provided a good fit to the data,  $\chi^2(9) = 16.98$ ,  $p = ns$ ; GFI = 0.98; NFI = 0.97; CFI = 0.99; PNFI = 0.42; RMSEA = 0.06. However, the standardized parameters for the direct paths between safety passive leadership and both safety compliance ( $\beta = -0.05$ ,  $p > 0.01$ ) and safety participation ( $\beta = -0.03$ ,  $p > 0.01$ ) were non significant ( $\beta = 0.07$ ,  $p > 0.01$ ). Therefore, the model was re-analyzed with the direct paths between safety passive leadership and safety compliance and safety participation removed,  $\chi^2(11) = 18.30$ ,  $p = ns$ ; GFI = 0.98; NFI = 0.97; CFI = 0.99; PNFI = 0.51; RMSEA = 0.053. The chi square difference test,  $\chi^2_{\text{difference}}(2) = 1.32$ ,  $p > .05$ , indicated that the original model including the direct effects of passive leadership on safety compliance and safety participation was not a significantly better fit to the data, therefore the revised fully mediated model was retained (See Figure 2).

To generate alternative safety-specific transformational leadership models, a partially mediated model (See Figure 3) was estimated suggesting that safety-specific transformational leadership has direct effects on safety outcomes in addition to the fully mediated paths in Figure 2. Furthermore, a non-mediated model was estimated suggesting that safety-specific leadership has direct effects on safety outcomes but does not affect safety climate, safety participation, or safety compliance (See Figure 4). Since both the fully mediated and non-mediated model estimations are nested within the partially mediated model, comparisons can be conducted using the  $\chi^2$  difference test.

To generate alternative passive leadership models, a partially mediated model (See Figure 5) was estimated suggesting that passive leadership has direct effects on injuries, in addition to the fully mediated paths in Figure 2. Furthermore, a non-mediated

model was estimated suggesting that passive leadership has direct effects on injuries, but does not affect safety climate, safety participation, or safety compliance (See Figure 6). Since both the fully mediated and non-mediated model estimations are nested within the partially mediated model, comparisons were conducted using the  $\chi^2$  difference test.

The partially mediated model of safety specific transformational leadership also provided a good fit to the data,  $\chi^2(10) = 18.96$ ,  $p$  ns.; GFI = 0.98; NFI = 0.97; CFI = 0.99; PNFI = 0.46; RMSEA = 0.058. The chi square difference test,  $\chi^2_{\text{difference}}(1) = 0.66$ ,  $p > .05$ , indicated that the partially mediated model was not a significantly better fit than the revised model. Furthermore, the standardized parameter for the additional path between safety transformational leadership and injuries was non significant ( $\beta = -0.03$ ,  $p > 0.01$ ). Finally, the non-mediated model provided a poor fit to the data,  $\chi^2(21) = 538.90$ ,  $p < .01$ ; GFI = 0.59; NFI = 0.19; CFI = 0.20; PNFI = 0.19; RMSEA = 0.34;  $\chi^2_{\text{difference}}(10) = 520.60$ ,  $p < 0.01$ . Thus, the revised fully mediated model provides a better fit to the data.

The partially mediated model of passive leadership (Figure 5) also provided a good fit to the data,  $\chi^2(10) = 14.98$ ,  $p$  ns.; GFI = 0.98; NFI = 0.97; CFI = 0.99; PNFI = 0.47; RMSEA = 0.045. However, the chi square difference test,  $\chi^2_{\text{difference}}(1) = 3.32$ ,  $p =$  ns, indicated that the partially mediated model was not a significantly better fit. The standardized parameter for the additional path between passive leadership and injuries was significant ( $\beta = -0.10$ ,  $p < 0.05$ ), however, the PNFI for the partially mediated model was lower than the PNFI found for the fully mediated model in Figure 2 (PNFI = 0.51)

indicating a lower level of parsimonious fit. Finally, the non-mediated model provided an unsatisfactory fit to the data,  $\chi^2(11) = 32.67, p < .01$ ; GFI = 0.96; NFI = 0.95; CFI = 0.96; PNFI = 0.50; RMSEA = 0.09;  $\chi^2_{\text{difference}}(0) = 14.37, p < 0.05$ . Thus, the fully mediated model presented in Figure 2 provides a better fit to the data. See Table 3 for summary of fit indices for each of the alternative models for both safety-specific transformational leadership and passive safety leadership.

Table 3.

Fit indices for the Alternative Safety-specific Transformational Leadership and Passive Leadership Models.

Model	X <sup>2</sup>	Df	X <sup>2</sup> <sub>diff</sub>	GFI	NFI	CFI	RMSEA	PNFI
Safety-specific Model								
1. Fully Mediated	18.30	11		.98	.97	.99	.053	.51
2. Partially Mediated	18.96	10	.66	.98	.97	.99	.058	.46
3. Non Mediated	538.9**	21	520.6**	.59	.19	1.00	.34	.19
Passive Model								
5. Partially Mediated	14.98	10	3.32	.98	.98	.99	.045	.47
6. Non Mediated	32.67**	11	14.37**	.96	.95	.96	.09	.50

Note. GFI = goodness of fit index; NFI = normed fit index; CFI = comparative fit index; RMSEA = root mean squared error of approximation; PNFI = parsimony normed fit index. \*\*p < .01.

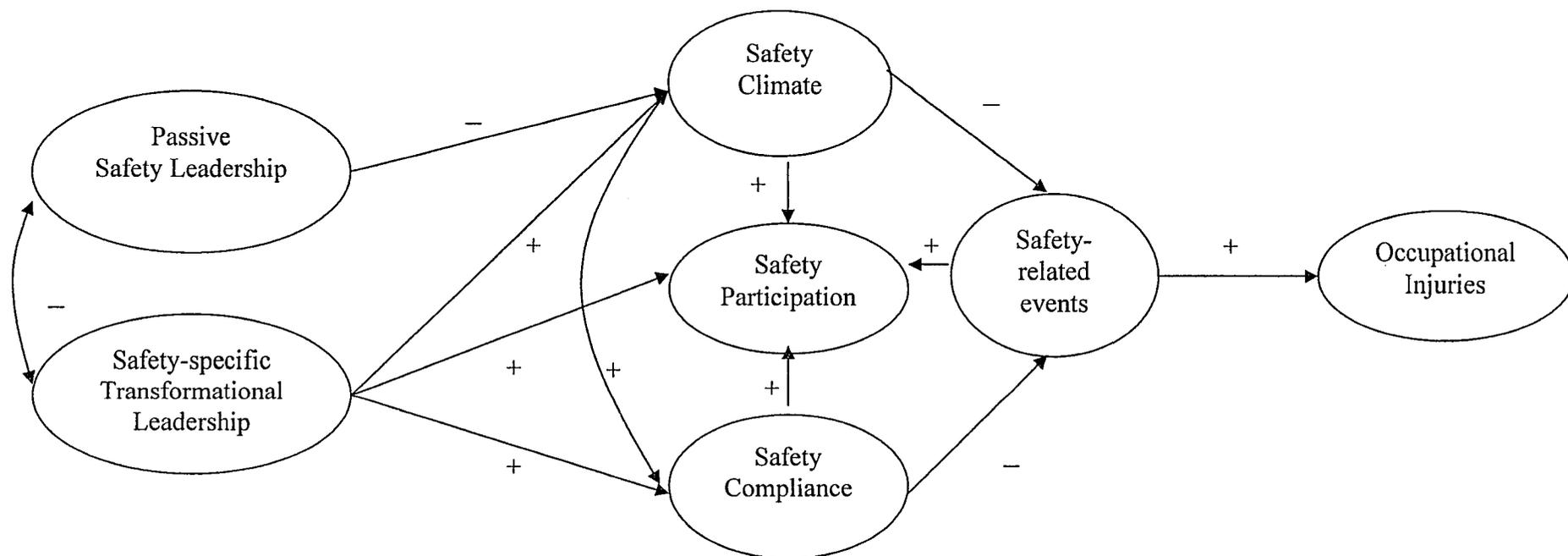


Figure 2.

Revised fully mediated model linking safety-specific transformational leadership and passive safety leadership with the safety outcomes.

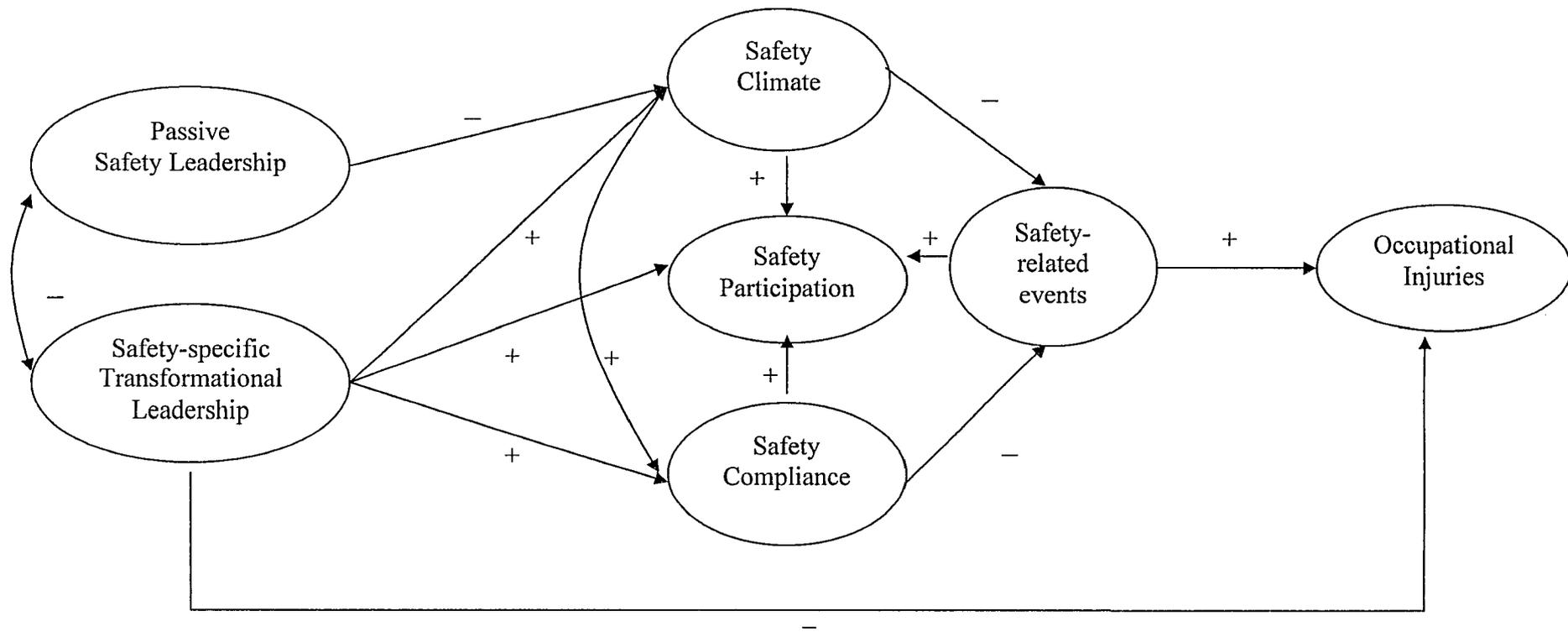


Figure 3.

Partially mediated model linking safety-specific transformational leadership and safety outcomes.

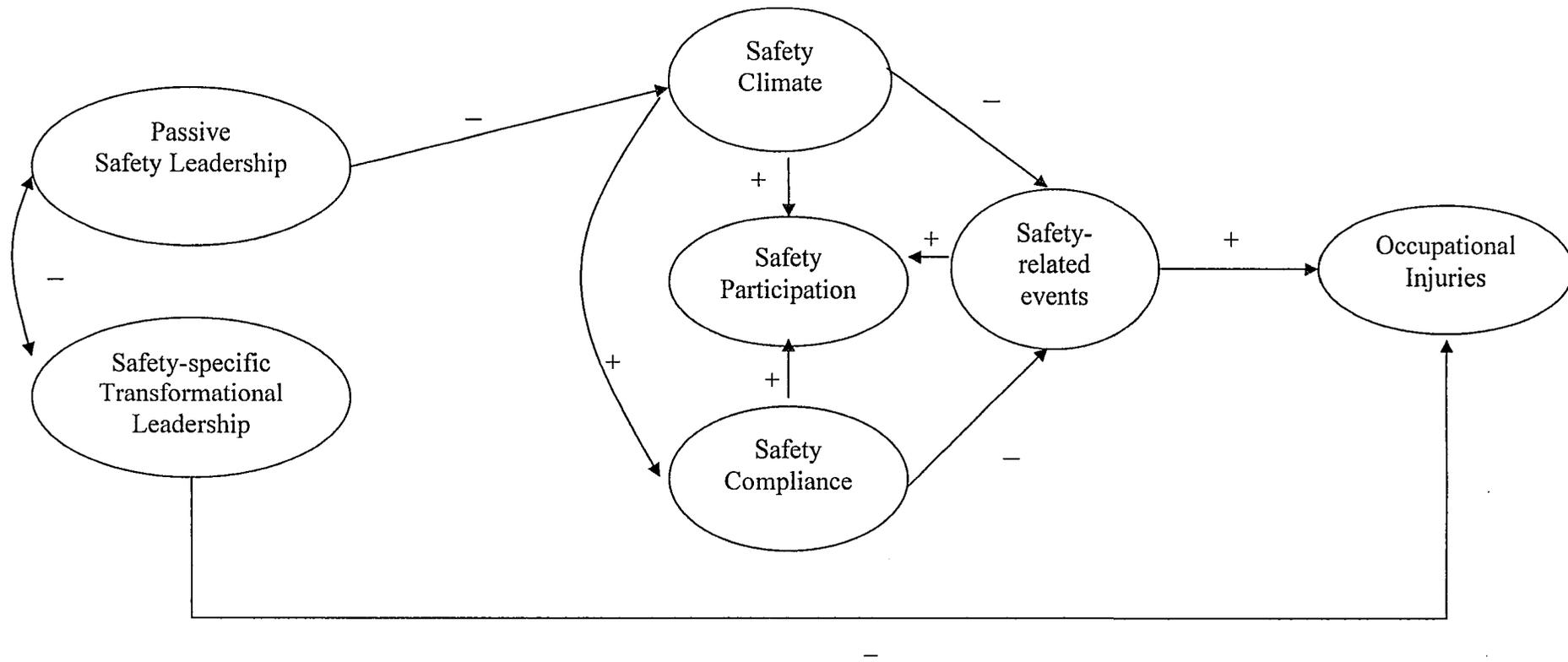


Figure 4.

Non-mediated model linking safety-specific transformational leadership and safety outcomes.

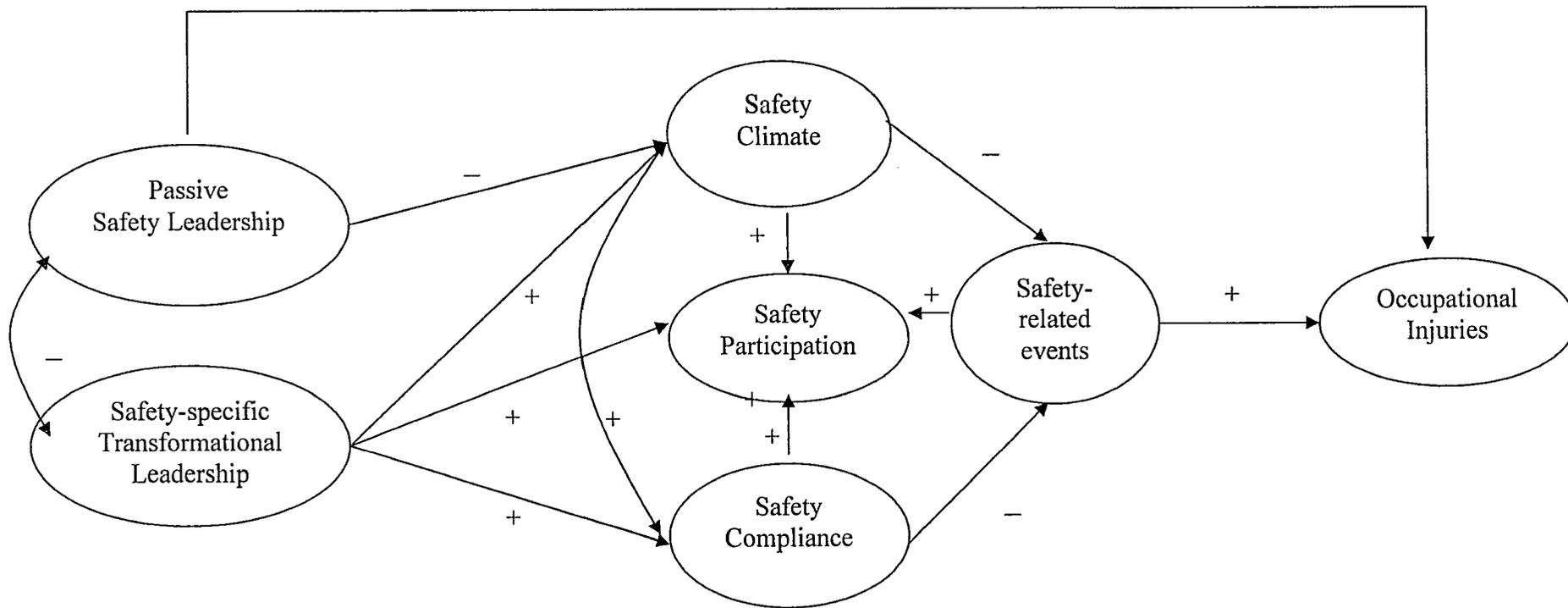


Figure 5.

Partially mediated model linking passive leadership and safety outcomes.

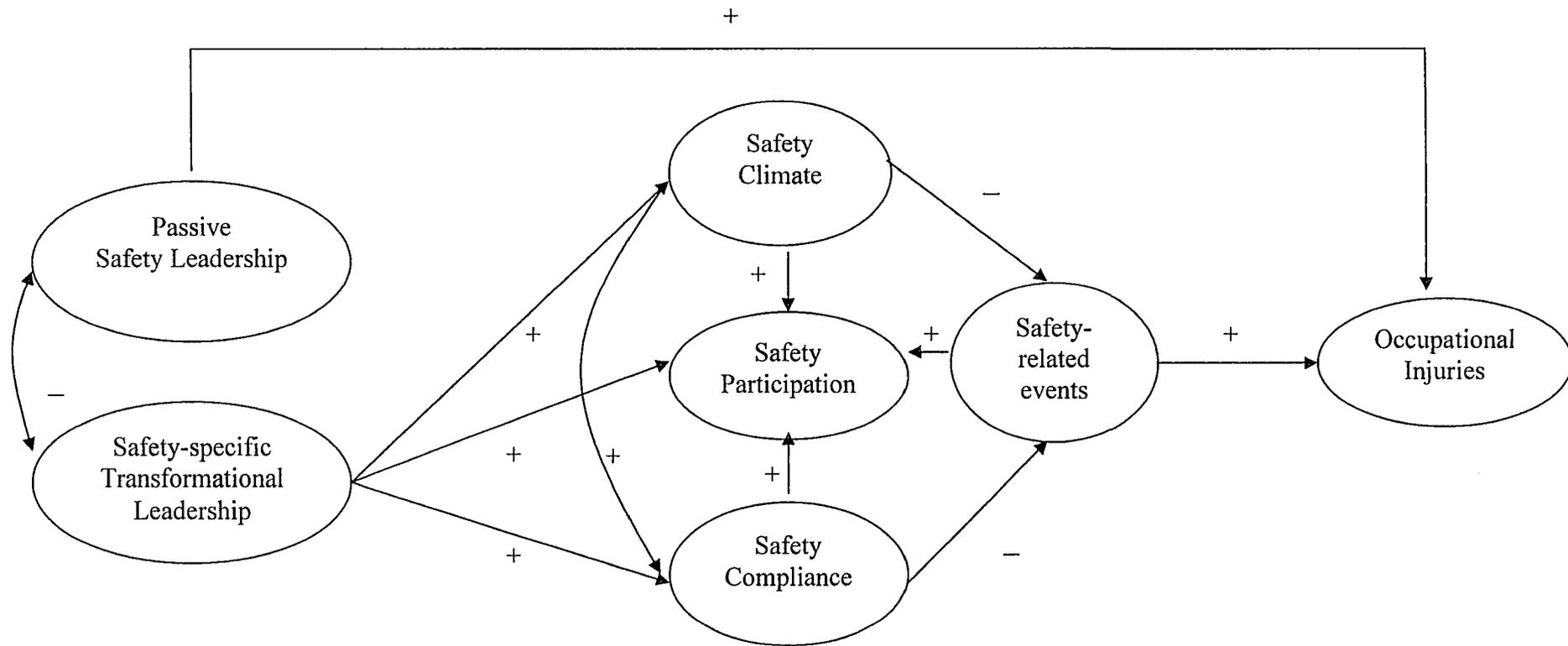


Figure 6.

