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Behavioral Integrity for Safety, Priority of Safety, Psychological Safety, and Patient Safety: A Team-Level Study

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Keywords
behavioral integrity, priority of safety, psychological safety, treatment errors, safety climate, leadership

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Abstract

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Behavioral Integrity for Safety, Priority of Safety, Psychological Safety, and Patient Safety: A Team-Level Study

Employee reporting of errors is considered to be an indicator of a healthy functioning organization (Argyris, 1977). Many leaders, however, experience problems in empowering employees to report errors. In many cases empowerment is an emperor in new clothes (Argyris, 1998), with leaders advocating strict adherence to company protocols, thus scrutinously avoiding errors, while at the same time hoping for the reporting of errors against those same company protocols (Kerr, 1975). As a result, employees may experience a double bind between these seemingly conflicting behaviors (Argyris, 1977, p. 117): "*When employees adhere to a norm that says "hide errors," they know they are violating another norm that says "reveal errors." The employees are thus in a double bind"*.

This double bind and the role of leaders herein have been shown to be especially salient in the context of hospitals and patient safety. Katz-Navon, Naveh, and Stern (2009), for instance, empirically demonstrate that employees may experience a conflict between the strong enforcement of safety procedures on the one hand and the reporting and learning from errors on the other hand. Despite this conflict, prior research indicates that a climate of safety requires both prioritizing existing safety protocols and constructive responses to errors (Hofmann & Mark, 2006). Prior research also points to the importance of leadership to foster team priority of safety (Katz-Navon, Naveh, & Stern., 2005; Zohar, 2000, 2002; Zohar & Luria, 2004; Zohar & Luria, 2010; Zohar & Tenne-Gazit, 2008) as well as team psychological safety (Edmondson, Edmondson, 1999, 2003, 2004; Nembhard & Edmondson, 2006). However, to date empirical research has remained surprisingly silent about which leader characteristics may help reconcile the seemingly conflicting demands of closely adhering to safety protocols and reporting errors against those safety protocols.

Early theorists suggested that leaders can help alleviate the double bind by communicating more clearly on what they truly value (Bateson, Jackson, Haley, & Weakland, 1956; Argyris, 1977). More recently, Zohar (2010) highlighted the importance of leader behavioral integrity for safety when it comes to alleviating ambiguities regarding safety. Behavioral integrity for safety reflects the extent to which leaders "walk the talk" or "practice what they preach" concerning safety (Simons, 2002) and is proposed to influence safety outcomes through two mechanisms (Simons, 2008). First, leader follow-through on safety values sends unequivocal messages that safety is valued, thus fostering a high team priority for safety (Zohar, 2010). Second, alignment between words and deeds signals that the leader's concern for safety is genuine and trustworthy, thus fostering high psychological safety within the workteam (Edmondson, 2004). In turn, by fostering both aspects of safety climate simultaneously, leaders who display behavioral integrity for safety will promote overall patient safety because their clarity of communication not only enforces safety protocols but also offers a safe haven where followers feel safe to speak up about errors against those safety protocols.

Thus, whereas previous research has predominantly looked at how different aspects of safety climate influence patient safety outcomes (Hofmann & Mark, 2006; Katz-Navon et al., 2005; Katz-Navon et al., 2009), we aim to extend this line of research by increasing our understanding of the unique role leaders play in fostering distinct aspects of safety climate and thereby improving patient safety outcomes. More specifically, we use theory and research on behavioral integrity (Simons, 2002, 2008) to posit that behavioral integrity for safety fosters patient safety by alleviating the double bind that followers may experience between adhering to safety protocols on the one hand and reporting errors against those safety protocols on the other hand.

Development of Hypotheses

Behavioral Integrity for Safety, Priority of Safety, and Psychological Safety

Simons (1999) argued that leader behavioral integrity is especially important in a work environment that poses high and diverse demands on employees. When leaders do not follow-up on the values they espouse, employees receive ambiguous messages about how the leader values specific behaviors in comparison to other pressing role demands. In support of this claim, Dineen, Lewicki, and Tomlinson (2006) found that supervisory guidance had a positive relationship with organizational citizenship behaviors when behavioral integrity was high and a positive relationship with deviant behavior when behavioral integrity was low.

