ABSTRACT

Purpose – The main goal of the current research was to investigate whether and how leaders in health care organizations can stimulate incident reporting and error management by “walking the safety talk” (enacted priority of safety).

Design/methodology/approach – Open interviews (N = 26) and a cross-sectional questionnaire (N = 183) were conducted at the Rotterdam Eye Hospital (REH) in The Netherlands.

Findings – As hypothesized, leaders’ enacted priority of safety was positively related to incident reporting and error management, and the relation between leaders’ enacted priority of safety and error management was mediated by incident reporting. The interviews yielded rich data on (near) incidents, the leaders’ role in (non)reporting, and error management, grounding quantitative findings in concrete case descriptions.
Research implications – We support previous theorizing by providing empirical evidence showing that (1) enacted priority of safety has a stronger relationship with incident reporting than espoused priority of safety and (2) the previously implied positive link between incident reporting and error management indeed exists. Moreover, our findings extend our understanding of behavioral integrity for safety and the mechanisms through which it operates in medical settings.

Practical implications – Our findings indicate that for the promotion of incident reporting and error management, active reinforcement of priority of safety by leaders is crucial.

Value/originality – Social sciences researchers, health care researchers and health care practitioners can utilize the findings of the current paper in order to help leaders create health care systems characterized by higher incident reporting and more constructive error handling.

Keywords: Patient safety; leadership; espoused and enacted priority of safety; incident reporting; error management

Patient safety and the degree of preventable patient deaths are of rising concern. In The Netherlands each year between 1,500 and 2,000 patients die due to medical error (Zegers et al., 2009). Similarly, a recent study by the Department of Health and Human Services: **Office of Inspector General of the United States (2010) concluded that an estimated 13.5% of American patients experienced some adverse event during their hospital stay that resulted in serious harm (including death) and another 13.5% of patients experienced some event that resulted in temporary harm. Physician reviews indicated that about 44% of the events were errors that could have been trapped and their negative consequences could have been minimized if not even completely removed. Alarmingly, out of all the adverse events that medical professionals were formally required to share, only 8% were actually reported, even though an earlier report by the Institute of Medicine (Kohn, Corrigan, & Donaldson, 2000) highlighted the importance of reporting and recognized that lack of reporting was a major deterrent to improving health care systems and patient safety.

Multiple theoretical papers that have appeared in the last decade suggest that visible leadership and enacted safety-related practices are a prerequisite for incident reporting, reducing the number of medical errors, and
improving patient safety (Barach & Small, 2000; Frankel, Leonard, & Denham, 2006; Mohr, Abelson, & Barach, 2002). So far, however, the empirical evidence related to the role of leadership is very limited (Ginsburg et al., 2010; Leroy et al., 2012; O’Dea & Flin, 2001). Additionally, it has been suggested, but not explicitly tested that leaders’ behaviors regarding safety and reporting are related to the error management strategy of the people working under a leader (e.g., Edmondson, 1996, 1999, 2003, 2004). Error management is a strategy that focuses on minimizing the negative consequences of errors by early detection and error correction, and on preventing similar errors in the future by analyzing the causes of and learning from errors. (Frese, 1991, 1995; Hofmann & Frese, 2011; van Dyck, Frese, Baer, & Sonnentag, 2005). From research in nonmedical, commercial settings it has become clear that error management predicts organizational performance (van Dyck et al., 2005). In hospital settings error management was found to be related to fewer nurse back injuries, higher patient perceptions of nurse responsiveness, and higher patient satisfaction (Hofmann & Mark, 2006). Error management is thus a precursor of improved outcomes for both patients and medical staff, which is why investigating what factors bring about error management in health care settings is both necessary and important.

The main goal of the current research is to investigate whether and how leaders can stimulate incident reporting and error management among their subordinates. Specifically, we investigate whether leaders’ words alone (espoused priority of safety) or their “walking the talk” (enacted priority of safety) affects the likelihood that personnel actively reports incidents and whether this is turn affects error management. That is, we test whether incident reporting mediates the relationship between the leader’s communicated expectations regarding safety (espoused priority of safety) and active reinforcement of espoused safety behaviour (enacted priority of safety), on the one hand, and the degree of error management, on the other.

