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The leadership practices of construction site managers and their influence on occupational safety: an observational study of transformational and passive/avoidant leadership

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ABSTRACT

More than 20% of all reported occupational accidents in Europe in 2015 occurred within the construction industry. Leadership is an imperative antecedent to occupational safety. Transformational leadership is considered a central aspect of safety-promoting leadership and passive/avoidant leadership is considered a central aspect of poor safety leadership. This study aimed to comprehensively elucidate concrete, real-life transformational and passive/avoidant leadership behaviours through context-specific descriptions of day-to-day interactions between construction site managers and employees. A mixed method design was applied, combining structured observations of construction site managers, with questionnaire responses from construction employees. With this design, common method bias was eliminated. The results provide context-specific examples of transformational and passive/avoidant leadership behaviour. High proportions of observed transformational leadership was found to predict high construction site safety. High proportions of observed passive/avoidant leadership was found to predict low construction site safety. The proportion of transformational leadership behaviour was higher among site managers in Sweden than in Denmark, indicating that national cultural context may be an antecedent to safety leadership among construction site managers. Applying less passive/avoidant leadership and more transformational leadership appears to be an effective way for construction site managers to improve occupational safety in the industry.

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Leadership; safety; occupational safety; leadership behaviour; construction industry; safety climate; safety-related behaviour

Introduction

The construction industry is one of the economic sectors worst affected by occupational injuries, severe and fatal ones in particular. More than 20% of the 3841 European occupational fatalities in 2015 occurred within construction (Eurostat 2017a). Recent research into occupational safety indicate that the way leadership is executed may be imperative for how occupational risks are managed and occupational safety advanced, across economic sectors (Zohar 2002, 2010, Conchie 2013, Pilbeam *et al.* 2016). Transformational leadership has been identified as a promising component of effective safety leadership (Mullen and Kelloway 2009, Clarke 2013, Grill *et al.* 2017). Transformational leadership involves individualized consideration, intellectual stimulation, inspirational motivation and idealized influence; it is understood to engage employees without the use of

power and to emphasize developing the mutual interests of managers and employees (Bass and Bass 2008). Passive/avoidant leadership, on the other hand, has been identified as a component of poor safety leadership (Kelloway *et al.* 2006, Grill *et al.* 2017).

Although transformational and passive/avoidant leaderships generally have been found influential for the level of occupational safety, contingency leadership theory and situational leadership research indicate that the constituents and effects of leadership practices are dependent on contextual factors (Johns 2006, Porter and McLaughlin 2006, Oc 2018). What actually constitutes transformational and passive/avoidant leadership varies, for example, between different occupational sectors and across different hierarchical positions (Avolio and Bass 1995, Lowe *et al.* 1996). Context-specific knowledge related to how transformational and passive/avoidant leadership is enacted by

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managers in the construction industry can generate better understanding of how contemporary findings in leadership research may be applied in real-life managerial work. Furthermore, managerial leadership practice seem to differ depending on national cultural context (House *et al.* 2004). Scrutinizing how transformational and passive/avoidant leadership is enacted by managers in the construction industry in Sweden and Denmark, two countries with comparably low occupational injury rates (Eurostat 2017b), may provide examples of how construction site safety can be augmented through efficient safety leadership.

Construction site managers hold important roles in the construction industry (Mustapha and Naoum 1998). These managers occupy a middle management position operating across organizational boundaries, requiring coordination of many interacting employees, subcontractors, and external organizations (Djebarni 1996, Styhre and Josephson 2006). On a day-to-day basis, construction site managers implement leadership at the operational as well as the strategic level (Mustapha and Naoum 1998, Fraser 2000). Mustapha and Naoum (1998) concluded that central performance variables in construction projects were more closely related to site managers' personal leadership abilities than to project characteristics such as building type, complexity/size and project duration. Furthermore, studies have found that the transformational leadership practices of construction site managers seem to be important for construction site safety performance, in terms of occupational injuries (Hoffmeister *et al.* 2014), safety-related work behaviour among employees (Conchie and Donald 2009, Conchie *et al.* 2013, Hoffmeister *et al.* 2014, Grill *et al.* 2017), and construction site safety climate (Hoffmeister *et al.* 2014, Toderi *et al.* 2016, Grill *et al.* 2017). In addition, passive/avoidant leadership practices of construction site managers seem to be negative for construction site safety climate (Toderi *et al.* 2016, Grill *et al.* 2017).