Supervisory guidance regarding safety has previously been investigated as managerial safety expectations and safety actions (Zohar, 2000). Recently, Zohar (2010) suggested that alignment between espoused and enacted safety values is especially important for fostering a high priority of safety in the work unit. The alignment between words and deeds sends clear signals to the team about the value of safety in comparison to other pressing role demands. *Hypothesis 1*. Leader behavioral integrity for safety positively relates to team priority of safety.

Simons (2002) argued that keeping one's word makes an individual more predictable and is thus a key element to signaling that one is a reliable and trustworthy individual. In support of this idea, Simons, Friedman, Liu, and McLean Parks (2007) found that perceptions of leader behavioral integrity are positively related to employees' trust in leaders. Trust in the leader is important as it reflects employee's willingness to be vulnerable based on the expectation that leaders will not abuse this vulnerability (Rousseau, Sitkin, Burt, & Camerer, 1998). As an example, risky but valuable learning and interpersonal behaviors such as admitting personal mistakes—which make the employee vulnerable to supervisory discipline—are less likely to be abused by a trustworthy leader (Edmondson, 1999).

Edmondson (2004) further advocated that part of creating a psychologically safe working environment concerns establishing clear boundaries about which behaviors are and are not valued. In following through on espoused safety values, leaders that display behavioral integrity for safety establish such clear boundaries (Zohar & Luria, 2010). Furthermore, when leaders practice the safety values they preach, team members perceive their leader's concern for safety as more genuine and therefore are more likely to speak up about safety issues because they believe their leader values these discussions.

Hypothesis 2. Leader behavioral integrity for safety positively relates to team psychological safety.

Priority of Safety, Psychological Safety, and Patient Safety

In this paper we conceptualize patient safety as a lack of errors in the treatment of patients (Katz-Navon et al., 2005; Naveh, Katz-Navon, & Stern, 2005). Previous research has demonstrated that a positive safety climate consists of both adherence to safety protocols and constructive responses to errors (Hofmann & Mark, 2006). Katz-Navon et al. (2009) further disentangle the safety climate dimensions of priority of safety and psychological safety, as both may have unique and contrasting effects on the number of reported treatment errors. On the one hand, team priority of safety will relate negatively to the number of reported treatment errors because team members who prioritize existing safety protocols are more mindful of safety procedures in the execution of their work (Katz-Navon et al., 2005; Naveh et al., 2005). Team psychological safety, on the other hand, will relate positively to the number of reported treatment errors as team members who feel they are in a psychologically safe environment are more willing to honestly report the number of errors that were experienced (Edmondson, 2004; Tucker & Edmondson, 2003).

Hypothesis 3. Team priority of safety negatively relates to reported treatment errors.

Hypothesis 4. Team psychological safety positively relates to reported treatment errors.

While both priority of safety and psychological safety have reverse relationships with reported treatment errors (Katz-Navon et al., 2009), both are necessary ingredients for an overall safety climate (Hoffman & Mark, 2006). A higher priority for safety protocols without the willingness to openly admit errors against safety protocols may reflect a fear of reprimand (e.g. from the leader). In contrast, team priority of safety will reflect a more genuine concern for existing safety protocols when team members are also willing to report and learn from their mistakes (Hoffman & Mark, 2006). We posit that team psychological safety will strengthen the negative relationship between team priority of safety and the number of reported treatment errors.

Hypothesis 5. Team priority of safety is more negatively related to reported treatment errors for higher levels of team psychological safety.

Behavioral Integrity, Priority of Safety, Psychological Safety, and Patient Safety

Extending earlier reasoning, we further posit that leader behavioral integrity for safety will be positively related to reported treatment errors through team priority of safety and team psychological safety. Simons (2008) proposed that leader behavioral integrity influences follower outcomes through two complementary mechanisms: it builds trust but it also clarifies intended direction as the leader sends consistent messages through both words and actions. Both clear procedures and constructive responses to errors have been shown to reduce the number of reported treatment errors (Hoffman & Mark, 2006). Similarly, in this study, we argue that both team psychological safety (a trusting and safe environment) and team priority of safety (clear directions regarding safety) are important to understand the effects of leader behavioral integrity for safety on the number of reported treatment errors.

Hypothesis 6. Team priority of safety and team psychological safety mediate the effect of leader behavioral integrity for safety on reported treatment errors.