**HYPOTHESES DEVELOPMENT**

*Leader’s Priority of Safety and Incident Reporting*

Leadership is the process of influencing the activities of an organized group toward the achievement of organizational goals (Bryman, 1992; Rauch & Behling, 1984; Yukl, 2006). Leadership additionally involves formal role of and accountability by the leader. In the current context the organizational
goals entail incident reporting and enhanced error management. Leaders can use two broad strategies to influence their group: (a) communication of expectations that incidents are reported (espoused priority of safety) and (b) active reinforcement of the importance of safety and reporting (enacted priority of safety; Zohar, 2000). Note that enacted priority of safety includes in itself espousal through action, thus in a sense, enacted priority of safety incorporates both espousal and action. Accordingly, we refer to espousal as talking about the importance of safety, whereas enacted priority of safety involves walking the safety talk. Leaders communicate expectations if they, for example, state that safety is important and can actively reinforce such priority by giving positive verbal feedback, or sharing their own (near) incidents with the group. Note that we predict that both espoused and enacted priority of safety would be positively related to incident reporting. Nonetheless, we expect that enacted priority of safety will have a greater impact on incident reporting because by observing the actual practices of leaders, subordinates can estimate how important reporting really is in the organization (Zohar, 2000). This, in turn, will affect the likelihood that subordinates themselves report occurring incidents.

It has been argued that leaders’ active reinforcement of espoused safety values is more powerful than the mere communication of expectations (Morgan, 1997; Schein, 2004). Put differently, walking the talk (enacted priority of safety) is more powerful than merely talking about the importance of safety (espoused priority of safety). The latter is the case, because communicated expectations may not come across, may not be fully trusted and/or may be contradicted by the leaders’ actual behavior. A major cause of word-deed misalignment is that leaders face competing goals and have to make trade-offs between them (Simons, 2002). It is well known that safety goals often are in conflict with other goals such as productivity, speed, or convenience, which are also important organizational goals (Zohar, 2000). Situations in which competing goals need to be taken into account are very common and it is from the choices leaders make in such situations that subordinates acquire a standard of how important safety really is (Zohar, 2000, 2010; Zohar & Luria, 2004). According to Zohar (2000, p. 588) “...workers interpret supervisory action in individual role episodes as reflecting an overall emphasis or deemphasis on safety issues. In other words, group members assess whether supervisory practices converge into an internally consistent pattern in terms of the relative priorities of safety versus efficiency goals.”

If leaders only talk, but do not walk the safety talk, for example, if a leader says that reporting is important, but does not report herself, followers
will soon become cynical and distrustful of the leader’s dedication to safety (e.g., Simons, 2002), which in turn can negatively affect safety behaviors and reporting. When the explicit rules regarding reporting are different from the implicit rules that are actually enacted by a leader, followers stop listening to the words and pay attention to the actions, because a leader’s actions, not words, provide reliable information on the types of behaviors that are expected and endorsed (Zohar, 2002, 2010).

**Hypothesis 1.** Leaders’ enacted priority of safety will have a greater impact on incident reporting than leaders’ espoused priority of safety.

*Incident Reporting and Error Management*

One way through which many health care organizations attempt to minimize medical errors is by the implementation of incident reporting (e.g., Kassels-Habraken, Van Der Schaaf, De Jonge, & Rutte, 2010). Incident reporting is considered essential as it allows for a systematic analysis of the causes underlying incident occurrence and makes it possible for medical professionals to prevent or constructively deal with subsequent occurring errors (Anderson & Webster, 2001; Liang, 2002). The main function of incident reporting, thus, is claimed to be the reduction of errors and the minimization of the negative consequences of errors for patients, clinicians, and hospitals (Mahajan, 2010). Put differently, the purpose of incident reporting is promoting error management among medical practitioners. Given the widespread implementation of incident reporting in health care and its presumed impact on error management, it is surprising that no studies to date have explicitly tested this predicted relationship.

Incidents and the errors underlying them can form the starting point as well as the “motor” of error management (Argyris, 1992; Keith & Frese, 2008; Sitkin, 1996; Sitkin, Sutcliffe, & Schroeder, 1994). With reoccurring left/right mix-up, for example, thorough analysis of incidents might reveal that in a number of cases, the errors originate not in the operating theatre but in the administrative processing of patient files. What can be learned is that there might be ways to prevent errors early on in the process (e.g., by development of file sheets on which body parts are visually consistent with physical left and right). Alternatively, or preferably additionally, a short check in the operating theatre might be implemented, so that any errors that still have slipped through are caught before they become consequential...
We predict that higher levels of incident reporting will be linked to greater error management, because when more incidents are being reported, the chance that certain common patterns may be caught and people can actually learn from the observed errors is higher.

