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The differential effects of transformational leadership facets on employee safety

Krista Hoffmeister [a,*], Alyssa M. Gibbons [a], Stefanie K. Johnson [b], Konstantin P. Cigularov [c], Peter Y. Chen [d], John C. Rosecrance [e]

[a] Colorado State University, Department of Psychology, 1876 Campus Delivery, Fort Collins, CO 80523, United States
[b] University of Colorado, Denver Business School, PO Box 173364 Campus Box 165, Denver, CO 80217-3364, United States
[c] Old Dominion University, Department of Psychology, MGB250, Norfolk, VA 23529, United States
[d] University of South Australia, International Graduate School of Business, City West Campus WL5-62, Adelaide, SA 5001, Australia
[e] Colorado State University, Department of Environmental and Radiological Health Sciences, 1681 Campus Delivery, Fort Collins, CO 80523, United States

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ABSTRACT

Transformational and transactional leadership have been associated with numerous positive safety outcomes, such as improved safety climate, increased safety behaviors, and decreased accidents and injuries. However, leadership is a complex, multidimensional construct, and there is reason to suspect that different facets of leadership may affect safety in different ways and for different reasons. Yet little research to date has considered the relationships between individual facets of transformational and transactional leadership and safety outcomes. The present study addressed this gap by using relative weights analysis to examine the unique influences of leadership facets on five employee safety outcomes. In a survey of 1167 construction pipefitters and plumbers, idealized attributes and behaviors accounted for the most variance in each of the safety outcomes, whereas individualized consideration and active management-by-exception frequently accounted for the least amount of variance. These results suggest that leadership development programs in construction should address multiple individual elements of leadership, such as core values, as well as concrete skills and behaviors.

1. Introduction

To foster a proactive approach in the prevention of workplace injuries, organizations have turned towards key predictors of safety, such as leadership (e.g., Zohar, 2002). Due to their influence within an organization, leaders can play a pivotal role in the promotion of safety at work (Flin and Yule, 2004). Although research on the relationship between leadership and safety has progressed substantially over the last 30 years, the majority of studies have focused on the influence of overall effective leadership or general leadership styles on a variety of safety outcomes (Christian et al., 2009; Nahrgang et al., 2011). For example, transformational leadership that emphasizes safety has been linked to increased employee safety behaviors (e.g., Barling et al., 2002; Conchie and Donald, 2009). This research has established the broad influence of leadership on safety; however, it has not yet examined the role of more specific facets of leadership within these general leadership models (Inness et al., 2010).

Understanding the links between individual leadership facets and safety is important for both theoretical and practical reasons. First, the underlying mechanisms by which leadership may influence safety are not yet well understood (Zohar, 2011). As leadership is often conceptualized as a multidimensional construct (Bass, 1985), it is quite possible that different aspects of leadership may affect safety in different ways and for different reasons. In other words, there may be multiple paths between leaders' behavior and employees' safety outcomes, which are obscured when leadership is treated as a unitary construct. Indeed, there is tentative evidence in the research literature to suggest several such paths (e.g., Bruch and Walter, 2007), which we will discuss in more detail below. Establishing whether one, some, or all facets of leadership have unique influences on safety can provide useful insight about the complexity of the relationship between these variables and provide a framework for future theory development. Further, from a pragmatic perspective, determining the relative contributions of individual leadership facets to safety can aid researchers and practitioners in developing better interventions. If some facets are much more important than others in predicting outcomes, it is logical to target resources toward developing the most important

* Corresponding author. Tel.: +1 970 491 6363.
E-mail address: hoffmk@rams.colostate.edu (K. Hoffmeister).

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facets. If, however, all facets make unique contributions, a comprehensive development approach is needed.

In this study, we examined the differential effects of seven facets of transformational and transactional leadership on five safety outcomes: safety climate, safety compliance, safety participation, work-related injuries, and work-related pain. We argue that individual facets of leadership are likely to relate to different outcomes to different degrees. In the following sections, we briefly introduce transformational and transactional leadership, and then review the theoretical and empirical links between these leadership models and safety. We then discuss the facets of transformational and transactional leadership in more detail, considering the limited existing evidence that suggests that each facet might have a unique relationship with employee safety outcomes, and propose specific hypotheses for the present study.

1.1. Transactional and transformational leadership

Much of the leadership research in recent years has focused on transactional and transformational leadership (Avolio, 2011; Avolio et al., 2009; Bass and Riggio, 2006; Inness et al., 2010; Zohar and Tenne-Gazit, 2008). The transactional leader recognizes the needs of employees and the needs of the organization, and then conveys to employees what they must do to meet both of these (Burns, 1978). Transformational leaders recognize the needs of both the organization and employees, but go beyond these to arouse and satisfy higher needs within each individual. To explain further, a transactional leader addresses employees' separate, individual interests, but a transformational leader encourages employees to unite in the pursuit of higher goals aimed at significant positive change in an organization. Both transactional and transformational leadership styles are related to leader effectiveness, with the best leaders demonstrating both transactional and transformational behaviors (Avolio, 1999; Bass, 1985; Judge and Piccolo, 2004).

Both transactional and transformational leadership are conceptualized as multidimensional constructs, comprised of related but theoretically distinct facets (Bass, 1985; Burns, 1978). Transactional leadership behavior can be divided into three facets: contingent reward, active management-by-exception, and passive management-by-exception (Avolio, 1999). Contingent reward involves providing appropriate rewards and recognition for positive behaviors and clearly communicating those reward contingencies to employees. Both types of management-by-exception involve discouraging negative behavior; active management-by-exception is proactive and focused on prevention, whereas passive management-by-exception is reactive and focused on correction after the fact. Contingent reward and active management-by-exception are considered effective leadership and have been shown to have positive effects on employee outcomes (Bass, 1985); however, passive management-by-exception reflects ineffective leadership (Avolio, 1999).

Transformational leadership consists of four major facets: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass, 1985). Idealized influence is the degree to which employees look to the leader as an example and seek to emulate him or her. Inspirational motivation involves encouraging employees to strive for something beyond their individual goals. Intellectual stimulation means inspiring employees to think creatively and innovatively, and individualized consideration means showing respect and personal concern for employees as individuals. Although the facets of transformational leadership are highly correlated (Bass, 1985), recent research suggests that they can be distinguished empirically as well as conceptually (Hobman et al., 2012), and some studies have established differential links between specific facets and outcomes such as job satisfaction, productivity, and organizational commitment (e.g., Chiok Foong Loke, 2001; McNeese-Smith, 1995, 1997). This raises the important question of whether specific leadership facets might also show differential relationships with safety.