We argued that team priority of safety mediates the effects of leader behavioral integrity for safety on reported treatment errors and that team psychological safety strengthens the relationship between team priority of safety and reported treatment errors. We further posit that team psychological safety will also moderate the indirect relationship between behavioral integrity for safety and reported treatment errors through team priority of safety. This mediated moderation effect suggests that the indirect effect of leader behavioral integrity for safety on reported treatment errors is further strengthened by those aspects of team psychological safety that are not linked to leader consistency of communication (e.g. leaders actively inviting employee input).

Hypothesis 7. Team psychological safety moderates the effect of leader behavioral integrity for safety on reported treatment errors through team priority of safety resulting in lower reported treatment errors when team psychological safety is low, but less so when it is high.

Integrative Model

Figure 1 summarizes the hypothesized relationships of our research model. It suggests that leader behavioral integrity for safety influences reported treatment errors through two mechanisms: team priority of safety and team psychological safety. Furthermore, it indicates that team psychological safety strengthens the relationship between team priority of safety and reported treatment errors and the indirect relationship between leader behavioral integrity for safety and reported treatment errors (via team priority of safety). Overall this model suggests that clarity and consistency of leader communication and behavior regarding safety (leader behavioral integrity for safety) is important to ensure that employees do not experience a double bind between adhering to safety procedures and reporting errors against those safety procedures (Argyris, 1977). Solving that double bind is important, as both team psychological safety and team priority of safety are important in fostering positive safety outcomes (Hofmann & Mark, 2006).

Method

Participants and Procedure

We collected survey data from four Belgian hospitals to test our hypothesized model. As our research is specified on the team level of analysis, we focused our sampling on nursing departments within these hospitals. We considered a team to be composed of one head nurse and a minimum of three nurses who reported directly to this head nurse. We received permission from hospital nursing directors to conduct our survey with 54 nursing departments. Paper surveys were distributed to nurses and head nurses within the different nursing departments, and nurses were asked to deposit them in a sealed box or envelope to assure anonymity. We collected survey data in the nursing departments at two stages. At Stage 1, we collected 580 surveys from nurses, which resulted in a response rate of 70%. At Stage 2, six months later, we used the same procedure to collect survey data from all the head nurses in the four hospitals on the number of reported treatment errors.

An average of 11 nurses per department responded to our survey, ranging from 3 to 19. These nurses take care of an average number of 19 patients (SD = 12) at one specific point in time. The departments have different specializations: surgery, geriatrics, emergency medicine, pediatrics, maternity, psychiatry, revalidation, dental care, oncology, cardiology, gastroenterology, orthopedics, radiography, and polyclinics. Head nurses are on average 43 years old (SD = 8), worked in the hospital for 20 years (SD = 9) and have held their position as a head nurse for 12 years (SD = 9). Fifty-six percent of the head nurses are female and 43 % of the head nurses had worked in the department as a nurse before they served as a head nurse. Nurses are on average 38 years old (SD = 11), have worked in the hospital for 14 years (SD = 11) and held their current position for 15 years (SD = 10). On average, a nurse works in the hospital for 33 hours per week (SD = 8). Seventy-five percent of the nurses are female.

Measures

Behavioral integrity for safety. We constructed a six-item measure based on the behavioral integrity measure reported in Simons et al. (2007). Leroy, Dierynck, Halbesleben, Savage, and Simons (2010) validated this instrument showing that behavioral integrity for safety was correlated with, but factorially distinct from, general behavioral integrity. The items are 'Regarding safety, my head nurse delivers the consequences he/she describes.', 'When my head nurse lays out safety protocols, he/she makes sure people follow it.', 'My head nurse enforces the safety protocols he/she describes.', 'My head nurse always practices the safety protocols he/she preaches.', 'My head nurse does not actually prioritize safety issues as highly as he/she says he/she does.' (reversed) and 'Regarding safety, my head nurse's words do not match his/her deeds.' (reversed).[1]

Nurses rated these items on a five-point Likert scale ranging from *completely disagree* to *completely agree*. The internal consistency reliability estimate for this scale was 0.93. As we are interested in team perceptions of the leader, we checked whether we could aggregate this measure to the team level of analysis. Supporting the aggregation of this measure (Bliese, 2000), we found an average r_{wg} of 0.92 (*Mdn* = 0.92), an ICC(1) of 0.26 and an ICC(2) of 0.80 and a significant amount of between-group variance F (53, 579) = 4.93, $p < 0.01$.