The classification of leadership behaviours as transformational or passive/avoidant is largely theoretical, based on employees' global assessments of perceived leadership behaviours obtained through questionnaires. It has been argued that transformational leadership research needs to return to the drawing board to develop consistent behavioural leadership constructs (Van Knippenberg and Sitkin 2013), and to reconnect with the real-life practices of managerial leadership (Alvesson and Sveningsson 2003b). Recent findings by Nielsen and Daniels (2016) indicate that transformational leadership behaviours are not always compatible with occupational health and safety. The

actual constitutions of transformational and passive/avoidant leadership behaviours need to be further elucidated (Bass 1999, Alvesson and Sveningsson 2003a, Van Knippenberg and Sitkin 2013, Andersen 2015). The large-grained measures offered to us through questionnaires may fail to comprehensively identify the finer aspects of transformational leadership. Understanding the full complexity of transformational leadership may call for more fine-grained research methods. Third-party observational research methods, which do not rely on the potentially biased subjective perceptions of employees, have been called for to expand our understanding of the constitution of leadership practices (Bass and Riggio 2006, Behrendt *et al.* 2017). Context-specific, empirical descriptions of day-to-day manager-employee interactions is a promising route to a more comprehensive understanding of concrete and specific real-life leadership behaviours. This study contributes to such efforts by thoroughly scrutinizing and describing the actual behavioural content of basic managerial leadership practices, i.e. unravelling what managers actually do. Furthermore, by aligning third-party observations of construction site managers with employee ratings of construction site safety, we intend to contribute to the understanding of how observed leadership behaviours influence safety performance in the construction industry.

The present study aims to develop qualitative, context-specific descriptions of how transformational and passive/avoidant leadership is enacted by construction site managers, to develop a third-party observational method to observe, categorize and quantify transformational and passive/avoidant leadership behaviours, and to assess the influence of such observed and quantified leadership behaviours on construction site safety. Third-party observational method allows for generating concrete descriptions of how safety leadership is enacted in real-life managerial work at construction sites.

Safety-influencing mechanisms in transformational and passive/avoidant leadership

Grill (2018) outlined how transformational and passive/avoidant leadership behaviours of construction managers may influence safety performance at construction sites through antecedents (activators) and consequences (feedback). However, the mechanisms by which transformational and passive/avoidant leadership influences occupational safety are not yet comprehensively described. Previous research indicates that safety is positively associated with employees' perceptions of

transformational leadership behaviours displayed by managers while attending to safety-related work content (Barling *et al.* 2002). However, we argue that transformational leadership per se may be important for safety, also when the leadership behaviour is not perceived by employees as safety-related. Törner *et al.* (2017) demonstrated how leaders may encourage safety without being safety-specific, as effective leaders may stimulate the attainment of several organizational goals simultaneously. Transformational leadership has been found not only to improve safety but also to augment productivity and profitability (Bass and Bass 2008).

Transformational leaders are human-oriented and care for their employees (Bass and Bass 2008). Caring and considerate managers are more likely to enact their consideration by implementing healthy and safe working conditions for employees at their work-places. Further, when transformational leaders communicate care and consideration for their employees, the latter recognize that they are cared for and may in turn care more for themselves as well as for their colleagues. Consideration and care for self and others are essential for obtaining a high organizational safety climate (Kines *et al.* 2011). In addition, by role modelling appropriate safe, efficient, and productive work behaviours, transformational leaders may stimulate employees to engage in such behaviours.

Passive/avoidant leaders on the other hand, do not display proactive leadership behaviours and delay responding to urgent problems. They may leave unsafe working conditions unattended, which may preserve such conditions. Also, by failing to correct unsafe work behaviour among employees such work behaviour may be preserved. In addition, by role modelling passive/avoidant behaviours, leaders may encourage carelessness and passive behaviours among employees. Nevertheless, the influence of passive/avoidant leadership on occupational safety have not yet been thoroughly assessed since most research into transformational leadership interpret passive/avoidant leadership as merely the absence of transformational leadership (Kelloway *et al.* 2006, Toderi *et al.* 2016). We argue that passive/avoidant leadership may have direct negative and unique effects on occupational safety, explaining variation in occupational safety that cannot be understood as merely the absence of transformational leadership.