1.2. Evidence linking leadership and safety

The link between leadership in general and safety is both theoretically logical and empirically supported (Christian et al., 2009; Nahrgang et al., 2011). The behavior of managers and leaders reflects the priority they place on safety and health on the job, and workers can interpret these behaviors to create ideas and norms regarding the importance of safety to their leaders (Zohar, 2011; Zohar and Tenne-Gazit, 2008). There is evidence to suggest that leaders play a key role in the creation of safety climate, which in turn influences workers to increase their safety behaviors, thereby decreasing their accidents and injuries (e.g., Barling et al., 2002).

1.2.1. Leadership and safety climate

It has long been recognized that leaders create climates through their actions (Lewin et al., 1939), which provide the guidelines for how employees should act and interact with their work environment, colleagues, and supervisors. Safety climate can be defined as employees' perceptions regarding the way an organization values safety (Zohar, 1980). Empirical studies have provided support for the importance of transformational leadership in particular in establishing the safety climate in an organization, with meta-analyses estimating corrected correlations as strong as $r = .5$ or .6 (Christian et al., 2009; Nahrgang et al., 2008). However, all of this research has treated transformational leadership as a unitary variable, using global measures of transformational leadership or aggregating across facets, and research on transactional leadership and safety climate is lacking.

1.2.2. Leadership and safety behaviors

Employees that observe their leader behaving safely at work will be more likely themselves to behave in a safe manner with that leader as a role model (Hofmann and Morgeson, 2004). Employee safety behaviors can generally be characterized by two forms: safety compliance and safety participation (Griffin and Neal, 2000). Safety compliance refers to following safety policies and procedures and engaging in required safety behaviors. Safety participation is demonstrated by going beyond procedures to help coworkers, promote safety and its principles, taking initiative to be safe, and putting effort into improving safety at work (Neal et al., 2000). A recent meta-analysis (Christian et al., 2009) shows support for the link between leadership and safety compliance (mean corrected correlation: $r = .24$) and safety participation (mean corrected correlation: $r = .35$). However, leaders may engage in many different behaviors, and whether employees engage in safety participation and/or safety compliance may depend on the leader behavior they are modeling. It is therefore important to distinguish between these two types of safety behaviors, as they may be influenced by different facets of leader behavior.

1.2.3. Leadership, injuries, and pain

Effective leadership can also lead to decreased occupational injuries and pain. In a meta-analysis by Christian et al. (2009), the uncorrected correlation between leadership and accidents and injuries was $r = -.14$. After correcting for artifactual error (i.e., sampling error, Raju and Brand, 2003), this correlation was $r = -.16$. In a more recent meta-analysis by Nahrgang et al. (2011), the uncorrected correlation between leadership and pain was $r = -.12$ ($r = -.14$ after correcting for unreliability). When leaders engage in safety-promoting behaviors, employees perceive

a positive safety climate and engage in more safety behaviors themselves, thus avoiding more injuries and pain due to an increased awareness and focus on safety (Griffin and Neal, 2000).

1.3. Specific leadership facets and safety

As noted above, although the facets of transactional and transformational leadership are positively correlated, they are conceptually distinct (Bass, 1985), and research suggests that some facets may be more important than others for predicting specific organizational outcomes (e.g., organizational commitment, Bycio et al., 1995; job satisfaction, Bruch and Walter, 2007). Further, even when different facets of leadership predict the same outcome, they may do so via different mediating mechanisms (e.g., team performance, Dionne et al., 2004). All of this suggests the possibility that different leadership facets may relate in different ways to different safety outcomes (Inness et al., 2010). However, there is still very little theory or empirical research examining leadership and safety at the facet level.

For some combinations of individual facets and outcomes, theory, logic, and research from other areas suggest specific predictions. In the following sections, we briefly discuss this evidence where it exists and offer tentative hypotheses. Where relevant research is lacking, we highlight the gaps and propose exploratory research questions. Taken together, however, we believe the pattern of previous research on leadership facets (or similar constructs) and safety supports two general hypotheses:

Hypothesis 1. Each leadership facet should be individually associated with at least one safety outcome.

Hypothesis 2. Different leadership facets will show different patterns of association with different safety outcomes; that is, not all facets will be equally related to all outcomes.

1.3.1. Transactional leadership

Because contingent reward and active management-by-exception are viewed as positive and beneficial facets of transactional leadership (Bass, 1985), we focus on these positive facets as possible predictors of safety outcomes.

1.3.1.1. Contingent reward. Contingent reward leadership involves clearly communicating which employee behaviors are desired by the organization and what the rewards for such behaviors will be, as well as following through to actually reinforce the desired behaviors. Leaders practicing contingent reward in relation to safety will help employees understand organizational safety-related goals, keep them focused on meeting these goals, and reward them for engaging in safety behaviors consistent with those goals (Bass, 1985). By providing rewards for specific safety-related behaviors, for example through recognition, promotion, increased salary, future job contracts, or job security, leaders encourage employees to continue those safe behaviors (Fogas et al., 2011). Therefore, it is plausible to expect that contingent reward behavior should be associated with increased employee safety compliance, and should also be associated with more positive safety climate, as safety climate can be defined in terms of perceived rewards for safe behavior (Zohar, 1980). However, it is not clear whether contingent reward leadership will increase safety participation, which tends to be more voluntary (Neal et al., 2000) and may not be explicitly rewarded by the organization. Although we might expect that encouraging safety-related behaviors should result in fewer injuries and less work-related pain, this relationship is indirect and there is as yet no empirical evidence to support it.

Hypothesis 3. Contingent reward leadership will be associated with higher levels of safety climate and safety compliance.

Research Question 1. Is contingent reward leadership associated with safety participation, injuries, and/or pain?

1.3.1.2. Active management-by-exception. Active management-by-exception represents an active monitoring of employee performance to detect deviance from standards and procedures (Bass and Riggio, 2006). There appears to be no research linking active management-by-exception specifically to safety; however, it is plausible that enforcing safety policies may help to avoid safety mistakes and prevent accidents and injuries from occurring in the workplace. For this reason, leaders engaging in active management-by-exception should promote better safety compliance from employees, and might also see fewer injuries as a result of this preventive approach. However, it is not clear whether active management-by-exception would promote more active behaviors such as safety participation, or contribute to a positive safety climate.

Hypothesis 4. Active management-by-exception leadership will be associated with higher levels of safety compliance and lower levels of injuries.

Research Question 2. Is active management-by-exception associated with safety climate, safety participation, and/or pain?

1.3.2. Transformational leadership

Transformational leaders go beyond rewarding and monitoring employees to help them combine their individual interests to promote overall organizational safety and an improved safety climate (e.g., Griffin and Neal, 2000; Hofmann and Morgeson, 2004). Transformational leadership consists of four dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass, 1985).