Non-mediated model linking passive leadership and safety outcomes

Standardized parameter estimates for the revised fully mediated model are presented in Figure 7. Injuries were predicted by safety-related events ( $\beta = 0.72, p < 0.01$ ). Safety-related events were predicted by safety climate ( $\beta = -0.19, p < 0.01$ ), and safety compliance ( $\beta = -0.20, p < 0.01$ ). Safety climate was predicted by passive leadership ( $\beta = -0.24, p < 0.01$ ), and safety-specific transformational leadership ( $\beta = 0.49, p < 0.01$ ). Safety participation was predicted by safety-specific transformational leadership ( $\beta = 0.34, p < 0.01$ ), safety climate ( $\beta = 0.16, p < 0.01$ ), safety compliance ( $\beta = 0.34, p < 0.01$ ), and safety-related events ( $\beta = 0.16, p < 0.01$ ). Safety compliance was predicted by safety-specific transformational leadership ( $\beta = 0.15, p < 0.01$ ) and safety climate ( $\beta = 0.43, p < 0.01$ ). The model accounted for 52% of the variance in injuries, 11% of the variance in safety-related events, 28% of the variance in safety compliance, 42% of the variance in safety participation, and 38% of the variance in safety climate.

#### Hierarchical Regression Analysis

Hierarchical regression analysis was used to demonstrate that passive safety leadership makes an incremental contribution in the prediction of subordinate perceptions of safety climate. To assess this hypothesis, safety climate was regressed on safety-specific transformational leadership in the first step of the analysis. Safety climate was then regressed on passive safety leadership in the second step. The results are presented in Table 4. The results show that passive safety leadership made a significant contribution beyond that of safety-specific transformational leadership for the safety climate variable. Passive safety leadership predicted 4% of the variance in safety climate, over and above the variance attributable to safety-specific transformational leadership.

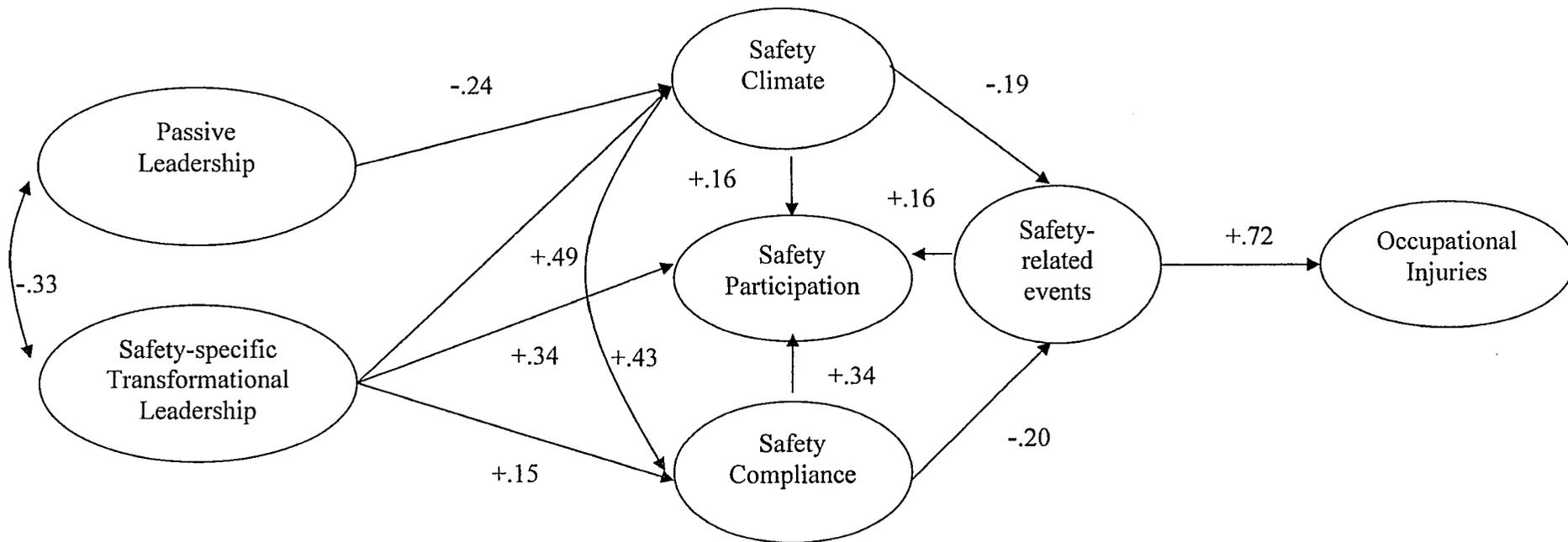


Figure 7.

Standardized parameter estimates for the fully mediated model linking safety-specific transformational leadership, passive leadership and safety outcomes.

\*Note: All standardized parameter estimates are significant at  $p < .01$

Table 4.

Hierarchical Regression Analysis for Variables Predicting Employee Perceptions of Safety Climate (n = 241).

Variable	<u>B</u>	<u>SE B</u>	<u>β</u>
Step 1			
Safety-specific transformational leadership	.30	.04	.49**
Step 2			
Safety-specific transformational leadership	.31	.03	.49*
Passive safety leadership	-.15	.03	-.24**

Note.  $R^2 = .32$  for Step 1;  $\Delta R^2 = .05$  for Step 2; Total  $R^2 = .37$  ( $p < 0.01$ ).

Discussion

The purpose of this study was to develop and empirically evaluate a model of safety-specific transformational leadership and passive safety leadership. The model was based on the hypothesis that passive safety leadership and safety-specific transformational leadership are empirically distinct constructs. Support for this hypothesis was found. All of the hypothesized path parameters in the original model (Figure 1) were supported with the exception of hypothesis 8. The direct paths between passive safety leadership and safety compliance and safety participation were not significant. The revised fully mediated model (Figure 7) provided a good fit to the data and all of the hypothesized paths were significant. Perceptions of safety-specific transformational leadership significantly predicted safety compliance, safety participation, and safety climate. Passive safety leadership also significantly predicted safety climate. Safety climate in turn predicted safety compliance, safety participation and safety-related events. Safety compliance predicted safety participation and safety-

related events. Finally, safety-related events significantly predicted safety participation and injuries.

#### Implications for Future Research

The results of this study provide empirical support for the impact of both active and passive safety-specific leadership on safety outcomes. Consistent with previous studies (Kelloway et al., in press), safety-specific transformational leadership and passive safety leadership each have important, yet opposite effects on subordinate perceptions of safety climate. Furthermore, passive safety leadership contributes incrementally in the prediction of safety climate, over and above the contribution of safety-specific transformational leadership. This finding is illuminating given that most research has ignored the impact that passive leadership has on safety outcomes in the workplace. If managers are not taking an active role in promoting safety, they are destroying the safety climate within their respective organization. Safety climate mediates the relationship between passive safety leadership and both safety compliance and safety participation. Thus, empirical support is provided for the revised theoretical model suggesting that passive leadership has indirect, as opposed to a direct effect, on the participatory and compliance safety behaviours of employees. However, future research must continue to examine both the direct and indirect effects of passive safety leadership on occupational safety outcomes.

As expected, the relationship between safety participation and safety-related events suggests that individuals who experience higher levels of safety-related events and perceive that they have a chance of being injured on the job are more likely to take the initiative to actively promote safety and voluntarily engage in safe work practices.

However, this finding is somewhat problematic in that it suggests that safety participation, or taking the initiative to actively engage in safe working behaviours is at least in part motivated by an individual's exposure to safety-related events or injuries. It also suggests that as safety-related events decrease, the expectation of being injured may also decrease, thus decreasing an individual's safety participation, which is contradictory to the intended effects of safety-specific transformational leadership.

Furthermore, individuals are likely to have greater judgments of risk if the negative effects of their actions are immediate (e.g., burns) as opposed to delayed (e.g., back pain from repetitive lifting) (Bjorkman, 1984). If the effects of work related injuries are not immediate individuals may be more likely to have a lower judgment of associated risks (Mullen, 2004). Such perceptions may further exacerbate the undesirable effect of lower safety-related events on safety participation. Future research that examines both the predictors and outcomes of safety participation is warranted.

Finally, it is important to note that the sample in the current study consisted of a group of young workers with a restricted age range and who were employed in a variety of occupations. Safety research is critical for this group of young workers (e.g., less than 25 years of age) since they tend to be at higher risk for injuries (Loughlin & Barling, 2001; Loughlin & Frone, 2003); however, there is a need to examine the model within different contexts in order to establish external validity. To further establish the external validity of the safety-specific transformational leadership model developed in Study 1, future research must be directed at assessing the model using samples from a variety of industries and organizations. Therefore, the purpose of the subsequent study was to

replicate the model within the health care setting across several long-term health care organizations.

### Implications for Practice

The conclusion that safety-specific transformational leadership has a positive effect on both safety compliance and safety participation makes a significant contribution to the safety literature in several ways. First, the examination of the effects of safety-specific transformational leadership, as opposed to general transformational leadership, on subordinate safety compliance and safety participation received little attention in the safety literature. This omission is important given the strong association that safety transformational leadership has with both subordinates' safety compliance, and safety participation behaviour. Safety-specific transformational behaviours, such as actively promoting safety, becoming a safety role model, stressing the importance of working safely, and continuously encouraging innovative ways to improve safety, were strongly associated with increased safety compliance. This study also contributes to the leadership safety literature, which has focussed on the examination of transactional forms of leadership and safety compliance (e.g., Zohar, 2002), by providing empirical evidence for the relationship between safety-specific transformational leadership and positive safety compliance outcomes. In sum, the findings suggest an alternative, transformational leadership based approach to safety management within organizations.

In addition, safety-specific transformational leadership behaviours were also associated with higher employee participation in safety activities. Under the guidance of a safety transformational leader, employees were more likely to take the initiative to promote safety in their workplace and exert effort to make the workplace a safe

environment. Leaders who show concern for the safety and well being of their employees, and promote their personal values and beliefs about the importance of safety ultimately help to develop employees who want to participate in safety activities. Safety-specific transformational leadership shifts the focus away from managing through the enforcement of safety rules and regulations, to the development of safety initiative among employees.

The findings also show how passive, uninvolved safety leadership impacts employee safety compliance and safety participation behaviour. Support was found for the mediating role of safety climate in the prediction of the safety behaviours. Leaders who avoid making decisions about safety actively destroy the perceived safety climate within an organization. Furthermore, passive safety leaders indirectly impact employee safety behaviour through safety climate, such that employees are less likely to comply with safety rules, or participate in safety activities when under the leadership of a passive safety leader. In light of these findings, it is important for organizational leaders to recognize that being uninvolved in safety has negative implications for the safety and well being of the employees within their respective organization.

### Limitations

The current study is not without limitations. One possible limitation was the reliance on self-report injury data, which poses an internal validity threat. The safety literature contains mixed results with respect to the reliance on self-reports of injuries as opposed to other independent sources of injuries and accidents. Some researchers suggest that self-reports of occupational accidents and illnesses are under-reported (Glenn, 2003; Pransky, Snyder, Dembe & Himmelstein, 1999; Schenzer, Rugulies & Krause, 2005;

Zaroff, Levenstein & Wegman, 2002). Therefore, the observed relationships between safety-related events, injuries and predictor variables may be attenuated.

Others suggest that self-report data may be more appropriate for safety research as organizational safety records may also be inaccurate (Eisenberg & McDonald, 1985). In their examination of safety records of a sample of 200 manufacturing companies, Eisenberg and McDonald (1985) found that 15% of injuries were over-recorded, meaning that injuries that are not required to be recorded under the occupational health and safety guidelines were included in the safety records. Furthermore, 20% of the injuries were under-recorded – injuries that should have been recorded were not. Lusk, Ronis and Baer (1995) conducted a study to compare observations, supervisor reports, and self-report data of safety behaviour among blue-collar workers. Supervisor reporting of safety behaviour varied significantly from both the observed and self-report injury data. However, self-report data and observations were highly correlated. Overall, these results suggest that self-reporting of injuries and accidents may be more accurate than the use of manager ratings or safety records when assessing safety-related events and injuries.

### Conclusion

In conclusion, competing models of safety-specific transformational leadership and passive safety leadership were developed and empirically evaluated. The results of provided a fully mediated theoretical model for the subsequent study, which examines the model parameters within the health care industry. Furthermore, passive safety leadership contributed incrementally in the prediction of safety climate, over and above that of safety-specific transformational leadership.

In Study 2, the theoretical model developed in this study is examined within a

long-term health care setting to assess generalizability. The nature of the safety-specific transformational leadership construct is also examined, as well as the contribution it makes in the prediction of safety outcomes beyond the variance accounted for by general transformational leadership.

## Study 2

### Safety-specific transformational leadership and passive safety leadership: Testing the model within a long-term healthcare setting

Several competing models of safety-specific transformational leadership and passive safety leadership were empirically evaluated in Study 1. Although the fully mediated model of safety-specific transformational leadership and passive safety leadership provided the best fit to the data, several issues remain to be addressed in Study 2. First, the generalizability of the fully mediated safety-specific transformational and passive safety leadership model developed in Study 1 was assessed in a sample of long-term health care workers.

Hypothesis 1: Long-term health care employee perceptions of their leaders' safety-specific transformational leadership significantly predict perceptions of safety compliance, safety participation, and safety climate. Employee perceptions of passive safety leadership significantly predict perceptions of safety climate. Perceptions of safety climate in turn predict perceptions of safety compliance, safety participation and safety-related events. Perceptions of safety compliance predict perceptions of safety participation and safety-related events. Finally, safety-related events significantly predict safety participation and injuries.

The second issue addressed in Study 2 was the replication of the findings showing that passive safety leadership makes an incremental contribution to the prediction of safety climate, over and above that of safety-specific transformational leadership within a sample of long term health care employees. Thus,

Hypothesis 2: Passive safety leadership contributes incrementally to the prediction of safety climate, over and above safety-specific transformational leadership.

Prior to assessing the generalizability of the theoretical model and the incremental contributions of passive safety leadership in the prediction of safety outcomes over and above safety-specific transformational leadership, it is necessary to discuss three issues that are unaddressed in the literature on safety leadership; namely, the lack of safety leadership research in the health care industry, the nature of the safety leadership construct, and the issue of hierarchical data structures.

#### Safety Leadership in the Health Care Industry

Concern for safety within the health care industry has focussed primarily on patient safety, and unsafe behaviours of frontline staff (Flin & Yule, 2004). The health care industry is an important setting for occupational health and safety research as safety applies not only to the health care workers, but also to the patients receiving care and who are at risk of being injured as a result of health care workers' safety behaviour (Flin & Yule, 2004). Health care leaders are responsible for motivating employees to maintain high levels of safety, ensuring employee well being, and ultimately responsible for their organization's overall safety performance (Flin & Yule, 2004). This suggests that transformational leadership would be an effective approach for improving safety in the

healthcare setting (Firth-Cozens & Mowbray, 2001). However, no empirical studies examined the utility of safety-specific transformational leadership within health care. The current research study aimed to redress this.

To summarize, the model that was tested in the current study hypothesized that perceptions of safety-specific transformational leadership significantly predict health care worker perceptions of safety compliance, safety participation, and safety climate. Health care worker perceptions of their supervisor's passive safety leadership were hypothesized to predict safety climate. In turn, perceptions of safety climate were hypothesized to predict perceptions of safety compliance, safety participation and safety-related events. Perceptions of safety compliance were expected to predict perceptions of safety participation and safety-related events. Safety-related events were hypothesized to predict perceptions of safety participation. Finally, perceptions of safety-related events were hypothesized to significantly predict occupational injuries.

#### The Nature of Safety leadership: Safety-specific versus General Transformational Leadership.

Although it is established that leadership has important implications for safety in the workplace (Dunbar, 1975; Hofmann, Jacobs & Landy, 1995; Zohar, 1980), researchers only recently expanded the study of workplace safety to include transformational leadership (e.g., Barling et al., 2002; Kelloway et al., 2003; Zohar, 2002). For example, Williams, Parker and Turner (2000) found that transformational leadership significantly predicted employee attitudes and safety behaviour in a sample of manufacturing technicians. Similarly, Barling et al. (2002) reported that safety-specific transformational leadership had positive effects on safety climate and safety

consciousness, which in turn predicted safety events (e.g., “close calls” or, almost being injured).

Upon examining these studies, there are differing perspectives concerning the leadership construct that is used to predict safety outcomes. Some researchers adopt safety-specific leadership measures (Barling et al., 2002; Kelloway et al., in press), whereas, others use a more global perspective and examine the impact of general conceptions of transformational leader behaviour on safety outcomes (Hofmann & Morgeson, 1999). The latter would argue that concern for individuals’ safety at work is inherently part of transformational leadership since by definition such leaders are concerned for individuals’ well being and physical welfare (e.g., safety). This perspective would suggest that safety-specific transformational leadership is redundant. However, those who argue for the inclusion of safety-specific measures when examining the impact of leader behaviour on safety outcomes (e.g., Kelloway et al., in press; Zohar, 2002b) would disagree with the notion that specific measures are redundant. For example, Zohar (2002b) found that transactional supervisory practices that focused specifically on safety performance lead to fewer accidents in the workplace. Furthermore, Kelloway et al. (in press) suggested that behaviours that are characteristic of both transformational leadership and passive leadership may be exhibited in the same leader. For example, leaders may display transformational behaviours in one aspect of work (e.g., achieving high production levels), and passive leadership behaviours in others (e.g., achieving safety goals). Transformational leaders are expected to enhance the performance of their subordinates by setting higher expectations and generating a greater willingness to achieve more difficult challenges (Avolio, 1999). Thus, although transformational leaders

may focus on inspiring individuals to achieve high production levels, this may inadvertently be at the cost of workplace safety such that performance pressures lead to unsafe behaviour through perceptions of role overload (Hofmann & Stetzer, 1996). Workers will forgo safe working practices when they feel the need to perform quickly to meet the expectations of their leader. Furthermore, Kelloway et al. (in press) found that when leaders did not actively promote safety (e.g., passive leadership), a negative effect on safety outcomes (e.g., safety climate, safety consciousness, and injuries) resulted.

Thus, safety-specific transformational leadership appears to play an important role in safety management and intervention. Both perspectives of leadership lead to positive safety outcomes, but there is no evidence to suggest whether using a safety-specific construct makes an incremental contribution in predicting safety outcomes above and beyond a general type of transformational leadership. On the basis of this discussion, the following hypotheses were proposed:

Hypothesis 3: Safety-specific transformational leadership and general transformational leadership are positively related, yet, empirically distinct constructs.

Hypothesis 4: Employee perceptions of safety-specific transformational leadership contribute incrementally, over and above the variance attributable to general transformational leadership, in the prediction of perceived safety climate, safety participation, safety compliance, safety-related events and injuries.

#### Hierarchical Data Structure

Much of the safety leadership research involves hierarchical data structures, such that observations are nested within individuals, and individuals are nested within

organizational units. Further, organizational units are nested within organizations. In the current study, the health care workers exist within hierarchies; therefore, they may be more similar to each other than individuals who were randomly sampled from the entire population (Bryk & Raudenbush, 1992) of long-term health care workers. The health care workers share similar characteristics (e.g., groups of employees reporting to one manager, existing within the same organization). Thus, observations based on these individuals are not fully independent since each manager may have a unique impact on the individuals' attitudes and behaviour. Similarly, the organization in which an individual is employed may also have a unique impact on performance and behaviour.

Quite often, researchers pool data across managers and organizations, ignoring the nesting of individuals within various groups (Bryk & Raudenbush, 1992). Researchers must address this limitation by gathering multilevel data (e.g., Wright & Boswell, 2002), and conducting hierarchical modelling techniques to account for nested data structures (Bryk & Raudenbush, 1992). Obtaining a large number of responses both within and across organizations will enable researchers to assess not only individual level effects, but also group and organizational effects as well.

Due to the hierarchical, or nested, data structure in Study 2 (groups of health care workers report to the same manager, and exist within similar organizations), the assumption that each observation is independent is not met. Therefore, the effects of the hierarchical data structure (manager, organization) on individual safety outcomes were assessed.

## Method

### Participants

Health care workers were recruited from long term health care organizations. The Nova Scotia Association of Health Organizations assumed responsibility for recruiting the participants from their member organizations. Participants were recruited from 66 long-term care organizations. In order to focus the recruiting efforts on the desired pool of health care workers, Nova Scotia Association of Health Organizations first recruited the health care managers by sending a letter to all health organization members to invite managers to participate in the training (See Appendices I & J). The primary researcher assumed responsibility for tracking voluntary participant interest in the study. A total of 1822 employees were identified and invited to participate. Of the 1822 individuals, 494 participated in the study resulting in a 27.2% response rate. Due to listwise deletion of missing data, a sample of 491 employees was retained. The sample consisted of 455 women (approximately 92%) and 36 men. The average age of participants was 42.47, SD = 10.76; employed an average of 9.82 years, SD = 8.67 and worked an average of 35.65 hours per week, SD = 7.39.

### Procedure

To assess the validity of the theoretical model, each participant completed a survey. Participants received a package containing an informed consent form, explaining the voluntary nature of the study (See Appendix K), a survey, and a postage paid envelope. The survey contained items that assessed the participant's perceptions of their direct manager's safety-specific transformational leadership, passive safety leadership and the model variables. Due to the longitudinal nature of Study 3 and Study 4, which

both involve the same sample used in this study, participants were also asked to record a self-generated 6-digit code to allow for matching the post-test surveys at time two (T2). The code was generated by asking participants to record the last two letters of their first name, the last two numbers of the year they were born, and the first two letters of their mother's maiden name. For example, if the participant's first name is Joan, born in 1956, and her mother's maiden name is White, the respective code for the participant would be "an56wh". Participants were also asked to identify the name and position of their direct manager, as well as their health care organization. Participants were asked to return the completed survey using the postage paid and addressed envelope.

### Measures

Safety-specific transformational leadership, passive safety leadership, safety climate, safety compliance, and safety participation were all assessed using the measures described in Study 1 (See Appendices B – F). Cronbach's alpha for each measure is reported in Table 5 on the diagonal.