Leadership and safety performance

Safety, defined by the absence of injuries, is commonly used in population-based register studies.

However, injuries are relatively rare and therefore, in observational empirical studies, which generally do not allow such large research materials, injuries as the outcome variable is sensitive to stochastic effects. Also, injuries are lagging indicators of safety (Beus *et al.* 2016). Hence, more pervasive and proximal safety outcomes are needed to evaluate safety performance in organizations. Employee's safety-related work behaviour (Neal and Griffin 2006) and safety climate (Zohar 2010, Kines *et al.* 2011) are such proximal and well-established indicators of workplace safety and a meta-analysis identified them as strongly associated with occupational injuries (Christian *et al.* 2009). Management safety priority, commitment and competence has been identified as the most central aspect of safety climate (Christian *et al.* 2009, Fruhen *et al.* 2014, Beus *et al.* 2016), and the strongest predictor of safety outcomes (Kines *et al.* 2011).

Previous research on the importance of transformational leadership for construction site safety rely on employee ratings of leadership behaviours (Conchie and Donald 2009, Conchie *et al.* 2013, Hoffmeister *et al.* 2014, Toderi *et al.* 2016, Grill *et al.* 2017), predominantly with common source data on safety performance. This introduces a risk of common method bias. In the present study we will therefore assess the importance of transformational and passive/avoidant leadership for occupational safety with a mixed method design, combining third-party observations of construction site managers' leadership behaviours, with questionnaire responses from construction employees.

By practising transformational leadership behaviours – such as individualized consideration, intellectual stimulation, inspirational motivation, and role modelling – construction site managers may potentially improve construction site safety. Such improvement should be detectable among construction site employees as they would (1) perceive and report higher safety priority, commitment and competence among their managers; and (2) respond by enhancing their own safe work behaviour. Similarly, any negative influence on construction site safety by passive/avoidant leadership should also be detectable among construction site employees.

Hypothesis 1: Observed transformational leadership is positively associated with employees' ratings of construction site safety, in terms of (a) management safety priority, commitment and competence and (b) employees' safety-related work behaviour.

Hypothesis 2: Observed passive/avoidant leadership is negatively associated with employees' ratings of

construction site safety, in terms of (a) management safety priority, commitment and competence and (b) employees' safety-related work behaviour.

National culture as an antecedent to transformational leadership behaviour

Assuming that observed transformational leadership behaviour among construction site managers is positively associated with construction sites safety, and passive/avoidant leadership is negatively associated with safety, assessing potential antecedents to such transformational and passive/avoidant leadership is merited. Favourable national cultural conditions have been identified as an important antecedent for leadership practices (Dorfman *et al.* 1997, House *et al.* 2004, Oc 2018). Dorfman *et al.* argue that cultural leadership norms stimulate managers to develop certain leadership practices within certain national entities. Grill (2018) proposes that the mechanism behind such development is that certain managerial leadership behaviours are more accepted, appreciated, and acknowledged by senior managers and subordinate employees in certain cultural contexts than in others. Eurostat statistics (Eurostat 2017a) report that the average annual rate of fatal occupational injuries 2008–2015 is considerably lower in the Swedish (3.14 fatalities per 100,000 employees) than the Danish (3.96 fatalities) construction industry. Grill *et al.* (2017) suggested that this difference in injury rates may partly be explained by differences in safety leadership practices of Swedish and Danish construction site managers and that cultural conditions at Swedish construction sites may be more favourable for safety promoting leadership behaviours than conditions at Danish construction sites. In an interview study with managers and workers in the Scandinavian construction industry (Grill *et al.* 2015), the managerial safety leadership in Sweden was described as more proactive, participative, and transformational compared to the managerial safety leadership in Denmark. To investigate national differences in safety leadership, and thus if culture may be an antecedent to safety-related leadership practices, the following hypothesis was formulated:

Hypothesis 3: Observed transformational leadership is more frequent among Swedish than Danish construction site managers.

Method

A mixed method approach was applied, combining observations of construction site managers with

questionnaire responses from construction employees at the respective sites.