1.3.2.1. Idealized influence. Leaders attain idealized influence by evoking feelings of integrity, trust, and respect in employees, who ultimately view them as role models. Current research suggests that idealized influence can be separated into two distinct sub-facets: idealized attributes, or character qualities that employees attribute to the leader, and idealized behaviors, or things the leaders do to earn such attributions (Bass and Riggio, 2006). For example, instilling pride in employees is an idealized attribute, whereas expressing one's values to subordinates is considered an idealized behavior. Both types of idealized influence are challenging to study because they are more abstract and less behavioral than other aspects of transformational leadership. Although leadership research has not examined specific links between either type of idealized influence and safety outcomes, there is some evidence to suggest that constructs related to idealized influence, such as trust and integrity, might be related to health outcomes. Studies by Dellve et al. (2007) and Nyberg et al. (2008) both found that leaders who were viewed as more trustworthy and as having higher levels of integrity had employees that took fewer sick days. Although the number of sick days taken is not a direct measure of employee injury and illness, it does suggest that idealized influence is related to employee outcomes. However, many questions remain about the nature of this relationship. In some cases, idealized influence might operate in an unhealthy direction, if employees follow a supervisor who sets an example of working through pain or illness or taking risks. At present, there is no evidence to suggest the type of effect that idealized influence would have on employee safety compliance, safety participation, or safety climate,

or if idealized influence could be separated from more concrete leadership facets such as individualized consideration or intellectual stimulation.

Research Question 3. Is idealized influence associated with safety climate, safety compliance, safety participation, injuries, and/or pain?

1.3.2.2. Inspirational motivation. Inspirational motivation reflects a leader's clear articulation of a compelling vision and the need for employees to work towards this mission, resulting in more inspired employees (Bass, 1985). Leader inspirational motivation has been associated with employees' willingness to voice opinions and be open about their thoughts (Detert and Burris, 2007). Based on this limited research, it is possible that leader inspirational motivation could have an important effect on employee safety participation, which requires that employees speak up and take initiative to promote a safe environment. Inspirational motivation might promote a positive safety climate if safety is part of the leader's vision; however, a leader who promotes a vision of high productivity might actually reduce safety climate perceptions. It is not clear whether inspirational motivation would have substantial effects on safety compliance, because following existing rules and procedures may not require "inspiration," and this inspiration (or lack thereof) may or may not translate to reduced injuries and pain in employees.

Hypothesis 5. Inspirational motivation will be associated with safety participation.

Research Question 4. Is inspirational motivation associated with safety climate, safety compliance, injuries, and/or pain?

1.3.2.3. Intellectual stimulation. Intellectual stimulation reflects the extent to which a leader solicits employees' perspectives on problems and considers a wide variety of opinions in making decisions (Bass, 1985). Again, no empirical research reports a specific relationship between intellectual stimulation and safety performance. However, leader intellectual stimulation might reasonably be expected to contribute to employee safety participation. Leaders who ask for new ideas and encourage innovation will convey to employees that their opinions are valued, and they may be more likely to generate unique and valuable solutions to safety issues in the workplace. Intellectual stimulation should be related to safety participation, as it encourages employees to creatively envision new ways to perform the job safely and effectively, but may be unrelated to safety compliance, which implies following existing rules. Further, intellectual stimulation may contribute to safety climate by empowering employees (cf. Wiegmann et al., 2002, who argued that empowerment is a critical element of safety culture). However, any link between intellectual stimulation and injuries or pain seems likely to be indirect at best.

Hypothesis 6. Intellectual stimulation will be associated with safety participation and safety climate.

Research Question 5. Is intellectual stimulation associated with safety compliance, injuries, and/or pain?

1.3.2.4. Individualized consideration. Leaders engaging in individualized consideration attend to the individual differences in the needs of their employees and seek to coach or mentor them in an effort to help them reach their full potential (Avolio, 1999; Bass and Riggio, 2006). There is a plausible conceptual link between individualized consideration and safety, but a lack of empirical evidence to support this claim. Similar to inspirational motivation, individualized consideration has an influence on employee expression of opinions and being open to new ideas (Detert and Burris, 2007). This suggests that that when leaders consider their employees individually, employees are more open to generating ideas and solutions to safety-related problems (safety participation). However, it is not evident based on the current research whether individualized consideration would influence safety compliance, safety climate, injuries, or pain. Employees who believe their leader cares about their needs might be more willing to mention minor injuries or pain, and considerate leaders might be more responsive to such reports, allowing earlier intervention and preventing more significant injury or pain in the long term. However, there is as yet no evidence regarding this relationship.

Hypothesis 7. Individualized consideration will be associated with safety participation.

Research Question 6. Is individualized consideration associated with safety climate, safety compliance, injuries, and/or pain?

In summary, it seems clear that different logical paths can be drawn between individual facets of leadership and particular safety outcomes. Transactional leadership behaviors (contingent reward and active management-by-exception) appear to have most potential to influence employee safety compliance, and also appear to have the most direct links to injury and pain. Transformational leadership behaviors (particularly, inspirational motivation, intellectual stimulation, and individualized consideration) seem most likely to influence safety participation. Contingent reward and intellectual stimulation have the clearest conceptual links to safety climate. However, there is minimal empirical evidence that can be used even as indirect support for these arguments; at present, they are speculative at best. Before we can develop strong theory about *how* individual leadership facets relate to safety, it seems wise to establish *whether* each facet accounts for unique variance in safety outcomes, independent of the effects of other facets.

1.4. Current study

Based on a large-scale survey, we used relative weights analysis (Johnson, 2000) to estimate the unique impact of each of the transactional and transformational leadership facets on each safety outcome (safety climate, safety behaviors, injury, and pain) after accounting for the effects of the other facets. This analysis allowed us to identify which facet was most strongly associated with each safety outcome, providing preliminary evidence that can inform both theory development and empirical research on the impact of leadership on safety.

To ensure that we used a sample where both safety and leadership were important, we focused this study on construction workers. Construction is a dynamic and complex industry that plays an important role in the US economy, as this sector is responsible for building, renovating, and improving the buildings in which we live and work (Behm, 2008). In 2011, the construction industry employed roughly 4% of the entire workforce; however, it accounted for 17.5% of all work-related fatalities in the United States, as well as 5% of all workdays lost to injuries (BLS, 2012). Most construction jobsites involve several different contractors at once, and so much of the exposure to risks is episodic and unpredictable (Ringen et al., 1995a). The environment is rapidly changing, as the supervisors, employers, work assignments, and jobsites vary continuously

(Ringen et al., 1995b). The job of a construction worker is therefore characterized by the simultaneous presence of a number of physical and social stressors that are harmful to safety on the job.

