

WorkSafeNB S.A.F.E.R Training & Evaluation

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Executive Summary

In partnership with WorkSafeNB, the S.A.F.E.R leadership training program was implemented and evaluated to improve health and safety in selected industry groups in the province of New Brunswick (long-term healthcare, restaurant and hotel management, municipal employees). The primary purpose of this study was to evaluate the effectiveness of the S.A.F.E.R. leadership training and model. Toward this end, we focused on three questions:

1. Was the training effective in enhancing safety leadership?

Trained leaders reported engaging in more safety leadership behaviors relative to a wait-list control group for the mixed industry group but not in the long-term care sample. Employees in both samples reported that trained leaders engaged in more safety leadership behaviors than did the wait list control groups. Moreover these effects were replicated in a second, Francophone, sample in which both leaders and their employees reported small increases in S.A.F.E.R. leadership.

2. What is S.A.F.E.R. Leadership?

Analysis suggested that S.A.F.E.R. leadership is strongly related to both transformational and passive safety leadership. Moreover S.A.F.E.R. leadership is related to safety-related variables in the expected fashion.

3. How does S.A.F.E.R. leadership work?

Our results strongly supported a model suggesting that the effects of S.A.F.E.R. leadership on safety outcomes are indirect – being mediated by safety attitudes/perceptions and safety behaviors.

These initial results are promising and suggest that S.A.F.E.R. leadership training is an effective means of increasing employee safety behaviors and safety outcomes in organizations.

S.A.F.E.R. Leadership

In partnership with WorkSafeNB, the S.A.F.E.R. leadership training program was implemented and evaluated to improve health and safety in selected industry groups in the province of New Brunswick (long-term healthcare, restaurant and hotel management, municipal employees). The primary purpose of this study was to evaluate the effectiveness of the S.A.F.E.R. leadership training and model. Toward this end, we focused on three questions related to [a] the effectiveness of the training (i.e., does the training and coaching program result in leaders engaging in more safety leadership behaviors?), [b] the meaning of S.A.F.E.R. leadership (i.e., how is S.A.F.E.R. leadership related to other models of safety leadership and to safety outcomes?) and [c] the process (i.e., how does S.A.F.E.R. leadership affect safety outcomes?).

The S.A.F.E.R. leadership training is delivered in a three-hour session. The goal setting component is completed within the context of the training session and requires leaders to develop five behavioral S.A.F.E.R. leadership goals. Following the three-hour training session each leader meets individually with a coach to review the results of the S.A.F.E.R. Index feedback provided by their direct reports and to review their S.A.F.E.R. leadership goals. The individual coaching session ensures that (a) leaders developed five specific behavioral safety goals, (b) the goals are aligned with the results of the 360 S.A.F.E.R. Index feedback (i.e. if there is a particular weakness identified) and (c) leaders have generated a method for tracking their goals for a 90 day period.

The S.A.F.E.R. Model

In developing the S.A.F.E.R. leadership program, we drew on extant research focussing on the importance of health and safety leadership. Empirically, our research to date suggests that S.A.F.E.R. leadership and other theories of safety leadership (i.e., transformational leadership) are strongly related (i.e., leaders who are rated high on one are typically rated high on another). However, recognizing that it is difficult for organizational leaders to see the immediate application of theoretical models of safety leadership, the S.A.F.E.R. leadership program focusses on five *specific behaviors* that effective safety leaders report doing rather than a theory about effective leadership. These S.A.F.E.R. leadership behaviours include (1) Speaking about safety, (2) Acting safely at work, (3) Focusing on maintaining safety standards, (4) Engaging others in safety initiatives, and (5) Recognizing individuals who adhere to safety practices. Each of the five dimensions has empirical evidence supporting their influence on subordinates' safety performance.

Previous research has demonstrated that leaders' behaviors have a pervasive effect in changing perceptions of safety climate, changing working behaviors and, ultimately, enhancing safety outcomes (e.g., Barling et al., 2002). Based on these observations, we move away from pre-defined leadership styles and turn to a consideration of what leaders actually do to facilitate safety performance. We propose the S.A.F.E.R. Leadership Model of safety leadership as a comprehensive identification of five core effective leadership dimensions. The model comprises of (1) speaking of safety, (2) acting safe at work, (3) focusing on maintaining safety standards, (4) engaging others in safety initiatives, and (5) recognizing individuals who adhere to safety.

