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Living Up to Safety Values in Health Care: The Effect of Leader Behavioral Integrity on Occupational Safety

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While previous research has identified that leaders' safety expectations and safety actions are important in fostering occupational safety, research has yet to demonstrate the importance of leader alignment between safety expectations and actions for improving occupational safety. We build on safety climate literature and theory on behavioral integrity to better understand the relationship between the leader's behavioral integrity regarding safety and work-related injuries. In a time-lagged study of 658 nurses, we find that behavioral integrity for high safety values is positively associated with greater reporting of fewer and less severe occupational injuries. The effects of behavioral integrity regarding safety can be better understood through the mediating mechanisms of safety compliance and psychological safety toward one's supervisor. We discuss the implications of our findings for future research on safety climate.

Keywords: behavioral integrity, psychological safety, safety compliance, occupational safety, safety climate

Occupational safety remains a pervasive problem in health care (Zohar, 2010) and one of widespread academic and practical interest (Guest & Zijlstra, 2012; Nahrgang, Morgeson, & Hofmann, 2011). Despite overall incident decreases in some of the most dangerous occupations (e.g., agriculture and construction; CDC, 2011), occupational injuries in health care have increased in recent years (BLS, 2011). These startling statistics suggest that more research is needed to understand organizational factors that might help reduce injury incidence. Leadership is an often-mentioned factor in driving occupational safety (Clarke, 2013; Mullen & Kelloway, 2009). Previous research has demonstrated the importance of both leader safety expectations and leader safety actions in fostering safety attitudes, behaviors, and outcomes (Clarke, 2013; Zohar, 2000; Zohar & Luria, 2004). Recently, behavioral integrity has been advocated by researchers as adding value to existing measures of safety climate (Leroy, Dierynck et al., 2012; Zohar, 2010; Zohar & Hofmann, 2012). Leader behavioral integrity is the perceived alignment between expectations and actions (or the extent that leaders "walk the talk" and "practice what they preach"; Simons, 1999, 2002). For instance, a nurse manager may espouse the importance of safety procedures while he or she fails to enact, enforce, and support the same safety procedures through contingent consequences, allocation of time and resources, and personnel evaluations. In this study, we build on previous safety climate studies (Zohar, 2000, 2010) and theory on behavioral integrity (Simons, 2002, 2008) to clarify the role of leader behavioral integrity regarding safety in fostering occupational safety for followers.

Simons (2008) proposed that the behavioral integrity of managers influences followers through two mechanisms: (1) leader actions supporting espoused workplace values send unequivocal messages that safety is prioritized over competing work-related

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demands and (2) alignment between words and actions signals that the leader has deep and genuine concern for workplace values and is trustworthy, thus fostering a psychologically safe work environment (Edmondson, 1999). Applied to the promotion of safety values, behavioral integrity promotes the complementary mechanisms of safety compliance while also supporting a psychologically safe environment in which to report, discuss, and learn from safety errors. Accordingly, behavioral integrity and its operating mechanisms may benefit various indicators of occupational safety: frequency, severity, and reporting of occupational safety injuries.

Theory and Hypotheses

Safety Climate and Behavioral Integrity

Safety climate denotes employee perceptions concerning the procedures, practices, and behaviors that get rewarded and supported with regard to safety (Nahrgang et al., 2011). Over the past several decades, researchers have validated safety climate as a robust leading indicator of various safety outcomes, including patient safety and occupational safety (Christian, Bradley, Wallace, & Burk, 2009). A central idea in the safety climate literature is that safety climate perceptions are mainly formed by how leaders trade-off safety with other competing demands such as productivity or efficiency (Zohar & Luria, 2004). Leaders can reveal their relative priorities among competing demands by managing safety expectations or by demonstrating the importance of safety through their actions.

Zohar (2000) suggested that espousal and enactment of the priority of safety need not necessarily be correlated: a supervisor might be emphasizing safety in communicating to employees, but actively compromising safety procedures when other competing demands arise. Conversely, a supervisor could display the importance of safety values in his or her behavior as a role model, without explicitly drawing attention to the issue of safety in his or her expectations. Recently several authors have drawn attention to the degree of divergence between safety expectation and safety actions (Zohar, 2003, 2010; Zohar & Hofmann, 2012), arguing that it is only the enacted policies that are informative about the behavior that is likely to be rewarded or supported. These authors refer to theory on behavioral integrity for a better understanding (Simons, 2002, 2008) on the effects of alignment between words and deeds.

Behavioral integrity is defined as the perceived pattern of alignment between a supervisor's words and deeds (Simons, 2002). Behavioral integrity regarding safety is distinct from safety expectations and safety actions (Zohar, 2000). Whereas expectations highlight the words spoken, safety actions highlight the actions undertaken. In other words, expectations and actions form the basic elements comprising actual alignment of word and deeds, and (because of perceptual filters) a combination of expectations and actions does not translate perfectly into perceived alignment. As used in this study, behavioral integrity for safety implies perceived alignment for high espoused safety values. One could argue that a leader could have behavioral integrity for socially undesired values such a disregard for safety, and that there is value in such consistency regardless of value content (Simons, 2002). While an interesting avenue for future research, when using the term behavioral integrity for safety, we imply alignment for high espoused safety values.