Participants and procedure

The National Work Environment Authorities (WEA) in Sweden and Denmark provided the researchers with contact information to the responsible site managers of all construction sites registered in accordance with common WEA-regulations in both countries (AFS 1999), between the 1st of October and the 15th of November 2015. In all, 939 Swedish and 140 Danish sites were registered. Three inclusion criteria were formulated: (1) the construction sites were to start operation sometime between the 1st of January and the 1st of June 2016; (2) the construction sites should be anticipated to employ at least 20 construction employees, and thereby require site managers to be extensively present at the sites; and (3) for practical reasons, the sites had to be located south of the 60th latitude, a criterion met by all Danish and 90% of the Swedish sites. All 21 Danish sites that met the inclusion criteria, and a random selection of 35 of the Swedish sites that met the inclusion criteria, were invited to participate in the study. 37 managers accepted participation, 22 Swedish and 15 Danish.

The participating managers were all male and their average age was 43 years ($SD = 9$). They had on average 10 years of experience as construction site managers ($SD = 9$). 27% were employed in larger firms (>200 employees). On average they spend 29 hours/week ($SD = 13$) at the current construction site. All construction employees at the participating sites, those employed by the main contractor as well as those employed by subcontractors, were asked to respond to a questionnaire. In Sweden, the questionnaires were administered by the site managers and in Denmark by members of the research team. 394 construction employees answered the questionnaire, equivalent to a response rate of 68%. The participating employees were 98% male and their average age was 39 years ($SD = 13$). 27% were temporarily employed and 73% had permanent employment.

Observations of leadership practice

In order to explore how construction site managers practice leadership in their daily interactions, naturalistic structured observations of interactions of the site managers were performed. The researchers took the role of third-party observers and, as unobtrusively as possible, "shadowed" individual managers carrying out

their everyday work (Tengblad 2006). Tengblad's study was a follow-up on a study by Mintzberg (1973); and both studies found that managers spend more than 70% of their total work time in verbal interactions with other people. Observing the managers in verbal interactions hence provided us with information on the bulk of managerial work behaviour. The shadowing not only provided data on the leadership practice of the site managers, it also gave the opportunity to observe how recipients of leadership reacted to the leadership, i.e. the immediate effects of managers' behaviour on subordinates and subcontractors' behaviour.

The observations were carried out during the spring of 2016, by the first three authors, to detect, categorize, and produce qualitative descriptions of the leadership behaviours practised by the site managers. Prior to the observations, the site managers were informed about the general aim of the study and that the purpose of the observations was to elucidate the day-to-day work of construction site managers. They were encouraged to carry on with their work as they normally would. Each manager was subjected to two hours of direct observation, where the researcher followed the manager around the site, in meetings and during office work. To minimize the influence of his/her presence the researcher kept in the background and tried to avoid interaction with the site manager and persons with whom the manager interacted.

Every interaction between the site manager and any other person at the construction site was observed and described in writing by the researcher. An interaction was defined as an exchange of information between the site manager and at least one other physically present person. The interactions could be initiated by either the site manager or the other person(s). Some longer and more complex interactions involving several employees and subcontractors were observed, e.g. when a site manager took a tour of the construction site with the foreman and they talked with different employees and subcontractors around the site. In these instances, the continued interaction between the site manager and the foreman was split up into shorter and isolated interactions if two conditions were satisfied: (1) at least one new person joined the interaction; and (2) a new theme in the content of the interaction was initiated. The interaction was defined as completed upon the fulfilment of both of two conditions: (1) an exit of at least one person from the interaction; and (2) the theme in the content of the interaction was discontinued.

Questionnaire measures

Construction site safety climate was measured with four items (Cronbach's $\alpha = 0.81$) from the Management safety priority, commitment and competence scale in NOSACQ-50 (Kines *et al.* 2011): (1) "Management encourages employees to work in accordance with safety rules – even when the work schedule is tight", (2) "Management ensures that everyone receives the necessary information on safety", (3) "Management looks the other way when someone is careless with safety", and (4) "Management accepts employees taking risks when the work schedule is tight". Participants rated to what extent they agreed with the statements, using a 6-point scale ranging from strongly disagree (1) to strongly agree (6). Safety-related work behaviour was measured with two items (Cronbach's $\alpha = 0.88$) from the safety compliance scale formulated by Neal and Griffin (2006): (1) "I use all the necessary safety equipment to do my job", and (2) "I use the correct safety procedures for carrying out my job". Participants rated how often they engaged in each type of behaviour, using a 7-point scale ranging from never (1) to always (7).