Team psychological safety. We measured psychological safety with the seven-item survey developed by Edmondson (1999). These seven items are measured with a five-point Likert scale, ranging from *completely agree* to *completely disagree*. Example items are: 'If you make a mistake in this team, it is often held against you' (reversed) and 'Members of this team are able to bring up problems and tough issues'. The internal consistency reliability estimate for this scale was 0.80. In support of aggregating this measure to the team level, we found an average r_{wg} of 0.76 (*Mdn* = 0.77), ICC(1) = 0.10 and ICC(2) = 0.53 and a significant amount of between-group variance F (53, 579) = 2.14, $p < 0.01$.

Team priority of safety. Katz-Navon et al. (2005) validated a seven-item scale measuring priority of safety that draws on the work of Zohar (2000). This scale measures the extent to which safety is perceived as a priority within a nursing department in comparison to other work tasks. Items were measured on a five-point Likert scale ranging from *completely disagree* to *completely agree*. Two examples of items are: 'It doesn't matter how the work is done as long as there are no accidents' and 'In order to get the work done, one must ignore some safety aspects.' All of the items in this scale are reverse-scored. The internal consistency reliability estimate for this scale was 0.89. In support of aggregation, we found an average r_{wg} of 0.74 (*Mdn* = 0.74), ICC(1) = 0.15 and ICC(2) = 0.65 and a significant amount of between-group variance F (53, 579) = 2.88, $p < 0.01$.

Patient safety. We operationalized patient safety as treatment errors in the performance of an operation, procedure, or test; in the administration of the treatment; in the dosage or method of using a drug; or as generally inappropriate care that resulted in harm to a patient (Naveh et al., 2005; Katz-Navon et al., 2005). Common medical errors are adverse drug events and improper transfusions, surgical injuries and wrong-site surgery, suicides, restraint-related injuries or death, falls, burns, pressure ulcers, and mistaken patient identities (Institute of Medicine, 1999). In this study, we collected data on incidents that (1) are broadly applicable, (2) occur relatively frequently and (3) are subject to underreporting: patient falls, wound infection, bedsores, and different types of medication errors (medication of wrong type, at the wrong time, in the wrong amount or applied in the wrong way). A meta-analysis of Beus, Payne, Bergman, and Arthur (2010) indicates that self-reports and cross-sectional data can artificially strengthen the relationship between safety climate and safety outcomes. Accordingly, we asked head nurses to report the treatment errors six months after we collected the other measures (Mitchell & James, 2001). Over six months head nurses reported an average of 12 incidents per department (SD = 4).

Control variables. We controlled for characteristics of the nurses, the nursing teams and the overall hospital. First, at Stage 1 nurses indicated the average number of patients that nurses in the team take care of, as reported treatment errors may be a function of nurse workload (Katz-Navon et al., 2005). Second, at Stage 2 head nurses reported on the average complexity of patient conditions at the work unit using six items (Hoffman & Mark, 2006) to control for the fact that reported treatment errors may also be a function of more complex patient conditions. An example item is 'How many patients on your unit have complex problems that are not well understood?' These items were measured on a five-point Likert scale ranging from *a few* (< 20%) to *most* (> 80%). Third, we controlled for potential differences between the hospitals (Katz-Navon et al., 2005). Hospital membership of nurses was derived from the data collection. We found that the addition of these controls did not meaningfully change our results. Therefore, following the recommendations of Becker (2005), we omitted these variables from subsequent analyses.

Analyses

We analyzed the data using structural equation modeling in two steps. First, we conducted a confirmatory factor analysis on our measurement model. The measurement model showed a good fit to the data (Hu & Bentler, 1998, 1999): χ^2 (167) = 484.40 (p = 0.00), *SRMR* = 0.04, *RMSEA* = 0.06 and *CFI* = 0.95. When we alternately constrained each pairwise factor to unity, we found that, in each case, constraining the factor correlation significantly worsened the model ($p < 0.05$). In a next step, we tested the hypothesized, structural relationships at the team-level of analysis. As multi-level structural equation models are too parameter intensive for our data (Grizzle, Zablah, Brown, Mowen, and Lee, 2009), we proceeded using aggregated measures in a path model, correcting for measurement error. We performed these analyses using the Mplus statistical package (Muthen & Muthen, 2012).