Speak: Communicating about Safety at Work

Behaviors relating to speaking of safety enable one-way dissemination of information about safety and subordinates' safety performance and may include data reporting, feedback, or simply verbal exchanges regarding safety. As such, communication is a key component of safety leadership as it is the mechanism through which the leader's view and position on safety are shared with their employees. Indeed, communication has been identified as a critical aspect of effective safety leadership by leaders themselves (Fruhen, Mearns, Flin, & Kirwan, 2013) and has been shown to mediate the relationship between leader-member exchange and safety commitment, which, in turn, predicts lower rates of accidents (Hofmann & Morgeson, 1999). As well, feedback provided at least three times a week was found to effectively maintain improved safety behaviors (Komaki, Heinzmann, & Lawson, 1980).

Several intervention studies to date have focused on improving safety performance by coaching leaders on how to communicate. For example, Zohar (2002b) implemented an intervention that involved teaching leaders how to communicate safety as a priority, as well as enhancing leaders' interview skills for giving their employees safety-related feedback. Frequency of safety interactions was reported to be significantly higher in the experimental group, and minor injury rate, earplug use, and perceived safety climate were more stable over time. In another intervention study involving Danish construction foremen, coaching leaders on safety communication was found to increase the amount of verbal exchanges regarding safety, the subordinates' attention to safety, and the safety index of the work site (Kines et al., 2010). In summary, Zohar (2002b) and Kines et al.'s (2010) intervention studies demonstrate that safety communication and feedback facilitate better safety outcomes, and that those two behaviors are skills that can be successfully trained.

Act: Acting Safe at Work

Although communication is an important aspect of safety leadership, it is critical that leaders reinforce what they communicate through the physical visibility of their efforts (Biggs, Banks, Davey, & Freeman, 2013; Luria, Zohar, & Erev, 2008). In other words, they need to engage in observable behaviors to demonstrate their own adherence to safety at work. Thus, acting safe is primarily related to the concept of behavioral integrity, which refers to the perceived alignment between the leaders' expectations and actions for safety (Leroy et al., 2012). Previous research suggests that leader's behavioral integrity towards safety may contribute to a safer workplace by enhancing subordinate compliance through the establishment of clear expectations of appropriate safety behaviours (Halbesleben et al., 2013; Leroy et al, 2012). Specifically, Leroy et al. (2012) found that priority of safety mediated the relationship between leader's behavioral integrity and reported treatment errors. Furthermore, in a cross-lagged analysis Halbesleben et al. (2013) showed that psychological safety and safety compliance at Time 2 mediated the relationship between behavioral integrity of leaders at Time 1 and frequency and severity of injuries at Time 3. Together, these two studies demonstrate that the alignment between leaders' expectations of subordinates and their own actions regarding safety can improve both in-role (i.e., compliance) and extra-role (i.e., reporting errors) safety behaviors.

Focus: A Resolution for Safety at Work

A good safety leader fosters a safety-focused workplace by demonstrating commitment, persistence, motivation, and engaging in monitoring. Research suggests that perceptions of leaders' commitment to safety are related to lower perceived risk and more willingness from subordinates to participate in safety programs (Cree & Kelloway, 1997). The inability to commit or consistently adhere to safety standards can be as detrimental as not complying with them in

the first place. For instance, subordinates of inconsistent leaders who displayed both safety-specific transformational and safety-specific passive behaviors reported lower safety participation and compliance (Mullen, Kelloway, & Teed, 2011).

Motivating subordinates is a mechanism by which good safety leaders can enhance subordinates' safety performance. Conchie (2013) found that intrinsic motivation mediated the relationship between safety-specific transformational leadership and safety citizenship behaviors (i.e., whistle blowing and safety voice behaviors), while extrinsic motivation mediated the relationship between safety-specific transformational leadership and safety compliance. Furthermore, the motivation to not partake in risk-taking behaviors is linked to lower injury rates at work (Westaby & Lowe, 2005).

Focusing on safety involves using active monitoring. Leaders who are able to recognize problems in the workplace are the ones who are constantly keeping track of their subordinates' safety performance. Indeed, Griffin and Hu (2013) found that safety-specific monitoring positively associated with safety compliance. An intervention study conducted by Zohar and Luria (2003) revealed that training leaders to monitor subordinates led to higher observer-rated frequency of safety behaviors and self-reported ratings of safety climate. According to Griffin and Hu (2013), consistent monitoring increases subordinates' safety behaviors because the act of monitoring enforces a clear standard for which safety behaviors are appropriate and which are not.