Leadership is a key element in construction work because trade training is primarily built upon a mentorship model for apprentices (Meliá and Becerril, 2007; Rogers, 2007; Sobeih et al., 2006). Novice workers (i.e., apprentices) are usually mentored by their more experienced coworkers, journeymen. Senior journeymen work with apprentices in order to help them become accustomed to the industry, learn and hone their skills, and serve as a role model during the apprenticeship training. Journeymen, in turn, are usually overseen by even more experienced workers, who are typically in the position of foremen or general foremen (Rogers, 2007). This industry provides a unique situation for the development of leadership and the potential for leadership to influence safety, and so construction will be the population of focus for the present study.

2. Methods

2.1. Participants and procedure

We distributed surveys to plumbers and pipefitters from five organizations in three different regions of the United States. Both apprentices (1090 recruited, 870 completed; 80% response rate) and journeymen (1787 recruited, 658 returned; 37% response rate) were included in the study. The differing response rates among apprentices and journeymen are likely due to differences in recruitment procedures. All apprentices were enrolled in training classes at their respective unions, and these individuals were recruited during their classes. In the first region, we recruited journeymen through a mailing; however, only 29% of surveys were returned. In the other two regions, we recruited journeymen who were enrolled in code classes to update their training. Although not all journeymen elected to take these classes, surveying those that did attend seemed to be a better use of resources than a mailed survey. The response rates for the regions where journeymen were recruited in class (69% and 86%) were a large improvement over the response rate in the region where surveys were mailed.

The final sample consisted of 1548 responses, with an overall response rate of 53%. The other demographic characteristics were representative of the mechanical construction industry, with mostly Caucasian (80.4%) males (96.8%) at an average age of 35. Participants had been working with their current supervisor for an average of 3 years, with a range from 1 month to 41 years.

2.2. Measures

2.2.1. Demographic variables

A number of demographic variables were included in the survey, including age, gender, ethnicity, and time with current supervisor. We also asked participants to report their role (apprentice or journeyman), because the importance of each facet of leader behavior might differ based on this variable.

2.2.2. Leadership

We used an abbreviated version of the Multi-Factor Leadership Questionnaire (MLQ) to measure leadership (Avolio and Bass, 2004). Eight items measuring two facets of transactional leadership were included, four for contingent reward (Cronbach's $\alpha = .89$ for this study), and four for active management-by-exception ($\alpha = .86$). Twenty items measuring five facets of transformational leadership were included in the survey: idealized attributes (4 items; $\alpha = .89$), idealized behaviors (4 items; $\alpha = .91$), inspirational motivation (4 items; $\alpha = .90$), intellectual stimulation (4 items; $\alpha = .91$), and individualized consideration (4 items; $\alpha = .89$). Participants rated how often their current, immediate supervisor engaged in each behavior, using a 5-point scale ranging from 1 (*not at all*) to 5 (*frequently, if not always*). Due to confidentiality constraints and requests from the organizations surveyed, we were unable to identify the specific supervisor referenced by each respondent. Thus, although it is possible that more than one respondent may have rated the same supervisor, we were unable to ascertain whether this was the case. Accordingly, we conducted the analyses at the individual level rather than the group level.

2.2.3. Safety outcomes

We measured safety climate using two subscales from Neal et al.'s (2000) measure: supervisor support and safety communication. Supervisor support refers to the extent to which employees perceive their supervisor to place a high priority on safety and provide support and encouragement for safety-related behaviors. Safety communication refers to the openness of communication on safety and health issues at work. Due to space constraints, we selected the three items for each scale that were most relevant to the construction industry and combined them to form a 6-item scale of supervisory safety climate ($\alpha = .93$).

We used Neal and Griffin's (2006) safety compliance (3 items; $\alpha = .89$), and safety participation (3 items; $\alpha = .84$) scales as indices of safety behavior. Participants rated to what extent they agreed with the statements from 1 (*strongly disagree*) to 5 (*strongly agree*). We assessed injury and pain at work with one question each. Single-item measures are often criticized, particularly on the grounds that reliability of such measures is difficult to determine. However, as suggested by Sackett and Larson (1990), when a construct of interest is narrow in scope, unambiguous to the respondent, and one-dimensional as opposed to multidimensional (as we believe general injury and pain are), a single item represents the best type of measure. For work-related injuries, we asked participants "Have you had an injury at work (e.g. cut, burn, sprain, etc.) in the past two months," and they responded yes (scored as 1) or no (scored as 0). We asked a similar question for work-related pain: "Have you experienced any work-related pain (e.g. back, shoulder, wrist pain, etc.) in the past two months," and they responded yes (scored as 1) or no (scored as 0).

3. Results

Before any formal analyses were conducted, we checked the data for outliers. Outliers were identified based on four indices: leverage values exceeding 2(p/n), studentized deleted residuals exceeding 2 SD, DFFIT values exceeding $2\sqrt{(p/n)}$, and Cook's distances exceeding 4/n. Cases with scores that were consistently flagged as outliers and influential data points were deleted from further analyses listwise. After these deletions, the final usable data set consisted of 1167 cases that did not significantly differ from the initial data in age, gender, ethnicity, role, or time working with supervisor.

Descriptive statistics, correlations, and Cronbach's alphas for all scales are reported in Table 1. Some demographic variables (age, time with supervisor, role, and organization) were significantly correlated with leadership and safety ($r = .07–.25$). Upon closer examination of these relationships, role (apprentice or journeyman) was positively associated with safety climate, safety compliance, and safety participation, indicating that journeymen reported higher levels of these outcomes than apprentices. However, role was negatively related to most leadership scales, indicating that apprentices perceived higher levels of leadership than did journeymen. Because role is theoretically relevant to the study, we will present the results for apprentices and journeymen separately to

Table 1
Means, standard deviations, reliabilities, and correlations of key variables.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Role	–	–	–												
2. Idealized attributes	3.77	1.03	−.04	(.89)											
3. Idealized behaviors	3.40	1.12	.01	.78*	(.90)										
4. Inspirational motivation	3.54	1.06	−.04	.76*	.81*	(.90)									
5. Intellectual stimulation	3.63	1.06	−.08*	.78*	.74*	.79*	(.91)								
6. Individualized consideration	3.55	1.10	−.10*	.77*	.74*	.72*	.80*	(.89)							
7. Contingent reward	3.46	1.07	−.07*	.78*	.77*	.79*	.80*	.84*	(.88)						
8. Active management-by-exception	3.23	1.06	−.09*	.30*	.38*	.38*	.33*	.31*	.38*	(.85)					
9. Safety climate	7.97	1.67	.06*	.62*	.56*	.54*	.56*	.51*	.55*	.20*	(.93)				
10. Safety compliance	4.16	.66	.18*	.34*	.34*	.31*	.30*	.23*	.29*	.16*	.51*	(.85)			
11. Safety participation	3.89	.72	.25*	.33*	.35*	.32*	.27*	.23*	.28*	.16*	.45*	.56*	(.81)		
12. Injury	.24	.43	−.19*	−.08*	−.16*	−.13*	−.08*	−.06	−.09*	−.07*	−.17*	−.24*	−.16*	–	
13. Pain	.40	.49	−.11*	−.19*	−.19*	−.20*	−.18*	−.17*	−.18*	−.15*	−.18*	−.18*	−.10*	.24*	–

Note. For Role, 1 = Apprentices, 2 = Journeymen. For Injury and Pain, 0 = No, 1 = Yes.
* $p < .05$.