**Hypothesis 2.** Incident reporting is positively related to error management.

*The Mediating Role of Incident Reporting*

Leadership has been recognized as an important antecedent of both incident reporting and effective error handling (e.g., O’Dea & Flin, 2001; Edmondson, 1996, 2003, 2004). One previously theorized way through which leaders can affect employees is by creating a constructive error handling climate characterized by error management, where people try to understand the causes and prevent the negative consequences of errors (Hofmann & Frese, 2011; van Dyck et al., 2005). Although talking about the importance of safety is likely to be positively linked to creating such an error management climate among medical professionals, we predict that leaders who “walk the safety talk,” rather than merely say how important safety is, will be more likely to encourage error management among their subordinates. Leaders’ saying that safety matters may make people more conscious of errors and inspire them to try and minimize the negative consequences of the errors that occur. Only leaders active support of safety behaviours, however, shows subordinates how to handle errors. For example, if during a staff meeting a leader actively shows priority of safety by discussing an error she herself made and by stimulating open discussion of how similar errors can be prevented in the future, her subordinates would be better prepared to handle errors constructively than the subordinates of someone who never actively enforces the priority of safety. Similarly, if leaders pay lip service to the importance of submitting incident reports but do not actively reinforce it through personal example (e.g., reporting and discussing incidents themselves), employees’ willingness to report incidents is likely to diminish. People are often afraid that if they report they may be held accountable and punished for whatever went wrong, and such a fear of being blamed is likely to stop many from reporting, even if leaders officially espouse priority of safety (e.g., Waring, 2005). If a leader, however, reports herself and is not punished for it such fears among medical professionals
are likely to dissipate because the leader is now showing that it is safe to report.

In line with our reasoning, recent research indicated that leaders who “walk the safety talk” are likely to stimulate an environment characterized by psychological safety (“a shared belief that the team is safe for interpersonal risk taking,” Edmondson, 1999, p. 354), which in turn was linked to more reported treatment errors (Leroy et al., 2012). More specifically, Leroy and colleagues (2012) investigated the relationship between leaders’ behavioral integrity for safety and incident reporting and the mediating role of team priority of safety and team psychological safety. Behavioral integrity for safety is a construct theoretically similar to enacted priority of safety in the sense that it investigates whether “leaders walk the safety talk.” Additionally, Leroy et al. (2012) were interested in team priority of safety, which is operationalized similarly to what we call espoused priority of safety, however, espoused priority of safety in our research was measured at the leader level, not at the team level. Another difference is the way in which incidence reporting is measured in the two studies: in Leroy et al. (2012) head nurses reported treatment errors made six months after the study, whereas in our study only subordinates indicated how often they report incidents. Note that a distinction should be made between incident reporting and errors made (Edmondson, 2004). The goal is that practitioners report more of the errors made, but make fewer errors. Leroy et al. (2012) expected a negative relationship between leaders’ behavioral integrity for safety and errors made, as well as between team priority for safety and errors made. In our research, however, we focus on errors reported, not on errors made, thus we expect a positive relationship between leaders’ enacted and leaders’ espoused priority of safety. In the current research we extend the work by Leroy et al. (2012) by investigating whether leaders’ “walking the safety talk” is associated with more incident reporting, which in turn should be linked to enhanced error management. Specifically, we predict that when leaders follow through on their words about the priority of safety with actions (enacted priority of safety), personnel is more likely to perceive reporting as an important element of creating a safe environment and follow through in their own actions by reporting incidents. More reporting is, in turn, linked to thinking more about the cause of the errors, the potential consequences of the errors, and the ways in which the errors can be prevented in the future (Hofmann & Frese, 2011). In other words, we hypothesize that:

**Hypothesis 3.** Incident reporting mediates the relationship between enacted priority of safety and error management.
METHODS

Research Site

Data were collected as part of a study on patient safety and organisational culture in the Rotterdam Eye Hospital (REH). The REH is the only eye hospital in The Netherlands (16 million inhabitants) and is a major referral centre providing secondary eye care for the region and tertiary eye care for the whole country. On yearly basis 145,000 patients visit the outpatient department and 14,000 cases are treated in the 6 operating theatres. The highly specialized ophthalmologists are not employed by the hospital but are running their practices through partnerships within the hospital organization. This is also the case for the four anesthesiologists and the four internal specialists. The REH runs a resident and fellow program and has a research institute.