Examining the impact of behavioral integrity on safety, we include both safety compliance and psychological safety (Hofmann, Morgeson, & Gerras, 2003; Hofmann & Mark, 2006; Neal & Griffin, 2006) as dual mediators to the behavioral integrity−safety relationship (see Figure 1). More specifically, for safety compliance we look at the extent to which nurses work around safety protocols to finish their work (Halbesleben, 2010). We also look at the extent to which employees experience psychological safety. More specifically, we look at the extent to which the employee feels psychologically safe to voice concerns and mistakes toward one's supervisor. In a health care setting, those mistakes will often be related to safety problems. Also, we look at voicing to higher-ups as distinct from voicing within the team or among other coworkers, given the distinct power position of leaders (Detert & Trevino, 2010; Detert & Edmondson, 2011).

In this study we measure the frequency and severity of occupational injuries, as well as the reporting of injuries. It is important to distinguish between these different measures of occupational

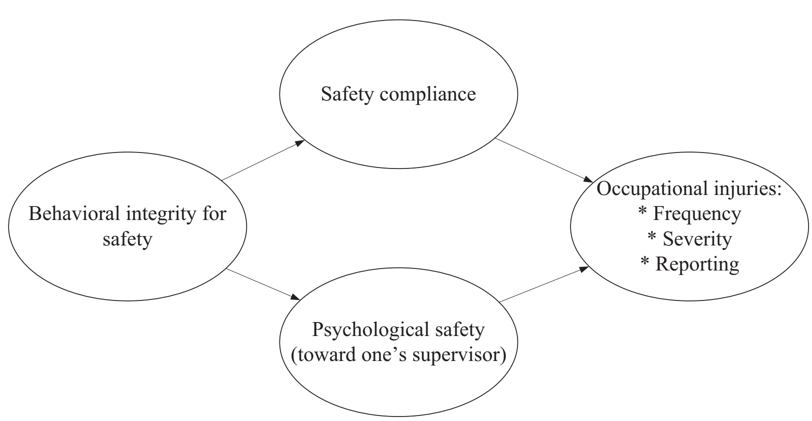

Figure 1. Hypothesized model. *Note*: Solid lines indicate paths tested in the stability model, dashed lines were paths added in the causal (cross-lagged) model. Parameter estimates are derived from a test of the proposed cross-lagged model. All parameter estimates are significant at the .05 level. CD = Coefficient of Determination (reported for the final cross-lagged model).

safety, as each of these outcomes holds unique meaning. For example, infrequent injuries that are very severe are qualitatively different from frequent injuries that are less severe. Furthermore, experienced injuries are not always reported and it is the reporting of errors that it is important for organizational learning (Macrae, 2009). Reductions in reported injuries can reflect either genuine enhancement of safety or the inhibition of reporting injuries that actually occur—and inhibition of reporting is neither desirable nor constructive with regard to actual occupational safety. To the contrary, a high reporting ratio facilitates learning and thus actual safety. Research on occupational safety, therefore, should differentiate between these three measures due to slightly different psychological processes driving each (Edmondson, 2004; Probst, Brubaker, & Barsotti, 2008).

Behavioral Integrity for Safety, Safety Compliance, and Occupational Injuries

Alignment between words and deeds is important to send unequivocal signals that values (such as safety) are prioritized in the organization (Dineen, Lewicki, & Tomlinson, 2006; Simons, 2008). Safety compliance refers to following safety protocols meant to protect employees. Well-aligned words and actions send clear signals to employees that appropriate safety behavior (e.g., following safety regulations) will be rewarded and that inappropriate safety behavior (e.g., working around safety regulations) will be punished. More directly, leader behavioral integrity will serve as role modeling (leading by example) such that the leader's enacted priority attached to safety will be mirrored by followers (Bandura, 1977). These arguments suggest that behavioral integrity for safety will be positively associated with follower compliance with safety protocols.

There is an extensive literature suggesting that following protocols is associated with fewer occupational injuries (Christian et al., 2009; Halbesleben, 2010). Reducing injuries is the intent of the protocols, so one would expect a negative association between safety compliance and occupational injury frequency and severity. This impact is consistent with injury epidemiology, which suggests that safety protocols reduce one's exposure to occupational hazards, thus reducing the likelihood and severity of injury (Hagberg et al., 1997). Further, if the employee was following a protocol and still got hurt, we would expect the employee to be more likely to report the injury than if he or she had not been following protocols because compliance with protocols would extend to compliance with reporting injuries as well.

> *Hypothesis 1.* Safety compliance mediates the impact of leader behavioral integrity for high safety values on occupational safety related to (a) fewer injuries, (b) less severe injuries, and (c) higher proportion of injuries reported.