Results

Main and Interaction Effects

Table 1 depicts the mean, standard deviations and correlation coefficients between our variables. A path model where behavioral integrity for safety is related to reported treatment errors through team psychological safety, team priority of safety, and their interaction had a good fit to the data: $\chi^2(2) = 6.72$ ($p = 0.03$), *SRMR* = 0.07, *RMSEA* = 0.02 and *CFI* = 0.98. We summarized the relationships between these variables in Figure 1, reporting standardized beta-coefficients. We found support for Hypothesis 1 that behavioral integrity for safety is positively related to team priority of safety ($\beta = 0.37$, $p = 0.01$) and for Hypothesis 2 that behavioral integrity for safety is positively related to team psychological safety ($\beta = 0.34$, $p = 0.01$). In addition, we found support for Hypothesis 3 that team priority of safety is negatively related to reported treatment errors ($\beta = -0.40$, $p = 0.01$) and Hypothesis 4 that team psychological safety is positively related to reported treatment errors ($\beta = 0.28$, $p = 0.02$).[2] Lastly, we found support for Hypothesis 5 that posited an interaction between team psychological safety and priority of safety on reported treatment errors ($\beta = -0.35$, $p = 0.01$).

In Figure 2 we specify the nature of the interaction effect. We differentiate between high and low levels of psychological safety, respectively, one standard deviation above and one standard deviation below the mean (Aiken & West, 1991). As can be seen in Figure 2, the relationship between team priority of safety and reported treatment errors is more negative for higher levels of team psychological safety.

Insert Table 1 about here

Insert Figure 1 and Figure 2 about here

Mediation and Moderated Mediation Effect

Hypothesis 6 asserted that the effect of leader behavioral integrity for safety on reported treatment errors is mediated through team priority of safety and team psychological safety. In the path analysis we specified an indirect effect of leader behavioral integrity for safety on reported treatment errors through team priority of safety ($\beta = -0.13$, $p < 0.01$) and team psychological safety ($\beta = 0.12$, $p < 0.01$) using a bootstrapping procedure (Preacher & Hayes, 2008). In addition, we tested an alternative model where leader behavioral integrity for safety is also directly related to the number of reported treatment errors (James, Mulaik, & Brett, 2006). This model showed a good fit to the data: $\chi^2(1) = 1.37$ ($p = 0.24$), *SRMR* = 0.04, *RMSEA* = 0.03 and *CFI* = 0.98 but we found no evidence for a direct relationship between leader behavioral integrity for safety and reported treatment errors ($\beta = -0.08$, $p = 0.15$). This suggests that the model without the direct effect is the more parsimonious and, thus, the preferred model. Hypothesis 7 asserted that the indirect effect of leader behavioral integrity for safety on reported treatment errors through team priority of safety is a function of team psychological safety. This consists of a test of moderated mediation (Muller, Descartes, Judd, & Yzerbyt, 2005). In support of Hypothesis 7, we found that the conditional indirect effect was higher at one standard deviation above the mean ($\hat{y} = -4.12$, $p = 0.03$) than one standard deviation below the mean ($\hat{y} = -3.60$, $p = 0.03$) (Preacher, Rucker, & Hayes, 2007).

Discussion

The objective of this study was to understand how leaders can reconcile the seemingly paradoxical elements of enforcing safety protocols while encouraging employee error reporting. Using theory and research on leader behavioral integrity, we hypothesized that when leaders live up to espoused safety values, teams will not only attach more importance to the adherence of safety protocols but also feel psychologically safe to admit mistakes. The results from a survey study in four hospitals and 54 nursing teams confirm the hypotheses that head nurse behavioral integrity for safety is related to team perceptions of priority of safety (Hypothesis 1) as well as psychological safety (Hypothesis 2). These findings imply that when head nurses are perceived to stay true to the safety values they espouse, they give clear signals that nurses should place a high priority on safety compared to other demands. Furthermore, when head nurses' words and actions align, this signals to nurses that their concern for safety is genuine, and that it is safe to admit treatment errors. These results advance previous research in showing that behavioral integrity for safety fosters both team priority of safety (e.g. Zohar, 2000) and psychological safety (e.g. Edmondson, 1999).