General Transformational Leadership. Subordinate perceptions of general transformational leadership were assessed with 7 items from Carless, Wearing, and Mann's (2000) Global Transformational Leadership scale (GTL). The scale is highly correlated with Bass and Avolio's (1990) Multifactor Leadership Questionnaire ( $\alpha = .83$ ). Example items include, my manager "Gives encouragement and recognition to staff for achieving performance targets on the job", and "Encourages thinking about problems in new ways and questions assumptions". Respondents indicated their agreement with the statements on a 7-point scale ranging from 1 (not at all) to 7 (frequently or always). Cronbach's alpha was 0.93. (See Appendix L)

Safety-related Events were assessed using items taken from the Nova Scotia Association Health Organization database of reported causes of injuries among health care workers. Sample items that assess safety-related events include, 'While performing my job I... 'had something fall on me', and 'overextended myself lifting or moving things'. Respondents indicated the frequency in which the events occurred on a 7-point scale ranging from 1 (rarely) to 7 (frequently). Cronbach's alpha was 0.89. (See Appendix M)

Injuries were assessed with items based on the Workers Compensation Board Database, which outlined the nature and of the injuries suffered by health care workers. Examples of injuries include strains or sprains, cuts or lacerations, and bruises or contusions. Respondents indicated the frequency in which the events occurred on a 7-point scale ranging from 1 (rarely) to 7 (frequently). Cronbach's alpha was 0.79. (See Appendix N).

## Results

Descriptive statistics, inter-item correlations and scale reliabilities for all variables are presented in Table 5.

### Hierarchical Linear Modelling.

The analytic techniques in this study require independence of observations as a necessary assumption that must be met (Bryk & Raudenbush, 1992). To test for the effects of the hierarchical structure of the data (organization and manager), a series of 2 level hierarchical linear model analyses were conducted. The analyses assessed whether organization and manager accounted for significant variability in slopes. In the first level of the analysis, variability across each individual is tested. If there was significant

variability across individuals, the level 2 analysis then tests whether the variability across individuals is accounted for by the nested structure (e.g., organization, manager).

Table 5

Descriptive Statistics, Inter-item correlations, and Reliabilities of the Variables

Variable	1	2	3	4	5	6	7	8
	Health care Workers (n = 491)							
1. Safety-specific leadership	(.94)	-.52	.61	.24	.30	-.30	-.27	.80
2. Passive leadership		(.84)	-.51	-.18	-.16	.41	.32	-.53
3. Safety climate			(.72)	.28	.25	-.53	-.44	.61
4. Safety compliance				(.87)	.41	-.22	-.12	.18
5. Safety participation					(.71)	<b>.05</b>	<b>.01</b>	.25
6. Safety-related events						(.89)	.73	-.30
7. Safety injuries							(.79)	-.30
8. General leadership								(.93)
Mean	5.52	2.37	5.05	6.09	5.52	2.00	1.84	4.94
Standard Deviation	1.46	1.43	0.94	0.77	0.92	0.79	0.68	1.50

Note. Bold items are not significant at  $p < .05$ ; remaining correlations are significant at  $p < .01$  level.

The results showed that neither organization nor manager accounted for significant variability in the slopes for any of the model variables ( $p > .01$  for all model variables). The  $R^2$  change when organization was entered in level 2 of the analysis was less than 0.001 for all of the variables. Similarly, the  $R^2$  change when manager was entered in level 2 of the analysis was also less than 0.001 for all of the safety variables. Therefore, it is acceptable to conduct the structural equation modelling technique to assess the remaining hypotheses.

Factor Analysis

The hypothesis that safety-specific transformational leadership and general transformational leadership are empirically distinct constructs was tested on the sample of health care workers using a set of two confirmatory factor analyses. The analyses were

estimated with maximum likelihood estimation using LISREL 8.53 (Joreskog & Sorbom, 2002). The first confirmatory factor analysis assessed a unidimensional model on which all items were expected to load. The unidimensional model was compared to a model with two correlated, yet empirically distinct factors on which the items load. The models are nested, thus the  $\chi^2$  difference tests the null hypothesis that the correlation between the two factors is 1.00. A significant  $\chi^2$  difference allows for the null hypothesis to be rejected, indicating that the factors are empirically distinct, as the two factor model provides a significantly better fit than the unidimensional model.

The unidimensional model provided a poor fit to the data,  $\chi^2(119) = 1128.42$ ,  $p < .01$ ; GFI = 0.70; NFI = 0.95; CFI = 0.95; PNFI = 0.83; RMSEA = 0.17. In contrast, the two factor model provided a significantly better fit to the data,  $\chi^2(118) = 623.15$ ,  $p < 0.01$ ; GFI = 0.85; NFI = 0.97; CFI = 0.94; PNFI = 0.84; RMSEA = 0.10;  $\chi^2_{\text{difference}}(1) = 505.27$ ,  $p < 0.01$  (see Table 6). The standardized parameter estimates for the two factor model were all significant ( $p < 0.01$ ) and are presented in Table 7. The disattenuated correlation between the two factors is  $r = 0.91$ ,  $p < 0.01$ . This indicates that the two factors are empirically distinct and highly correlated.

Table 6

Fit Indices for the Unidimensional and Two Factor Model

Model	$\chi^2$	df	GFI	NFI	CFI	RMSEA	PNFI
1. Unidimensional	1128.42**	119	.70	.95	.95	.17	.83
2. Two Factor	623.15**	118	.85	.97	.94	.10	.84

$\chi^2_{\text{difference}}(1) = 505.27, p < 0.01.$

Note.; GFI = goodness of fit index; NFI = normed fit index; CFI = comparative fit index; RMSEA = root mean squared error of approximation; PNFI = parsimony normed fit index. \*\*  $p < .01$ .

Hierarchical Regression Analyses: Incremental Contribution of Safety-specificTransformational Leadership

To demonstrate that safety-specific transformational leadership contributes incrementally over and above general transformational leadership to the prediction of the safety outcomes in the model, a series of hierarchical regression analyses were conducted. Each downstream variable in the model was regressed on general transformational leadership in the first step and safety-specific transformational leadership on the second step. The results presented in Tables 8 - 12. The results show that safety-specific transformational leadership made a significant contribution beyond that of general transformational leadership for all model variables with the exception of injuries. Safety-specific transformational leadership predicted 3% of the variance in safety participation, 3% of the variance in safety compliance, 5% of the variance in safety climate, and 1% of the variance in safety related events, over and above the variance attributable to general transformational leadership.

Table 7

Standardized Parameter Estimates for the Safety-specific Transformational Leadership  
and General Transformational Leadership Oblique Two Factor Model

Variable	Safety-specific transformational leadership	General transformational leadership
1. Expresses satisfaction when I perform my job safely	0.72	
2. Makes sure that we receive appropriate rewards for achieving safety targets on the job	0.65	
3. Provides continuous encouragement to do our jobs safely	0.84	
4. Shows determination to maintain a safe work environment	0.82	
5. Suggests new ways of doing jobs more safely	0.79	
6. Encourages me to express my ideas and opinions about safety at work	0.82	
7. Talks about his/her values and beliefs of the importance of safety	0.85	
8. Behaves in a way that displays a commitment to a safe workplace	0.85	
9. Spends time showing me the safest way to do things at work	0.77	
10. Would listen to my concerns about safety on the job	0.60	
11. Communicates a clear and positive vision of the future		0.74
12. Treats staff as individuals, supports and encourages their development		0.85
13. Gives encouragement and recognition to staff for achieving performance targets on the job		0.80
14. Fosters trust, involvement and cooperation among employees		0.85
15. Encourages thinking about problems in new ways and questions assumptions		0.84
16. Is clear about his/her values and practices what he/she preaches		0.80
17. Instills pride and respect in others and inspires me by being highly competent		0.89

Table 8

Hierarchical regression analyses ( $R^2$ ) showing the incremental variance of safety-specific transformational leadership in the prediction of safety climate.

Variable	<u>B</u>	<u>SE B</u>	$\beta$
Step 1			
General transformational leadership	0.38	.02	.61**
Step 2			
General transformational leadership	.20	.03	.33**
Safety-specific transformational leadership	.22	.04	.34**

Note.  $R^2 = .37$  for Step 1;  $\Delta R^2 = .05$  for Step 2 ( $p < .01$ ).

Table 9

Hierarchical regression analyses ( $R^2$ ) showing the incremental variance of safety-specific transformational leadership in the prediction of safety participation.

Variable	<u>B</u>	<u>SE B</u>	$\beta$
Step 1			
General transformational leadership	.16	.03	.26**
Step 2			
General transformational leadership	.003	.04	.05
Safety-specific transformational leadership	.17	.05	.26**

Note.  $R^2 = .07$  for Step 1;  $\Delta R^2 = .03$  for Step 2 ( $p < .01$ ).

Table 10

Hierarchical regression analyses ( $R^2$ ) showing the incremental variance of safety-specific transformational leadership in the prediction of safety compliance.

Variable	<u>B</u>	<u>SE B</u>	$\beta$
Step 1			
General transformational leadership	.01	.02	.18**
Step 2			
General transformational leadership	.001	.04	.03
Safety-specific transformational leadership	.14	.04	.27**

Note.  $R^2 = .04$  for Step 1;  $\Delta R^2 = .03$  for Step 2 ( $p < .01$ ).

Table 11

Hierarchical regression analyses ( $R^2$ ) showing the incremental variance of safety-specific transformational leadership in the prediction of safety-related events.

Variable	<u>B</u>	<u>SE B</u>	$\beta$
Step 1			
General transformational leadership	-.16	.02	-.31**
Step 2			
General transformational leadership	-.001	.04	-.18*
Safety-specific transformational leadership	-.01	.04	-.16*

Note.  $R^2 = .10$  for Step 1;  $\Delta R^2 = .01$  for Step 2 ( $p < .05$ ).

Table 12

Hierarchical regression analyses ( $R^2$ ) showing the incremental variance of safety-specific transformational leadership in the prediction of injuries.

Variable	<u>B</u>	<u>SE B</u>	$\beta$
Step 1			
General transformational leadership	-.14	.02	-.30**
Step 2			
General transformational leadership	-.11	.03	-.24**
Safety-specific transformational leadership	-.004	.03	-.07

Note.  $R^2 = .09$  for Step 1;  $\Delta R^2 = .002$  for Step 2 ( $p > .05$ ).

#### Hierarchical Regression Analyses: Incremental Contribution of Passive safety Leadership

To replicate the findings in Study 1 and to demonstrate that passive safety leadership contributes incrementally to the prediction of the safety outcomes, over and above safety-specific transformational leadership, hierarchical regression analyses were conducted. In this case safety climate was regressed on safety-specific transformational leadership in the first step of the analysis, and then on passive safety leadership in the second step. The results of the analysis are presented in Table 13. Consistent with the findings of Study 1, the results show that passive safety leadership made a significant contribution in the prediction of safety climate, beyond that of safety-specific transformational leadership. Passive safety leadership predicted 5% of the variance in safety climate, over and above the variance attributable to safety-specific transformational leadership.

Table 13

Hierarchical Regression Analysis for Variables Predicting Employee Perceptions of Safety Climate (n =491)

Variable	B	SE B	$\beta$
Step 1			
Safety-specific transformational leadership	.39	.02	.61**
Step 2			
Safety-specific transformational leadership	.31	.03	.47**
Passive safety leadership	-.17	.03	-.26**

Note.  $R^2 = .37$  for Step 1;  $\Delta R^2 = .05$  for Step 2. ( $p < 0.01$ )

Structural Equation Models

To assess the fully mediated model (effects of safety-specific transformational leadership and passive leadership on safety outcomes) developed in Study 1, the covariance matrix of the variables was used as the input to the maximum likelihood estimation procedures of LISREL 8 (Joreskog & Sorbom, 1996). To test alternative models, a partially mediated model was estimated (Figure 3) suggesting that safety-specific leadership has direct effects on injuries, in addition to the fully mediated paths. Furthermore, a non-mediated model was estimated suggesting that safety-specific leadership has direct effects on safety injuries, but does not affect safety climate, safety participation, or safety compliance (Figure 4). Since both the fully mediated and non-mediated model estimations are nested within the partially mediated model, comparisons were conducted using the  $\chi^2$  difference test.

To test alternative models of passive safety leadership, a partially mediated model was estimated (Figure 5) suggesting that passive safety leadership has direct effects on

injuries, in addition to the fully mediated path. Furthermore, a non-mediated model was estimated suggesting that passive safety leadership has direct effects on safety injuries, but does not affect safety climate (Figure 6). Since both the fully mediated and non-mediated model estimations are nested within the partially mediated model, comparisons were conducted using the  $\chi^2$  difference test.

Descriptive statistics, intercorrelations and reliabilities for all of the model variables were presented earlier in Table 5. The covariance matrix of the variables served as the input to the maximum likelihood estimation procedure.

The proposed fully mediated model provided a good fit to the data,  $\chi^2(11) = 29.22$ ,  $p = \text{ns}$ ; GFI = 0.98; NFI = 0.98; CFI = 0.99; PNFI = 0.51; RMSEA = 0.058. The partially mediated model also provided a good fit to the data,  $\chi^2(10) = 27.23$ ,  $p = \text{ns}$ ; GFI = 0.98; NFI = 0.97; CFI = 0.99; PNFI = 0.47; RMSEA = 0.059. The chi square difference test,  $\chi^2_{\text{difference}}(1) = 1.99$ ,  $p > .01$ , indicated that the partially mediated safety-specific transformational leadership model was not a significantly better fit. Furthermore, the standardized parameter for the additional path between safety transformational leadership and injuries was non significant ( $\beta = -0.05$ ,  $p > 0.01$ ). Finally, the non-mediated safety-specific transformational leadership model provided a poor fit to the data,  $\chi^2(21) = 867.39$ ,  $p < .01$ ; GFI = 0.64; NFI = 0.33; CFI = 0.33; PNFI = 0.33; RMSEA = 0.30;  $\chi^2_{\text{difference}}(10) = 838.17$ ,  $p < 0.01$ . A summary of the fit indices for each model is presented in Table 14.

The partially mediated passive safety model fit the data,  $\chi^2(10) = 28.81$ ,  $p < \text{ns}$ ;

GFI = 0.98; NFI = 0.98; CFI = 0.99; PNFI = 0.47; RMSEA = 0.062. However, the chi square difference test,  $\chi^2_{\text{difference}}(1) = 0.41, p > .01$ , indicated that the partially mediated passive safety leadership model was not a significantly better fit. Furthermore, the standardized parameter for the additional path between passive leadership and injuries was non significant ( $\beta = 0.03, p > 0.01$ ). Finally, the non-mediated passive safety leadership model provided a poor fit to the data,  $\chi^2(11) = 71.83, p < .01$ ; GFI = 0.96; NFI = 0.95; CFI = 0.96; PNFI = 0.50; RMSEA = 0.10;  $\chi^2_{\text{difference}}(0) = 42.61, p < 0.01$ . A summary of the fit indices for each model is presented in Table 14.

Standardized parameter estimates for the fully mediated model developed in Study 1 are presented in Figure 8. As hypothesized, injuries were predicted by safety-related events ( $\beta = 0.73, p < 0.01$ ). Safety-related events were predicted by safety climate ( $\beta = -0.53, p < 0.01$ ), safety compliance ( $\beta = -0.11, p < 0.01$ ). Safety climate was predicted by passive leadership ( $\beta = -0.27, p < 0.01$ ), and safety-specific transformational leadership ( $\beta = 0.47, p < 0.01$ ). Safety participation was predicted by safety-specific transformational leadership ( $\beta = 0.21, p < 0.01$ ), safety compliance ( $\beta = 0.36, p < 0.01$ ), and safety-related events ( $\beta = 0.12, p < 0.01$ ). Finally, safety compliance was predicted by safety-specific transformational leadership ( $\beta = 0.11, p < 0.01$ ). The model accounted for 53% of the variance in injuries, 29% of the variance in safety-related events, 9% of the variance in safety compliance, 22% of the variance in safety participation, and 42% of the variance in safety climate. The hypothesized path between safety climate and safety participation was non-significant.

Table 14

Fit indices for the alternative models

Model	$\chi^2$	df	$X^2_{diff}$	GFI	NFI	CFI	RMSEA	PNFI
1. Fully mediated model	29.22	11	-	0.98	0.98	0.99	0.058	0.51
2. Partially mediated safety-specific transformational leadership model	27.23	10	1.99	0.98	0.97	0.99	0.059	0.47
3. Non mediated safety-specific transformational leadership model	867.39**	21	838.17**	0.64	0.33	0.33	0.30	0.33
4. Partially mediated passive leadership model	28.81	10	0.41	0.98	0.98	0.99	0.062	0.47
5. Non mediated passive leadership model	71.83**	11	42.61**	0.96	0.95	0.96	0.10	0.50

Note. GFI = goodness of fit index; NFI = normed fit index; CFI = comparative fit index; RMSEA = root mean squared error of approximation; PNFI = parsimony normed fit index. \*\*p < .01.

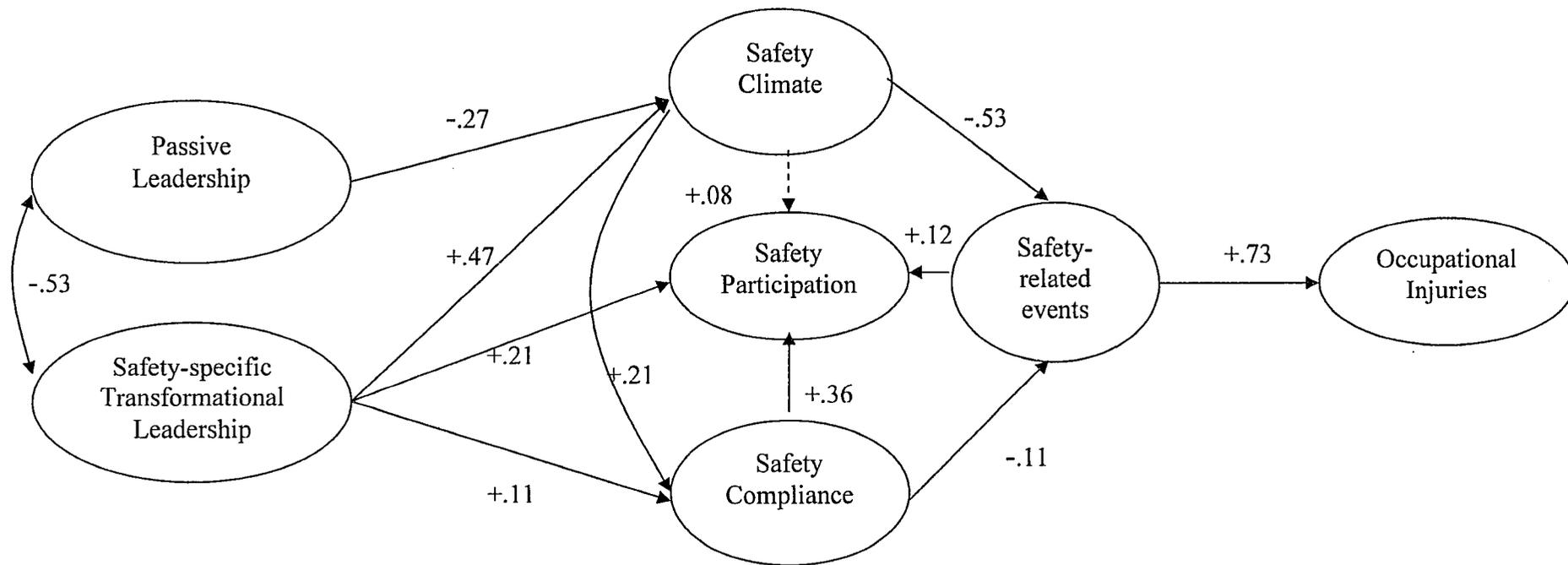


Figure 8.

Standardized parameter estimates for model linking safety-specific transformational leadership, passive leadership and safety Outcomes.

Note: - - - -> indicates  $p > .05$

## Discussion

The hypothesis that safety-specific transformational leadership and general transformational leadership are two, positively correlated, yet empirically distinct constructs was tested. This hypothesis was supported and the results of the confirmatory factor analysis provide support for the distinction between the two constructs. Based on leadership theory, the correlation between safety-specific and general transformational leadership was high as expected, since both safety-specific transformational leaders and general transformational leaders show concern for an individual's well being, inspire individuals to achieve high standards of performance, talk about their values, and encourage individuals to think about problems in new ways. Thus, although the correlation between the two factors was high ( $r = .91$ ), confirmatory tests of the two factor structure provided a significantly better fit to the data than the alternative unidimensional model. This finding supports the decision to examine the effects of safety-specific transformational leadership on the safety outcomes, as the construct is empirically distinct from general transformational leadership. These results suggest that safety-specific leadership is not a redundant concept as previously discussed in the literature (e.g., see Kelloway et al., in press for discussion) and should be incorporated into safety research. Thus, the argument for the inclusion of safety-specific transformational leadership in safety research is supported.

While it is important to establish the empirical distinction between the two transformational leadership concepts, it also important to show that safety-specific transformational leadership makes an incremental contribution to the prediction of the *safety attitudes and behaviours in the model*; prediction that extends beyond that of

general transformational leadership. The results of the series of hierarchical regression analyses illustrate that safety-specific transformational leadership makes a significant incremental contribution to the prediction of individual's perceptions of safety climate, safety compliance, safety participation, and safety-related events.

The incremental contribution of safety passive safety leadership over and above safety-specific transformational leadership in the prediction of safety climate was also assessed. As hypothesised, the results showed that passive safety leadership made a significant contribution in the prediction of safety climate, over and above that of safety-specific transformational leadership. This provides further evidence for the need to include passive leadership in future safety research.