In the early 1990s, the hospital was at risk of being taken over by an academic hospital. The Dutch government allowed REH to remain a stand-alone hospital if, and only if, it was able to achieve high production volumes, low costs, and a patient centered approach. In 1992, the hospital decided to benchmark with aviation, given the sector’s accomplishments in handling more passengers, improving logistics, safety, and being service oriented. As part of a variety of initiatives aimed at improving patient safety (see De Korne et al., 2010), a comprehensive project combining a large scale survey and interviews was conducted by the first author. Topics covered in the project were protocol adherence, errors, incident reporting, and leadership.

Design, Participants and Measurements

In the current study we combine interviews with a survey. Interviews were conducted to gather rich and in-depth information on actual incidents and the role of leadership, reporting and error management in them. The survey was used to statistically test our hypotheses.

Operationalization of leadership

Leaders as well as nonleaders participated in both the interviews and the survey. In the medical setting, leadership applies differently for different tasks and situations. For example, a head nurse holds a formal leadership position, but in the operating room, working together with the interdisciplinary team,
the medical specialist is the formal leader. Even medical specialists, who are formal and actual leaders in nearly all of their work activities (e.g., medical treatment, teaching, and supervision of residents) occasionally face situations where a physician of a different specialization (e.g., anaesthetist versus surgeon), or the board of directors of the hospital calls the shots. The interviews allowed for flexibility and focus on the leadership role during a specific incident rather than formal position (only). For example, in the interviews a head nurse may describe an incident in the operating theatre where the leadership role is held by the physician, whereas in a pre- or post-op incident s/he holds the leadership role. The transcript of one interview can therefore yield both leader as well as nonleader segments. In the survey we restricted leadership to those participants with a formal leader position, including all physicians. As we aimed to get data about the person respondents considered to be their (most crucial) leader, and thus, most likely the person to influence incident reporting and error management, nonleaders were asked to fill out leadership items keeping in mind the leader they work with most of the time.

**Interviews**

Taking into account a representative sample according to both department and professional background in the REH, 46 potential interviewees were randomly invited for participation. The pool of 46 potential interviewees was chosen such that it allowed for nonresponse of half of the pool, while still ending up with a representative sample across departments and professional background. Each employee of the stratified, but otherwise random sample received a letter explaining the purpose and other relevant information about the interviews. Upon sending the letter, the first author directly contacted the potential interviewees through e-mail and/or telephone. As is not uncommon in a hospital setting, it was difficult to get in contact with the medical staff, requiring several telephone calls and/or e-mails for each potential interviewee. The challenge for ensuring sufficient response to the interviews was related to actually getting in direct contact with potential interviewees, not to a lack of willingness to participate. In the process of contacting and personally inviting employees to participate, two staff members indicated that they were unable to participate because of travel plans. None of those approached declined our invitation because of unwillingness to participate. When 24 of the 46 approached employees indicated willingness to participate, and after we had made sure that all departments and professional backgrounds were included, we stopped with contact the remaining pool of 22. Two additional employees
volunteered for participation. A total of 26 employees was thus interviewed. Specifically, open interviews were held with five physicians, three residents, four nurses, seven supporting medical staff members, three team leaders, three members of the management team, and one policy employee.

Interviews were held using the critical incident technique (Flanagan, 1954). All interviews were semi-structured. No set list of questions was used. Rather, actual incidents formed the base. Near the end of each interview a checklist was used. Interviewees were invited to elaborate on topics that had not been covered thus far.

In our letter to the respondents we explained the purpose of the interviews and asked them to think about a recent incident. In line with the Critical Incident Technique (Flanagan, 1954), interviews started with an invitation to describe a recent incident. The incident was then used to explore actual concrete handling of the incident, reasons for (not) reporting and leadership. Interviewees that had a leadership role (see above) were asked about an incident in their team, and their own response to that incident. Follow up questions then were directed at whether handling of the incident, (not) reporting and leadership in this case were representative for general practice – and if not, what were crucial factors for general practice. If necessary and possible, the interviewee was invited to elaborate on a second recent incident. Interviews lasted 45–90 minutes.

Interviews were audio recorded and transcribed. Two independent raters coded transcript segments for (a) leadership, with leaders’ espoused priority of safety (7 segments), leaders’ enacted priority of safety (12 segments), (in)consistency between what leaders espouse and enact (11 segments) (b) incident reporting (21 segments), and (c) error management (17 segments).\(^1\)

The two raters that were unaware of the hypotheses, but familiar with the central concepts, and trained on coding them on a random selection of about 10% of the transcript texts. Interrateragreement (Cohen’s Kappa) of the categorization of segments was 0.68 and thus more than sufficiently high (Fliess, 1982; Robson, 2002).