These results are further important as they demonstrate that team priority of safety and psychological safety have a negative (Hypothesis 3) and positive (Hypothesis 4) relationship respectively with the number of reported treatment errors. On the one hand, team priority of safety reflects following safety protocols in daily operations and thus relates to a lower number of reported treatment errors. On the other hand, team psychological safety reflects an environment where it is safe to admit mistakes and thus relates to a higher number of reported treatment errors. These results establish that both aspects are important determinants of an overall safety climate (Hofmann & Mark, 2006), but they also emphasize the need to distinguish both aspects from one another as they have a different, seemingly paradoxical, effect on the number of reported treatment errors (Katz-Navon et al., 2005; 2009).

To further clarify these opposite effects, we also predicted and found an interaction effect between team priority of safety and psychological safety (Hypothesis 5). More specifically, we found that team priority of safety is more negatively related to the number of reported treatment errors when team psychological safety is high. This suggests that adherence to safety procedures reflects a genuine concern for safety (and thus has a larger effect on reported errors) when employees feel safe to speak up about errors. These results support previous findings that while team psychological safety and priority of safety show opposing effects on reported treatment errors (Katz-Navon et al., 2009) it is their combination that has the strongest effect on reported treatment errors (Hofmann & Mark, 2006).

We further demonstrated that the effect of leader behavioral integrity for safety on reported treatment errors is mediated through the combination of team psychological safety and priority of safety (Hypothesis 6). In staying true to the safety values they espouse, leaders foster a safer working environment because they send clear signals that safety should be prioritized while also fostering an environment supportive of reporting treatment errors. These results suggest that leader behavioral integrity operates through the complementary mechanisms of clear communication and fostering a trusting environment (Simons, 2008). Finally, we found that team psychological safety moderated the indirect relationship between leader behavioral integrity for safety and reported treatment errors (Hypothesis 7). This suggest that aspects of psychological safety that are not specific to leader behavioral integrity for safety may further enhance its positive effects on reported treatment errors.

Overall these results suggest that leaders who follow-up on safety values show a genuine concern for safety and can expect their team to show a similar genuine commitment to safety in that they not only adhere to safety protocols but also remain willing to admit safety mistakes. In this way, behavioral integrity for safety helps resolve the double bind for team members between adhering to safety protocols and speaking up about mistakes.

Future Research

First, whereas the present study looked at the perceived word-deed alignment of leaders, additional research is needed to clarify the distinct effects of safety expectations, safety actions (Zohar, 2000) and their alignment (Simons, 2002). For example, future research should use surface mapping to indicate how actual alignment of word and deeds influences perceived alignment. We further expect that safety espousal may influence priority of safety, but that only their enactment will influence psychological safety.

Second, more research is needed on how specific leader behaviors are related to employee perceptions that leaders align words and deeds. Future research could extend the present findings by looking at how authentic leadership fosters behavioral integrity for safety (Leroy, Simons, & Palanski, in press). Whereas previous research has revealed that transformational leadership correlates with managerial safety actions (e.g. Barling, Loughlin, & Kelloway, 2002; Zohar & Luria, 2010), authentic leadership may help us further understand when leaders enact espoused safety values and invite authentic follower behavior such as speaking up and admitting mistakes (Gardner, Avolio, & Walumbwa, 2005).

Third, future research should clarify how team psychological safety reduces work-related errors over the long term. In this study we found that team psychological safety is positively related to the number of reported treatment errors. Psychological safety may also lead to a decrease of reported errors over time because an environment supportive of reporting errors can help employees to learn from mistakes (Edmondson, 1999; Tucker & Edmondson, 2003; Tucker, Nembhard, & Edmondson, 2007). Future research could use growth modeling to study these relationships. Building on our findings, we would expect that whereas psychological safety would be positively related to the average levels of reported treatment errors in a department at one specific time, psychological safety may lead to a decrease of reported treatment errors over time.