The hierarchical structure of the data was addressed in the current study. The results of the hierarchical linear modelling analysis showed that the common characteristics shared by groups of health care workers (e.g., reporting to the same manager, and groups of workers existing within the same organization), did not account for significant variance in the slopes of the safety outcome variables.

Finally, the theoretical model developed in Study 1 was replicated on a sample of health care workers. Subordinate perceptions of safety-specific transformational leadership significantly predicted safety compliance, safety participation, and safety climate. Passive safety leadership significantly and directly predicted safety climate. Safety climate in turn predicted safety compliance and safety-related events. Safety compliance predicted safety participation and safety-related events. Finally, safety-related events significantly predicted safety participation and injuries.

### Implications for Future Research

Researchers have included both safety-specific transformational leadership (e.g., Barling et al. 2002; Kelloway et al. 2004) and general transformational leadership (e.g., Hofmann & Morgeson, 1999; Williams et al. 2000) concepts in previous studies on occupational safety. These researchers provided empirical support for each of the leadership concepts in terms of their prediction of various safety outcomes. Similarly, both safety-specific transformational leadership and general transformational leadership significantly predict the safety attitudinal and behavioural variables in the model. However, the incremental contribution of safety-specific transformational leadership is noteworthy and changes the way researchers should approach safety research in the future. The measures of safety-specific transformational leadership are specifically designed to assess individuals' perceptions of their supervisor's safety leadership. For example, Barling et al. (2002) highlighted that the safety-specific measure of transformational leadership assesses the frequency in which the leader provides an individual with encouragement and recognition for achieving *safety* performance targets on the job. Furthermore, the measure assesses whether the leader encourages the individual to think about safety problems in new ways and question underlying assumptions about safety practices, and whether the leader acts as a role model of safety by showing commitment to safe work practices and building a positive safety climate. Finally, the frequency in which the leader shows concern for an individual's safety and well being was also assessed. In other words, when using the safety specific transformational leadership measure, the issue of safety is being directly assessed by the four characteristics of transformational leadership (inspirational motivation, intellectual

stimulation, idealized influence, and individualized consideration) (Bass, 1978).

The general measure of transformational leadership (e.g., Bass & Avolio, 1990; Carless et al., 2000), however, makes no overt connection to safety in the workplace. Using the previously discussed examples, an emphasis is placed on the achievement of performance standards in general, innovation and creative thinking about general production problems, being a role model of desired performance expectations, and showing concern for an individual. The issue of safety is not directly addressed by this general form of transformational leadership. Furthermore, although a leader may demonstrate behaviours consistent with transformational leadership, these behaviours may not necessarily focus on improving safety outcomes (Kelloway et al., in press), especially when conflict exists between performance objectives (e.g., speed vs. safety) (Zohar, 2002). In situations where high production or performance levels are a priority, managers tend to compromise safety for speed and productivity (Wright, 1986). The pressure to compromise safety for productivity is intensified in a work environment that is faced with staffing shortages (Mullen, 2004) as is the case in the health care industry (Flin & Yule, 2004). Thus, although a transformational leader may inspire individuals to elevate their performance (Bass, 1978), safety may be compromised if it is not a priority. Thus, future research aimed at examining safety outcomes should incorporate the safety-specific transformational leadership construct.

This study also responded to the call to consider the impact of passive leadership on safety outcomes (Kelloway et al., in press) by examining the effects of passive safety leadership on safety climate. The results suggest that passive leadership has negative effects on perceptions of safety climate, thus, providing further evidence for the need to

include passive leadership in future safety research. Leaders must take an active role in promoting safety within the workplace, as a failure to do so negatively impacts perceptions of safety climate. Through its impact on safety climate, passive leadership was associated with higher safety-related events, which in turn predicted injuries. The present findings support previous empirical evidence (e.g., Kelloway et al., in press), suggesting that passive leadership is equally important to safety-specific transformational leadership. Given that this is an under researched area in the field, the findings make a useful contribution to the safety literature.

Contrary to the findings in Study 1, although the parameter between safety climate and safety participation was positive, it did not reach significance. There is prior empirical evidence supporting the safety climate – safety participation relationship. Researchers suggest that safety performance will be valued within positive safety climates (Hofmann, Morgeson, & Gerras, 2003; Hofmann & Stetzer, 1996; Zohar, 2000). Thus, positive safety climates will enhance safety by motivating individuals to participate in safety programs and activities and complying with safety policies (Griffin & Neal, 2000). This argument is based on social exchange theory (Blau, 1964), which states that individuals will reciprocate by exerting extra effort when they perceive that the organization is concerned for their well-being (Hofmann & Morgeson, 1999). The safety climate – safety participation relationship was partially supported in the current study due to the moderate positive correlation, however, future research is needed to further explore this relationship.

#### Implications for Practice

The current study examined the model of safety-specific transformational

leadership within the health care industry. This study has extended previously developed models of safety leadership (e.g., Barling et al., 2002; Kelloway et al., in press) through the inclusion of both safety compliance and safety participation in the theoretical model. All of the hypotheses regarding safety-specific transformational leadership and safety outcomes were supported. The results illustrate that safety-specific leadership directly predicts both safety participation and safety compliance. This suggests that transformational leadership behaviours aimed at enhancing safety are associated with increased individual compliance with safety regulations. More importantly, safety-specific transformational leadership predicted individuals' safety participation and their initiative to voluntarily promote and engage in safe work practices.

The role safety-specific transformational leadership plays in promoting safety participation highlights a recent shift in safety management that extends beyond traditional approaches to safety. Traditional approaches to managing workplace safety have focused mainly on job redesign (Chokar & Wallin, 1984), technical aspects of engineering systems (Kanki, Lozito & Foushee, 1989), and safety compliance approaches (Zohar, 2002). Researchers also debated the issue of whether a majority of workplace accidents and injuries can be attributed to the unsafe work practices of employees rather than unsafe working conditions (Garavan & O'Brien, 2001; Hoyos, 1995). Until recently, safety participation, or the notion of employees working safely because they want to was not discussed in the literature (e.g., Kelloway et al., in press).

The results of this study suggest that there is a need to move beyond compliance and engineering approaches to managing safety in the workplace. Safety-specific transformational leadership predicts safety participation and safety compliance among

workers. This form of leadership creates a safety initiative among employees that is needed to elevate current safety performance in organizations. Interestingly, individuals are actively and voluntarily engaging in safe work practices that may not be directly related to rewards. Typical approaches to safety management are designed to increase compliance through rewards, incentives or feedback (e.g., Zohar, 2002). In contrast, managers are able to strongly influence employee safety compliance and participation using an alternative approach to active transactional leadership style whereby employee behaviour is continuously monitored and rewarded. Employees engage in safe behaviour because they *want* to.

#### Potential Limitations

I acknowledge that alternative models may provide an equivalent or better fit to the data. For example, employee safety participation may be explained by additional safety factors that were not incorporated into the model. In previous work, perceived safety risk was associated with employee willingness to participate in health and safety programs (Cree & Kelloway, 1997). Based on the results of the model development and evaluation in Study 1 and 2, it is possible that perceived risk may also be associated with an individual's safety participation (e.g., promoting safety and voluntarily carrying out safe work practices). Furthermore, there may be other variables, in addition to safety-specific transformational leadership, that serve as predictors of safety participation. Therefore, future research should be conducted to evaluate additional predictor variables that were not identified in this theoretical model.

#### Conclusion

In summary, the current study shows that safety-specific transformational

leadership and general transformational leadership are correlated, yet empirically distinct constructs. Furthermore, safety-specific transformational leadership provides a significant incremental contribution to the prediction of individuals' perceptions of safety climate, safety participation, safety compliance, and safety-related events.

The current study tested and replicated a model of safety-specific transformational leadership and passive safety leadership with a health care setting providing further support for the external validity of the model. Safety-specific transformational leadership predicted employee perceptions of safety compliance, safety participation and safety climate. Safety compliance and safety climate, in turn, predicted lower levels of safety-related events. Further, passive leadership had a direct negative impact on safety climate, and indirect impact on safety compliance, safety events and injuries.

In Study 3 the impact of safety-specific transformational leadership training vs general transformational leadership training vs no training (control) on leader perceptions of safety attitudes, leader intentions to promote safety, and leader perceptions of self-efficacy is examined. The study is based on the theoretical argument developed in Study 2, which highlights the importance of safety-specific as opposed to general transformational leadership with respect to safety outcomes.

### Study 3

#### Impact of Transformational Leadership Training on Leader Safety Attitudes

Support for the generalizability of the fully mediated model of safety-specific transformational leadership and passive safety leadership was provided in Study 2. Given the positive employee safety outcomes associated with safety-specific transformational

leadership, the primary issue addressed in Study 3 was to assess the impact of safety-specific transformational leadership training on leader safety attitudes.

Despite the growing body of occupational safety knowledge, safety management remains a major challenge for organizational leaders as recent studies indicate that unsafe work practices continue to prevail in many organizations (Belcourt, Bohlander & Snell, 2005; National Safety Council, 2003). Employees engage in unsafe work behaviour for a variety of reasons. For example, the uncomfortable element and awkwardness of safety equipment lead to unsafe behaviour (Corcoran, 2002; Mullen, 2004). Hofmann and Stetzer (1996) suggest that performance pressures also influence unsafe behaviour through perceptions of role overload, such that performance is affected by inadequate time, training and resources (Jones & James, 1979). Similarly, Mullen (2004) found that employees who experienced time constraints, lack of training, and role overload, were more concerned with performance than safety. These researchers suggest that workers are more likely to engage in “short cut” work practices when they face pressures from managers to perform. Thus, safety management continues to be a major challenge for organizational leaders who are faced with safety issues in addition to performance pressures.

#### Managing Safety through Leadership Training Interventions

A popular method for managing safety is through the implementation of safety training and intervention programs. The most frequently used interventions rely on behaviour modification (also known as the operant perspective) and the ABC model of behaviour (e.g., antecedent (training) – behaviour – consequence (incentives) (see Connellan, 1978; Luthans & Kreitner, 1985). Recently, Zohar (2002) incorporated the

variable ‘facet-specific leadership’, a form of active transactional leadership, to expand the theoretical model of safety intervention. Facet-specific leadership was described by Zohar as the “supervisory activity of closely monitoring certain aspects of performance [i.e. safety] and adjusting consequences depending on the relative priorities” (p.157). The results showed that facet-specific supervisory practices associated with safety resulted in a significant decrease in accident rates.

Given the shift that has occurred in terms of safety management with an emphasis now being placed on safety initiative (Kelloway et al., in press) as opposed to safety compliance approaches, there is a need to examine alternative safety intervention models. One alternative that was discussed in the literature is based on transformational leadership (Kelloway et al., in press; Zohar, 2002). The question of whether transformational leadership can be enhanced through training has gained increased attention (Barling et al., 1996; Kelloway et al., in press). Furthermore, the issue of whether enhanced transformational leadership training leads to improved safety outcomes needs to be examined. Although research shows that improved transactional leadership results in fewer accidents (Zohar, 2002), no studies examined the impact of transformational leadership-based interventions on leader safety outcomes (e.g., leaders safety attitudes, leader self efficacy, leader intention to promote safety). Furthermore, as discussed in Study 2, little is known about the nature and importance of safety-specific transformational leadership, as opposed to general transformational leadership, or their impact on leader safety outcomes. Based on their review of the transformational leadership literature, Flin and Yule (2004) concluded that “the challenge for health care is to identify and then train the leadership behaviours that will improve safety beyond

current levels” (p. 49). Therefore, the purpose of this study is to establish the means through which safety-specific transformational leadership training interventions result in changed leader perceptions of safety outcomes within a health care setting.

Very few studies have examined the impact of transformational leadership based training interventions on performance outcomes, and there are no known studies that examined the impact of such interventions within the context of safety. Bass (1990) described two types of transformational leadership interventions. The first intervention takes the form of a general coaching model that incorporates feedback and goal setting (Kelloway & Francis, 2004). Feedback concerning the leader’s transformational leadership style is obtained from subordinates and then discussed with the leader in an individual coaching session between the leader and a coach. Inconsistencies between the leader’s self-ratings and the subordinates’ ratings are identified, and specific goals are set to enhance the leader’s transformational leadership behaviours.

The second training method described by Bass (1990) involves workshops aimed at enhancing transformational leadership behaviour. The workshops require leaders to brainstorm and generate behaviours displayed by both effective and ineffective leaders. These behaviours are then linked to active (e.g., transformational, transactional) and passive (e.g., laissez-faire) theories of leadership. Leaders also participate in other exercises and discussions aimed at enhancing transformational leadership including role playing and watching videos that depict transformational behaviour. The workshop also emphasizes the development of action plans for incorporating transformational leadership in leaders’ everyday work activities.

Using both the feedback/goal setting method and training workshops, Barling et al. (1996) conducted a field experiment to assess the effects of transformational leadership training on subordinates' commitment to the organization and financial performance of the business unit. Their study showed the effectiveness of combining transformational leadership training and personal feedback, such that training branch managers in transformational leadership lead to changes in subordinates' commitment to the organization and financial performance. Although the study resulted in positive organizational outcomes as reported by subordinates, the researchers did not assess whether a change occurred in leader behaviour. The current study aims to address this.

To assess the independent contributions of both elements of transformational leadership training (workshop & feedback), Kelloway, Barling, and Helleur (2000) examined the effects of leadership workshops and the feedback on subordinates' perceptions of transformational leadership. In this study, managers were randomly assigned to one of four groups: 2 (training vs no training) or 2 (feedback vs no feedback). The results suggest that workshop training and feedback do not necessarily need to be used together to enhance subordinate perceptions of transformational leadership. These findings extend previous research (e.g., Barling et al., 1996) and indicate that both interventions may be implemented independently and still result in increased subordinate perceptions of transformational leader behaviour. Again, changes in leader perceptions and behaviour remain to be addressed.

#### Assessing the Effectiveness of Transformational Leadership Training

Training effectiveness is typically assessed by using one or more of the criteria proposed in Kirkpatrick's (1976) training outcome model. These criteria include trainee

reactions (e.g., do they like the training), knowledge or skill acquisition (e.g., did trainees learn the material), behaviour change (e.g., did the trainees apply the learned behaviour and attitudes to their job), and individual/organizational results (e.g., did the training result in fewer occupational injuries). Behaviour change (Kirkpatrick, 1976), was also termed as the “transfer” of learned behaviour to the job (Alliger, Tannenbaum, Bennet, Traver & Shotland, 1997). Studies 3 and 4 examine level 3 (change in attitudes) and level 4 (results).

Organizations are showing an increased interest in assessing behaviour changes and results over the past decade to determine whether training actually results in improved organizational outcomes (Haccoun, 1998). Thus, the goal of the current study was to assess whether the transformational leadership training interventions resulted in changes in leader attitudes, as well as improved safety outcomes. To better understand the change in leader attitudes, Ajzen’s (1985, 1991) theory of planned behaviour was applied to assess the likelihood that leaders will use what they learned through training to improve their transformational leadership behaviour. The theory of planned behaviour is used to examine a variety of behavioural intentions in the workplace including ethical behaviour (Flannery & May, 2000), recycling (Boldero, 1995) and social networking activity (Caska, 1998). The theory suggests that the key to predicting an individual’s behaviour lies with their behavioural intentions. According to Ajzen’s theory, an individual’s behavioural intention directly predicts their future behaviour.

An individual’s intention to perform a behaviour (e.g., promoting safety) increases, as their attitudes toward the behaviour become more favorable. Attitudes toward the behaviour stem from the individual’s beliefs about the outcomes of performing the

behaviour. Furthermore, Kraiger, Ford and Salas (1993) also suggest that training effectiveness may be assessed through attitudinal outcomes. One attitudinal outcome of training is self-efficacy (Colquitt et al., 2000). Self-efficacy is defined as an individual's "belief in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). Considerable empirical evidence supports the relationship between self-efficacy, motivation to learn, and learning (e.g., Gist, Stevens, & Bavetta, 1991; Mathieu, Tannenbaum, & Salas, 1992), as well as task effort and persistence in task achievement (Gist & Mitchell, 1992). Moreover, a finding that has consistently resulted from training research is the role of self-efficacy for increasing training effectiveness and in the transfer process (Martineau, & Tannenbaum, 1993; Saks, 1997). Considerable empirical research on training and self-efficacy supports the notion that training increases self-efficacy, and self-efficacy predicts training outcomes (Colquitt et al., 2000; Frayne & Latham, 1987; Gist, 1989; Gist et al., 1991; Mathieu, Martineau, & Tannenbaum, 1993; Saks, 1995). Finally, in their review of transformational leadership training, Kelloway and Barling (2000) suggested that transformational leadership training should result in higher leader self-efficacy beliefs. However, the relationship between transformational leadership and leader self-efficacy has yet to be empirically evaluated.

Thus, an accurate assessment of the transfer of learned behaviour will be obtained through leader safety attitudes, leader intentions to promote safety, and leader self-efficacy. Furthermore, based on the findings of Study 1 and Study 2, suggesting that safety-specific transformational leadership makes an incremental contribution to the

prediction of safety outcomes, over and above general transformational leadership, I hypothesize that:

Hypothesis 1: Safety-specific transformational leadership training results in higher leader safety attitudes, than both the general transformational leadership training and the control group.

Hypothesis 2: Safety-specific transformational leadership training results in higher leader intentions to promote safety, than both the general transformational leadership training and the control group.

Hypothesis 3: Safety-specific transformational leadership training results in higher leader perceptions of self-efficacy, than both the general transformational leadership training and the control group.

### Summary

The purpose of the current study is to assess the impact of safety-specific transformational leadership training vs general transformational leadership training vs no training (control) on leader perceptions of safety attitudes, leader intentions to promote safety, and leader perceptions of self-efficacy. Based on the theoretical argument developed in Study 2, which describes the importance of safety-specific as opposed to general transformational leadership, I expect that safety-specific transformational leadership training will yield significantly higher leader perceptions of safety attitudes, leader intentions to promote safety, and leader perceptions of self-efficacy.

### Method

#### Participants

The pre-test sample consisted of leaders from 21 long term health care

organizations. Approximately 172 participants were identified by participating organizations. Of the 172 participants who received surveys, 84 participants responded (48.8% response rate). Due to listwise deletion of missing data on the pre-test measure, a sample of 60 leaders was obtained.

The sample of 60 participants (50 females; 10 males) were an average age of 48.03,  $SD = 9.08$ . The average number of years employed was 9.52,  $SD = 8.77$  and participants worked an average of 39.28 hours per week ( $SD = 3.67$ ).

The post-test sample consisted of 60 participants who participated in one of the study conditions. After matching pre and post test participant responses, and listwise deletion of missing data, only 32 responses were retained.

The sample of 32 participants (28 females; 4 males) were an average age of 49.73,  $SD = 8.72$ . The average number of years employed was 10.47,  $SD = 7.78$  and participants worked an average of 38.36 hours per week ( $SD = 5.56$ ).

### Procedure

To assess the effects of safety-specific versus general transformational leadership training versus no training interventions on changes in leader attitudes, a longitudinal experimental design was used.

Pre-test/Post-test. Prior to conducting the training interventions with managers, a pre-test measure was administered to managers to obtain a base rate measure of the study variables. The survey administered at T1 served as the pre-test measure. The pre-test measure included items that assessed managers' self-ratings of safety attitudes, intent to promote safety, and their self-efficacy to promote safety. Participants received a package containing an informed consent form, explaining the voluntary nature of the study (See

Appendix O), a survey, and a postage paid envelope. Managers were asked to identify their organization, as well as record a 6 digit self-generated code as described earlier for matching surveys at T2.

Managers completed the pre-test measure approximately 1 week before the training programs were conducted, and completed the same measure again 3 months (post-test) following the training intervention.

### Measures

Safety Attitudes. Leader safety attitudes were assessed using 11 items developed by Kelloway, Francis, Schat and Iverson (2005). Items include “I have made safety a priority while at work”, and “I think it is more important to work safely than it is to work quickly”. Participants responded on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Cronbach’s alpha = .89. (See Appendix P)

Leader Intent to Promote Safety. Leader intent to promote safety was assessed using a 3-item scale. An example of an item in the scale includes “It is very likely that I will promote safety in my organization”. Participants responded on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Cronbach’s alpha = .79. (See Appendix Q).

Self Efficacy. Self efficacy was assessed using Chen, Gully, and Eden’s (2001) 9-item New General Self Efficacy scale. The items for this study were adapted to reflect safety self efficacy. Example items include “When facing difficult safety tasks, I am certain that I will accomplish them”, and “In general, I think that I can obtain safety outcomes that are important to me”. Participants responded on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). (Cronbach’s alpha = 0 .77). (See

Appendix R).

Training Intervention. Health care organizations and their managers were randomly assigned to one of the training interventions or control group (no training) (See Figure 9). A total of 27 managers participated in the safety-specific transformational leadership training, 13 managers participated in the general transformational leadership training, and 20 managers were assigned to the no training conditions. Both the general and safety-specific training interventions were implemented approximately 1 week following the pre-test (see Figure 10). Managers in the control group received the safety-specific transformational training after the post-test was completed.