Behavioral Integrity for Safety, Psychological Safety, and Occupational Injuries

Psychological safety toward one's supervisor refers to a state whereby an individual does not feel constrained by the potential for negative consequences that would result from honestly sharing one's beliefs (Edmondson, 1999). When leaders practice the safety values they preach, employees will perceive the leader's concern for safety as more genuine and therefore are more likely to speak up about safety issues. The relationship between behavioral integrity regarding safety and psychological safety can be further justified by following Simons' (2002) argument that behavioral integrity enhances predictability and trust, which is a necessary ingredient for psychologically safety (Edmondson, 1999). Finally, Edmondson (2004) argued that part of creating a psychologically safe environment involves creating clear boundaries of what behaviors are (un)wanted. Within those safe boundaries, employees are more likely to speak up.

Psychological safety toward one's supervisor is related to occupational safety (Christian et al., 2009) because it affects the ability to discuss, learn from, and ultimately reduce safety errors (Edmondson, 1999, 2004; Hirak, Peng, Carmeli, & Schaubroeck, 2012; Leroy, Dierynck et al., 2012). Psychological safety toward one's supervisor has offsetting effects on occupational injury rates (Edmondson, 2004). On the one hand, psychological safety toward one's supervisor will increase learning at the individual level (Carmeli & Gittell, 2009) and thereby reduce the number of actual injuries and their severity over time. On the other hand, psychological safety toward one's supervisor will increase the proportion of occupational injuries reported, as employees feel safe to learn from mistakes (Edmondson, 1999; Edmondson, 2004).

> *Hypothesis 2.* Psychological safety toward one's supervisor mediates the impact of leader behavioral integrity on occupational safety related to (a) fewer injuries, (b) less severe injuries, and (c) higher proportion of injuries reported.

Method

Participants

The participants included 658 registered nurses from four acute-care hospitals in the Midwest United States. The sample included 82 males and 572 females (four participants did not respond to this question) with a mean age of 41.39 (SD = 11.88) years. The participants had been working for their current organization for a mean of 10.14 years (SD = 9.22). They reported working a mean of 36.18 hours per week.

The data were collected via an online survey. A survey link was sent by the director of nursing at the hospital with a request to participate in the survey; a reminder was sent 3 days following the initial e-mail. This process was repeated two additional times with 6 months between each survey administration. We utilized a 6-month lag in order to balance exposure to injury with ability to recall specific injuries (Halbesleben, 2010). Time lags between data collections can also minimize concerns about common method bias (Podsakoff, MacKenzie, & Podsakoff, 2012). At the end of each survey, we asked the participants to include a code that they generated from personal information in order to maintain anonymity of data and allow for tracking over the three data collection periods.

The four facilities employ 1,087 registered nurses working in nonmanagement positions. At Time 1, 865 nurses completed the survey for an initial response rate of 80%. The Time 2 survey was completed by 724 nurses, and 673 completed the Time 3 survey. Overall, we were able to match three rounds of data from 658 nurses (final response rate = 61%); this included dropping data from 34 nurses who indicated they had changed units during the time of the study or were working for a different head nurse at some point during the study. Our retention rate from Time 1 to Time 3 (76%) differed only slightly from the average employee retention rate of the four facilities that had participated in the survey during the same period of time (77%). Final response rates for the four facilities did not differ significantly (57%, 63%, 60%, and 65%).

To test for the possibility of nonresponse bias, we tested the characteristics of each group as they responded to the survey (Rogelberg & Stanton, 2007). We found that the final sample did not differ significantly from the participants who responded only to the first survey with respect to the demographics and the major variables in the study. Moreover, the respondents to each week's reminder were not significantly different from those who responded to the initial request to complete the survey.

The four hospitals are part of the same health system. All of the hospitals have a relatively flat organizational structure with very little turnover among supervisors. During the course of the study, only two head nurses (out of approximately 50) left their positions. Due to confidentiality concerns, we were unable to collect data in this study on the department within which each nurse worked. However, we did ask on each survey whether he or she had changed units in the course of the study or whether he or she was working under a different head nurse.

Measures

Unless otherwise noted, all items were scored on a 5-point, Likert-type scale from *strongly disagree* (1) to *strongly agree* (5). Mean values and measures of internal consistency (Cronbach's alpha) are depicted in Table 1.

Behavioral integrity for safety. To examine behavioral integrity, we asked the nurses to complete an adapted version of the 6-item behavioral integrity scale (Simons et al., 2007). Leroy, Dierynck et al. (2012) validated this scale as factorially distinct from safety expectations and actions (Zohar, 2000). Behavioral integrity for safety was correlated with, but factorially distinct from, general behavioral integrity. A sample items is "Regarding safety, my head nurse delivers the consequences he or she describes (see Leroy, Dierynck et al., 2012 for the items).

Psychological safety toward one's supervisor. We utilized a 4-item version of Edmondson's (1999) psychological safety measure (Nembhard & Edmondson, 2006). Further, we adapted the measure to refer to the supervisor. A sample item is "I am afraid to express my opinions to my supervisor" (reversed).