Engage: Involving others in Safety Initiatives

Effective safety leaders recognize that safety is a group effort and strive towards engaging their employees in important decisions and initiatives. They achieve this by opening

up a two-way communication channel that enables subordinates to suggest ways to improve safety in their organization and voice their safety related concerns.

In a study involving offshore drill workers, engaging subordinates and encouraging their questions were considered to be important assets of a good leader by 97% of the respondents (Crichton, 2005). Furthermore, leaders' receptiveness to safety information is related to subordinates' willingness to raise safety issues (Mullen, 2005). Upward safety communication is a specific type of communication that happens when subordinates reach an adequate level of comfort to discuss safety issues with their leaders without the fear of being reprimanded (Hofmann & Stetzer, 1998). In a sample of mixed industry blue-collared workers, upward safety communication mediated the relationship between the high quality of leader-member exchange and lower perceived injury risk (Muldoon, Matthews, & Foley, 2012). Ease of incident reporting may suggest that there is trust and high psychological safety in the leader-subordinates relationship (Clark & Payne, 2006; Conchie, Taylor, & Donald, 2012; Reason, 1997). Trust is not only an important indicator of a good safety culture, but also how a good safety leader exerts their influence on subordinates' safety performance. Safety-specific trust mediates the relationship between safety-specific transformational leadership and safety voice behaviors (Conchie et al., 2012). As well, transformational leadership is associated with more safety citizenship behaviors only under high or moderate levels of cognitive trust (Conchie & Donald, 2009).

Overall, engagement behaviors from leaders can create a psychologically safe environment for subordinates to bring up safety issues are important for increasing extra-role safety behaviors and reducing counterproductive safety behaviors.

Recognize: Valuing Safety Efforts

Aside from having a consistent feedback and monitoring system for correcting safety violations, a safety leader values and acknowledges subordinates who are safe in their everyday work. A properly designed safety-incentive program uses social praise, recognition, tangible reinforcements, and non-monetary privileges to reinforce the reporting of hazards (Komaki, Barwick, & Scott, 1978). However, a good safety leader does not necessarily need to reward safety accomplishments by monetary means. In an intervention study by Austin, Kessler, Riccobono, and Bailey (1996), daily feedback and weekly monetary reinforcements were associated with 64% labor cost reductions in roofers compared to the workers who were paid by an hourly wage. The researchers conducted a follow-up and found that monetary rewards were not necessary; rewarding employees with break times improved safety compliance. Since recognition is a comparably cost-efficient form of reward that does not draw from company resources, good safety leaders should use it to reinforce desirable safety behaviors.

The Current Study

The goal of the current study was to evaluate the effectiveness of a brief, three-hour training program focused on the five dimensions comprising the S.A.F.E.R. model. To do so we implemented a wait-list control group design in two industry groups. The first group comprised leaders in long term care who were assigned to either a training (n=25) or a control (n=19) group. Assignments to group was at random with the provision that leaders from the same organization were assigned to the same group. Prior to the training, leaders were asked to identify eight direct reports to participate in the study.

The second industry group was a mixed industry group comprising representatives from hospitality and municipal governments who were assigned to either a training (n=15) or a control

(n=15) group. Seven representatives from long term care were included in the control group for this industry group as they were unable to attend the industry – specific training. Again, prior to the training, leaders were asked to identify eight direct reports to participate in the study.

In general the design of the study was consistent across both industry groups. First, baseline data were collected from all leaders and their direct reports. The leaders in the “training” group then participated in the leader training/coaching. Following the training, leaders completed goal surveys (assessing goal progress, satisfaction and effort) every two weeks for the three months following the training (i.e., 6 goal surveys). Leaders were also invited to participate in monthly telephone coaching sessions. Three months after the training, all leaders (both training and control groups) and their direct reports participated in a second round of data collection. Next the leaders assigned to the control group were trained and, again, three months subsequently all leaders and direct reports participated in a third round of data collection. Time lines for both industry groups are presented below.