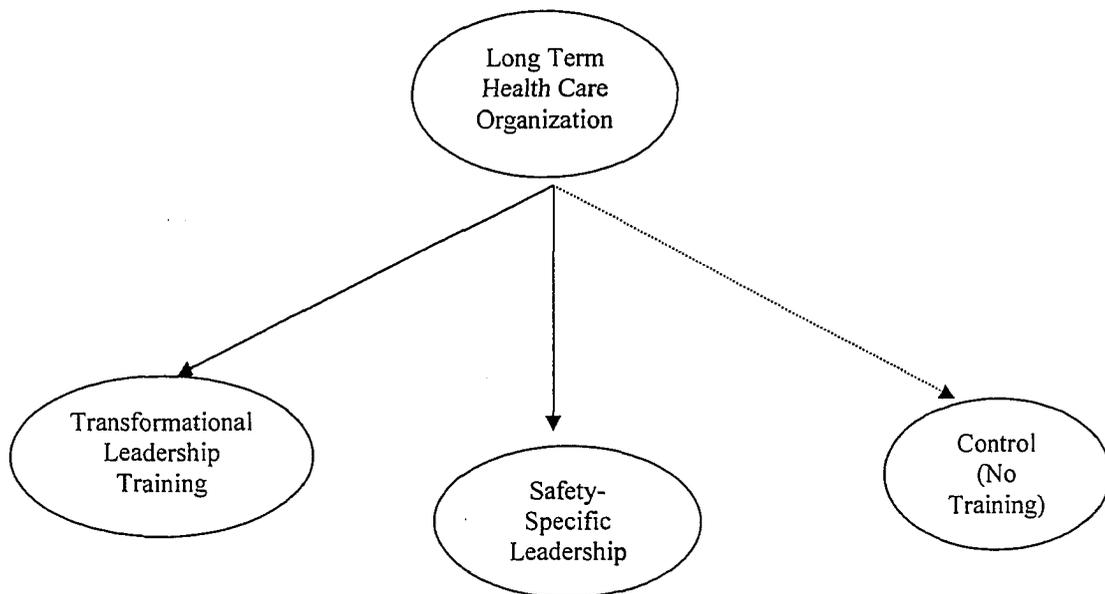


Figure 9. Experimental design used in study 3.

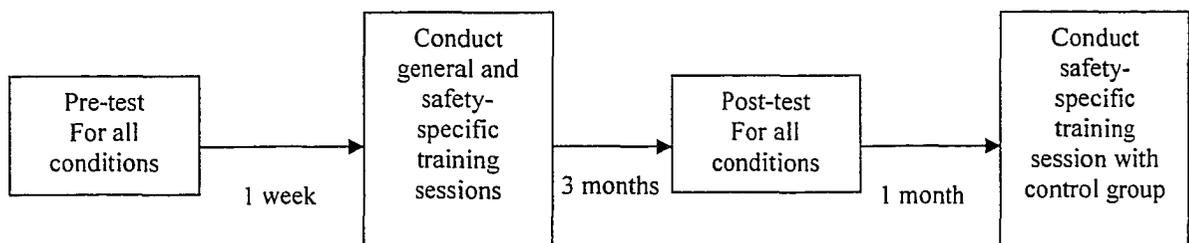


Figure 10. Training intervention timeline.

General Transformational Leadership Training. The training intervention consisted of a half day group-based training workshop for the managers (Barling, 1996; Kelloway et al., 2000). The purpose of the training was to familiarize managers with the theory of transformational leadership and goal setting. Through lecture format, discussions, and goal setting managers gain an understanding of how transformational leadership behaviours could be implemented in their daily work. Following Barling et al.'s (1996) training format, the subsequent training steps were implemented. First, managers identified the characteristics and behaviour of the best and worst leaders they encountered. These characteristics are categorized by the training facilitator as being either transformational, transactional (active vs passive), or laissez faire leadership behaviours. Managers are introduced to the various theories of leadership through lecture and discussion format, with the emphasis on transformational leadership and performance outcomes.

The workshop facilitator worked with the group of managers to help them apply the concept of transformational leadership to their own work context through goal setting (Locke & Latham, 1984). Managers were provided with a personalized plan for setting specific, challenging, yet attainable goals with respect to transformational leadership behaviour. This training program has seen success in previous studies, and has contributed to positive organization outcomes including improved subordinate organizational commitment, perceptions of leader transformational leadership, and sales performance (Barling et al., 1996; Kelloway et al., 2000).

Safety-specific Transformational Leadership Training. The safety-specific training intervention also consisted of a half day group-based training workshop for the

managers. The program was designed by adapting the general transformational leadership training intervention (Barling et al., 1996; Kelloway, 2000) to reflect safety issues in the health care profession. The purpose of the training was to familiarize managers with safety-specific transformational leadership. Using the same format as the general leadership training (lectures, discussions, and goal setting), managers gained an understanding of how safety-specific transformational leadership behaviours could be implemented in their daily work. First, managers identified the characteristics and behaviour of the best and worst leaders they encountered. These characteristics are categorized by the training facilitator as being either transformational, transactional (active vs passive), or laissez faire leadership behaviours. Managers are introduced to the various theories of safety leadership through lecture and discussion format, with the emphasis on safety-specific transformational leadership and performance outcomes.

The workshop facilitator worked with the group of managers to help them apply the concept of safety-specific transformational leadership to their own work context through goal setting (Locke & Latham, 1984). Managers in the safety-specific condition were also provided with a personalized plan for setting specific, challenging, yet attainable goals with respect to safety-specific transformational leadership behaviour. Both the general and safety-specific transformational leadership training interventions were standardized in format, length, and method of delivery. The only difference between the two types of training was the experimental manipulation (general vs safety-specific content).

## Results

Intercorrelations and scale reliabilities for all study variables at both pre-test and

post-test are presented in Table 15. Descriptive statistics for the pre-test and post-test measures by group are presented in Table 16.

Table 15

Pre-test and Post-test Inter-item Correlations, and Reliabilities.

Variable	1	2	3
Pre-test (n = 60)			
1. Self efficacy	(.77)	.49**	.67**
2. Intent to promote safety		(.79)	.51**
3. Safety attitudes			(.89)
Grand Mean	5.71	5.86	6.21
SD	0.65	0.75	0.63
Post-test (n = 32)			
1. Self efficacy	(.79)	.75**	.90**
2. Intent to promote safety		(.81)	.66**
3. Safety attitudes			(.80)
Grand Mean	4.79	4.40	5.21
SD	1.17	1.05	0.90

Note. \* \*  $p < .01$ . Reliabilities for each scale are presented on the diagonal in parentheses.

Hierarchical Data Structure

To test for the effects of the hierarchical structure of the data (groups of managers existing within and across health care organizations), a 2-level hierarchical linear model analysis was conducted. The analysis assessed whether the long-term health care organization accounted for significant variability in slopes of the attitudinal variables. In the first level of the analysis, variability in the outcomes across each manager is tested. If there was significant variability across managers, the level 2 analysis then tests whether the variability across managers is accounted for by the common characteristic shared by the managers (health care organization).

Table 16

Descriptive Statistics of the Study Variables at Pre-test and Post-test for the Intervention and Control Groups

Variable	Group 1		Group 2		Control	
	M	SD	M	SD	M	SD
Pre-test						
1. Self efficacy	5.69	0.49	5.51	1.10	5.85	0.64
2. Intent to promote safety	6.07	0.55	5.74	0.68	5.65	0.94
3. Safety attitudes	6.31	0.46	5.94	0.91	6.24	0.57
	n	27	13		20	
Post-test						
1. Self efficacy	5.43	1.25	4.27	0.64	4.16	0.39
2. Intent to promote safety	4.80	1.22	4.35	0.62	3.60	0.80
3. Safety attitudes	5.70	1.05	4.80	0.58	4.76	0.13
	n	15	10		7	

Note. Group 1 = safety-specific transformational leadership training group; Group 2 = general transformational leadership training group; Control = no training.

The results showed that the health care organization in which groups of managers were employed did not account for significant variability in the slopes for any of the attitudinal variables ( $p > .05$  for all model variables). The  $R^2$  change when organization was entered in level 2 of the analysis was less than 0.001 for all of the variables. Therefore, it is acceptable to conduct the multivariate analysis of variance technique to assess the effects of training on manager safety outcomes.

Effects of Training on Manager Safety Attitudinal Variables

Multivariate analysis of covariance (MANCOVA) was used to assess the effects of leadership training (general transformational leadership training vs safety-specific leadership training vs no training control) on leader attitudinal variables (safety attitudes, intent to promote safety, and self-efficacy)<sup>2</sup>.

<sup>2</sup> Differences between conditions at the pre-test were assessed using MANOVA. The multivariate effect was not significant,  $F(2, 57) = 1.48, p > .05$  indicating that there were no experimental group differences on the dependent variables found in the pre-test scores.

The managers' post-test ratings of safety attitudes, intent to promote safety, and self efficacy were entered as the dependent variables, and group membership was entered as the independent variable. The managers' pre-test ratings of safety attitudes, intent to promote safety, and self efficacy were entered as the covariates. With the use of Wilks' criterion, the combined DV's were significantly affected by training,  $F(2,26) = 2.20$ ,  $p < .05$ .

The effects of each training group on the dependent variables were assessed using a series of univariate analysis of variances. Significant univariate effects were obtained for safety attitudes,  $F(2, 26) = 4.81$ ,  $p = .01$ , partial  $\eta^2 = .174$ ; and self efficacy,  $F(2, 26) = 4.16$ ,  $p < .05$ , partial  $\eta^2 = .175$ . The univariate effect for intent to promote safety was not significant,  $F(2, 26) = 2.78$ ,  $p = .07$ , partial  $\eta^2 = .152$ .

Post hoc analyses were conducted to identify the specific group differences. Post hoc tests showed that manager ratings of safety attitudes in the safety-specific transformational leadership group ( $M = 5.70$ ,  $SD = 1.05$ ) were significantly higher than both the general transformational leadership training group ( $M = 4.80$ ,  $SD = 0.58$ ), and the control group ( $M = 4.76$ ,  $SD = 0.13$ ). No significant difference in manager safety attitudes was found between the general transformational leadership training group and the control group. Manager ratings of self efficacy were significantly higher in the safety-specific transformational leadership group ( $M = 5.43$ ,  $SD = 1.25$ ), than they were in both the general transformational leadership group ( $M = 4.27$ ,  $SD = 0.64$ ), and managers in the control group ( $M = 4.16$ ,  $SD = 0.39$ ).

## Discussion

The findings of Study 3 provide empirical evidence for the effectiveness of safety-specific transformational leadership training. The pre-test post-test control group design of this study allowed for an evaluation of leader attitudes (predictor of behaviour) (level III), as described in Kirkpatrick's (1976) training outcome model. The results of the experimental training intervention showed that leaders' safety attitudes were highest among managers who received the safety-specific transformational leadership training, as opposed to managers who participated in the general transformational leadership training or the control condition. The same was found for leader self efficacy to promote safety. Although the univariate effect of training on leader intentions to promote safety was not found to be significant ( $p = .07$ ), leader ratings of intent to promote safety were highest in the safety condition ( $M = 4.80$ ,  $SD = 1.22$ ).

This study extends previous experimental examinations of the effects of transformational leadership training (e.g., Barling et al., 1996; Kelloway et al., 2000; Kirkpatrick & Locke, 1996) by assessing changes in manager attitudinal variables, whereas previous investigations of transformational leadership training focussed on examining the effects of leadership interventions on subordinates' perceptions of their manager's leadership, attitudinal, and performance outcomes. Furthermore, unlike previous studies (e.g., Zohar, 2002), the current study extends leadership research through the examination of both safety-specific transformational leadership and general transformational leadership. Safety-specific transformational leadership training resulted in higher leader safety attitudes, intentions to promote safety, and perceptions of self efficacy. The results indicate that manager ratings of the three safety outcomes are

higher for the safety-specific transformational leadership group than ratings in both the general transformational leadership training and the control groups. Furthermore, the ratings for the managers in the general transformational leadership condition were not significantly higher than the ratings in the control group. Therefore, examining the various types of transformational leadership interventions (safety-specific vs general) allowed for an in-depth analysis to determine which of the experimental training conditions were most effective in terms of achieving positive safety outcomes.

Although the results indicate that leader ratings on the safety outcomes were highest in the safety-specific condition, it is important to address the small decline in ratings on the post-test. Manager post-test ratings were slightly lower than pre-test ratings on each of the safety outcome variables. The decrease was also consistent across experimental conditions, including the control condition. Given that the decline occurred across all conditions, the trend is not likely a result of the training interventions. A possible explanation for this finding is that managers simply could not sustain high levels of intentions to promote safety, self efficacy and safety attitudes for a prolonged period of time. There may be additional extraneous organizational variables that explain the decrease in ratings on the post-test measures. For example, the post-test data was collected during the summer vacation period and perhaps leaders were facing staffing shortages to cover vacations. Managers may have found it difficult to focus on safety when facing other staffing challenges. However, despite the small decline in ratings it is important to note that significant differences were not found between the experimental conditions at the pre-test, yet there were significant overall and univariate effects for training at the post-test. As discussed earlier, this suggests that the safety-specific

transformational leadership training was effective and results in higher leader safety attitudes, self efficacy and intent to promote safety, than both the general condition and control.

It is also important to briefly discuss the rationale for the method used to assign participants to experimental conditions. Organizations, rather than individual leaders were randomly assigned to one of the three training conditions (safety-specific, general, control). This form of random assignment was selected in order to minimize the likelihood that the effects of training on the safety outcomes would be confounded by participant interaction following the training. Groups of leaders work together in various long-term health care organizations, therefore, the probability that they discuss the training intervention is high (since they interact on a daily basis). It would be difficult to draw conclusions about which training condition had the effect on safety outcomes. Therefore, organizations, rather than leaders, were randomly assigned to conditions to minimize the likelihood that leaders who participated in the safety-specific condition would not discuss their training with other leaders who received the general training. To ensure that the effects were not simply a result of the organization in which the leaders worked, hierarchical linear modelling was used and the results indicated that the organization did not account for significant variability in the leader safety outcomes. Therefore, this method of random assignment as opposed to randomly assigning individuals, did not appear to have a significant impact on the results.

#### Implications for Future Research

There are several issues stemming from this research that warrant further investigation. Firstly, both types of leadership training (safety-specific and general) in

this study focussed on increasing leaders' intellectual stimulation, individualized consideration, idealized influence, and inspirational motivation behaviour. The inclusion of all four transformational leadership characteristics (Burns, 1978) provides for a more comprehensive analysis of the effects of transformational leadership on safety outcomes than previous intervention studies, that typically focussed on the effects of intellectual stimulation, individualized consideration (Barling et al., 1996), and charismatic leadership behaviours (Kirkpatrick & Locke, 1996). Previous studies that assessed only one or two of the transformational leadership characteristics possibly resulted in an underestimation of the effects of training on the outcome variables. (Barling et al., 1996). Due to the inclusion of the full range of transformational leadership characteristics in the training intervention, a more accurate estimation of the effects on safety outcomes is possible in the current study. However, future research is necessary to examine the effects of the full range of transformational leadership training versus the effects of each individual component of transformational leadership.

Secondly, future research on the effectiveness of safety-specific transformational leadership training needs to expand the safety outcomes that are assessed. It is important to identify and empirically evaluate other potential outcomes associated with safety-specific transformational leadership training. For example, Kraiger, Ford and Salas (1993) suggest that training effectiveness may be assessed through post training motivation, which Noe and Schmitt (1986) define as "the trainee's desire to use the knowledge and skills mastered in the training program on the job" (p. 502). Managers would be more likely to use the knowledge and skills that they attained through safety-specific transformational leadership training when they have the desire and motivation to

do so. Noe and Schmitt (1986) suggest that this desire or increased motivation results when individuals perceive that the learned behaviour will help them solve work-related issues (e.g., safety-related challenges). Thus, future research on the effectiveness of safety-specific transformational leadership training will benefit from the inclusion of post-training motivation of leaders to transfer safety leadership behaviour to the work environment as an outcome measure.

Finally, the length of time necessary for safety-specific leadership to have an impact on the safety outcomes is not clear from the results of this study. The training content in both conditions focussed on improving transformational leadership (Bass, 1985). Thus, managers concentrated on transferring transformational leadership behaviours to their work environment. However, there is no research indicating the length of time necessary for safety-specific transformational leadership to have a strong impact on these safety outcomes. The current study found a significant effect of safety-specific leadership on safety attitudes, and self-efficacy over a three month period; however, the effects sizes were small. Therefore, it is possible that a longer period of time must elapse in order to achieve stronger positive effects of safety-specific transformational leadership based interventions. Future research should assess the effects of safety-specific transformational leadership training on safety outcomes at various time intervals.

Further research should also examine the optimal length of the training intervention required to achieve the safety benefits. The current study examined the impact of a half-day training intervention, whereas previous studies examined the impact of a full-day training intervention (e.g., Barling et al, 1996). Due to the costs associated with training (e.g., time away from work to attend training; facilities; training materials),

it is important to determine whether comparable outcomes to the full-day session may be achieved by the condensed half-day training. Thus, future research must be conducted to compare safety outcomes of the short version and long version (Barling et al., 1996) of safety-specific transformational leadership training.

### Implications for Practice

The current study is an example of a leadership intervention that has led to safety attitudinal improvements within the health care industry. The results of the safety-specific transformational leadership training intervention provided evidence that safety practitioners can use in their efforts to convince organizations to take an active role in developing their leaders' safety-specific transformational leadership behaviour. The safety-specific training intervention resulted in significantly higher manager safety attitudes in this study. Safety attitudes are extremely useful predictors of the safety climate within organizations (e.g., Cox & Cox, 1991; Harvey, Bolam, Grogory, & Erdos, 2001). Safety climate, in turn, mediates the relationship between transformational leadership and safety-related events (e.g., close calls), which in turn predict occupational injuries (Barling et al., 2002; Kelloway et al., in press) and safety performance (Zohar, 1980).

Training interventions and research aimed at improving safety-specific transformational leadership behaviour and safety attitudinal outcomes represent a fundamental shift in the approach to safety training within organizations. In addition to providing subordinate safety training, organizations must recognize the importance and value of training organizational leaders in safety leadership. The findings of this study are extremely timely given the recent introduction of Bill C-45, an amendment to the

Canadian Criminal Code affecting the criminal liability of organizations (Department of Justice, Canada, 2004), which states that individuals, including supervisors or anyone who directs how work is done, are responsible for the safety of employees. Therefore, not only is safety-specific transformational leadership important for improving safety climate and achieving positive safety outcomes. Safety-specific transformational behaviours are critical given the recent amendment to the criminal code stating that managers must ensure the safety of employees by promoting safety and continuously striving to improve the work environment. Furthermore, it is noteworthy that general transformational leadership approaches may not be sufficient given that the leadership behaviours are not directed specifically on safe behaviour.

#### Potential Limitations

Non response bias poses a potential threat to the validity of the results since the perceptions of the individuals who participated in the study may not be representative of the perceptions held by non-respondents. However, the potential threat of non-response bias is minimal as recent data suggest that a low response rate does not jeopardize sample representativeness (Schalm & Kelloway, 2001).

#### Conclusion

In summary, safety-specific transformational leadership and general transformational leadership based interventions were empirically examined in this study. The results showed that safety-specific transformational leadership training resulted in the highest manager ratings of safety attitudes, and self efficacy to promote safety. The implications for practice and future research were discussed.

## Study 4

### Impact of Leadership Training on Subordinate Safety Outcomes

Although the literature on transformational leadership has grown rapidly, few studies have examined how transformational leadership predicts employee performance. For example, in a longitudinal study, Howell & Avolio, (1993) found that senior managers' transformational leadership predicted the percentage of financial goals achieved in strategic business units. Recently, Bass Avolio, Jung, and Berson (2003) examined the effects of transformational leadership, unit potency, cohesion, on unit performance. The results showed that transformational leadership ratings of sergeants and platoon leaders positively predicted unit performance. Furthermore, the relationship between platoon leadership and unit performance was partially mediated through by both unit potency and cohesion.

Barling et al. (1996) conducted a field experiment to assess the effects of transformational leadership on subordinates' commitment to the organization and financial performance of the business unit. Their study showed the effectiveness of combining transformational leadership training and personal feedback, such that training branch managers in transformational leadership lead to changes in subordinates' commitment to the organization and financial performance.

Based on the theoretical arguments developed in both Studies 1, 2, and 3 describing the importance of safety-specific as opposed to general transformational leadership, I propose that safety-specific transformational leadership training will yield significantly higher safety outcomes among subordinates than will general transformational leadership training. For example, leaders may display transformational

behaviours in one aspect of work (e.g., achieving high production levels), and passive leadership behaviours in others (e.g., achieving safety goals). Thus, leader training that is focussed primarily on improving safety-specific transformational leadership behaviour will enable leaders to focus directly on improving safety in their work units.

Overall, the literature shows that there is a need to conduct further research that extends our knowledge of the performance outcomes associated with transformational leadership training. The current study aims to extend research in this area by examining the impact transformational leadership training on subordinates' attitudes and perceptions specified in the model described earlier. These variables include subordinates' perceptions of safety climate, safety compliance, safety participation, safety-related events and occupational injuries. The following hypotheses are proposed;

Hypothesis 1: Employee post-test perceptions of their leader's safety-specific transformational leadership, perceived safety climate, safety participation and safety compliance will be significantly higher in the safety-specific condition than ratings in both the general transformational leadership training group and the control group.

Hypothesis 2: Employee post-test perceptions of their leader's passive safety leadership will be significantly lower in the safety-specific transformational condition than ratings in both the general transformational leadership training group and the control group.

Hypothesis 3: Employee post-test perceptions of the frequency of safety-related events and injuries will be significantly lower in the safety-specific condition than

in both the general transformational leadership training group and the control group.