Survey

A cross-sectional questionnaire study was conducted among all REH staff. All employees, that is, medical staff (medical specialists, nurses, and residents), as well as support staff, policy employees, and the board were invited to participate. Only nonleaders (see above, \(n = 129\)) were asked to complete the measures on leaders’ espoused and enacted priority of safety. Only medical staff (\(n = 116\)) was asked to complete our measurement of
incident reporting. All respondents were asked to complete our error management measure.

Two versions – one web-based, and one paper and pencil version – of the survey were distributed, so as to accommodate to preferences and access to a computer during working hours and/or at home. Three reminders were sent electronically. Additionally, the third author encouraged employees to complete questionnaires via intranet and formal and informal meetings in the hospital. A total of 183 employees that formed a representative sample of departments as well as professional backgrounds within the hospital completed the questionnaire (response rate 57%).

Leaders’ espoused and enacted priority of safety was measured with Zohar’s (2000) scales on expectation (espoused priority of safety; \( k = 5 \)) and active reinforcement (enacted priority of safety; \( k = 5 \)). Whereas the expectancy scale focuses on whether or not clear priority of safety is communicated by a leader (e.g., “As long as work remains on schedule, my supervisor doesn’t care how this has been achieved.” (reverse scored), the action scale deals with actual safety reinforcing behavior exhibited by the leader (e.g., “My supervisor approaches employees during work to discuss safety issues”). All leadership items were measured on 5-point Likert scales with 1 = not at all applicable and 5 = completely applicable. The expectations scale comprises 5 items and had a Cronbach’s alpha of 0.88. The action scale comprises 5 items and had a Cronbach’s alpha of 0.77.

The degree of incident reporting was measured with a single item stating: “When an incident, accident, or near-accident occurs we never/hardly ever/sometimes/often/always report by means of filing in an incident report” \((k = 1)\).

Error management was measured with the error management scale of the Error Culture Questionnaire (ECQ) which comprises correction, analysis and learning from errors (van Dyck et al., 2005). Sample items are: “For us, errors are very useful for improving the work process,” “After an error has occurred, it is analyzed thoroughly,” and “After making a mistake, people try to analyze what caused it.” All error management items were measured on 5-point Likert scales with 1 = not at all applicable and 5 = completely applicable. The scale comprises 12 items. Cronbach’s alpha was 0.81 \((k = 12)\).

**RESULTS**

We test our hypotheses with the quantitative data derived from the survey. Interviews, and segments selected from them serve as illustration and help crystallize quantitative findings. Two incidents were mentioned throughout
several interviews: Due to a mix-up where a strong gas cylinder, needed to ensure post-op eye pressure, had been placed in the container that should hold a weaker type of gas, some ten patients had suffered elevated eye pressure after being released from the hospital. Three physicians, a member of the board, and a technical support staff member volunteered this incident in their respective interviews. A total of 15 interview segments relate to the gas incident. A medical specialist and a planning support staff member both discussed a second incident that involved two patients with identical names and initials that were both on a transplant waiting list. The wrong patient was called to the hospital. The error was only detected after the patient was on the operating table, under anaesthesia, but fortunately before the actual surgery commenced. A total of 10 interview segments relate to the patient mix-up incident. In addition, interviewees elaborated on more isolated incidents captured by 69 relevant segments.

One thing that popped out from the interviews was that respondents did not seem to have any trouble elaborating on several recent (near) incidents. Yet, the survey findings show that as much as half of the respondents, leaders and nonleaders, report never, hardly ever or only sometimes. The other half, in contrast, reports (almost) always. The linkage between quantitative findings and concrete incidents is explicitly addressed in the results section.

Relation Between Espoused and Enacted Leadership on Incident Reporting

Table 1 presents the means, standard deviations and correlations of the variables included in the study. Unless otherwise stated, all analyses were conducted in SPSS 20.0. We first tested whether enacted priority of safety had a stronger connection with incident reporting than espoused priority of safety (Hypothesis 1). No significant correlation was found between espoused priority of safety and incident reporting, \( r = 0.02 \). There was, however, a significant correlation between enacted priority of safety and incident reporting, \( r = 0.21 \), as well as a significant correlation between espoused and enacted priority of safety, \( r = 0.28 \). To test our hypothesis we conducted an analysis of the difference between correlations with the program provided by Garbin (2013), which compares correlational coefficients (see Meng, Rosenthal, & Rubin, 1992). The results indicate that, as predicted, leaders’ enacted priority of safety has a greater impact on incident reporting than leaders’ espoused priority of safety, Steiger’s \( Z = -2.24, p = 0.025 \). Hypothesis 1 was thus supported.
The interviews illustrate the quantitative findings. Leaders’ espoused priority of safety is illustrated by the following quote: “We tell all new residents that we have a blame-free culture. [...] It is a message you want to instil.” (chairman of the board). Subsequent interview segments suggest, however, that mere communication of expectations is not sufficient; “The supervisor can be called in the middle of the night. But [residents] would think twice, more times actually, before doing that. [...] the physicians... were very surprised to hear that. They had the impression that they were very approachable. So perceptions can be totally different from residents to supervisors” (member of the board). The mere communication of espoused practices in itself does not sufficiently convince followers. Either the espoused practices do not come across, are not trusted, or are contradicted by the actual behavior of leaders.