Data analysis

Coding of leadership behaviour

Subsequent to the observations, the description of each interaction was, in the manner described below, coded into one or more of the eight leadership categories of the Full Range Leadership Theory (FRLT) (Bass and Avolio 1997, Antonakis *et al.* 2003, Bass and Riggio 2006, Clarke 2013). For longer interactions, and interactions containing more than one leadership behaviour, up to four distinct categories were used for a single interaction. Apart from transformational and passive/avoidant leadership the FRLT also includes active transactional leadership (Clarke 2013).

Transformational leadership (four categories): (1) individualized consideration: actions that pay attention to the individual needs, goals and competences of employees; (2) intellectual stimulation: actions that appeal to employees' sense of logic and analysis by challenging them to think creatively and find solutions to difficult problems; (3) inspirational motivation: actions that inspire and motivate employees by depicting an optimistic future, stressing ambitious goals, projecting visions, and communicating that the goals are achievable; and (4) idealized influence: role modelling behaviour and actions centred on values, beliefs, and a sense of mission.

Passive/avoidant leadership (two categories): (1) passive management-by-exception (MBEP): passive corrective behaviours, performed only after non-compliance or mistakes have occurred; and (2) laissez-faire leadership: absence of leadership, interactions where the leader avoids making decisions, abdicates responsibility, and does not use his/her authority. If deviations were brought to the managers' attention, and the manager refrained from taking actions, the behaviour was coded as laissez-faire.

Active transactional leadership (two categories): (1) contingent reward: actions focused on clarifying role and task requirements, and providing employees with material or psychological rewards, contingent on the fulfilment of responsibilities; and (2) active management-by-exception (MBEA): vigilance behaviours, dedicated to ensure that standards are met and to prevent inaccuracies.

To establish high inter-rater reliability, the first ten site managers were simultaneously but independently observed and coded by two researchers. The codings were subsequently compared and displayed an overlap of 80%. The 20% of the observations that were coded differently by the two researchers were discussed and coded in consensus. To ensure inter-rater reliability throughout the remaining observations, all interactions, as described in writing by the observing researcher, were coded independently by both researchers. The codings were subsequently compared and continued to display an 80% overlap. The 20% of the observations coded differently by the two researchers were discussed and coded in consensus. Finally, when all observations were completed, all interactions were reanalysed together by the first and the second author, to ensure consistency in the coding throughout the data collecting period.

Upon completion of the coding, the first and second author together analysed all behavioural descriptions in each category by applying thematic content analysis (Schilling 2006). This was done to identify patterns in the descriptions within each category, so the behavioural themes in the categories could emerge. These patterns and themes were used to get rich data-driven context-specific descriptions of the theoretically defined categories of leadership behaviour.

Statistical analyses

To obtain sufficient power for quantitative analyses of the observational data, the leadership behavioural sub-categories were organized into the higher order

categories of transformational and passive/avoidant leadership. The proportions of transformational and passive/avoidant leadership were obtained by dividing the number of behaviours observed in each category with the total number of observed behaviours in all categories, resulting in a 0–1 scale for the proportions.

Coded observational data at site level were merged with questionnaire data at the individual level, rendering a two-level data structure. The nested structure of the questionnaire data, at construction sites, was accounted for by employing mixed model regression analyses with random intercepts. Management safety priority, commitment and competence and safety-related behaviour were grand mean centred prior to analyses.

To assess if the proportions of transformational and passive/avoidant leadership behaviour predicted the level of management safety priority, commitment and competence (hypotheses 1a and 2a), the regression model with the best goodness-of-fit was obtained through a stepwise procedure. First, a model including only the confounders were estimated and compared with a model that also included the proportion of transformational leadership. Second, the transformational leadership model was compared with a model that also included the proportion of passive/avoidant leadership. The same stepwise procedure was conducted to assess if the proportions of transformational and passive/avoidant leadership behaviour predicted the level of safety-related behaviours among employees (hypotheses 1b and 2b).

Regression models were estimated in SPSS version 24, using maximum likelihood (ML), and χ^2 -tests were conducted to assess the differences in log likelihoods between models. All regression coefficients were estimated under control for potential confounders identified in previous leadership research, i.e. age and managerial experience (Pinder and Pinto 1974, Latta and Emener 1983, Bass and Bass 2008), company size and time at site (Ford 1981, Djebarni 1996, Clark and Waldron 2016), employment status of employees, i.e. permanent versus temporary employment (Lamude *et al.* 2000, Winkler 2011, Bhattacharya and Tang 2013), and national cultural context (House *et al.* 2004, Oc 2018).