## Method

### Participants

The sample of 1822 health care workers described in Study 2 was used as the pre-test sample in Study 4. This pre-test sample consisted of the direct reports of the managers who participated in the experimental training interventions in Study 3. These health care workers were employed in 21 long term health care organizations. Of the 1822 health care workers who received surveys, 494 participants responded (27.2% response rate). Due to missing data on the pre-test measure, a sample of 491 participants was obtained.

The sample of 491 participants (455 females; 36 males) were an average age of 42.47,  $SD = 10.76$ . The average number of years employed was 9.82,  $SD = 8.67$  and participants worked an average of 35.65 hours per week ( $SD = 7.39$ ). Examples of the types of jobs that participants held include health care staff, and office support staff.

At the post-test, 269 participants completed the survey (approximately 14% response rate). Some of the respondents completed the post-test survey, but did not complete the pre-test survey. Thus, due to matching participant responses at both the pre-test and post-test and listwise deletion, only 114 responses were retained.

The sample of 114 participants (112 females; 2 males) were an average age of 44.07,  $SD = 10.63$ . The average number of years employed was 11.27,  $SD = 8.07$  and participants worked an average of 39.46 hours per week ( $SD = 4.56$ ). The final sample was representative of the sample obtained at the pre-test.

### Procedure

To assess the effects of each training condition on employee attitudes and behaviour, each health care worker completed a pre-test (approximately 1 week before training) and post-test survey (approximately 3 months following the training). At both the pre-test and post-test participants received a survey, and a postage paid envelope. The survey contained items that assessed the participant's perception of their direct manager's safety-specific transformational leadership, and the model variables. Participants were asked to base their answers on their experiences during the past three months when completing the surveys. Due to the longitudinal nature of the study participants were also asked to record a self-generated 6-digit code to allow for matching surveys at T2. Participants were also asked to identify the name and position of their direct manager, as well as their health care organization. Participants returned the completed survey using the postage paid and addressed envelope that was provided.

### Measures

The measures for safety-specific transformational leadership, passive safety leadership, safety climate, safety participation, safety compliance, safety-related events, and injuries are described in Study 2 (See Appendices B-F, M, N). Each measure was used as both the pre-test and post-test. All measures are reliable and the Cronbach's alpha for each scale at both the pre-test and post-test is presented on the diagonal in Table 17.

### Results

Intercorrelations and scale reliabilities for all study variables at both the pre-test and post-test are presented in Table 17. Descriptive statistics for the pre-test and post-test data by group are presented in Table 18.

Multivariate analysis of variance was used to test for group differences on all pre-test variables (safety transformational leadership, passive safety leadership, safety climate, safety participation, safety compliance, safety-related events, and injuries). With the use of Wilks' criterion, a significant overall multivariate effect was obtained for the pre-test data,  $F(2, 488) = 2.65, p < .01$ . A series of univariate tests were conducted to examine the group differences on the measures. The univariate analyses revealed only one significant effect for group on employee ratings of safety participation,  $F(2, 489) = 6.78, p < .01$ .

Table 17.

Intercorrelations, and Reliabilities of the Variables at Pre-test and Post-test

Variable	Pre-test						
	1	2	3	4	5	6	7
1. Safety-specific transformational leadership	(.94)	-.52	.61	.24	.30	-.30	-.27
2. Passive leadership		(.84)	-.51	-.18	-.16	.41	.32
3. Safety climate			(.72)	.28	.25	-.53	-.44
4. Safety compliance				(.87)	.41	-.22	-.12
5. Safety participation					(.71)	.05	.01
6. Safety-related events						(.89)	.73
7. Safety injuries							(.79)
n = 491							
Variable	Post-test						
	1	2	3	4	5	6	7
1. Safety-specific transformational leadership	(.95)	-.47	.68	.34	.30	-.33	-.32
2. Passive leadership		(.82)	-.41	-.30	<b>-.09</b>	.34	.35
3. Safety climate			(.71)	.44	.40	-.44	-.37
4. Safety compliance				(.92)	.51	-.30	-.31
5. Safety participation					(.74)	.13	<b>.02</b>
6. Safety-related events						(.91)	.76
7. Safety injuries							(.82)
n = 114							

Note. Correlations in bold are ns at the  $p = .05$  level. Remaining correlations are significant at the  $p = .01$  level. Cronbach's alpha for each scale is presented on the diagonal in parentheses.

To further explore the differences in the pre-test measure, a series of Roy-

Bargman stepdown analyses were conducted. Each downstream variable in the model was entered, with injuries being entered in the last step in the analysis. The stepdown analysis indicated that there was a significant difference between employee ratings of safety participation,  $F(2, 487) = 7.68, p < .01$ . Ratings were significantly higher among employees with managers assigned to the general transformational leadership group ( $M = 5.68, SD = 1.07$ ), than employees in the safety-specific transformational leadership group ( $M = 5.34, SD = 1.07$ ). A significant difference was also found for employee ratings of safety climate,  $F(2, 488) = 6.65, p < .01$  such that employee ratings of safety climate in the safety-specific leadership group were significantly higher ( $M = 5.16, SD = 0.92$ ) than employee ratings of safety climate in the general transformational leadership group ( $M = 4.97, SD = 0.99$ ).

Table 18.

Descriptive Statistics for the Study Variables at Pre-test and Post-test

Variable	Group 1		Group 2		Control		
	M	SD	M	SD	M	SD	
<b>Pre-test</b>							
1. Safety-specific transformational leadership	4.55	1.50	4.73	1.38	4.37	1.47	
2. Passive leadership	2.28	1.33	2.36	1.48	2.55	1.48	
3. Safety climate	5.16	0.92	4.97	0.99	5.03	0.88	
4. Safety compliance	6.07	0.83	6.13	0.77	6.09	0.70	
5. Safety participation	5.34	1.07	5.68	1.07	5.57	0.85	
6. Safety-related events	1.91	0.67	2.10	0.93	1.98	0.72	
7. Safety injuries	1.79	0.66	1.90	0.73	1.79	0.62	
	n	182		186		123	
<b>Post-test</b>							
		Group 1		Group 2		Control	
1. Safety-specific transformational leadership	5.18	1.35	4.97	1.25	4.48	1.60	
2. Passive leadership	1.86	1.05	1.86	1.30	2.15	1.03	
3. Safety climate	5.40	0.76	5.26	0.70	4.89	0.66	
4. Safety compliance	6.28	0.66	6.30	0.59	6.03	0.79	
5. Safety participation	5.74	1.12	5.51	0.85	5.34	1.11	
6. Safety-related events	1.38	0.48	1.50	0.57	1.80	0.68	
7. Safety injuries	1.25	0.41	1.52	0.62	1.52	0.48	
	n	47		40		27	

Note. Group 1 = safety-specific group; Group 2 = general group.

The effects of each training condition (general transformational leadership vs safety-specific transformational leadership vs control) on the safety outcome variables (safety transformational leadership, passive safety leadership, safety climate, safety participation, safety compliance, safety-related events, and injuries) were assessed using multivariate analysis of covariance. The employees' post-test ratings of safety transformational leadership, passive safety leadership, safety climate, safety participation, safety compliance, safety-related events and injuries were entered as the dependent variables, and group membership (type of training manager received in study 3) was entered as the independent variable. The pre-test measures of safety climate and safety participation were entered as the covariates in the analysis to control for the differences between groups on these variables.

With the use of Wilks' criterion, the combined DV's were significantly affected by training,  $F(14, 208) = 2.18, p < .01$ . The effect of training on each of the dependent variables was assessed using a series of univariate analysis of variances. Significant univariate effects on the post-test measures were obtained for safety-specific transformational leadership,  $F(2, 110) = 5.07, p < .01$ , partial  $\eta^2 = .084$ ; safety climate,  $F(2, 110) = 8.51, p < .01$ , partial  $\eta^2 = .134$ ; safety participation,  $F(2, 110) = 3.55, p < .01$ , partial  $\eta^2 = .070$ ; safety-related events,  $F(2, 110) = 6.71, p < .01$ , partial  $\eta^2 = .109$ ; and safety injuries,  $F(2, 110) = 4.84, p < .01$ , partial  $\eta^2 = .081$ . No significant effects were obtained for passive safety leadership,  $F(2, 110) = 1.61, p > .05$ , partial  $\eta^2 = .029$ , or safety compliance  $F(2, 110) = 2.51, p > .05$ , partial  $\eta^2 = .044$ .

A series of post hoc analyses showed that ratings of safety-specific transformational leadership were significantly higher in the safety-specific

transformational leadership group ( $M = 5.18, SD = 1.35$ ) than in the general transformational leadership group ( $M = 4.97, SD = 1.25$ ). Safety-specific transformational leadership ratings for both the safety-specific transformational leadership training group and the general transformational leadership group were higher than ratings in the control group ( $M = 4.48, SD = 1.60$ ). Employee ratings of safety climate in the safety-specific transformational leadership group ( $M = 5.40, SD = 0.76$ ) were also significantly higher than the control group ( $M = 4.89, SD = 0.66$ ). However, employee ratings of safety climate in the safety-specific transformational leadership group ( $M = 5.40, SD = 0.76$ ) were not significantly higher than those of general transformational leadership training group ( $M = 5.26, SD = 0.70$ ). Furthermore, employee ratings of safety-related events were significantly lower in the safety-specific transformational leadership condition ( $M = 1.38, SD = 0.48$ ) than in the control condition ( $M = 1.80, SD = 0.68$ ). Ratings in the safety-specific transformational leadership condition ( $M = 1.38, SD = 0.48$ ) were also lower than general transformational leadership training condition ( $M = 1.50, SD = 0.57$ ), however, this difference was not significant at the .05 level. Finally, ratings of injuries for the safety-specific transformational leadership group ( $M = 1.25, SD = 0.41$ ) were also significantly lower than ratings in the control group ( $M = 1.52, SD = 0.48$ ) and the general transformational leadership training condition ( $M = 1.52, SD = 0.62$ ).

To account for the correlations among the dependent variables, Roy-Bargman stepdown analysis was conducted to further explore post-test group differences. The effect of leadership training was only retained for the safety-specific transformational leadership and safety climate outcomes. There was a significant effect of training on

employee perceptions of safety-specific transformational leadership,  $F(2,110) = 5.07$ ,  $p < .01$ . Employee ratings of safety-specific transformational leadership were significantly higher in the safety-specific transformational leadership training group, ( $M = 5.18$ ,  $SD = 1.35$ ), than employee ratings of safety-specific transformational leadership in the control group ( $M = 4.48$ ,  $SD = 1.60$ ). Employee ratings of safety-specific transformational leadership were also higher in the safety transformational leadership group than ratings obtained in the general transformational leadership group ( $M = 4.97$ ,  $SD = 1.25$ ). Secondly, there was a significant effect of leadership training on safety climate,  $F(2, 108) = 3.55$ ,  $p < .05$ ). Employee ratings of safety climate were significantly higher in the safety specific transformational leadership condition ( $M = 5.40$ ,  $SD = 0.76$ ), than ratings of safety climate in both the control group ( $M = 4.89$ ,  $SD = 0.66$ ) and the general transformational leadership training condition ( $M = 5.26$ ,  $SD = 0.70$ ).

### Discussion

This study was designed to assess transformational leadership based interventions emphasizing safety-specific transformational leadership and general transformational leadership behaviours specifically on subordinate perceptions. The effects of three experimental training conditions (safety-specific transformational leadership training, general transformational leadership training and no transformational leadership training) on employee perceptions of their manager's safety-specific transformational leadership, safety passive leadership, safety climate, safety participation, safety compliance, safety-related events and injuries were examined. The objective of each training condition was to improve leaders' transformational leadership behaviour through the goal setting technique (Locke & Latham, 1984).

The results of the study suggest that subordinate perceptions of their manager's safety-specific transformational leadership behaviour changed as a result of the safety-specific transformational leadership training that managers received. Hypothesis 1 was partially supported. Employee ratings of leader safety-specific transformational leadership and perceptions of safety climate were significantly higher in the safety-specific transformational leadership group, than ratings in both the general transformational leadership training group and the control group. Furthermore, Hypothesis 3 was also partially supported since employee perceptions of safety-related events and injuries were significantly lower for individuals who were under the direct supervision of managers who participated in the safety-specific transformational leadership training than the other groups. However, once the relationships between the dependent variables were accounted for in the analysis, employee ratings of their manager's safety-specific transformational leadership behaviour and perceptions of safety climate were the only significant effects retained following the training intervention.

The design of this study allowed for an evaluation of the change in leader behaviour (level III), and organizational results (Level IV) as outlined in Kirkpatrick's (1976) training outcome model. As discussed above, employee perceptions of their manager's safety-specific transformational leadership behaviour changed following the safety-specific transformational leadership training intervention (level III). Furthermore, changes in employee perceptions of safety-related events and injuries assessed whether the training resulted in improvements in the organizations "bottom-line" (Haccoun, 1998; Kirkpatrick, 1987). Although the effect of safety-specific transformational leadership training on employee perceptions of safety-related events and injuries was not retained

following the Roy Bargman step down analysis, the mean ratings for each of these safety outcomes in the safety-specific condition were lower than the mean ratings in the other training conditions. Furthermore, the post-training ratings for safety-related events and injuries were significantly lower than the pre-training ratings, thus providing further evidence that the training intervention yields positive “bottom line” results for the organization.

The causality inferences drawn from these results were possible due to the nature of the research design. Random assignment of work units to the training conditions qualified this study as a field experiment from which causality statements are possible (Cook & Campbell, 1979). Manipulation of the training variable (safety-specific, general, control), randomization, and statistically controlling for extraneous variables (e.g., organization, manager, age, hours worked, etc) increased the amount of control exercised, thereby reducing potential threats to the validity of the findings. Furthermore, a measure of subordinates’ perceptions of leader safety-specific transformational leadership was obtained making it was possible to conclude that leaders transferred the transformational leadership behaviours to the workplace. Subordinate reports of safety-specific transformational leadership were highest for those who were supervised by leaders in the safety-specific condition. Overall, evidence for the training effects on the subordinate safety outcomes has been provided and alternative explanations for the findings are ruled out.

### Implications for Future Research

There are several interesting issues stemming from this research that require future investigation. One issue that needs to be examined is the identification of the optimal time-lapse required in order for safety-specific leadership to have an impact on the safety outcomes, as this is not completely clear from the results of this study. The training content in both conditions focussed on improving transformational leadership (Bass, 1985). Thus, managers concentrated on transferring transformational leadership behaviours to their work environment, explaining the change in employee ratings for this variable following the intervention. Previous research shows that safety-specific transformational leadership directly predicts employee perceptions of safety climate (Barling et al., 1996; Kelloway et al., in press), which in turn predicts lower levels of safety related events and injuries. However, there is no research indicating the length of time necessary for safety-specific leadership to have an impact on these safety outcomes. The current study did not find a significant effect of safety-specific leadership on several of the safety outcome variables over a three month period. However, it is noteworthy that employee ratings in the safety-specific condition were highest for perceptions safety climate, safety participation, safety compliance, and lowest for safety-related events, and injuries. Therefore, it is possible that a longer period of time must elapse in order to achieve the full range of positive effects of safety transformational leadership based interventions. Future research should be aimed at assessing the effects of transformational leadership training on safety outcomes at various time intervals.

Secondly, the current study assessed the impact of safety-specific and general transformational leadership on individual safety attitudes and behaviour. Future research

should incorporate organizational level safety outcome measures to further assess the effectiveness of the transformational leadership based training interventions. Barling et al. (1996), for example, found that general transformational leadership training leads to improved financial outcomes for the organization. Thus, researchers may also consider examining alternative financial outcomes such as reduced workers compensation costs, or the costs associated with time away from work as a result of a work-related injury, and organizational reports of injuries and lost time perhaps to corroborate employee perceptions.

#### Implications for Practice

There are several important practical implications resulting from the current study. Similar to other studies of transformational leadership training (e.g., Barling et al., 1996; Kelloway et al., 2000) the findings suggest that leaders were able to learn how to become safety-specific transformational leaders and successfully transfer the learned behaviour to their work environment. Safety-specific transformational leadership is identified in this study as one of the possible variables that are associated with increased safety participation among individuals, in addition to increased safety compliance and perceptions of safety climate. Given that the training consisted of a half day workshop, this is a relatively low cost safety management intervention that yields positive results in terms of safety outcomes. Consistent with previous research on transformational leadership training interventions (Barling et al., 1996; Kelloway et al., 2000) the leaders participating in the safety-specific training displayed transformational leadership behaviours, as reported by their subordinates. Furthermore, a safety-specific transformational leadership style resulted in enhanced perceptions of subordinate safety

attitudes and behaviour. Thus, training a small portion of organizational members (e.g., managers) have a significant impact on a large number of individuals within the organization (e.g., subordinates). This suggests that the safety-specific approach to training leaders is a very cost effective and efficient way to move forward in safety management within organizations.

The results of this intervention research provide safety experts with some insight into “how” safety-specific transformational leadership operates to enhance safety within organizations. Safety-specific transformational leadership has an indirect effect on subordinate occupational injuries. The relationship between safety-specific transformational leadership and occupational injuries is mediated by variables including safety climate, safety compliance and safety-related events. Thus, similar to previous transformational leadership intervention studies that examined the indirect effects of transformational leadership training on employee attitudes and performance (e.g., Barling et al., 1996; Kelloway et al., 2000), the current research provides some empirical evidence for how the effects of safety-specific transformational leadership are manifested through various safety attitudinal variables.

### Limitations

Similar to the limitation discussed in Study 3, non response bias is also a potential threat to the validity of the results of Study 4. Again, it is possible that the perceptions of the employees who responded to the survey may not be representative of the perceptions held by non-respondents. However, as discussed earlier, the potential threat of non-response bias is minimal as recent data suggest that a low response rate does not jeopardize sample representativeness (Schalm & Kelloway, 2001). Therefore, although

the response rate was low there is evidence supporting the representativeness of the finding to the health care workers who did not participate in the study.

### Conclusion

In sum, similar to previous studies of transformational leadership based interventions (e.g., Barling et al., 1996; Kelloway et al., 2000), the findings of this study provide further empirical support for the positive impact of transformational leadership on subordinate's perceptions and behaviours. This study extends beyond previous safety-specific transactional leadership based interventions (Zohar, 2002), by examining the impact of safety-specific and general transformational leadership based interventions. This research has important implications for both safety researchers and safety experts interested in transformational leadership based interventions.

### General Discussion

As a complete set, my research makes several important contributions to the existing knowledge base. In Study 1, I empirically evaluate a model of safety-specific transformational leadership and passive safety leadership based on a sample of young workers. Consistent with previous findings reported in the safety literature (e.g., Kelloway et al., in press) passive safety leadership and safety-specific transformational leadership are empirically distinct and negatively correlated constructs. Passive safety leadership also makes a unique contribution to the prediction of safety climate, over and above that of safety-specific transformational leadership. These findings call for a shift in the way we examine safety in the future and suggests that research must no longer ignore the potential negative outcomes associated with passive safety leadership.

The fully mediated safety-specific transformational leadership and passive safety leadership model examined in Study 1 provided the best fit to the data. All of the hypothesized model path parameters were significant. Safety-specific transformational leadership predicted perceptions of safety climate, safety compliance and safety participation, providing further empirical support for the role that leadership plays in creating positive safety climates within organizations (Barling et al., 2002; Hofmann & Morgeson, 1999; Zohar, 1980). Consistent with previous research findings on the relationship between safety climate and injuries (e.g., Barling et al., 2002; Zohar, 2000; 2002), safety climate negatively predicted safety-related events, which in turn predicted injuries. Empirical support was also provided for the model paths between passive safety leadership, safety climate, and safety outcomes. This builds on the safety literature (e.g., Neal & Griffin, 1997; 2002) by illustrating how safety climate mediates the relationship between passive safety leadership, safety compliance and safety participation. Finally, empirical support was provided for the hypothesized model paths between safety-specific transformational leadership, safety participation and safety compliance. The findings suggest that safety-specific transformational leadership is associated with higher levels of employee compliance with safety rules and regulations, in addition to higher levels of safety initiative and participation in safety activities. The implications of these findings are discussed below.

The generalizability of the model was established in Study 2. The theoretical propositions of the fully mediated model were validated in a sample of long-term health care employees. The consistency of findings across samples suggests the stability of the relationships under investigation. Furthermore, safety-specific transformational

leadership and general transformational leadership are highly correlated, yet empirically distinct constructs. Taken together, Studies 1 and 2 contribute to our understanding of the processes through which both active and passive safety leadership affects safety outcomes within organizations.

Studies 3 and 4 build on the established model by assessing an intervention aimed at enhancing safety-specific transformational leadership. The intervention was assessed using a field experiment in which leaders within 21 health care organizations were randomly assigned to general transformational leadership training, safety-specific transformational leadership training or a wait-list control group. In Study 3, positive effects of the training on leaders' self-reported attitudes toward safety, and self-efficacy were found. In Study 4, positive effects of training on subordinates' perceptions of leader safety transformational leadership were also found. Together, my studies assessed the effectiveness of a leadership intervention using a design from which causal inferences are possible. Such assessments are rare in the general leadership literature (for exceptions see Barling et al., 1996; Kelloway et al., 2000) and, thus far, non-existent in the realm of safety leadership. Thus, my research constitutes the first known assessment of a transformational leadership based intervention on safety outcomes. My research goes beyond the assessment of whether or not training works to provide information on the process through which training works.