Safety compliance. We operationalized safety compliance using the 4-item safety workarounds scale of Halbesleben (2010). A sample item was "I alter my work processes to bypass a safety procedure because the procedure slows me down."

Occupational safety (injuries and reporting). Occupational injuries were reported with a self-report checklist of injuries that had occurred during the previous 6 months. This checklist was based on the Bureau of Labor Statistics system and an existing survey from the CDC (2004), with some modifications to address the specific injuries faced by health professionals in a hospital setting (Halbesleben, 2010) and to fit the reporting procedures used by the participating facilities. Sample items included "needlesticks" and "chemical splashes (bodily fluid)." Additionally, participants indicated how many days of work were missed due to the injury to provide an indication of the severity of the injuries (Halbesleben, 2010). Finally, for each injury, we asked the participants whether or not they had reported the injury to hospital administrators. From this, we created a "reporting ratio" by dividing the number of injuries

Table 1
Descriptive Statistics and Intercorrelations Among Study Variables

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Time 1 measures																				
1. Safety BI	3.56	1.15	(.93)																	
2. Psych safety	3.19	1.09	.40	(.90)																
3. Workarounds	3.96	1.21	.50	.07	(.85)															
4. Injury frequency	1.19	2.15	−.25	−.12	−.46	n/a														
5. Injury severity	1.64	1.98	−.29	−.11	−.49	.52	n/a													
6. Reporting ratio	0.69	0.26	.15	.25	.29	−.21	.15	n/a												
Time 2 measures																				
7. Safety BI	3.44	1.17	.69	.19	.15	−.15	−.29	.11	(.91)											
8. Psych safety	3.07	1.14	.31	.65	.06	−.20	−.28	.15	.35	(.89)										
9. Workarounds	3.81	0.98	.43	.10	.75	−.16	−.16	.21	.41	.11	(.81)									
10. Injury frequency	1.38	1.99	−.38	−.16	−.38	.67	.52	−.13	−.26	−.10	−.31	n/a								
11. Injury severity	1.95	2.15	−.29	−.09	−.49	.49	.27	−.09	−.19	−.17	−.45	.49	n/a							
12. Reporting ratio	0.60	0.31	.19	.39	.35	−.17	−.09	.55	.12	.30	.29	−.16	.18	n/a						
Time 3 measures																				
13. Safety BI	3.61	1.27	.62	.12	.12	−.21	−.29	.12	.55	.34	.17	−.20	−.16	.12	(.94)					
14. Psych safety	3.29	1.06	.35	.59	.10	−.23	−.82	.19	.29	.61	.10	−.25	−.19	.09	.31	(.89)				
15. Workarounds	3.76	1.35	.39	.09	.69	−.11	−.16	.19	.36	.12	.45	−.16	−.21	.18	.55	.07	(.84)			
16. Injury frequency	1.24	2.26	−.19	−.15	−.35	.51	.31	−.10	−.17	−.18	−.37	.39	.21	−.08	−.13	−.21	−.36	n/a		
17. Injury severity	1.70	1.71	−.21	−.12	−.40	.39	.19	−.08	−.22	−.14	−.48	.12	.17	−.03	−.28	−.16	−.29	.39	n/a	
18. Reporting ratio	0.71	0.21	.09	.23	.25	−.13	−.10	.49	.09	.49	.35	−.05	−.01	.39	.12	.45	.18	−.15	.17	n/a

Note. $N = 658$. Internal consistency estimates (Cronbach's alpha) appear in parentheses along the diagonal, where applicable. BI = Behavioral integrity. Correlations over .08 are $p < .05$; correlations over .11 are $p < .01$.

self-reported to the organization by the total number of injuries self-reported as part of this study.

In addition to the self-report data, we were able to collect data regarding the number of injuries reported and the number of sick leave days used following each injury. We obtained these data for three 6-month periods: prior to Time 1 data collection, between Time 1 and Time 2, and between Time 2 and 3. Because the survey was anonymous, we could not match organizational data to individual data. Instead, we utilized these data to examine the approximate validity of the self-report data (Halbesleben, 2010). The mean number of injuries reported and time missed as a result of the injuries were generally consistent, with somewhat lower rates coming from the organization than from the sample. For example, at Time 1 the frequency of occupational injuries was self-reported as 1.98 for one facility; that organization reported a mean of 1.33 for the population. Importantly, there were no significant differences between facilities in the ratio of injuries reported; all facilities demonstrated a similar pattern whereby the self-reports of injuries were somewhat higher than the organization reports. This result is consistent with the notion that injuries are underreported in most organizations (Azaroff, Levenstein, & Wegman, 2002; Probst & Estada, 2010).

Control variables. We controlled for general behavioral integrity by using the 6-item behavioral integrity scale (Simons et al., 2007) to control for nonspecific effects of behavioral integrity. We found that the addition of the controls did not meaningfully improve our tests of the model. Therefore, we continued without control variables (Becker, 2005).