To assess the differences in the levels of observed transformational leadership behaviours at the Swedish and Danish construction sites (hypothesis 3), a regression model assessing the effect of national context was estimated. Regression coefficients were estimated under control of the managers' age, managerial experience, time at site, company size, and employee'

Table 1. Quantities (Q) and proportions (P) of observed leadership behaviours.

	All managers		Swedish managers		Danish managers	
	Q	P	Q	P	Q	P
Transformational leadership	77	0.18	55	0.24	22	0.11
Idealized influence	5	0.01	5	0.02	0	0
Inspirational motivation	8	0.02	6	0.03	2	0.01
Individualized consideration	14	0.03	12	0.05	2	0.01
Intellectual stimulation	50	0.12	32	0.14	18	0.09
Passive/avoidant leadership	70	0.16	35	0.15	35	0.17
Passive management-by-exception	47	0.11	21	0.09	26	0.13
Laissez-faire	23	0.05	14	0.06	9	0.05
Active transactional leadership	285	0.66	140	0.61	145	0.72
Contingent reward	166	0.38	81	0.35	85	0.42
Active management-by-exception	119	0.28	59	0.26	60	0.30
All behaviours	432	1.0	230	1.0	202	1.0

Note: Q: Quantities; P: Proportions.

ratings of management safety priority, commitment and competence, safety-related work behaviour, age and employment status.

Results

A total of 297 interactions were observed and 432 distinct leadership behaviours were detected, described and analysed. The quantities and proportions of the observed leadership behaviour among the construction site managers are displayed in Table 1.

Transformational leadership

Transformational leadership behaviour comprised 18% of all observed leadership behaviours. The primary transformational behaviour was intellectual stimulation, which accounted for almost 2/3 of such behaviour, while individualized consideration, inspirational motivation and idealized influence were the three most infrequent leadership behaviours over all.

Intellectual stimulation

Intellectual stimulation behaviours were typically observed in problem-solving situations where site managers made sure that different perspectives were considered. This was done by managers stimulating interactive problem-solving processes by creating discussions, questioning and challenging workers for different types of solutions, or introducing additional concerns that needed to be considered, such as quality, economy, safety or sequencing of work operations. Managers also facilitated discussions of different solutions between different workers with different competences, thus making sure that all the important perspectives were represented. The site managers created interactive discussions/problem-solving processes in one-on-one situations between

the site manager and an individual subordinate or subcontractor, or through the involvement of a team of workers. For instance, at one site there was a problem with the construction of the roof. The site manager then involved the carpenter, the roofer, the plumber and a sheet metal worker in a discussion on how to solve the issue.

The site managers practised intellectual stimulation either by being active parts in discussions or merely by encouraging workers to express and develop their own solutions. By practising intellectual stimulation, the site managers recognized the competences and knowledge of the worker, and the need to use this knowledge in solving problems more effectively. One expositive example of this practice was when a site manager, interacting with a construction worker, explicitly stated: "you know this better than me".

Intellectual stimulation leadership was occasionally practiced by site managers as a deliberate learning process, where the manager tried to teach workers how to advance their problem-solving procedures by including different perspectives. Most commonly, however, intellectual stimulation was coupled with actual, concrete problem-solving, as specific production-related problems were handled. Intellectual stimulation was also seen in discussions of hypothetical situations (e.g. a potential strike) and how to handle different scenarios related to such situations.

Individualized consideration

Individualized consideration was observed as site managers demonstrated care for workers' well-being, e.g. by asking questions about their health that were not always related to work-issues. For example, one site manager searched out a painter to ask him about the recovery of his leg and the outcome of a medical appointment. The manager also urged the worker to let him know if he by any means could ease the

workers' pain. In the work-related area, individualized consideration was practiced by managers identifying workers' individual problems and adapting the working conditions to the workers' capabilities. For example, one site manager participated in the rehabilitation of a site supervisor by assessing what work tasks were appropriate for the supervisor in returning to work, and at what pace this should be done. The managers also took advantage of specific knowledge about workers' individual characteristics in assigning work tasks, e.g. by involving a worker dissatisfied with safety procedures in a safety audit.