Table 2
The relative importance of leadership behaviors in predicting safety climate.

Variable	Apprentices				Journeymen			
	β	RW	95% CI	RI (%)	β	RW	95% CI	RI (%)
Idealized attributes	.34*	.11*	[.09,.13]	26.76	.52*	.13	[.10,.16]	28.89
Idealized behaviors	.12*	.07*	[.05,.08]	16.27	.04	.07	[.05,.08]	14.66
Inspirational motivation	.04	.06*	[.04,.07]	13.60	−.00	.06	[.04,.07]	12.57
Intellectual stimulation	.16*	.06*	[.05,.08]	15.79	.09	.07	[.04,.09]	14.78
Individualized consideration	−.08	.04*	[.04,.06]	10.94	−.15	.05	[.03,.07]	11.67
Contingent reward	.12*	.06*	[.05,.08]	15.08	.21*	.07	[.05,.09]	15.92
Active management-by-exception	−.01	.01	[.00,.01]	1.56	−.05	.01	[−.01,.02]	1.50
Total model R^2	.40*				.45*			
N	703				464			

Note. β = Regression Coefficient, RW = Relative Weight, RI = Relative Importance, as a percentage of total R^2.
* $p < .05$.

better interpret any role differences. The effect sizes of the other demographic variables were very small ($r = .07–.14$) and lacked practical significance when role was controlled for, so these variables were not included as covariates.

Our study rests on the premise that the facets of transactional and transformational leadership are, indeed, distinct. Although some factor analytic studies of the MLQ question whether the individual subscales actually measure different factors (Yukl, 1999), others have shown that the hypothesized factors can be differentiated, although they remain highly correlated (e.g., Bycio et al., 1995). Prior to conducting relative weights analysis, we performed a confirmatory factor analysis to determine whether the factors were distinct in our sample. The hypothesized seven-factor model, in which each facet of the MLQ was proposed as a separate factor, fit reasonably well ($\chi^2(df = 329) = 2{,}716.67$, $p < .01$; CFI = .93, TLI = .92, RMSEA = .07). A comparison model, based on previous research (e.g., Avolio et al., 1988; Bass, 1985; Waldman et al., 1987) in which the first six facets loaded onto a general factor and active management-by-exception was kept separate, did not fit as well as the seven-factor model ($\chi^2(df = 343) = 3{,}109.20$, $p < .01$; CFI = .92, TLI = .92, RMSEA = .07, χ^2 difference ($df = 14$) = 392.53, $p < .01$). A comparison model in which all items loaded onto a single common factor fit poorly ($\chi^2(df = 350) = 7{,}400.59$, $p < .01$; CFI = .81, TLI = .79, RMSEA = .12, χ^2 difference ($df = 21$) = 4,683.92, $p < .01$). It seems, therefore, that it is reasonable to consider the seven facets of transformational leadership as related but distinct in this sample.

3.1. Analysis of research questions

The zero-order correlations reported in Table 1 provide surface-level support for Hypothesis 1—each leadership facet, considered individually, does relate to safety outcomes. In fact, every leadership facet is correlated with nearly every safety outcome (the negligible correlation between individualized consideration and injury is the lone exception). Consistent with overall models of the relationship between leadership and safety, the correlations are strongest for the most proximal outcome (safety climate) and decrease in magnitude for more distal outcomes (safety compliance and participation, followed by pain and injury).

To proceed with testing our hypotheses, we used relative weights analysis (Johnson, 2000). Relative weights analysis is an extension of regression analysis that directly addresses the issue of substantial multicollinearity among predictors (Johnson, 2000). Relative weights analysis creates the closest possible orthogonal transformation of the set of predictors, then uses this new set of predictors in a regression analysis to predict the outcome. The regression weights are then translated back into the metric of the original variables, which produces an estimate of the unique contribution of each independent variable, as if they were uncorrelated (LeBreton and Tonidandel, 2008). For work-related injury and pain, which were measured as binary variables, we used the logistic regression variant of relative weights analysis proposed by Tonidandel and LeBreton (2010).

Results of these analyses are described in Tables 2–4. The tables present four important results for each predictor/outcome combination. The first column presents the traditional (standardized) regression coefficient from a multiple regression model containing all predictors. Asterisks indicate regression coefficients that meet conventional statistical significance criteria relative to their standard errors ($p < .05$). The second column is the raw weight from the relative weights analysis. This represents the amount of unique variance in the criterion that is explained by the predictor, after accounting for

Table 3
The relative importance of leadership behaviors in predicting safety behaviors.

Variable	Safety Compliance								Safety Participation							
	Apprentices				Journeymen				Apprentices				Journeymen			
	β	RW	95% CI	RI (%)	β	RW	95% CI	RI (%)	β	RW	95% CI	RI (%)	β	RW	95% CI	RI (%)
Idealized attributes	.15*	.03	[.00,.05]	20.22	.42*	.06*	[.03,.08]	30.76	.13*	.03*	[.01,.04]	18.36	.33*	.04	[−.00,.06]	26.54
Idealized behaviors	.17*	.03*	[.01,.05]	22.04	.05	.02*	[.01,.04]	13.78	.26*	.04*	[.02,.07]	29.17	.03	.02	[−.02,.03]	13.72
Inspirational motivation	.06	.03	[.00,.04]	17.36	−.03	.02	[.00,.03]	10.09	.07	.03*	[.01,.04]	17.76	.10	.02	[−.02,.03]	14.38
Intellectual stimulation	.14*	.03	[.00,.04]	18.13	.00	.02	[.00,.03]	10.64	−.00	.02	[.00,.03]	10.80	−.00	.02	[−.02,.02]	11.06
Individualized consideration	−.19*	.01	[−.01,.01]	7.25	−.21	.01	[−.00,.02]	8.13	.13	.01	[−.00,.02]	7.30	−.13	.01	[−.03,.02]	8.44
Contingent reward	.06	.02	[−.00,.03]	12.17	.10	.02*	[.01,.04]	12.32	.06	.02*	[.01, .03]	12.57	.02	.02	[−.02,.02]	11.05
Active management-by-exception	.00	.00	[−.02,.01]	2.83	.13*	.03	[.00,.06]	14.28	.01	.01	[−.00,.02]	4.04	.13*	.02	[−.02,.04]	14.82
Total model R^2	.15*				.18*				.15*				.17*			
N	703				464				703				464			

Note. β = Regression Coefficient, RW = Relative Weight, RI = Relative Importance, as a percentage of total R^2.
* $p < .05$.