Analyses

To analyze the cross-lagged panel data, we employed structural equation modeling (SEM). To test the conceptual model depicted in Figure 1, we employed the analytical approach of Cole and Maxwell (2003) for testing of mediation models in a three-wave cross-panel design. First, we examined the measurement model using confirmatory factor analysis to ensure that each survey item was loading appropriately onto its respective factor. Consistent with the two-step SEM approach advocated by McDonald and Ho (2002), in subsequent structural models we utilized mean aggregates for each variable (e.g., safety behavioral integrity at Time 1 is the mean of the safety behavioral integrity items measured at Time 1). To adjust for measurement error, the covariance matrix that resulted from the above measurement model tests was used as the input for the path models reported below.

To test the structural aspects of the model, we first tested a model that included the direct effects of the predictor (T1 safety behavioral integrity) to the outcome (e.g., T3 injury frequency), without the mediator (MDir in Table 2). Such an effect is recommended to establish mediation (Baron & Kenny, 1986). Next, we tested the causal model (MCaus), which added the cross-lagged associations (e.g., T1 safety behavioral integrity to T2 psychological safety toward one's supervisor and workarounds; T1 psychological safety toward one's supervisor and workarounds to T2 injury frequency) to the stability model in a stepwise fashion. Next, we tested a partial mediation model (MPar) that added the direct effects of safety behavioral integrity on injury frequency. Finally, we also tested a reverse causation model (MRev) that added reversed cross-lagged paths (e.g., T1 injury frequency to T2 safety compliance and psychological safety toward one's supervisor, T2 safety compliance and psychological safety toward one's supervisor to T3 safety behavioral integrity) to the stability model.

We ran these models three times: for injury frequency, for injury severity, and for reporting ratio. To account for the potential nesting effects of having four hospitals in the sample, we used the TYPE = COMPLEX command in Mplus and indicated the facility as a clustering variable.

Results

Results from the most critical model tests appear in Table 2. The fit for the proposed measurement model was acceptable, consistent across time, and superior to the fit for alternative measurement models, confirming the proposed factor structure of the measures (see Table 2).

As indicated in Table 2, the direct effects model (MDir) provided adequate fit to the data. However, the coefficients of determination for the safety outcomes in these models were low (.12−.26), indicating that while safety behavioral integrity was associated with safety outcomes, there may be more direct factors that can improve in the prediction of injuries. The stability model that included the autoregressive effects also fit the data adequately (see MStab in Table 2). The coefficients of determination for injury outcomes are higher than the direct effects model (e.g., Time 2 injury frequency: .25, Time 3 injury frequency: .27) and will serve as a baseline for the subsequent model tests.

We then added the various cross-lagged associations to the model in a stepwise fashion. For brevity, we report the final cross-lagged model fit with all cross-lagged paths. As indicated in Table 2, this final model provided adequate fit to the data and fit the data better than the stability model; moreover, the coefficients of determination for injury frequency (Time 2: .55, Time 3: .43) were much higher with the addition of psychological safety toward one's supervisor and workarounds as mediators. Importantly, all the parameters for the cross-lagged effects were significant and in the predicted directions.

Next we tested the partial mediation model (MPar) (for brevity, we report the best fitting model in Table 2 both based on fit statistics and comparison with the full mediation [MCaus] model). We found that while the fit indices for the partial mediation (MPar) model were more favorable, the relative fit compared to the full mediation (MCaus) model was not significant (with the exception of reporting ratio). Finally, the reverse causation model did not provide adequate fit to the data (see Table 2).

In light of the strong fit of the mediation models that we had predicted, we further examined the parameter estimates for each model. These are depicted in Figures 2, 3, and 4 for injury frequency, severity, and reporting ratio, respectively. The pattern in the parameter estimates is consistent across the three safety outcomes. Safety behavioral integrity is associated with both psychological safety toward one's supervisor and safety compliance during the subsequent measurement period; psychological safety toward one's supervisor and safety compliance are then associated with each safety outcome during the subsequent measurement period. Thus, in addition to the strong fit of the mediation models that we proposed, the parameter estimates confirm that the variables are associated in the directions we predicted. As a result,

Table 2
Fit Statistics for SEM Models of Safety Behavioral Integrity, Psychological Safety Toward One's Supervisor, Safety Compliance, and Safety Outcomes