Long-Term Care

Time 1 Baseline Data Collection	September 2015	Time 2 Data Collection	January 2016	Time 3 Data Collection
All leaders and direct reports from both Training and Control groups completed Time 1 electronic survey	Leaders assigned to the Training group received SAFER Training and 360 SAFER Index Feedback	All leaders and direct reports from both Training and Control groups completed Time 2 electronic survey	Leaders assigned to the Control group received SAFER Training and 360 SAFER Index Feedback	All leaders and direct reports from both Training and Control groups completed Time 3 electronic survey
	Leaders completed SAFER goal progress survey twice		Leaders completed SAFER goal progress survey twice	

a month for
three months

Leaders
invited to
participate in
phone
coaching
follow-up
sessions once
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three months

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Mixed Industry Group

Time 1 Baseline	November 2015	Time 2 Data Collection	February 2016	Time 3 Data Collection
All leaders and direct reports from both Training and Control groups completed Time 1 electronic survey	Leaders assigned to the Training group received SAFER Training and 360 SAFER Index Feedback	All leaders and direct reports from both Training and Control groups completed Time 2 electronic survey	Leaders assigned to the Control group received SAFER Training and 360 SAFER Index Feedback	All leaders and direct reports from both Training and Control groups completed Time 3 electronic survey
	Leaders completed SAFER goal progress survey twice a month for three months		Leaders completed SAFER goal progress survey twice a month for three months	
	Leaders invited to participate in phone coaching follow-up sessions once per month for three months		Leaders invited to participate in phone coaching follow-up sessions once per month for three months	

Implementation Notes

Although leaders appeared to enjoy and benefit from the training sessions based on face-to-face feedback it was clear that leaders were, for the most part, not fully engaged with the process. Several sources of data contribute to this conclusion. First, leaders were generally reluctant to complete surveys (e.g., pretests and post-tests) and to distribute surveys to their employees. Getting these data required multiple follow-up contacts by phone and email and failure to comply did lead to a loss of data over the course of the project. When possible we attempted to get as much data as we could – even by having leaders complete surveys when they arrived on-site for the training. Second, leaders were reluctant to participate in the telephone coaching sessions that were conducted post-training. Across the two industry groups only 46 leaders (i.e., 54.12%) participated in the telephone coaching sessions.

Third the data provided by leaders on their goals suggested less than full compliance with the program. For the LTC and mixed group, for example, we have data from 85 leaders who participated in either the training or control group, approximately 1/3 (n=28) did not complete any of the goal surveys post-training. Of those that did complete the surveys, only 2 leaders completed all six surveys. Participants in the training group were more likely to complete the goal surveys than were participants in the control group.

Taken together these concerns regarding treatment compliance limit the results in two important ways. First, they suggest that the size of the training effect (i.e., how much difference the training made) might be limited by leaders not “following through” with their goals. Second,

the concerns resulted in a less than ideal data set in terms of the number of participants making it more difficult to determine whether or not the program had the intended effects.

Results

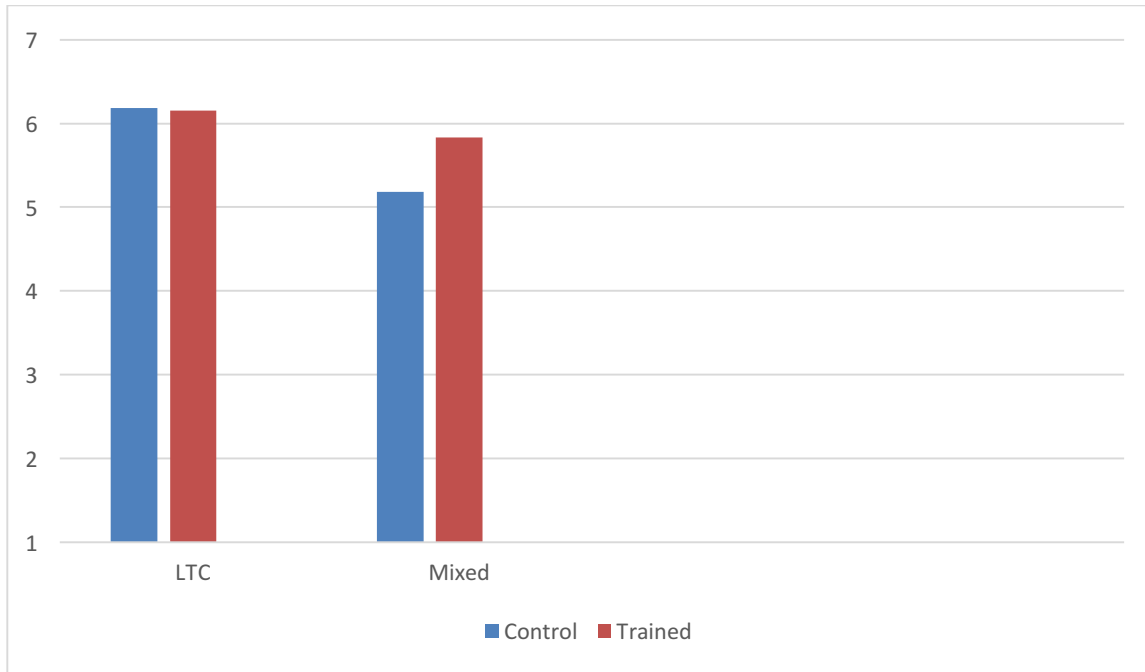
1. Is the training effective?