Table 4
The relative importance of leadership behaviors in predicting injury and pain.

Variable	Injury								Pain							
	Apprentices				Journeymen				Apprentices				Journeymen			
	β	RW	95% CI	RI (%)	β	RW	95% CI	RI (%)	β	RW	95% CI	RI (%)	β	RW	95% CI	RI (%)
Idealized attributes	.29	.00	[−.02,.01]	7.78	−.15	.01	[−.01,.03]	17.00	−.05	.01	[−.00,.02]	10.45	−.22	.01	[−.01,.03]	19.41
Idealized behaviors	−.46*	.02	[−.01,.03]	33.65	−.23	.01	[−.00,.03]	22.00	.00	.01	[.00,.02]	11.76	.07	.00	[−.01,.01]	10.09
Inspirational motivation	−.05	.01	[−.02,.01]	13.23	−.34	.01	[−.00,.03]	27.01	−.28	.01	[.00,.03]	21.55	.01	.00	[−.01,.01]	10.32
Intellectual stimulation	.04	.00	[−.02,.01]	5.87	−.05	.00	[−.01,.02]	12.15	−.03	.01	[−.00,.02]	10.56	−.07	.01	[−.01,.02]	14.50
Individualized consideration	.26	.00	[−.02,.01]	6.92	−.03	.00	[−.01,.01]	10.10	−.02	.01	[−.00,.01]	8.26	−.20	.01	[−.01,.02]	18.45
Contingent reward	−.27	.01	[−.02,.01]	13.58	.38	.00	[−.01,.01]	9.25	−.05	.01	[−.00,.02]	11.31	.03	.01	[−.01,.01]	12.45
Active management-by-exception	−.14	.01	[−.01,.03]	18.96	.09	.00	[−.01,.02]	2.48	−.23*	.02	[.00,.04]	26.11	−.14	.01	[−.01,.03]	14.79
Total model R^2	.05*				.03*				.06*				.05*			
N	703				464				703				464			

Note. β = Regression Coefficient, RW = Relative Weight, RI = Relative Importance, as a percentage of total R^2.
* $p < .05$.

its correlations with other predictors. Note that the raw weight values for each analysis sum to the same total model R^2 as in the multiple regression analysis (allowing for minor variations due to rounding). Relative weights analysis accounts for the same amount of variance in the criterion as does traditional multiple regression; it merely partitions that variance differently among the predictors. Because the unique contribution of any single predictor may be quite small, it may be difficult to interpret the size of raw weights. We followed the recommendations of Tonidandel et al. (2009) to compare each raw weight to the weight of a random predictor variable included in the model; as the random variable, by definition, cannot account for a meaningful amount of variance in the criterion, only predictors that account for more variance than the random variable should be considered "significant." Asterisks next to raw weight values in the tables indicate predictors that met this standard.

For further interpretation, the third column presents bootstrapped 95% confidence intervals around each raw weight value, and the fourth column presents relative importance values. Relative importance values are calculated by dividing the raw weight for each predictor by the total R^2 for the model (e.g., in Table 2, the relative importance of idealized attributes for predicting safety climate among apprentices is .11/.40 or 27.76%). The relative importance of each facet represents "the proportionate contribution each predictor makes to R^2, considering both its direct effect (i.e., its correlation with the criterion) and its effect when combined with the other variables in the regression equation" (Johnson and LeBreton, 2004, p. 240). Relative importance therefore facilitates comparisons among predictors by making clear which predictors are accounting for the greatest proportion of the explained variance. In the following sections, we will summarize the results for each outcome.

3.1.1. Safety climate

The full set of leadership variables explained a substantial and statistically significant amount of variance in safety climate for both apprentices ($F(7,695) = 66.60$, $p < .001$, $R^2 = .40$) and journeymen ($F(7,456) = 52.44$, $p < .001$, $R^2 = .45$). For both groups, the pattern of relative weights was similar (Table 2). Idealized attributes accounted for the largest proportion of the explained variance, but idealized behaviors, intellectual stimulation, contingent reward, inspirational motivation, and individualized consideration each accounted for a non-trivial proportion as well (11–16%). Active management-by-exception was the only leadership facet that did not contribute unique variance to safety climate. Consistent with our predictions, contingent reward (Hypothesis 3) and intellectual stimulation (Hypothesis 6) were related to safety climate, but neither was the strongest predictor, and many other facets were important predictors as well.

3.1.2. Safety compliance and participation

The leadership variables also explained a significant, though smaller, proportion of variance in safety compliance for both

apprentices ($F(7, 695) = 17.28$, $p < .001$, $R^2 = .15$) and journeymen ($F(7, 456) = 14.28$, $p < .001$, $R^2 = .18$). However, the relative weights analyses (Table 3) revealed that different leadership facets were important to each group. For apprentices, the only significant unique contribution came from idealized behaviors. For journeymen, idealized attributes was the most important predictor, followed by idealized behaviors and contingent reward. This provides partial support for Hypothesis 3, as contingent reward did predict safety compliance, but only among journeymen. Hypothesis 4, that active management-by-exception would predict safety compliance, was not supported.

For safety participation, the full multiple regression model again explained significant variance for both apprentices ($F(7, 695) = 17.83$, $p < .001$, $R^2 = .15$) and journeymen ($F(7, 456) = 13.04$, $p < .001$, $R^2 = .17$). Again, the pattern of predictors was different for the two groups (Table 3). Among apprentices, the most important predictors were idealized behaviors, idealized attributes, inspirational motivation, and contingent reward. In the model for journeymen, although the combination of leadership variables did explain significant variance, the relative weights analysis revealed that no single facet contributed a significant amount of unique variance. The results for apprentices support Hypothesis 5 (about the role of inspirational motivation), but not Hypotheses 6 and 7 (intellectual stimulation and individualized consideration). The results for journeymen suggest that although leadership as a whole is relevant to safety participation, no particular facet of leadership stands out as particularly influential.