#### Implications for Future Research

There are several issues stemming from this research that warrant further investigation. In the current research the incremental effects of safety-specific transformational leadership over general transformational leadership were examined. In

future research it would be useful to determine whether safety-specific transformational leadership augments transactional leadership approaches within the health care industry. Both transactional and transformational leader behaviours are necessary within the health care work environment. Due to high standards for patient safety, leaders must ensure that subordinates follow safety protocol by monitoring and rewarding safe behaviour (transactional leadership). Zohar (2002) found support for safety-specific transactional leadership based interventions, in which subordinate safety behaviour improved as a result of being monitored and rewarded by supervisors. However, Bass and Avolio (1990) suggested that transactional leaders gain compliance from subordinates and produce only the required performance levels. Transformational leadership builds on transactional leadership and enhances performance beyond the minimum expectations, known as the augmentation effect (Bass & Avolio, 1990). In order to achieve high levels of safety performance and participation, one can argue that a safety-specific transformational leadership approach would achieve effects beyond those of transactional leadership. However, the augmentation effect of safety-specific transformational leadership on safety outcomes remains to be examined.

The findings of the four studies highlight the effects that both safety-specific transformational leadership and passive safety leadership have on safety outcomes. Leaders may display both transformational and passive types of leadership, particularly with respect to production versus safety. Leaders may display transformational behaviours in one aspect of work (e.g., achieving high production levels), and passive leader behaviours in other competing organizational areas (e.g., safety). In contrast, it is possible that leaders may actively focus on safety, at the cost of production (passive

leadership). In either case, the organizational goals are unbalanced as one area improves as the other declines. Quinn (1988) suggests that effective leaders need to balance competing organizational goals. Quinn (1988) proposed a competing values framework which includes four models of organizational values, namely, the human relation model, rational goal model, open systems model, and the internal process model. Each model has a set of assumptions and leadership style that is appropriate for achieving competing organizational goals. For example, the primary value in the rational goal model is productivity and the leader's role is to set and clarify subordinate goals. In contrast, the primary value in the human relations model is human resources and the well being of subordinates. The leader adopts a participatory and supportive style. Prioritizing one model over the other leads to an either/or leadership approach and Quinn (1988) argues that leaders need to balance competing organizational demands in order to be effective. Thus, future research should extend the safety leadership literature by incorporating measures of productivity to determine whether a balance between safety and production can be achieved through the use of a safety-specific transformational leadership approach.

Future research may also assess whether the effects of the safety-specific transformational leadership training generalize to other health care contexts, such as acute health care. Long-term health care and acute health care differ with respect to the variety and extent of health conditions that patient experience, thus, it is important to determine whether safety-specific transformational leadership applies across organizational settings.

Future research should also be conducted to examine the predictors of safety participation. The results of these studies suggest that safety-specific transformational

leadership and safety-related events are both predictors of safety participation; however, the effect is contradictory in the sense that safety-specific transformational leadership is associated with higher safety participation and lower safety-related events. Safety-related events are also associated with higher safety participation. Therefore, future research should examine the impact of safety-specific transformational leadership on safety participation and whether this type of leader behaviour may compensate for lower levels of safety-related events and injuries. Future research must also be aimed at examining alternative predictors of safety participation in order to determine how safety participation can be increased and maintained in a proactive manner, such that participation in safety remains high as safety-related events and injuries decline.

The significant effect for employee ratings of manager safety-specific transformational behaviour provided evidence for the value of the safety leadership training. The results show that managers significantly improved their safety leadership behaviour within a short time period. However, future research should be conducted to determine the effects of the training over longer periods of time. Perhaps significant effects for the other safety outcome variables would be retained as well.

Finally, the findings of this research make a valuable contribution by providing empirical evidence that the safety-specific transformational leadership behaviours of women are both directly and indirectly related to positive organizational safety outcomes within health care organizations. However, future research is needed to assess whether these findings apply in other settings (traditionally male dominated occupations). For example, women leaders may be rated less favourably than male leaders because the leader behaviour is considered to be less desirable in women than men (Eagly & Karau,

2002). However, given the small number of men who participated in the current study, the comparison of men and women could not be assessed. Since there are fewer women occupying managerial positions in general (Eagly et al., 2003), comparing the outcomes of safety-specific transformational leadership exhibited by women and men in a variety of organizations remains a challenge for future researchers. Future research must examine the theoretical model that was validated in Study 2 using a sample that is representative of both women and men to determine whether the same results can be achieved.

Similarly, the effects of the safety-specific transformational leadership training on manager and subordinate outcomes must also be examined in a sample that is more representative of both sexes.

In sum, this research makes a significant contribution to the growing body of evidence supporting the role of safety-specific transformational leadership, as opposed to general transformational leadership, in enhancing workplace safety attitudes and behaviour. The findings provide a basis for future research on the effects of safety-specific transformational leadership based training interventions on leader and subordinate safety in the workplace.

#### Implications for Practice

The findings of this research have several meaningful and practical implications for safety management within organizations. The studies demonstrate the effectiveness of a safety-specific transformational leadership based intervention aimed at developing “safety initiative” among subordinates. Typical approaches to safety management that are designed to increase compliance through rewards, incentives or feedback (e.g., Zohar, 2002) resulted in improved working and safety conditions, however, occupational injuries

continue to prevail in organizations (National Safety Council, 2003). Although it is recognized that compliance and contingent reward approaches are important components of safety management (Komaki, 1998), the shift toward developing safety initiative among employees as a means for improving workplace safety is promising.

Leaders are not always able to continuously monitor subordinate safety behaviour (Mullen, 2004), which is a necessary element of the transactional contingent reward model (e.g., reward contingent on safe behaviour). Safety-specific transformational leadership approaches provide an alternative to the reward-based safety model, such that continuous monitoring of employee safety behaviour and the provision of rewards is not necessary for bringing about positive safety outcomes. Rather than relying only on a transactional contingent reward approach to ensure safety compliance, positive safety outcomes are enhanced through safety-specific transformational leadership behaviours, such that leaders become role models by focussing on safety and promoting the importance of safe work practices. Leaders inspire and motivate individuals to voluntarily perform beyond minimum safety requirements and to work safely at all times. Safety-specific transformational leaders challenge individuals to develop innovative ways for approaching and solving safety related issues to improve the overall safety of their coworkers and the work environment. Finally, safety leaders also show concern for the health and safety of individuals.

Evidence suggests that safety training is one of the most effective strategies for improving workplace safety (Colligen & Cohen, 2003). Safety-specific transformational leadership training appears to be a very low cost intervention that has positive effects on a variety of safety outcomes. In the grand scheme of things this makes for a very

attractive proposition for organizations. Although the reported effect sizes were small, the potential implications of the findings must not be underestimated. The human suffering and financial costs that are associated with an accident or injury can be extremely high. Thus, even a small effect can translate into significantly lower costs for the individual and organization if an injury is prevented as a result of the safety-specific leadership intervention.

The findings of this research also provide further empirical evidence for Bass et al.'s (2003) observation of the usefulness of the transformational leadership approach in unstable, and challenging organizational settings. Health care leaders manage teams in emergency situations under time pressures (Flin & Yule, 2004). Bass (1985) suggested that transformational leadership motivates individuals to persevere when conditions are stressful and challenging. Thus, when confronted with time pressures and role overload within the healthcare system, safety-specific transformational leadership will help to motivate individuals to maintain safe work practices. The current research showed that leaders, who maintained high safety standards when faced with such adverse challenges, enhanced subordinate safety attitudes. Moreover, leaders who adopt a passive approach to safety leadership foster negative perceptions of safety climate among health care employees. Thus, it is important that safety experts and organizational leaders recognize the direct implications of their safety leadership on employees' safety behaviour and performance.

## Final Summary and Conclusion

The four studies make several unique contributions to the existing safety and transformational leadership literature. Taken together, studies one and two contribute to our understanding of the processes through which safety leadership affects safety outcomes within organizations. In addition to providing insight into how safety-specific transformational leadership affects employee outcomes, the studies also contribute to our understanding of how passive safety leadership impacts employee safety attitudes and behaviour. Studies 3 and 4 are the first reported assessments of transformational leadership based interventions within the context of occupational health and safety. Previous leadership based intervention studies focused primarily on subordinate perceptions of leadership and subordinate attitudes (e.g., Barling et al., 1996; Kelloway et al., 2000). The current research examined the impact of transformational leadership training on both manager and subordinate attitudes. In sum, the studies provide a theoretical framework for future researchers with respect to safety-specific transformational leadership and passive safety leadership.

The findings also have important implications for safety practitioners, suggesting a shift in the way safety is managed and the call for increased safety initiative. Furthermore, the combined results of the four studies provide empirical support for the increased need for leaders to become champions of safety (Kelloway et al., 2005), rather than taking a passive, uninvolved approach. Overall, these findings suggest that organizational leaders, safety practitioners, and researchers must recognize the importance of taking an active, and involved approach to safety in the workplace.

## References

- Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In J.Kuhl & J. Beckmann (Eds.), *Action-control: From cognition to behaviour*: 11 – 39. Heidelberg: Springer.
- Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes*, 50, 179 – 211.
- Alliger, G.M., Tannenbaum, S., Bennet, W., Traver, H. & Shotland, A. (1997). A meta-analysis of the relations among training criteria. *Personnel Psychology*, 50, 341 – 358.
- Anderson, S.E., & Williams, L.J. (1992). Assumptions about unmeasured variables with studies of reciprocal relationships: The case of employee attitudes. *Journal of Applied Psychology*, 77, 638 - 650.
- Avolio, B. J. (1999). *Full leadership development: Building the vital forces in organizations*. Thousand Oaks, CA: Sage.
- Avolio, B.J., Zhu, W., Koh, W., & Bhatia, P. (2004). Transformational leadership and organizational commitment: mediating role of psychological empowerment and moderating role of structural distance. *Journal of Organizational Behaviour*, 25(8), 951-959.
- Bandura, A.J. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Barling, A.J., Weber, T., & Kelloway, E.K. (1996). Effects of transformational leadership training on attitudinal and financial outcomes: A field experiment. *Journal of Applied Psychology*, 81, 827 – 832.
- Barling, J., Loughlin, C., & Kelloway, E. (2002) Development and test of a model

- linking safety-specific transformational leadership and occupational safety. *Journal of Applied Psychology*, 87, 488 – 496.
- Bass, B.M. (1985). *Leadership and Performance beyond expectations*. New York: Free Press.
- Bass, B.M. (1988). The inspirational process of leadership. *Journal of Management Development*, 7, 21-31.
- Bass, B.M. (1990). From transactional to transformational leadership: learning to share the vision. *Organizational Dynamics*, 18 (3), 19 – 36.
- Bass, B.M., & Avolio, B.J. (1990). *Transformational leadership development: Manual for the Multifactor Leadership Questionnaire*. Palo Alto, CA: Consulting Psychologist Press.
- Bass, B. M. & Avolio, B. J. (1993). Transformational leadership: A response to critiques.(In M. M.Chemers & R. Ayman (Eds.), *Leadership theory and research: Perspectives and directions* (pp. 49—80). San Diego: Academic Press.
- Bass, B.M., & Avolio, B.J. (1994). *Improving organizational effectiveness through transformational leadership*. Thousand Oaks, CA: Sage.
- Bass, B.M., Avolio, B.J., Jung, D., & Berson, Y. (2003). Predicting Unit Performance by Assessing Transformational and Transactional Leadership. *Journal of Applied Psychology*, 88 (2), 207 – 218.
- Belcourt, M., Bohlander, G., & Snell, S. (2005). *Managing Human Resources: 4<sup>th</sup> Canadian Edition*. Toronto: Nelson.

- Bjorkman, M. (1984). Decision making, risk taking and psychological time: Review of empirical findings and psychological theory. *Scandinavian Journal of Psychology*, 25, 31 – 49.
- Blau, P. (1964). *Exchange and power in social life*. New York: Wiley.
- Boldero, J. (1995). The prediction of household recycling of newspapers: The role of attitudes, intentions, and situational factors. *Journal of Applied Social Psychology*, 25, 440 – 462.
- Borman, W. C., & Motowidlo, S. J. (1993). Expanding the criterion domain to include elements of contextual performance. In: Schmitt, N., Borman, W.C., and Associates, *Personnel Selection in Organizations, 71-98*, Jossey-Bass, San Francisco.
- Butler, M.C., & Jones, A.P. (1979). Perceived leader behaviour, individual characteristics, and injury occurrence in hazardous work environments. *Journal of Applied Psychology*, 64, 299 – 304.
- Burns, J.M. (1978). *Leadership*. New York: Harper & Row.
- Bycio, P., Hackett, R.D., & Allen, S.J. (1995). Further assessment of Bass's (1985) conceptualization of transactional and transformational leadership. *Journal of Applied Psychology*, 80, 468 – 478.
- Bryk, A. S., and Raudenbush, S. W. (1992). *Hierarchical linear models: Applications and data analysis methods*. Newbury Park: Sage.
- Carless, S.A., Wearing, A.J., & Mann, L. (2000). A short measure of transformational leadership. *Journal of Business and Psychology*, 14 (3), 389 – 402.
- Caska, B.A. (1998). The search for employment: Motivation to engage in coping

- behaviour. *Journal of Applied Social Psychology*, 28, 206 – 224.
- Castillo, D.N. (1999). Occupational safety and health in young people. In J. Barling and E. Kevin Kelloway (Eds.) *Young workers: Varieties of experience* (pp. 159-200). Washington, DC: American Psychological Association.
- Chen, G., Gully, S., & Eden, D. (2001). *Organizational Research Methods*. Thousand Oaks. Vol. 4 (1), 62 – 84.
- Chhokar, J.S., Wallin, J.A. (1984). Improving Safety through Applied Safety Behaviour Analysis. *American Society of Safety Ergonomics Journal*, 3, 281 – 292.
- Colligan, M.J. & Cohen, A. (2003). The role of training in promoting workplace safety and health. In J.Barling & M. R. Frone (Eds.). *The Psychology of Workplace Safety*. Washington, DC: APA Books.
- Colquitt, J.A., LePine, J.A., & Noe, R.A. (2000). Toward an integrative theory of training motivation: A meta-analytic path analysis of 20 years of research. *Journal of Applied Psychology*, 85 (5), 678 – 707.
- Connellan, T.K. (1978). *How to improve human performance*. New York: Harper & Row.
- Cook, T.D., & Campbell, D.T. (1979). *Quasi-experimentation: Design & analysis issues for field settings*. Chicago: Rand McNally.
- Cook, T.D., & Campbell, D.T. (1979). *Quasi-experimentation: Design & analysis issues for filed settings*. Chicago: Rand McNally.
- Corcoran, S. (2002). Why some workers boil over wearing cooling garments. *Occupational Health & Safety*, Waco.
- Cox, S., & Cox, T. (1991). Structure of employee attitudes to safety. A European example. *Work and Stress*, 5(2), 93 – 106.

- Cree, T., & Kelloway, E.K. (1997). Responses to occupational hazards: Exit and participation. *Journal of Occupational Health Psychology, 2*, 304 – 311.
- Dedobbeleer, N., & BeLand, F. (1991). A safety climate measure for construction sites. *Journal of Safety Research, 22*, 97 – 103.
- DeGroot, T., Kiker, D. S., & Cross, T. C. (2000). A meta-analysis to review organizational outcomes related to charismatic leadership. *Canadian Journal of Administrative Sciences, 17*, 356-371.
- Dejoy, D.M. (1985). Attributional processes and hazard control management in industry. *Journal of Safety Research, 16*, 61 – 71.
- Den Hartog, D.N., Van Muijen, J.J., & Koopman, P. (1997). Transactional versus transformational leadership: An analysis of the MLQ. *Journal of Occupational & Organizational Psychology, 70*, 19 – 34.
- Department of Justice, Canada, (2004). *Bill C-45, Amendments to the criminal code affecting criminal liability of organizations*. <http://canada.justice.gc.ca/en/dept/pub/c45>.
- Donaldson, L. (2001). Safe high quality health care: Investing in tomorrow's leaders. *Quality Safety Health Care, 10*(2), 8-12.
- Dunbar, R.L.M. (1975). Managers' influence on subordinates' thinking about safety. *Academy of Management Journal, 18*, 364 – 369.
- Dvir, T., Eden, D., Avolio, B.J., & Shamir, B. (2002). Impact of transformational leadership on follower development and performance: A field experiment. *Academy of Management Journal, 45*, 735 – 744.
- Eagly, A.H., Johannesen-Schmidt, M.C., & van Engen, M.L. (2003). Transformational,

- transactional, and laissez-faire leadership styles: A meta-analysis comparing women and men. *Psychological Bulletin*, 129(4), 569 – 591.
- Eagly, A.H., & Karau, J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review*, 109, 573 – 598.
- Edmonson, A.C. (1996). Learning from mistakes is easier said than done: Group and organizational influences on the detection and correction of human error. *Journal of Applied Behavioural Science*, 32, 5 – 28.
- Edwards, A.L. (1957). *The social desirability variable in personality assessment*. New York: Dryden.
- Eisenberg, W.M., & McDonald, H. (1988). Evaluating workplace injury and illness records: Testing a procedure. *Monthly Labor Review*, 111(4), 58 – 60.
- Firth-Cozens, J., & Mowbray, D. (2001). Leadership and the quality of care. *Quality Safety Healthcare*, 10 (3), 3 – 7.
- Flannery, B., & May, D.R. (2000). Environmental ethical decision making in the US metal fishing industry, *Academy of Management Journal*, 43 (4), 642 – 663.
- Flin, R., & Yule, S. (2004). Leadership for safety: industrial experience. *Quality Safety Health Care*, 13(2), 45 – 51.
- Frayne, C.A., & Latham, G.P. (1987). Application of social learning theory to employee self-management of attendance. *Journal of Applied Psychology*, 72, 387-392.
- Fuller, J.B., Patterson, C.E., Hester, K., & Stringer, D.Y. (1996). A quantitative review of research on charismatic leadership. *Psychological Reports*, 78, 271 – 287.
- Garavan, T.N., & O'Brien, F. (2001). An investigation into the relationship between

- safety climate and safety behaviours in Irish organizations. *Irish Journal of Management*, 22 (1), 141 – 170.
- Globe & Mail. (2002). *Job Hazards Kill Two Million a Year*. May 29, PC1.
- Gist, M.E. (1989). The influence of training method on self-efficacy and idea generation among managers. *Personnel Psychology*, 42, 787-805.
- Gist, M.E., & Mitchell, T.R. (1992). Self-efficacy: A theoretical analysis of its determinants and malleability. *Academy of Management Review*, 17, 183 – 211.
- Gist, M.E., Stevens, C.K., & Bavetta, A.G. (1991). Effects of self-efficacy and post training intervention on the acquisition and maintenance of complex interpersonal skills. *Personnel Psychology*, 44, 837 – 861.
- Glenn, W. (2003). Study says 4 in 10 injuries go unreported. *OHS Canada*, 19(2), 22.
- Goldberg, A. I., Dar-el, E. M., & Rubin, A. E. (1991). Threat perceptions and the readiness to participate in safety programs. *Journal of Organizational Behaviour*, 12, 109-122
- Griffin, M.A. & 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, 347 - 358.
- Haccoun, R.R., & Saks, M. (1998). Training in the 21<sup>st</sup> century: Some lessons from the last one. *Canadian Psychology*, 39 (2), 33 – 47.
- Hansen, L. (2004). How will they know? *Occupational Hazards*, 66(10), 39 – 43.
- Harland, L., Harrison, W., Jones, J., & Reiter-Palmon, R. (2005). Leadership Behaviours and Subordinate Resilience, *Journal of Leadership & Organizational Studies*, 11(2), 2 – 15.

- Harvey, J., Bolam, D., Gregory, D., & Erdos, G. (2001). The effectiveness of training to change safety culture and attitudes within a highly regulated environment. *Personnel Review, 30*(5), 615 – 639.
- Hater, J. J., & Bass, B. M. (1988). Superiors' evaluations and subordinates' perceptions of transformational and transactional leadership. *Journal of Applied Psychology, 73*, 695-702.
- Hayes, B.E., Peranda, J., Smecko, T. & Trask, J. (1998). Measuring perceptions of workplace safety: Development and validation of the workplace safety scale. *Journal of Safety Research, 29* (3), 145 – 161.
- Hofmann, D.A., Jacobs, R., & Landy, F.L. (1995). High reliability process industries: Individual, micro, and macro organizational influences on safety performance. *Journal of Safety Research, 26*, 131 – 149.
- Hofmann, D.A., & Morgeson, F.P. (1999). Safety-related behaviour as a social exchange: The role of perceived organizational support and leader-member-exchange. *Journal of Applied Psychology, 84*,(2), 286 – 296.
- Hofmann, D.A., Morgeson, F.P., & Gerras, S. (2003). Climate as a moderator of the relationship between leader-member exchange and content specific citizenship. *Journal of Applied Psychology, 88*, 170 – 178.
- Hofmann, D.A., & Stetzer, A. (1996). A cross-level investigation of factors influencing unsafe behaviours and accidents. *Personnel Psychology, 49* (2). 307 – 330.
- Howell, J.M., & Avolio, B.J. (2003). Transformational leadership, transactional

- leadership, locus of control, support for innovation: Key predictors of consolidated-business-unit performance. *Journal of Applied Psychology*, 78(6), 891 – 902.
- Howell, J.M., & Frost, P.J. (1989). A laboratory study of charismatic leadership. *Organizational Behaviour and Human Decision Processes*, 43, 243 – 269.
- Howell, J.M., & Hall-Merenda, K.E. (1999). The ties that bind. The impact of LMX, transformational and transactional leadership, and distance on predicting follower performance. *Journal of Applied Psychology*, 84(5), 680 – 694.
- Hoyos, C.G. (1995). Occupational safety: Progress in understanding the basic aspects of safe and unsafe behaviour. *Applied Psychology: An International Review*, 44 (3), 235 – 250.
- Jones, A.P., & James. (1979). Psychological Climate: Dimensions and relationships of individual and aggregated work environment perceptions. *Organizational Behaviour and Human Performance*, 23, 201 – 250.
- Joreskog, K.G., & Sorbom, D. (1993). *LISREL 8 User's Reference Guide*. Mooresville, IN: Scientific Software.
- Judge, T.A., & Bono, J.E. (2000). Five factor model of personality and transformational leadership. *Journal of Applied Psychology*, 85 (5), 751 – 765.
- Judge, T.A., & Piccolo, R.F. (2004). Transformational and transactional leadership: A meta-analytic test of their relative validity. *Journal of Applied Psychology*, 89 (5), 755-768.
- Kanki, B.G., Lozito, S., Foushee, H.C. (1989). Communication Indices of Curfew Coordination Aviation. *Space and Environmental Medicine*, 60, 56 – 60.