To assess the validity of the training, we began by asking whether participating in the training resulted in changes in leaders' behavior related to the S.A.F.E.R. model.

Leaders' Data

To do so we conducted an analysis comparing leaders' self-reported S.A.F.E.R. leadership at time 2 statistically controlling for S.A.F.E.R. leadership at time 1. Results of the analysis are shown in Figure 1. Trained leaders in long-term care reported the same level S.A.F.E.R. leadership at Time 2 as did the control group. In contrast, trained leaders in the mixed industry group reported slightly more S.A.F.E.R. leadership than did the control group. Note that as a result of the small sample size, neither difference attains statistical significance

Figure 1:
S.A.F.E.R. leadership at time 2 for long term care (n = 29) and mixed (n=15) industry groups.



Employee Data

For the employee data we conducted a series of analyses examining the effect of training on employees' perceptions of their leaders' behavior. Again our analyses statistically controlled for group differences at pre-test as well as accounting for the nested nature of the data¹. Results of these analyses are presented in Figure 2. Our initial analysis suggested no significant differences between the two industry groups – therefore these data were combined to maximize the statistical power of the analysis. As shown, employee perceptions of leader behavior increased from time one to time two when leaders were participants in the training group but did not change appreciably when the leaders were in the control group.

We further examined these changes by considering each of the five dimensions comprising the S.A.F.E.R. model. Results of these analyses are presented in Figure 3. The data

¹ The employee data are nested in that employees each rated a specific leader and multiple employees rated a single leader. This nesting violates the assumptions of most standard analyses and requires a mixed linear model in order to properly estimate the effects and marginal means.

suggest that employees of leaders who were trained saw an appreciable change in their leaders' behavior but there was little change in the control group data. In particular, employees reported changes in the trained leaders Speaking, Engaging and Recognizing about safety.