3.1.3. Injury and pain

As noted earlier, to examine the relationships between leadership variables and work-related injuries and pain, we used logistic regression and logistic relative weights analysis (Tonidandel and LeBreton, 2010). The overall model including all facets explained a significant, though small, amount of variance in work-related injury for apprentices ($\chi^2 = 32.49$, $df = 7$, $p < .001$, pseudo-$R^2 = .05$) and journeymen ($\chi^2 = 14.11$, $df = 7$, $p < .001$, pseudo-$R^2 = .03$). Results were similar for work-related pain (apprentice: $\chi^2 = 44.59$, $df = 7$, $p < .001$, pseudo-$R^2 = .06$, journeymen: $\chi^2 = 22.59$, $df = 7$, $p < .001$, pseudo-$R^2 = .05$). None of the raw weights for the individual facets contributed a significant amount of unique variance to work-related injury or pain (Table 4). This fails to support Hypothesis 4, that active management-by-exception would predict injury.

4. Discussion

The purpose of this study was to determine which facets of leader behavior had the largest influence on specific employee safety outcomes. Hypothesis 1, that all facets of transactional and transformational leadership would be related to at least one safety outcome, was generally supported, with the exception of active management-by-exception, which did not contribute unique variance to any outcome. All other facets made independent contributions to safety climate, but only some facets predicted safety compliance and participation, and no facets individually predicted injury or pain. This is generally consistent with Hypothesis 2, in which we predicted that different facets would relate to different outcomes. Of the more specific, though tentative, predictions we made on the basis of existing research, some were supported and others were not. Table 5 provides a comparison of results, which we hope will be useful for informing future research in this area.

Several interesting themes are apparent in the results. First, idealized attributes and idealized behaviors consistently emerged as the most important predictors of safety at work. Idealized attributes were the most important for establishing a positive safety climate, whereas idealized behaviors were most important for safety participation. For safety compliance, it was more important for apprentices that their leaders show idealized behaviors, but it was more important for journeymen that their leaders show idealized attributes. This finding is somewhat surprising considering the dearth of previous research related to idealized influence (note that we made no specific predictions regarding these facets). This presents something of a challenge for practice, because idealized attributes and behaviors are the most abstract components of transformational leadership and the hardest to define in clear behavioral terms. Overall, this finding is consistent with other evidence suggesting that a leader's values and the way a leader is perceived by employees (e.g., respected, trusted) may be more important than engaging in particular motivating, stimulating, coaching, or rewarding behaviors (cf. Gittleman et al., 2010, who argue that leaders "talking the talk" and "walking the walk" are important for construction safety). Certainly, idealized influence tends to covary with these more concrete behaviors, but one possible interpretation of these findings is that the other leadership facets are not as effective if they are separated from idealized influence. In other words, if a leader engages in inspirational motivation and intellectual stimulation but is *not* viewed as having idealized influence, his or her leadership will be less effective. This echoes the current direction of leadership research with a focus on the importance of core values in establishing oneself as an authentic leader (e.g., Gardner et al., 2005).

Second, intellectual stimulation, inspirational motivation, and contingent reward were important predictors of safety climate, compliance, and participation, but the relative importance of each varied considerably across the outcomes. The large sample size (yielding high statistical power; Tonidandel et al., 2009) and narrow confidence intervals we obtained suggest that at least the strongest of these differences are not simply a function of sampling fluctuations. Some of these relationships were consistent with our

Table 5
Rank orders of leader behaviors for individual safety outcomes.

Rank	Safety Climate		Safety Compliance		Safety Participation	
	Apprentices	Journeymen	Apprentices	Journeymen	Apprentices	Journeymen
1.	IA*	IA*	IB*	IA*	IB*	IA
2.	IB*	CR*	IA	A MBE	IA*	A MBE
3.	IS*	IS*	IS	IB*	IM*	IM
4.	CR*	IB*	IM	CR*	CR*	IB
5.	IM*	IM*	CR	IS	IS	IS
6.	IC*	IC*	IC	IM	IC	CR
7.	A MBE	A MBE	A MBE	IC	A MBE	IC

Note. Ranking is based on raw weights derived from relative weights analysis, and ranking should be interpreted with caution, as many differences are small. IA = Idealized Attributes, IB = Idealized Behaviors, IM = Inspirational Motivation, IS = Intellectual Stimulation, IC = Individualized Consideration, CR = Contingent Reward, A MBE = Active Management-by-Exception.
* $p < .05$.

predictions, some were not. Overall, we contend that this supports Hypothesis 2 and our overall argument that greater attention should be paid to the mechanisms by which leader behaviors influence safety. One important factor to consider in future research is the role of potential moderating variables. For example, if a leader engages in inspirational motivation, whether this translates into increased employee safety behaviors may be dependent on employee individual differences, such as self-efficacy or self-esteem (e.g., Judge and Bono, 2001; Yukl and Van Fleet, 1992).

Third, it seems clear that one such important moderator is likely to be job type. Although similar leadership facets predicted safety climate for both apprentices and journeymen, there were substantial differences between both groups in the leader behaviors that influenced safety compliance and participation. Explanations for these differences might be found on either the predictor or the criterion side. In construction, apprentices and journeymen have different kinds of interactions with leaders (e.g., apprentices are much more closely supervised), which might give rise to different perceptions about leadership or different exposure to particular leadership behaviors. At the same time, there are often different expectations for safety compliance and safety participation between apprentices and journeymen (e.g., journeymen are expected to be aware of safety policies and comply, whereas apprentices may still be learning compliance). Overall, journeymen reported lower levels of leadership behaviors by their foremen than apprentices reported of their journeymen; however, journeymen also reported higher levels of safety climate and safety behaviors, and less injury and pain than apprentices. This suggests that journeymen may be less dependent on their leaders' behavior to achieve positive safety outcomes. Further exploration of these issues would also be helpful in determining whether the results found here are likely to generalize to industries beyond construction.

Fourth, individualized consideration seldom contributed a large amount to the overall variance explained in safety outcomes for both apprentices and journeymen, suggesting that it may not be as effective as other approaches in promoting safety at work. It is interesting that in a field where apprenticeship training is highly valued, the leadership behavior most similar to mentoring was not strongly associated with safety outcomes. Previous studies have noted the key role that mentors play in construction (Meliá and Becerril, 2007; Sobeih et al., 2006); however, the results of this study as well as others (e.g., Hoffmeister et al., 2011) suggest that the act of coaching (i.e., individualized consideration) may not be as important in promoting safety as the message that is sent through other behaviors that mentors engage in (i.e., idealized influence, inspirational motivation, intellectual stimulation, and contingent reward).