The importance of incident reporting is recognized by some; “Things that nearly go wrong, or the risks if you will, things that we have seen several times, that in the future may lead to actual damage. We want to know about them, so they can be addressed.” (medical specialist), yet barriers for actual reporting may still remain. This is especially worrisome if it is the leaders who are not giving a good example; “It was clear that the physician felt somewhat uncomfortable, because he felt that a report would reflect badly on him as well. [...] So, it took a long while before the report was filed.” How long did it take?” (interviewer). “Two months” (team leader).

Relation Between Incident Reporting and Error Management.

Next, we conducted a regression analysis to test Hypothesis 2. Specifically, we regressed incident reporting on error management and found that, as
predicted, they were positively related to each other, $\beta = 0.38$, $p < 0.001$, supporting Hypothesis 2.

The interviews illustrate how incident reporting may enhance error management: “All reported incidents are discussed. If necessary we cross-check with patient charts to figure out exactly what went wrong. Is it related to medical treatment or to pre- or post-op patient care? Was it preventable? What are good ideas to ... how can we prevent a similar incident? Based on our analysis we formulate recommendations.” (physician/member of incident committee). In the same vein: “Every once in a while our team leader addresses the advice of the IR-committee in our work meetings. Like, how many reports there were, but also: What went wrong? How could that have happened? What improvements can we make?” (nurse)

**Incident Reporting as a Mediator**

Finally, we tested whether the degree of incident reporting mediates the relationship between leaders’ enacted priority of safety and error management. Four conditions have to be met to establish a mediation effect: (1) there is a significant relation between predictor and mediating variable, (2) there is a significant relation between mediator and dependent variable, (3) there is a significant relation between predictor and dependent variable, and (4) the significant relation between predictor and dependent variable ceases to be significant when the mediator is taken into the equation (Baron & Kenny, 1986). The indirect or mediated effect of the predictor on the dependent variable is the effect of the predictor that goes through the mediator. Because we had a relatively small sample, we used bootstrap methods which are recommended when sample sizes are small or moderate to test the significance of an indirect effect (Efron & Tibshirani, 1993; MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2004). Specifically, we used the SPSS Macro provided by Preacher and Hayes (2004) with 5,000 resamples to derive a 95% confidence interval (CI) for the indirect effect of incident reporting on the relationship between leaders’ priority of safety and error management. According to Hayes (2009) if zero is not included in the 95% CI, we can conclude with 95% certainty that the indirect effect is significantly different from zero, $p < 0.05$ (two-tailed). The Preacher and Hayes (2004) macro calculates all of the regression analyses outlined by Baron and Kenny (1986) and supplements them with a bootstrap for the indirect effect. As suggested by Preacher
and Hayes (2004) we centred the independent variables before conducting the analyses.

The analysis revealed a positive relationship between leaders’ enacted priority of safety and incident reporting, $\beta = 0.36$, $SE = 0.13, p = 0.008$. The regression analysis showed a positive relationship between leaders’ enacted priority of safety and error management, $\beta = 0.14$, $SE = 0.06, p = 0.021$. Finally, regressing simultaneously leaders’ enacted priority of safety and incident reporting on error management showed that incident reporting positively predicted error management, $\beta = 0.16, SE = 0.05, p < 0.001$, while the direct effect of leaders’ enacted priority of safety was reduced to non significant, indicating full mediation, $\beta = 0.08, SE = 0.06, p = 0.163$. The indirect effect of incident reporting was significant, $\beta = 0.06, SE = 0.03$, Sobel’s $Z = 2.10, p = 0.034$, CI 95% (0.01–0.12), indicating that incident reporting mediates the relationship between leaders’ enacted priority of safety and error management. Hypothesis 3 was thus supported.