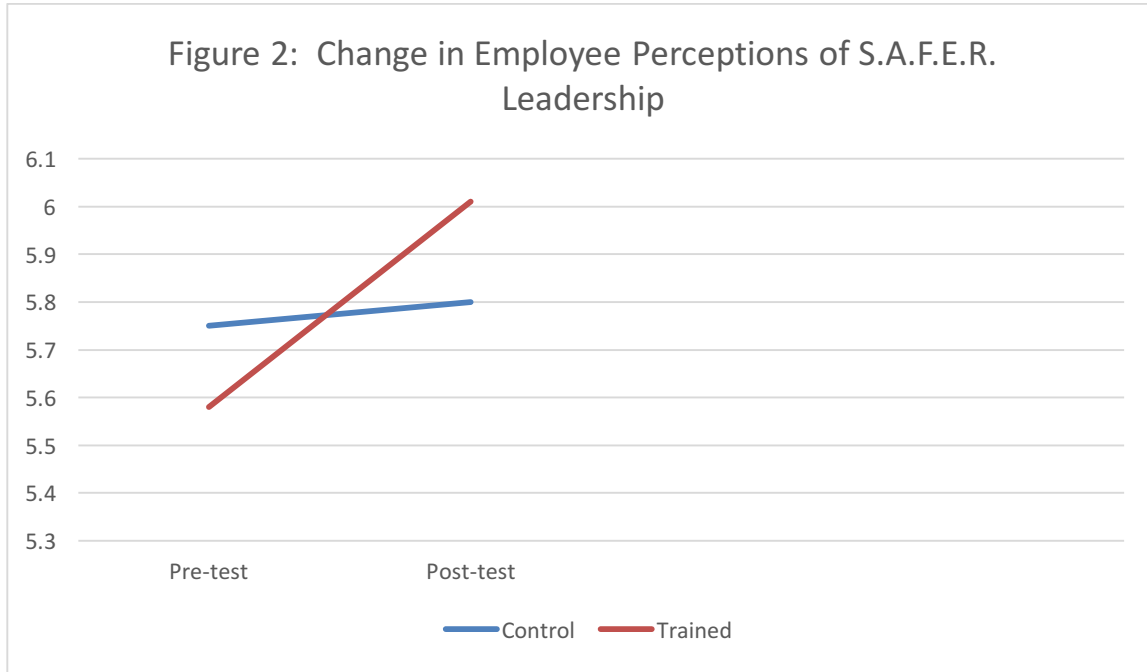


Table 1: Changes in the dimensions of S.A.F.E.R.

	Speak		Act		Focus		Engage		Recognize	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Control	5.38	5.46	6.35	6.27	6.03	6.18	5.78	5.87	5.14	5.22
Trained	5.12	5.66	6.10	6.39	6.01	6.18	5.63	6.11	4.97	5.58

Following the collection of these data, the intervention was reversed with the training of the control group. Prior to training, the control group employees reported a mean S.A.F.E.R. rating of 5.81 (see Figure 2). After the training, the control group employees reported a S.A.F.E.R. rating of 6.03 – a small but statistically significant effect of the training on employee perceptions.

These data suggest that the training was effective in changing leaders' behavior. Although leaders' own self-rated behavior provided equivocal evidence for the effectiveness of the training, employees of the trained leaders reported increased S.A.F.E.R. behaviors relative to the control group. Moreover implementing the training for the control group replicated the effect with employees in this group reporting enhanced perceptions of S.A.F.E.R. training.

2. What is S.A.F.E.R. leadership?

Using data from the employees we correlated employee ratings of S.A.F.E.R. leadership with two other established leadership scales; safety specific transformational leadership (Barling, Loughlin & Kelloway, 2002) and passive leadership (Kelloway, Mullen & Francis, 2006). As hypothesized, S.A.F.E.R. leadership was strongly associated with safety specific transformational leadership, (for the full sample: $r(147) = .86, p < .001$) and strongly and negatively correlated with passive leadership, (for the full sample: $r(147) = -.75, p < .001$). These data suggest that S.A.F.E.R. leadership is not a new “style” of leadership as much as it is a practical means of conveying the behavioral expectations of effective safety leadership.

Further evidence of this conclusion, is presented in Table 2 which shows the correlation between S.A.F.E.R. leadership and a variety of safety relevant measures. As shown, employees' perceptions of S.A.F.E.R. leadership are correlated with their safety compliance (i.e., adherence

to safety rules and procedures), their safety participation (i.e., willingness to go beyond requirements to promote safety in the workplace), employees' safety attitudes, employees' awareness of safety in the workplace. Finally, S.A.F.E.R. leadership ratings are negatively associated with injuries in the workplace.

Table 2
Correlation of study variables

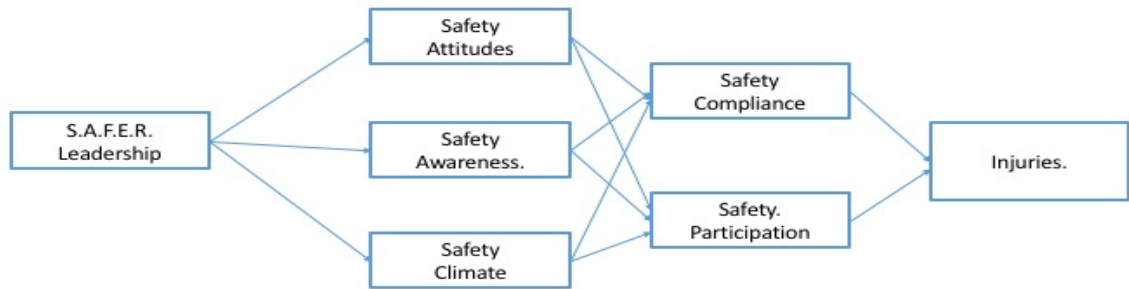
	1	2	3	4	5	6	7	8	9
1. S.A.F.E.R. leadership		.93	-.76	.78	.44	.39	.30	.38	-.31
2. Transformational Leadership	.81		-.78	.80	.54	.38	.40	.42	-.37
3. Passive Leadership	-.67	-.62		-.69	-.32	-.15	-.14	-.19	.27
4. Safety Climate	.43	.53	-.38		.53	.42	.46	.56	-.21
5. Safety Compliance	.31	.37	-.23	.48		.65	.87	.73	-.38
6. Safety Participation	.38	.47	-.18	.43	.67		.62	.80	-.12
7. Safety Attitudes	.29	.32	-.14	.47	.78	.60		.70	-.41
8. Safety Awareness	.34	.33	-.13	.46	.70	.69	.79		-.33
9. Injuries	-.22	-.18	.26	-.22	-.40	-.18	-.38	-.33	