Model description	χ^2	*df*	GFI	CFI	NFI	TLI	RMSEA	Model comparisons	$\Delta\chi^2$	Δdf
Measurement model T1	174.28	71	.95	.94	.95	.96	.047			
Measurement model T2	162.68	71	.96	.96	.96	.96	.044			
Measurement model T3	135.19	71	.97	.97	.97	.97	.037			
Direct effect of safety behavioral integrity (T1) on injury frequency (T3)	4.48	2	.94	.95	.94	.96	.043			
Direct effect of safety behavioral integrity (T1) on injury severity (T3)	4.99	2	.94	.94	.94	.95	.048			
Direct effect of safety behavioral integrity (T1) on reporting ratio (T3)	4.06	2	.95	.95	.95	.96	.040			
Cross-lagged relationships between safety behavioral integrity, psychological safety toward one's supervisor, safety compliance, and injury frequency										
Stability model (MStab)	152.13	62	.95	.95	.95	.95	.047			
Causal model (MStab + cross lagged paths)	92.98	54	.98	.97	.98	.97	.033	MStab vs. MCaus	59.15**	8
Partial mediation model (MCaus + direct BI to injury paths)	88.25	52	.98	.97	.98	.97	.033	MPar vs. MCaus	4.73	2
Reverse causal model (MStab + reverse cross lagged paths)	262.89	54	.82	.85	.81	.85	.077	MStab vs. MRev	110.76**	8
Cross-lagged relationships between safety behavioral integrity, psychological safety toward one's supervisor, safety compliance, and injury severity										
Stability model (MStab)	145.23	62	.95	.95	.96	.95	.045			
Causal model (MStab + cross lagged paths)	81.56	54	.97	.98	.98	.98	.028	MStab vs. MCaus	63.67**	8
Partial mediation model (MCaus + direct BI to injury paths)	77.05	52	.98	.97	.98	.98	.027	MPar vs. MCaus	4.51	2
Reverse causal model (MStab + reverse cross lagged paths)	427.06	54	.79	.76	.78	.72	.102	MStab vs. MRev	281.83**	8
Cross-lagged relationships between safety behavioral integrity, psychological safety toward one's supervisor, safety compliance, and reporting ratio										
Stability model (MStab)	224.88	62	.90	.90	.90	.92	.063			
Causal model (MStab + cross lagged paths)	105.15	54	.97	.96	.98	.97	.038	MStab vs. MCaus	119.73**	8
Partial mediation model (MCaus + direct BI to injury paths)	99.73	52	.98	.97	.98	.97	.037	MPar vs. MCaus	5.42	2
Reverse causal model (MStab + reverse cross lagged paths)	529.28	54	.69	.71	.64	.67	.12	MStab vs. MRev	424.13**	8

Note. Measurement models did not include safety outcomes since they were single item, nonscaled measures. All models were run using the TYPE = COMPLEX command to account for facilities.
* $p < .05$. ** $p < .01$

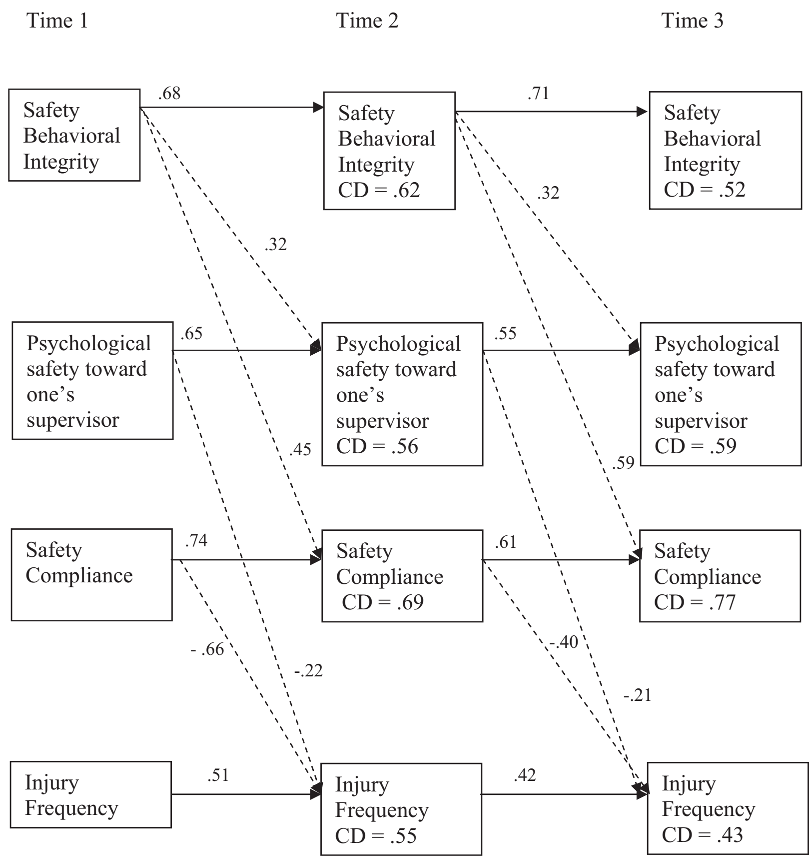

Figure 2. Cross-lagged panel parameter estimates for injury frequency. *Note*: Solid lines indicate paths tested in the stability model, dashed lines were paths added in the causal (cross-lagged) model. Parameter estimates are derived from a test of the proposed cross-lagged model. All parameter estimates are significant at the .05 level. CD = Coefficient of Determination (reported for the final cross-lagged model).

these findings offer support for the mediation effects predicted in Hypotheses 1 and 2.