An example of how enacted priority of safety may affect incident reporting and subsequent error management comes from the description of an incident where the wrong eye had been treated with laser: “How did you find out? “The surgeon puts the sheet over the patient. Looks, damn, wide pupil. That means they cannot start the surgery. The physician called me himself. It turned out that I had made a wrong assumption about the treatment. So I took it up with my supervisor, and we filed an incident report. And I discussed it with the colleague that had checked the record. She had missed it as well” (nurse). A technical support staff member continues in his (seperate) interview: “We then decided to only use widening drops for the eye that is to be treated. There is a disadvantage to that: Preferably we would be able to measure before and after treatment values for both eyes, but in this way the same incident cannot reappear … only if an eye has been treated with widening drops can it be treated with laser” (technical support staff member).

The combined findings that the effect of leaders’ enacted priority of safety outweighs their espoused priority of safety in enhancing incident reporting (Hypothesis 1), that incident reporting is related to error management (Hypothesis 2), and that incident reporting mediates the relationship between leaders’ enacted priority of safety and error management (Hypothesis 3) is best illustrated by interview segments regarding the usage of the wrong gas described at the beginning of the results section. It turned out that the wrong gas had been injected over a prolonged period of several weeks. Individual specialists started noticing that the number of their
patients returning to the hospital with complaints resulting from elevated eye pressure was higher than normal. Initially, none of the specialists reported incidents. At some point they started discussing the increased numbers of patients with elevated eye pressure amongst themselves. This resulted in incident reporting. A check of the gas cylinder at the operating room revealed that the label of the cylinder did not match that on the container. The head of the OR assembled an ad hoc team that took action and analyzed factors that had contributed to the incidents. “[…] first priority was managing the acute problem. We called back all patients. That’s the most urgent issue. The other issue was coming up with solutions that make sure that this cannot happen again” (medical specialist). Analysis of the causes started at the technical department, as they are responsible for stocking the operating room. The initial mistake was made by a technical staff member that had placed a gas cylinder in the wrong container. Two types of solutions and improvements were sought: Improvements that could prevent this mistake in the future, and solutions that would facilitate timely detection and correction should the mistake reoccur. Examples of the former were not only labelling the cylinders, but also putting in place labels on compartments in the storage room, and checking with the supplier whether labels on the cylinders could be designed such that they could be more easily differentiated visually. Examples of solutions aimed at detection and correction included discussions that made explicit who is responsible for what – the technical department for supplying operating rooms, medical staff, and ultimately the medical specialist for using the right product – a brief hand over checklist between technical and medical staff was developed in which medical staff checked the delivery and medical staff checked the reception of supplies. A medical specialist added “I now check it myself (with the checklist), every time I use gas. That’s the last moment, so it catches all possible errors that may have been made.”

DISCUSSION

A popular saying states that “actions speak louder than words.” The findings of the present research suggest that in the current context this was indeed the case. Leaders’ “walking the safety talk” was positively associated with subordinates’ incident reporting and with overall error management of both leaders and subordinates. Interestingly, leaders’ “talk” alone was not linked to incident reporting. These findings suggest that it takes more than
words from leaders to motivate more reporting. Additionally, we found a positive relationship between reporting of incidents and error management, which confirmed our predictions and provided the first empirical support for the previously theorized connection between incident reporting and error management. Specifically, the higher the degree of incident reporting, the more error management was exhibited by employees. Finally, our findings indicate that the relation between leaders’ enacted priority of safety and error management was explained by the degree of incident reporting: Incident reporting mediated the relationship between leaders’ active reinforcement of priority of safety and error management. The interviews yielded illustrative quotes that give concrete examples of how leaders’ active safety reinforcement promotes both reporting and constructive error handling (i.e., error management). These offer tangible suggestions to be taken to heart by leaders in the medical setting: With active reinforcement, such as supporting employees in incident reporting and complimenting on improvements offered by employees, both reporting and error management can be enhanced.

Our research has implications for both theory and practice. In addition, our results offer relevant practical suggestions for addressing some of the most persistent problems in health care: The unwillingness to report incidents and the challenge of constructively dealing with errors. In line with earlier research (Department of Health and Human Services, 2010), the current study showed that half of the respondents rarely report incidents. On the bright side, the other half indicated that they report consistently. Our findings offer some suggestions on tipping the balance toward incident reporting and subsequent error management.

If we had one advice to give to leaders in health care who want to inspire better safety practices, it would be to become the role model for priority of safety and lead by example by actively reinforcing what they say with actions. When leader’s words become meaningful, subordinates are more likely to act accordingly.