Notes: Data from Long-Term Care (n=105) below the diagonal. Data from mixed industry group (N=44) above the diagonal,

3. How does S.A.F.E.R. leadership affect safety outcomes?

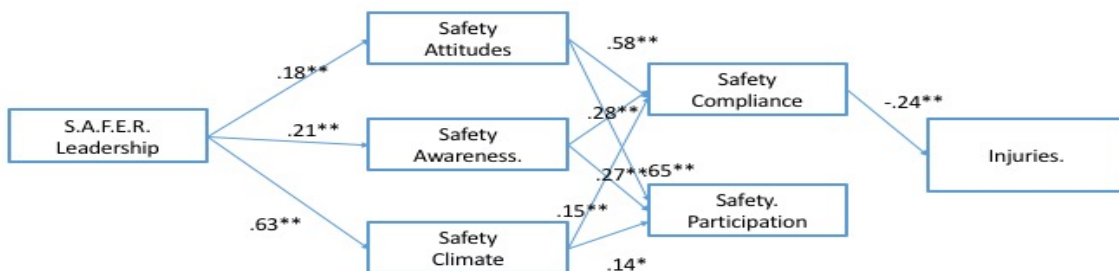
The S.A.F.E.R. model of leadership, like other leadership models (Kelloway & Barling, 2010) is based on a model of indirect effects. Leadership is thought, in the first instance, to affect individual attitudes and perceptions. Attitudes and perceptions are thought to predict safety behaviors which, in turn, affect safety outcomes. Figure 3 presents the model in diagrammatic form.

Figure 3: Model of how S.A.F.E.R. leadership affects safety outcomes



Using the combined data from both industry samples, we tested this model as an observed variable path analysis. The model provided an exceptional fit to the data, $\chi^2(6) = 12.06$, ns, CFI = .99; RMSEA = .06, ns). All of the hypothesized linkages were statistically significant with the exception of the link between safety participation and injuries which was not. The results of these analyses are presented in Figure 4.

Figure 4: Results of the Model Test



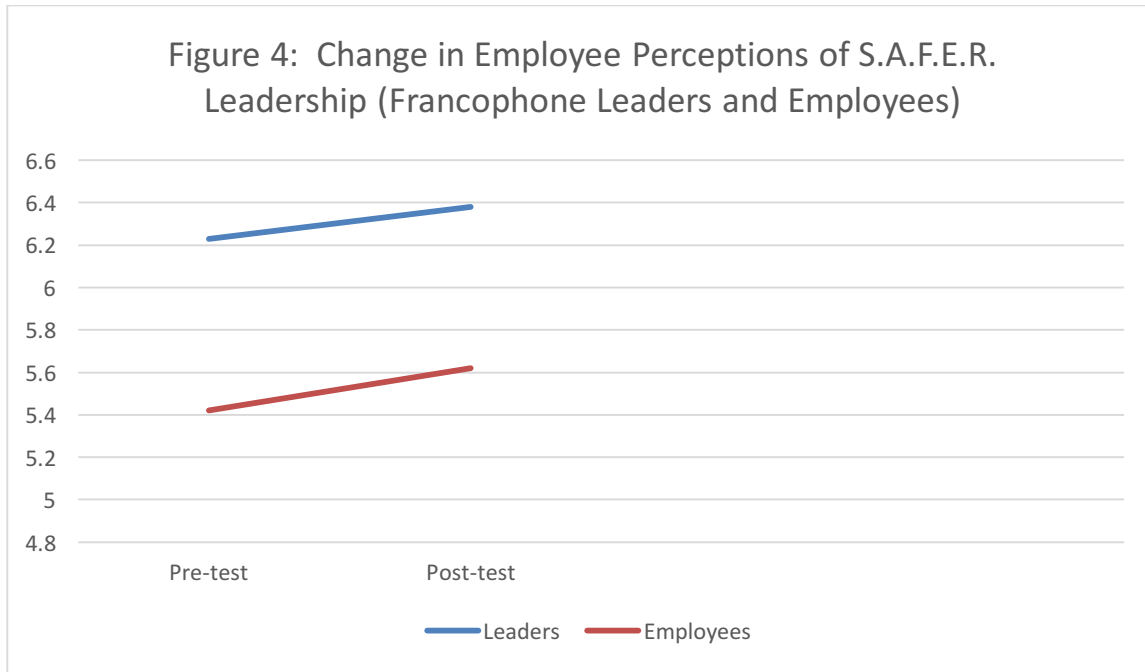
Implementing the S.A.F.E.R. model in Francophone LTC Facilities