- Keller, R.T. (1992). Transformational leadership and performance of research and development project groups. *Journal of Management*, 18 (3), 489 – 501.
- Kelley, E. (2005). *Context and leadership in the remote environment*. Unpublished doctoral dissertation, Saint Mary's University, Halifax, Canada.
- Kelloway, E.K., & Barling, J. (2000). What have we learned about developing transformational leaders. *Leadership & Organization Development Journal*, 21(7), 355 – 363.
- Kelloway, E.K., Barling, J., & Helleur, J. (2000). Enhancing transformational leadership: The roles of training and feedback. *The Leadership and Organizational Development Journal*, 21, 145-149.
- Kelloway, E.K., Barling, J., Kelley, E., Comtois, J., & Gatién, B. (2003). Remote transformational leadership. *Leadership & Organization Development Journal*, 24(3), 163 – 172.
- Kelloway, E.K. & Francis, L. (2004) *Leadership in Organizations: Course Manual*. Halifax, NS; Author
- Kelloway, E.K., Francis, L., Schat, A., Iverson, R. (2005). *Family socialization of young workers' safety attitudes*. Paper presented at the annual meeting of the Society for Industrial/Organizational Psychology, Los Angeles CA.
- Kelloway, K., Mullen, J.E., & Francis, L. (in press). Injuring your leadership: How passive leadership affects employee safety. *Journal of Occupational Health Psychology*.
- Kirkpatrick, D.L. (1976). Evaluation of training. In R.L. Craig (Ed.), *Training and development handbook* (2<sup>nd</sup> Ed., pp. 301 – 319). New York: McGraw-Hill.

- Kirkpatrick, D.L. (1987). Techniques for evaluating training programs. *Training and Development Journal*, 33 (6), 78 – 92.
- Kirkpatrick, D.L. (1976). Evaluation of training. In Craig R.L. Bittel, L.R. (Eds.), *Training and development handbook: A guide to human resource development* (3<sup>rd</sup> ed., pp301 – 319). New York: McGraw-Hill.
- Kirkpatrick, S.A., & Locke, E.A. (1996). Direct and indirect effects of three core charismatic leadership components on performance and attitudes. *Journal of Applied Psychology*, 81, 36 – 51.
- Komaki, J.L. (1998). *Leadership from an operant perspective*. Routledge: New York.
- Krager, K., Ford, J.K. & Salas, E. (1993). Application of cognitive, skill-based, and affective theories of learning outcomes to new methods of training evaluation. *Journal of Applied Psychology*, 78, 311 – 328.
- Lindell, M.K. & Whitney, D.J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology*, 86, 114-121.
- Locke, E. A. (1968). Toward a Theory of Task Motivation and Incentives. *Organizational Behaviour & Human Decision Processes*, 3, 157-189.
- Locke, E.A., & Latham, G.P. (1984). *Goal setting: A motivational technique that works*. Englewood Cliffs, NJ: Prentice-Hall
- Locke, E.A., & Latham, G.E. (1990). *A theory of goal setting and task performance*. Englewood Cliffs, NJ: Prentice Hall.

- Loughlin, C., & Barling, J. (2001). Young workers' work values, attitudes, and behaviours. *Journal of Occupational and Organizational Psychology*, 74, 543 – 558.
- Loughlin, C., & Frone, M. (2003). Young workers' occupational safety. In J. Barling & M. Frone, *Psychology of workplace safety*. Washington, DC: American Psychological Association.
- Lowe, K. B., Kroeck, K. G., & Sivasubramaniam, N. (1996). Effectiveness correlates of transformational and transactional leadership: A meta-analytic review. *Leadership Quarterly*, 7, 385-425.
- Lusk, S.L., Ronis, D.L., & Baer, L.M. (1995). A comparison of multiple indicators: Observations, supervisors' report, and self-report as measures of workers' hearing protection use. *Evaluation and The Health Professions*, 18, 51-63.
- Luthans, F., & Kreitner, R. (1985). *Organizational behaviour modification and beyond*. Glenview, Il: Scott, Foresman.
- Mathieu, J.E., Tannenbaum, S.I. & Salas, E. (1992). Influences of individual and situational characteristics on measures of training effectiveness. *Academy of Management Journal*, 35, 828 – 847.
- Mathieu, J.E., Martineau, J.W., & Tannenbaum, S.I. (1993). Individual and situational influences on the development of self-efficacy: Implications for training effectiveness. *Personnel Psychology*, 46, 125-147.
- Mullen, J.E. (2004) Factors influencing safety behavior at work. *Journal of Safety Research*, 35, 275 - 285.
- Mullen, J.E. (in press). Testing a model of employee willingness to raise safety issues.

- National Safety Council. (2003). *Accident facts:2004 edition*. (Washington, DC:Author.)
- Niskanen, T. (1994). Safety climate in the road administration. *Safety Science*, 17, 237 – 255.
- Neal, A., & Griffin, M.A. (in press). A longitudinal study of the relationships among safety climate, safety motivation, safety behaviour, and accidents.
- Neal, A., & Griffin, M. A. (1997). *Perceptions of safety at work: Developing a model to link organizational safety climate and individual behaviour*. Paper presented at the 12th Annual Conference of the Society for Industrial Organizational Psychology, St. Louis, MO.
- Neal, A., Griffin, M. A., & Hart, P. M. (2000). The impact of organizational climate and individual behaviour. *Safety Science*, 34(3), 99 - 109.
- Neal, A., & Griffin, M.A. (2002). Safety climate and safety behaviour. *Australian Journal of Management*, 27 (1), 67 - 78.
- Noe, R. A. (1986). Trainees' attributes and attitudes: Neglected influences on training effectiveness. *Academy of Management Review*, 11, 736-749.
- Noe, R. A. & Schmitt, N. (1986). The influence of trainee attitudes on training effectiveness: Test of a model. *Personnel Psychology*, 39, 497-523.
- Pater, R. (2005). Activating Executive Safety Leadership. *Occupational Hazards*, 67(3), 26 – 27.
- Pedhazur, E.J., & Pedhazur - Schmelkin, L. (1991). *Measurement, Design, and Analysis: An integrated approach*. Hillsdale, NJ. Lawrence Erlbaum Associates.
- Pinder, C. (1984). *Work Motivation; Theory Issues and Applications*. New York:

Prentice Hall.

- Pransky, G., Snyder, T., Dembe, A., & Himmelstein, J. (1999). Under-reporting of work-related disorders in the workplace: A case study and review of the literature. *Ergonomics*, *42*, 171-182.
- Quinn, R.E. (1988). *Beyond Rational Management: Mastering the paradoxes and competing demands of high performance*. San Francisco, CA. Jossey-Bass Inc.
- Saks, A.M. (1995). Longitudinal field investigation of the moderating and mediating effects of self-efficacy on the relationship between training and newcomer adjustment. *Journal of Applied Psychology*, *80*, 211-225.
- Saks, A.M. (1997). Transfer of training and self-efficacy: What is the dilemma? *Applied Psychology: An International Review*, *46*,4, 365-370
- Schenzer, T., Rugulies, R., & Krause, N. (2005). Work related Pain and Injury: Barriers to workers' compensation. *American Journal of Public Health*, *95*(3), 483 – 489.
- Schalm, R.L., & Kelloway, E.K. (2001). The relationship between response rate and effect size in occupational health psychology research. *Journal of Occupational Health Psychology*, *6*, 160 – 163.
- Shannon, H., Mayr, J., & Haines, T. (1997). Overview of the relationship between organizational workplace factors and injury rates. *Safety Science*, *26* (3) 201 – 217.
- Shamir, B., House, R.J., & Arthur, M.B. (1993). The motivational effects of charismatic leadership: A self-concept based theory. *Organization Science*, *4*(4), 577-594.
- Shin, S.J., & Zhou, J. (2003). Transformational leadership, conservation, and creativity: Evidence from Korea. *Academy of Management Journal*, *46* (6), 703 – 714.

- Smith, P., & Dyson, A. (2004). Get with the programme. *The Safety & Health Practitioner*, 22(12), 38 – 41.
- Stajkovic, A.D., & Luthans, F. (2003). Behavioural management and task performance in organizations: Conceptual background, meta-analysis, and test of alternative models. *Personnel Psychology*, 56, 155 – 195.
- Stajkovic, A.D., & Luthans, F. (1997). A meta-analysis of the effects of organizational behaviour modification on task performance, *Academy of Management Journal*, 40, 1122 – 1149.
- Steiger, J.H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research*, 25, 173 – 180.
- Waldman, D. A., Bass, B. M. & Yammarino, F. J. (1990). Adding to contingent-reward behaviour: The augmenting effect of charismatic leadership. *Group & Organizational Studies*, 15, 381-394.
- Walkerton Inquiry. (2002). *Report of the Walkerton Inquiry*. Toronto: Ontario Ministry of the Attorney General.
- Walumbwa, F., Wang, P., Lawler, J., & Shi, K. (2004). The role of collective efficacy in the relations between transformational leadership and work outcomes. *Journal of Occupational and Organizational Psychology*, 77(4), 515 – 531.
- Westray Mine Public Inquiry. (1997). *Report of the Westray Mine Public Inquiry*. Nova Scotia.
- Wright, C, (1986). Routine deaths: Fatal accidents in the oil industry. *The Sociological Review*, 34, 265 – 289.
- Wright, P., & Boswell, W. (2002). *Desegregating HRM: A Review and Synthesis of*

- Micro and Macro Human Resource Management Research*. Working paper 02-11: Centre for Advanced Human Resource Studies, Cornell University, NY.
- Williams, H., Turner, N., & Parker, S. (2000). *The compensatory role of transformational leadership in promoting safety behaviours*. Paper presented at the annual meeting of the Academy of Management, Toronto, Canada.
- Yukl, G. (1998). *Leadership in organizations*. Englewood Cliffs, NJ: Prentice Hall.
- Zaroff, A., Levenstein, C., & Wegman, D. (2002). Occupational Injury and Illness surveillance: Conceptual filters explain underreporting. *American Journal of Public Health, 92*(9), 1421 – 30.
- Zohar, D. (1980). Safety climate in industrial organizations: Theoretical and applied implications. *Journal of Applied Psychology, 65*, 96-102.
- 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*, 587-596.
- Zohar, D. (2002a). The effects of leadership dimensions, safety climate, and assigned priorities on minor injuries in work groups. *Journal of Organizational Behaviour, 23*, 75-92.
- Zohar, D. (2002b). Modifying supervisory practices to improve submit safety: A leadership-based intervention model. *Journal of Applied Psychology, 87*(1), 156 - 163.

## Appendix B

### *Items used to measure subordinate perceptions of leader safety-specific transformational leadership.*

Below are a number of statements concerning your perceptions of your direct manager. Use the rating scale below to rate the extent to which you feel each statement represents your manager's behaviour at work. Please record your responses in the blank spaces following each statement.

1	2	3	4	5	6	7
Not at all	Rarely	Once in a while	Sometimes	Fairly often	Often	Frequently or Always

My Direct Manager...

1. Expresses satisfaction when I perform my job safely
2. Makes sure that we receive appropriate rewards for achieving safety targets on the job
3. Provides continuous encouragement to do our jobs safely
4. Shows determination to maintain a safe work environment
5. Suggests new ways of doing jobs more safely
6. Encourages me to express my ideas and opinions about safety at work
7. Talks about his/her values and beliefs of the importance of safety
8. Behaves in a way that displays a commitment to a safe workplace
9. Spends time showing me the safest way to do things at work
10. Would listen to my concerns about safety on the job

### Appendix C

*Items used to measure subordinate perceptions of leader passive safety leadership.*

Below are a number of statements concerning your perceptions of your direct manager. Use the rating scale below to rate the extent to which you feel each statement represents your manager's behaviour at work. Please record your responses in the blank spaces following each statement.

1	2	3	4	5	6	7
Not at all	Rarely	Once in a while	Sometimes	Fairly often	Often	Frequently or Always

My Direct Manager...

1. Waits for things to go wrong before taking action
2. Fails to intervene until safety problems become serious
3. Avoids making decisions that affect safety on the job

## Appendix D

### *Items used to measure subordinate perceptions of safety climate.*

Below are a number of statements concerning your perceptions of safety at your workplace and your safety behaviour in general. Use the scale below to rate the extent to which you agree with each statement. Please write your responses in the blank spaces following each statement.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Strongly Disagree	Disagree	Somewhat Disagree	Neutral or Don't Know	Somewhat Agree	Agree	Strongly Agree

1. My manager is willing to invest money and effort to improve safety in this job
2. My manager assigns a high priority to safety issues
3. Workers who work safely have a better chance of promotion here
4. One of the main factors affecting workers' evaluation is whether they have been involved in a workplace accident before
5. Workers who violate safety regulations upset their fellow workers even when no harm is done
6. The best workers in our job care about safety and want others to behave according to regulations
7. It is only a matter of time before I'm involved in an accident here
8. The safety problems in my workplace are rather serious
9. Time pressure has nothing to do with accidents, there are simply safe workers and unsafe workers
10. There is little time to be concerned about safety in our work

Appendix E

*Items used to measure subordinate perceptions of safety participation.*

Below are a number of statements concerning your perceptions of safety at your workplace and your safety behaviour in general. Use the scale below to rate the extent to which you agree with each statement. Please write your responses in the blank spaces following each statement.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral or Don't Know	Somewhat Agree	Agree	Strongly Agree

1. I promote the safety program within the organization
2. I put in extra effort to improve the safety of the workplace
3. I help my co-workers when they are working under risky or hazardous conditions
4. I voluntarily carry out tasks or activities that help to improve workplace safety

Appendix F

*Items used to measure subordinate perceptions of safety compliance.*

Below are a number of statements concerning your perceptions of safety at your workplace and your safety behaviour in general. Use the scale below to rate the extent to which you agree with each statement. Please write your responses in the blank spaces following each statement.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral or Don't Know	Somewhat Agree	Agree	Strongly Agree

1. I carry out my work in a safe manner
2. I use all the necessary safety equipment to do my job
3. I use the correct safety procedures for carrying out my job
4. I ensure the highest levels of safety when I carry out my job

## Appendix G

### *Items used to measure subordinate perceptions of safety-related events.*

Please indicate how frequently you have experienced each of the following safety-related events. Safety related events refer to times that you were almost injured or “close calls” on the job.

1	2	3	4	5	6	7
Not at all	Rarely	Once in a while	Sometimes	Fairly often	Often	Frequently or Always

While performing my job I...

1. Had something fall on me
2. Overextended myself lifting objects
3. Overextended myself moving objects
4. Overextended myself pushing an object
5. Overextended myself bending or moving in an awkward position
6. Had my hand contact a sharp object while using or cleaning a piece of equipment
7. Tripped over an object
8. Slipped on a slick surface
9. Was caught in, under or between an object
10. Was exposed to chemicals, fumes or cleaning solutions without proper ventilation
11. Was in contact with broken glass
12. Tripped over something on the floor
13. Had something roll over my feet
14. Fell off of something (e.g., ladder, shelf, etc...)
15. Had clothes caught in something (e.g., a piece of equipment)
16. Was struck by an object

Appendix H

*Items used to measure subordinate perceptions of injuries.*

Please indicate how frequently you have experienced each of the following injuries.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not at all	Rarely	Once in a while	Sometimes	Fairly often	Often	Frequently or Always

1. Strains or sprains
2. Cuts or lacerations
3. Burns
4. Bruises or contusions
5. Fractured bone
6. Dislocated joint
7. Serious muscle or back pain
8. Blisters

Appendix I

*NSAHO Letter of Support sent to potential participating long-term health care organizations.*

June 1, 2004

Dear Member:

NSAHO is pleased to be forwarding information to members about a new research study led by Mrs. Jane Mullen, a doctoral candidate in Human Resource Management, with Saint Mary's University Business Administration PhD. Program. Mrs. Mullen is studying how the provision of occupational health & safety by healthcare managers to their employees, may be improved through leadership training.

This opportunity is unique one as it compliments both the new "Developing Transformational Capacity" learning retreat, and the new Occupational Health & Safety Service currently being offered by NSAHO's Organizational Development department.

We invite members to read through the attached letter, and for further information to contact the study's primary investigator, Jane Mullen.

Sincerely,

Carla Anglehart, Director  
Organizational Development  
NS. Association of Health Organizations

## Appendix L

*Items used to measure subordinate perceptions of general transformational leadership.*

Below are a number of statements concerning your perceptions of your direct manager. Use the rating scale below to rate the extent to which you feel each statement represents your manager's behaviour at work. Please record your responses in the blank spaces following each statement.

1	2	3	4	5	6	7
Not at all	Rarely	Once in a while	Sometimes	Fairly often	Often	Frequently or Always

My Direct Manager...

1. Communicates a clear and positive vision of the future
2. Treats staff as individuals, supports and encourages their development
3. Gives encouragement and recognition to staff for achieving performance targets on the job
4. Fosters trust, involvement and cooperation among employees
5. Encourages thinking about problems in new ways and questions assumptions
6. Is clear about his/her values and practices he/she preaches
7. Instills pride and respect in others and inspires me by being highly competent

## Appendix M

### *Items used to measure subordinate perceptions of safety-related events.*

Please indicate how frequently you have experienced each of the following safety-related events. Safety related events refer to times that you were almost injured or “close calls” on the job.

1	2	3	4	5	6	7
Not at all	Rarely	Once in a while	Sometimes	Fairly often	Often	Frequently or Always

While performing my job I...

1. Had something fall on me
2. Overextended myself lifting or transferring patients
3. Overextended myself lifting or moving objects
4. Overextended myself pushing a wheelchair or bed
5. Overextended myself bending or moving in an awkward position
6. Had my hand contact a sharp object while using or cleaning a piece of equipment
7. Tripped over an object
8. Slipped on a slick surface
9. Was caught in, under or between an object
10. Was exposed to chemicals, fumes or cleaning solutions without proper ventilation
11. Was in contact with broken glass
12. Tripped over something on the floor
13. Had something roll over feet
14. Fell off of something (e.g., ladder, shelf, etc...)
15. Had clothes caught in something (e.g., a piece of equipment)
16. Struck by an aggressive patient
17. Performed repetitive heavy work (e.g., lifting patient from laying position to standing position)

## Appendix N

### *Items used to measure subordinate perceptions of injuries.*

Please indicate how frequently you have experienced each of the following injuries.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Not at all	Rarely	Once in a while	Sometimes	Fairly often	Often	Frequently or Always

While performing my job I...

1. Strains or sprains
2. Cuts or lacerations
3. Needle pricks
4. Scratches
5. Bruises or contusions
6. Fractured bone
7. Dislocations
8. Serious muscle or back pain
9. Blisters
10. Joint/Muscle/Tendon inflammation
11. Allergic Reactions (e.g., chemical exposure)

## Appendix P

### *Items used to measure leader safety attitudes.*

Below are a number of statements concerning your safety attitudes. Use the scale below to rate the extent to which you agree with each statement. Please write your responses in the blank spaces following each statement.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral or Don't Know	Somewhat Agree	Agree	Strongly Agree

1. I have made safety a priority while at work
2. I think it is more important to work safely than it is to work quickly
3. Getting the job done is not as important as working safely
4. I do not take chances with my safety
5. I always try to follow safety regulations
6. I always follow safe working procedures
7. It bothers me to see someone working unsafely
8. It is important to work safely even if it takes longer to do the work
9. It is important to work safely even if it is inconvenient
10. I really believe in working safely at all times
11. I feel that our health and safety program is important

## Appendix Q

### *Items used to measure leader perceptions of intent to promote safety.*

Below are a number of statements concerning your safety intentions. Use the scale below to rate the extent to which you agree with each statement. Please write your responses in the blank spaces following each statement.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral or Don't Know	Somewhat Agree	Agree	Strongly Agree

1. It is very likely that I will promote safety in my workplace
2. I intend to achieve the goals that I set for myself
3. I want to apply what I learn about transformational leadership to my work setting

Appendix R

*Items used to measure leader perceptions of self efficacy.*

Below are a number of statements concerning your safety attitudes. Use the scale below to rate the extent to which you agree with each statement. Please write your responses in the blank spaces following each statement.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral or Don't Know	Somewhat Agree	Agree	Strongly Agree

1. I feel confident about promoting safety
2. I will be able to achieve most of the safety-related goals that I have set for myself
3. When facing difficult safety tasks, I am certain that I will accomplish them
4. In general, I think that I can obtain safety outcomes that are important to me
5. I believe that I can succeed at most any endeavor to which I set my mind
6. I will be able to successfully overcome many safety-related challenges
7. I am confident that I can perform effectively on many safety-related tasks
8. Compared to other people, I can do most tasks very well
9. Even when things are tough, I can perform quite safely