Limitations

First, we should be careful in drawing causal inferences regarding the direction of the relationships identified. Some of our data are cross-sectional and thus do not support causal claims. We have reasonable confidence in our conclusions, however, because a reversed relationship between leader behavioral integrity for safety and team psychological safety or priority of safety is unlikely. Leader perceived alignment between words and deeds is unlikely to be the result of either team priority of safety or team psychological safety. Nevertheless, additional studies that employ longitudinal designs are needed to determine the causal direction of the relationships between leader behavioral integrity for safety, team priority of safety, and team psychological safety.

Next, some of our variables were rated by the same source. This introduces the potential for common method bias (Podsakoff, Mackenzie, Lee, & Podsakoff, 2003). The risk of such bias is typically reduced by the adoption of several pro-active strategies (Lindell & Whitney, 2001; Podsakoff et al., 2003). In this study, we included leader-ratings of the number of reported treatment errors as an outcome and separated these in time from other ratings. We also used a multi-level research design that confirmed the posited effects at the group level of analysis, reducing biasing effects that are operative at the individual level of analysis. In addition, we confirmed the robustness of our findings with a split-sample approach.[2]

Third, our research is limited to the hospital setting and limited to behavioral integrity with respect to safety values. This confines the extent to which we can generalize our results to other industries or other values. Future research could expand on the present findings to see whether our hypothesized model holds true in other industries or when looking at other values. For example, future research could further investigate how leader behavioral integrity addresses the paradox of innovating while also conforming to pre-existing service standards in a service industry (Palanski & Vogelgesang, 2011).

Practical Implications

A first implication of our research is that leader behavioral integrity for safety may be important for creating a climate of safety in the organization. Simons (2008) argued that the concept of behavioral integrity typically is well received because it has an intuitive appeal (walking the talk), especially for middle managers who find themselves 'stuck in the middle' when it comes to enforcing safety or other procedures proposed by higher management. Our results suggest that helping these managers maintain their behavioral integrity for safety may create a safer work environment. In this way leader behavioral integrity not only reflects leader reliability but promotes a high-reliability organization.

Second, these results suggest that organizations should consider team psychological safety in addition to safety compliance when evaluating work unit safety. Psychological safety is important to gain a better understanding as to whether safety is valued out of fear of punishment or because of a genuine concern for safety. Furthermore, psychological safety is important to have an accurate assessment of the actual number of errors that occur. In our study, for example, based on Figure 2 one could conclude that teams low on psychological safety but high on priority of safety may appear to have the same actual safety performance as teams high on psychological safety and high of priority of safety. In a team low on psychological safety however some errors may not be reported, which may create a faulty perception of actual safety performance (Probst, Bubaker, & Barsotti, 2008).

Conclusion

Our findings suggest that by staying true to the safety values they espouse, leaders can start to solve the managerial dilemma of providing clear safety directives while encouraging employees to report errors. This is important as the results of our study indicate that the combination of both a high priority of safety and a psychologically safe working environment predicts the number of reported treatment errors in hospitals.

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Footnotes

[1] This study also included measures of safety climate (Zohar, 2000) and authentic leadership (Walumbwa, Avolio, Gardner, Wernsing, & Peterson, 2008). A measurement model where authentic leadership, safety climate, and leader behavioral integrity for safety are separate constructs has a reasonable fit to the data (χ^2 (87) = 267.51 (p = 0.00), *SRMR* = 0.04, *RMSEA* = 0.08, *CFI* = 0.96) and fit the data better ($p < 0.05$) than a model where these measures were set to correlate at 1.0. Furthermore, we found that behavioral integrity for safety predicted additional explanatory variance in priority of safety when controlling for authentic leadership ($\beta = 0.26$; $p < 0.01$) and psychological safety when controlling for safety climate ($\beta = 0.34$; $p < 0.01$). This is consistent with the idea that leader behavioral integrity for safety adds information to these other measures because it combines the beneficial effects of a psychologically safe environment and an environment that prioritizes safety regulations.

[2] To check for common method bias in these cross-sectional relationships, we used data from half of each team for leader behavioral integrity for safety on the one hand and team priority of safety and team psychological safety on the other hand to replicate these findings. While somewhat smaller, the direction and significance of the relationships confirm these findings.