Discussion

Injuries remain a major concern in the health care industry. This study contributes to the existing literature on safety climate in health care as well as the existing literature on behavioral integrity. We apply the concept of behavioral integrity to a very specific setting—safety—and we differentiate between and explicitly test two possible mechanisms that explain the effect of behavioral integrity on safety outcomes. We also included measures of self-reported injury rates, actual organizational rates of injury, nonreported injuries, and injury severity to provide exceptionally rich injury data. The separation of injury frequency, severity, and reporting is an important feature of this study. The frequency of reported workplace accidents contains an element of subjective judgment, as accidents are not always reported (Edmondson, 2004; Sutcliffe, 2004). Accidents will be more detrimental when they are not reported, because little learning can take place (Edmondson, 2004). As our study suggests, leaders can play a role not only in the reduction of occupational injuries, but also in promoting the reporting of those injuries. This is an important finding, since previous studies of leadership and safety have focused on either the experience of injury or injury reporting rather than integrating them into one model.

Workplace injury and illness statistics highlight the need to understand the causes and resulting negative consequences to health care providers (Clarke, 2010; Stone, Du, & Gershon, 2007), and this study holds a number of important implications for theory and research. While there has been considerable research on the role that leaders and safety messages play in occupational safety (e.g., Clarke, 2013; Zohar, 2000; Zohar & Luria, 2004), this study offers a theoretical framework to understand how perceptions of leadership behaviors affect safety attitudes, behavior, and, ultimately, outcomes. Given that a central focus of safety climate research is the importance of safety relative to other work role demands, the study of behavioral integrity for safety adds value in understanding how leadership perceptions regarding prioritization of safety over other competing work role demands impact safety outcomes.

Implications for Practice

Several practical implications arise from these findings. First these results highlight the importance of alignment between words and deeds. Leaders may not always be conscious of the fact that they are espousing A but really putting B to practice. In clarifying

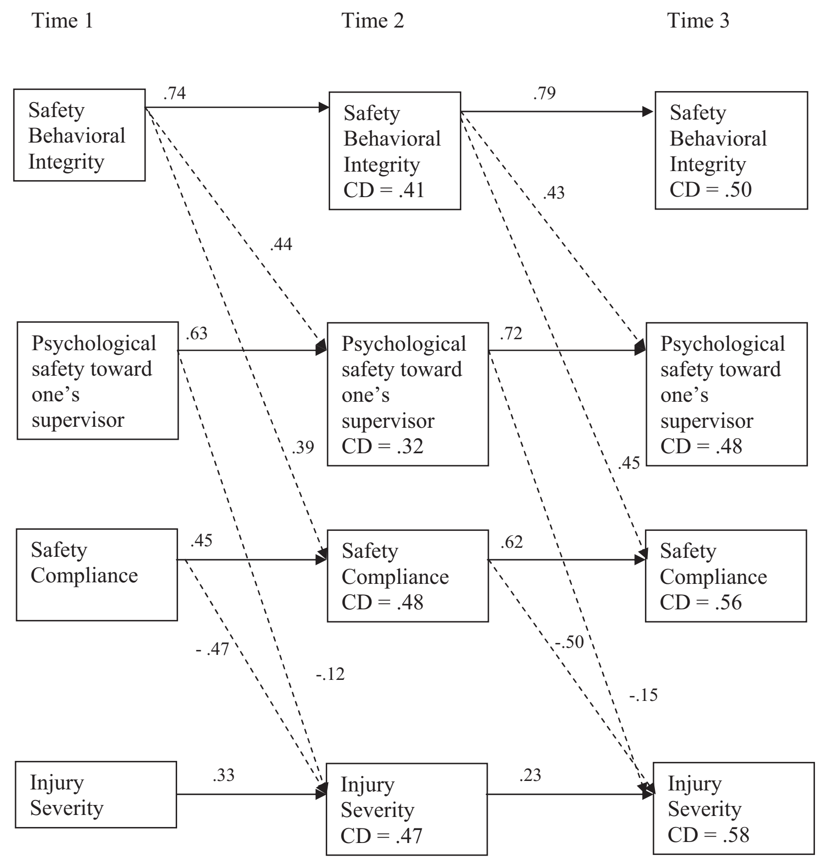

Figure 3. Cross-lagged panel parameter estimates for injury severity. *Note*: Solid lines indicate paths tested in the stability model, dashed lines were paths added in the causal (cross-lagged) model. Parameter estimates are derived from a test of the proposed cross-lagged model. All parameter estimates are significant at the .05 level. CD = Coefficient of Determination (reported for the final cross-lagged model).

the role that behavioral integrity for safety plays in fostering safety behaviors and safety outcomes, our results can help leaders in health care and those supporting and developing them to be conscious of the importance of this alignment and the reasons why this is important. Note that alignment is not only a function of the leader's character, but may also be a function of the organization's lack of communication (Simons, 2002). Leaders may be forced to espouse high safety values, without being able to follow up on these expectations themselves. Individual leaders and the organization as a whole may benefit from striving for alignment and maintaining alignment whenever possible.

A second implication of these findings is the idea that there are multiple indicators of safety climate and occupational safety, all of which paint a distinct picture of safety in the organization. Looking at only one indicator (e.g., frequency) may not represent the whole picture of safety. Indeed, a low frequency of injuries may actually be an indication of low reporting rather than an indication that the organization scores high on safety. Similarly, severity adds information to frequency. As more severe injuries are usually more heavily controlled by protocols, a lower frequency of injuries that are less severe may be a better indication of safety climate "between the procedural lines."