At the request of WorkSafeNB we also implemented the S.A.F.E.R. training program as previously described in Francophone long-term-care facilities. We followed the same general design as previously described however we were not able to implement a full waitlist control group design due to delays in determining the participants for the second session. Accordingly we had two groups of trainees with pretest and post test measures in both groups. All materials (questionnaires, slides etc.) were translated into French by WorkSafeNB. The training sessions were conducted in French by Dr. Michael Teed of Bishops University. All contact with the trainees and all coaching was also provided in French.

As with the Anglophone sample, we experienced difficulties in obtaining the full participation of leaders and their employees. It was difficult to get questionnaires returned and only one of the leaders agreed to participate in the telephone coaching. Again these factors resulted in a relatively small sample size there is some evidence that leaders did not commit fully to formulating and implementing their goals.

Results

Both leaders and their employees reported increases in leaders' S.A.F.E.R. behaviors as a result of training (see Figures 4 and 5). The effects of training were not significant based on the leaders self-rating perhaps due to the very small number of leaders who completed questionnaires at both time periods. Although the pattern was consistent across the two groups, leaders reported engaging in more S.A.F.E.R. behaviors than did their employees.



Discussion

The purpose of this study was to evaluate three questions related to the S.A.F.E.R. leadership training program and the S.A.F.E.R. model on which it is based. First, we asked whether the training resulted in enhanced safety leadership. Although self-reports from leaders were equivocal, reports from their employees suggested that training resulted in increases in safety leadership when compared to the control group. Moreover, these increases were particularly pronounced for Speaking, Engaging and Recognizing. This observation is consistent with our experience that these are the more clearly behavioral and easily implementable dimensions of the S.A.F.E.R. model.

Second, we found that S.A.F.E.R. leadership was strongly related to employees' perceptions of other forms of safety leadership (i.e., safety specific transformational leadership and passive safety leadership). Finally, the data supported the hypothesis that the effects of safety leadership are indirect. In the first instance safety leadership affects employee attitudes

and perceptions. Attitudes and perceptions result in increased safety behaviors (participation and compliance). Finally, increased compliance behaviors were associated with decreased injuries.

These results offer strong support for the S.A.F.E.R. model as an effective model of S.A.F.E.R. leadership. The results offer some, more limited, support for the training program. Several concerns around implementation left us dealing with small samples for these analyses. Moreover, there is some evidence that leaders did not fully implement the S.A.F.E.R. model as intended. These concerns in conjunction may result in an underestimate of the effects of S.A.F.E.R. training. Given that the training model has been shown to be effective in other contexts (e.g., Barling, Weber & Kelloway, 1996; Kelloway, Barling & Helleur, 2000; Mullen & Kelloway, 2009) further analysis could be profitably directed toward identifying potential moderators of the effectiveness of the S.A.F.E.R. training.

It is possible that the focus of this training (i.e., on senior leaders across organizations within a sector) could be profitably adapted. It is clear that senior leaders in organizations do have an influence on organizational safety (Tucker et al., 2016). However this influence has been described as a “trickle down process” and we suggest that a more effective intervention would focus on all levels of leaders in an organization. Our previous experience in delivering leadership training interventions in organizations suggests that these interventions are most successful when implemented throughout the leadership group (i.e., from front-line supervisors on up).

In summary, the results of this study suggested strong support for the S.A.F.E.R. model of safety leadership with more limited support for the effectiveness of the safety training

intervention – although the effects were marginal in some cases, there was evidence that training increased perceptions of leaders' S.A.F.E.R. behaviors.

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