Earlier work on behavioral integrity has shown that leaders’ walking the talk is positively linked to various outcomes such as follower work and life satisfaction, satisfaction with leader, trust in leader, organizational citizenship behaviour, improved follower job performance, team priority of safety, and team psychological safety, as well as negatively linked to absenteeism, stress, deviant behaviour, and treatment errors made (Davis & Rothstein, 2006; Dineen, Lewicki, & Tomlinson, 2006; Leroy et al., 2012; Palanski, Kahai, & Yammarino, 2011; Palanski & Yammarino, 2011; Prottas, 2008;
Simons, 2002). Our findings extend what is known about the role leaders’ walking the safety talk plays in a medical setting. Specifically, we add to the literature by examining a special case of leaders’ behavioral integrity – leaders’ enacted priority of safety – and its relationship with incident reporting and error management. While prior work has tested the relationship between leader’s behavioral integrity for safety and treatment errors made (Leroy et al., 2012), the current study shows that leaders’ enacted priority of safety is positively linked to (near) incident reporting. Additionally, we provide evidence linking leader’s enacted priority of safety with error management, a finding that implies that leaders probably influence the way they themselves and others deal with errors. Finally, our results show a positive relationship between incident reporting and error management, and in this way provide initial empirical support for the previously theorized, but not explicitly tested positive link between the two.

We should note that although a strength of the current study is the use of mixed-methods which, through triangulation, offers enhanced reliability of the findings, all data were cross-sectional. Thus, causality of the relations could be argued, but not established. This is problematic when testing mediation models because as indicated by Baron and Kenny (1986) the dependent variable, in this case, error management, should not be causing the mediator variable, and based on the current methods we cannot exclude potential interdependence among the two. Our current model presents a simplified version of the investigated concepts and the links between them. It is, thus, possible that the relationship between error management and incident reporting is more complex, especially over time.

In line with this suggestion, previous research by Hofmann and Mark (2006) indicated that error management was a predictor of incident reporting (Hofmann & Mark, 2006). It may well be that incident reporting and error management reinforce each other. It is therefore necessary for future research to address the issues of causality and interdependence by incorporating a longitudinal quasi-experimental design which can investigate the development of relationships between our variables in the long run. Ideally, such a design would additionally incorporate patient outcomes.

A second limitation of our study is the use of self-report measures of incident reporting and error management. The use of a single-item measure of incident reporting in mediation models is also somewhat problematic as such models assume that there is no measurement error in the mediator,
which is less likely to be the case when using a scale instead of a single item \(\text{(Baron & Kenny, 1986)}\). This being said, when applied to the measurement of homogenous constructs, such as incident reporting, single item-measures are considered as reliable as multiple-item measures \(\text{(e.g., satisfaction with leader; Loo, 2002; Wanous, Reichers, & Hudy, 1997)}\). Nonetheless, we hope future research amends the abovementioned shortcomings by including behavioral measures of incident reporting \(\text{(e.g., actual number of incident reports per team)}\) and measuring actual error management behaviors.

A third limitation of our study is that currently our analyses do not take into account the multilevel nature of the data. Specifically, some of the respondents shared the same leader, and it is likely that their ratings are not completely independent of each other. However, we could not use multilevel analyses because we did not explicitly ask participants who their leader was, so that the respondents could feel as anonymous as possible and respond truthfully.

Finally, the current research was conducted in a single, and relatively small eye clinic and we can only speculate to what extent our findings can be generalized to bigger hospitals, to different types of hospitals \(\text{(e.g., teaching hospitals may be more open to error management or incident reporting than nonteaching hospitals)},\) to hospitals with different profiles, patient mix or specializations. Future work should incorporate multiple settings, as to establish if and what factors moderate the present findings.

In sum, the current findings extend our knowledge of leaders’ priority of safety, incident reporting, error management, and the connections between these factors. Leaders with an interest in investing their influence in creating safer health care systems should take into account that it takes more than words to do so. For the promotion of incident reporting and error management, active reinforcement of priority of safety by leaders is crucial.

**NOTE**

1. As the current study was part of a larger project on safety culture, topics covered in the interviews were not restricted to leadership, incident reporting and error management. Additional quotes were categorized as follows: error communication \(17\); error awareness \(47\); error aversion \(2\); protocol adherence \(38\); the (new) protocol software package \(26\); and the tension between production and patient safety \(13\). These segments are not included in the current analyses.
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Leaders’ Enacted Priority of Safety, Incident Reporting, and Error Management 115


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