Limitations and Directions for Future Research

We acknowledge that our study is subject to the various biases associated with self-report measurement. However, in a number of cases, one could argue that self-reporting of variables in our study is less biased than the use of outside sources. As our confirmation with organizational injury data suggests, self-report may be the only way to separate out the incidence of injury and the reporting of injury. Further, other studies have suggested that workarounds are not necessarily subject to social desirability biases (Halbesleben, Savage, Wakefield, & Wakefield, 2010), again making self-report the most appropriate means for data collection. Of course, despite these arguments and the three-wave data collection, we cannot rule out the possibility that the reliance on self-report data is biasing these relationships.

While we were able to account for the dependence associated with the four locations in our analyses, we were unable to account for possible nesting effects from the units and shared head nurses for whom the individuals worked. This was due to the confidentiality concerns of the facilities within which we collected data. Future research that can address these effects would be valuable, particularly given recent work on within-group variation of safety climate issues (Beus, Jarrett, Bergman, & Payne, 2012). Such work

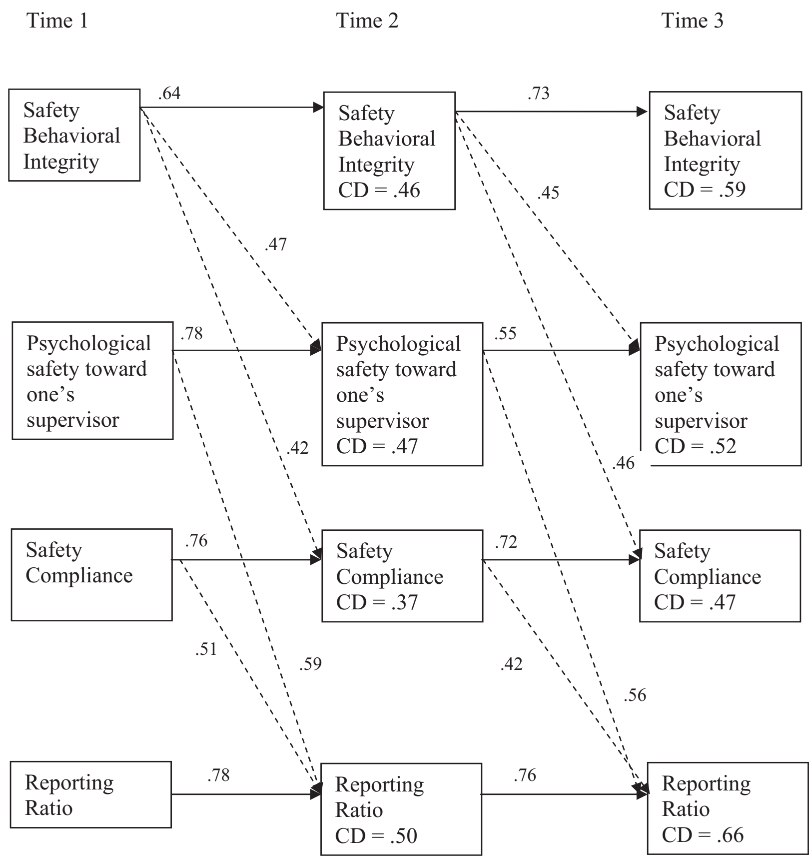

Figure 4. Cross-lagged panel parameter estimates for injury reporting. *Note*: Solid lines indicate paths tested in the stability model, dashed lines were paths added in the causal (cross-lagged) model. Parameter estimates are derived from a test of the proposed cross-lagged model. All parameter estimates are significant at the .05 level. CD = Coefficient of Determination (reported for the final cross-lagged model).

may also allow researchers to extend the recent literature on psychosocial safety climate (Clarke, 2010; Dollard & Bakker, 2010; Singh, Winkel, & Selvarajan, 2013) to safety outcomes.

Our research suggests that leaders play a role in signaling safety expectations through their behavioral integrity. As alignment between leader-espoused and enacted priorities serves to inform employees of expected safety behavior, further examination of the antecedents of the enactment/espousal gap is needed (Zohar, 2010). For example, Simons, Tomlinson, and Leroy (2011) provide an overview of how leadership styles such as authentic leadership (Leroy, Palanski, & Simons, 2012) and leader transparency (Vogelgesang, Leroy, & Avolio, 2013), may be a driver of perceptions of behavioral integrity. In addition, there may be others in the organization who offer signals that may be consistent or inconsistent with those of management. For example, in unionized settings, it may be important to consider the behavioral integrity of both management and union leadership.

In conclusion, our study's results provide greater insight into mechanisms that we posit will decrease workplace injury and enhance employee outcomes. Understanding the role of leader behavioral integrity on safety issues experienced by health care providers will help address the perceptions and outcomes of this group with the ultimate goal of achieving a safe and healthy environment for care providers.

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