Finally, active management-by-exception did not contribute significant unique variance to any safety outcome. Although we predicted possible connections between this type of leadership and safety, in studies of other outcomes of leadership, active management-by-exception is typically the least influential of all of the leader behaviors, and sometimes the relationship is negative (Avolio et al., 1996; Bass, 1985; Judge and Piccolo, 2004). Factor analyses of transactional and transformational leadership behaviors often reveal that even when a general leadership factor is present, active management-by-exception loads on a separate factor (e.g., Bass, 1985; Bycio et al., 1995). This suggests that active management-by-exception could be tapping into a different construct that has little influence on safety at work.

4.1. Limitations and directions for future research

Although this study applies a unique method of analysis to a novel question in the study of leadership, it has limitations. The first of these is the relatively exploratory nature of the study, as previous research provided only a tentative basis for predictions about relationships between specific leadership facets and specific safety outcomes. We offered some such predictions (a) to acknowledge the limited research that did exist relative to each facet and (b) to better explain the rationale for our broader hypothesis that different facets might relate to different outcomes. Some predictions were supported and some were not, highlighting the need for greater development of theory in this area, but we hope that our exploratory results may inform the design of better hypotheses in the future.

Another limitation is that the data were cross-sectional, and therefore we can only address associations between leadership and safety variables and not causal relationships. However, there is a significant amount of research that supports the idea that leadership influences safety outcomes (e.g., Barling et al., 2002; Hofmann and Morgeson, 2004; Inness et al., 2010), and these prior studies can be used as a guide for the interpretation of the results of this study. Future research should continue to examine why these relationships occur by using longitudinal designs. A related limitation is the single-source nature of the data; our results reflect subordinates' perceptions of their leaders' behavior, not the leaders' actual behavior. It is arguable, however, that perceptions of leadership are the more important predictors in this context; whether a leader is inspirationally motivating or intellectually stimulating, is, to a large extent, determined by the perceptions of the leader's employees. Combining perceptions of leadership behavior from multiple subordinates might have helped to alleviate this concern; unfortunately, due to organizational constraints, our data did not allow us to identify individuals who may have worked for the same supervisor. Further, given the breadth of the sample and the distributed nature of leadership in the construction industry, we suspect that it would have been rare for multiple respondents to rate the same supervisor in this data. Thus, we do not believe that accounting for this source of variance would have substantially changed the results we obtained.

It is also worth acknowledging that although some leadership facets contributed a relatively large amount to the overall variance explained, the raw weights of individual facets were typically small, and the overall proportion of variance explained for most outcomes was not large (ranging from pseudo-R^2 = .03 for injury to R^2 = .41 for safety climate). This implies that variables other than leadership are also important for predicting safety at work (e.g., job demands and job control, Parker et al., 2001). However, many individual leader behaviors did significantly contribute to the overall variance explained in safety climate, safety compliance, and safety participation, suggesting that although leadership may not be the only determinant of workplace safety, it is an important one. In demanding industries, such as construction, it may be difficult for a company to change the high pressure and steep demands that employees work under, and it may be equally difficult to give them more control over their work. Therefore, although changing job demands or job control might be influential in improving safety, these strategies are often impractical. Leader development is one way that organizations can have an impact on safety in construction, while continuing to work within the constraints of the industry.

Even in combination, the influence of leadership variables on work-related injury and pain was minimal. The magnitude of these effects is relatively consistent with previous research (Christian et al., 2009; Nahrgang et al., 2011) and likely reflects the difficulty of predicting a complex and relatively low-base-rate outcome that is affected by many external factors. In addition, our measures of work-related injury and pain were both broad and self-reported, with little sensitivity to the nuances of these variables. Previous research (Barling et al., 2002) has suggested a mediational model in

which leadership positively affects safety climate perceptions, which positively affect employee safety behaviors (compliance and participation), which then negatively affect work-related injuries and pain. This implies that we should see the strongest relationships between variables that are adjacent in the model. Although replicating this model was outside the scope of our study (and inconsistent with our goal of testing the effects of specific facets on different outcomes), the correlations presented in Table 1 are consistent at least with the idea that more proximal safety outcomes (such as safety climate) are more strongly related to leadership than more distal outcomes (such as injuries and pain).

Another potential limitation of this study (and perhaps of leadership research in general) is the degree of correlation among the individual leader behaviors. Relative weights analysis can statistically separate the effects of one behavior from the others, but if the leadership behaviors are truly highly correlated, it may not make sense to separate them. Numerous researchers in the past have argued that although the dimensions of transactional and transformational leadership are highly correlated, they should remain separate for theoretical reasons (e.g., Bass, 1985; Bass and Riggio, 2006). Furthermore, although it is empirically possible to separate the behaviors within leadership, the question is whether it is practically useful. Leadership researchers have suggested that all leaders possess varying degrees of each leader behavior, and in order to be successful, they must balance all of them (e.g., Avolio, 2011). Therefore, if one interprets the results of this study as suggesting that only idealized influence is important, this may not be as useful as interpreting the results to mean that *more* focus should be placed on idealized influence when developing leaders. Leaders will probably not exemplify one facet but never display another, and the purpose of this study is not to suggest that they do. Rather, this study has investigated the unique contributions of each facet in an attempt to highlight the varying importance each has for safety at work, and to stimulate efforts to explore more precisely the mechanisms by which specific leader behaviors affect safety. Our results suggest that, rather than a general characteristic of "good" leadership creating a halo that improves all safety-related outcomes, specific characteristics of leaders impact specific aspects of safety at work. Understanding these more specific relationships has both theoretical and practical benefits, as it may ultimately allow for more efficient and focused interventions to improve safety through leadership.

One particularly important area for future research lies in the further investigation of the dimensions of idealized attributes and behaviors. The idealized influence dimension of attributes and behaviors is not new in leadership theories, and has been a part of trait theories (i.e. integrity, trust, respect, honesty), behavioral theories (i.e. concern for people), contingency theories (i.e. ethical decision-making), and more recent theories such as charismatic and authentic leadership. However, exactly what constitutes idealized attributes and behaviors is difficult to define in behavioral terms, and it is not clear what one needs to do to acquire idealized influence. Future research should attempt to understand what specific actions distinguish an ethical leader, an honest leader, a leader with integrity, or a leader that holds respect among employees, so that we can better understand whether and how these characteristics can be developed.

5. Conclusion

In this study, we used relative weights analysis to investigate the influence of individual facets of leader behavior on safety. Idealized attributes and behaviors emerged as consistently important predictors of multiple safety outcomes, whereas inspirational motivation, intellectual stimulation, individualized consideration and contingent reward were less influential and related to different outcomes in different ways. These results support our argument that the relationship between leadership and safety is complex and that emphasizing different aspects of leadership may produce different results. Further, the less concrete aspects of leadership (e.g., idealized attributes and behaviors) were often the most important. Understanding the precise mechanisms by which individual facets of leadership affect safety is an important strategy for improving both theory and practice related to safety in organizations.

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