Table 1

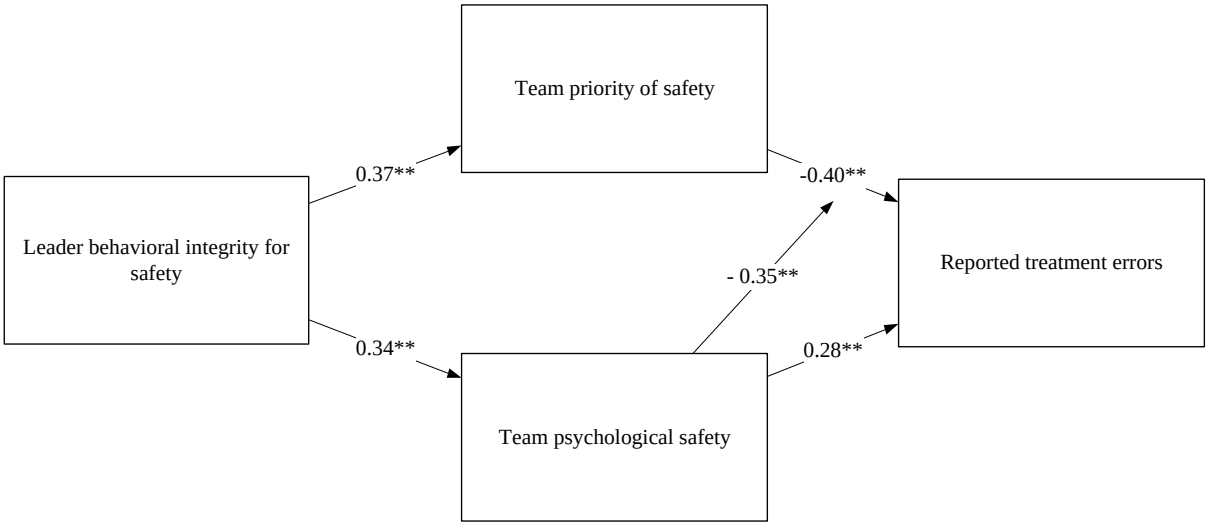
Means, Standard Deviations and Intercorrelations Among Study Variables.

		M	*SD*	*1*	*2*	*3*	*4*
1.	Leader behavioral integrity for safety	3.80	.40	.93			
2.	Team psychological safety	3.58	.30	.45**	.80		
3.	Team priority of safety	3.66	.45	.38**	.24*	.89	
4.	Reported treatment errors	11.68	1.37	-.26*	.18	-0.34*	/

Note. Reliability estimates for scales are presented on the diagonal.

* $p < 0.10$

** $p < 0.05$



** $p < 0.05$

Figure 1. Hypothesized model.

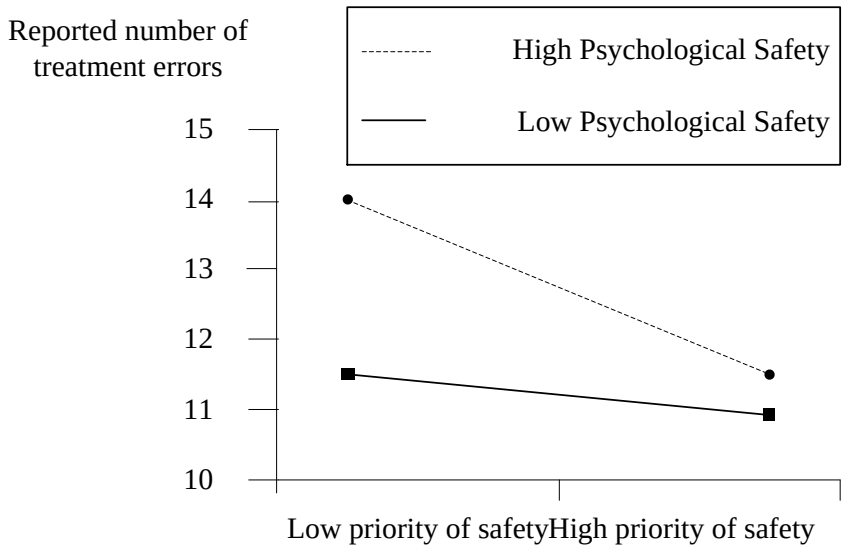


Figure 2. Interaction effect between team priority of safety and psychological safety on the reported number of treatment errors.