Inspirational motivation

Inspirational motivation behaviours were observed among the site managers as they talked about the importance of present work tasks, working procedures, or planning for the successful accomplishment of a project and realization of goals. For instance, one manager talked enthusiastically to a team of electricians about how unusual and demanding the setup of the electrical substation was, and how important the correct functioning of it was for the operation of the finished building. This communication clarified for the workers how the specific task at hand was vital for the success of the entire project.

Idealized influence

Idealized influence behaviours were observed among the site managers, as they articulated the value of goals such as team spirit, service mindedness and safety. Idealized influence was also shown by site managers through role modelling. This was e.g. done by one manager telling an anecdote about how his safety vigilance and challenging of the existing work procedures at a previous site, had resulted in the replacement of old concrete molds by new and safer ones.

Passive/avoidant leadership

Passive/avoidant leadership behaviour represented just over 16% of all observations. Passive management-by-exception was observed twice as often as laissez-faire leadership behaviour.

Passive management-by-exception

Passive management-by-exception behaviours encompassed correcting (potential) mistakes or deviations from standards, as identified by subordinates, subcontractors or customers. The mistakes or deviations were

related to project progress, planning, drawings or work tasks. It concerned tasks that had already been performed poorly as well as tasks that were in the process of being poorly performed. The nature of the exceptions regarded subordinates or subcontractors' lack of knowledge/competence of how to perform a task; problems related to production flow, such as anticipated or unexpected stops in the production; lack of or missing materials; restrained access to work areas; and lack of coordination between subcontractors. Sometimes the managers reacted actively/constructively on the exceptions by correcting them or instructing others on how to rectify them. Other times the site managers' reactions were more passive, not giving constructive solutions. As an example, a site manager with dirty shoes walked across a work area carefully prepared for flooring by the flooring contractor. When the flooring contractor criticized him for that, the site manager simply told the contractor to redo the preparation of the floor. Passive management-by-exception behaviours also included not solving less urgent problems or postpone the solving of more urgent problems, sometimes until others insisted that the site manager handled the problem. For instance, in a production meeting, a site manager did not correct a mistake in a document until the third time the subcontractor called attention to the mistake.

Passive management-by-exception was also demonstrated by site managers who reacted and handled obvious and urgent problems identified by others, but avoided to proactively follow up that other, similar problems were managed. For instance, one site manager was told by the site supervisor about faulty electrical installations on one floor of a building, but did not check whether similar electrical installations on the other floors in the same building were correct. Site managers also displayed passive management-by-exception by handling problems in suboptimal ways, making subcontractors repeatedly return to the site managers with the same unresolved problems.

Laissez-faire

The laissez-faire leadership behaviours displayed by the site managers involved explicitly acknowledging problems or tasks that needed to be handled, but without taking actions. It occurred that instead of addressing non-compliant workers directly, managers talked to others, behind the back of the worker. Managers could also make jokes about hazardous working situations, e.g. about a carpenter not using ear protection when required to do so.

Laissez-faire leadership was also displayed by site managers contacted by others for information or instructions, but not providing the requested information. In these interactions, the site managers lacked the necessary information and made no effort to acquire it.

Laissez-faire leadership behaviours were also displayed in situations in which somebody else, e.g. the safety coordinator, another site manager, or a superior manager, was present. In these situations, site managers displayed laissez-faire behaviours by being passive, for instance during safety meetings led by the safety coordinator. During such meetings, site managers also displayed more active laissez-faire behaviours such as opposing suggestions from the safety manager or obstructing the agenda of a fire instructor.

Active transactional leadership

Active transactional leadership behaviour was the most common type of leadership behaviour constituting almost 2/3 of all observed behaviour. Contingent reward, accounted for 38% of all observed leadership behaviour, while active management-by-exception was a little less common, but still the second overall most common leadership behaviour.

Contingent reward

The site managers displayed contingent reward leadership behaviours in interactions related to planning and coordination, by assigning work tasks and providing drawings, materials or instructions. Contingent reward behaviours consisted of continuous follow-up and coordination of work tasks; correcting/adjusting time plans and drawings; administrating the physical resources ("where to put what"); coordinating subcontractors work; assigning tasks; paperwork; book meetings; organizing site layout; and upholding tidiness. Contingent reward behaviours were observed during discussions with employees and subcontractors and in the form of delegations.

Contingent reward behaviours were also observed as site managers approved or sanctioned solutions suggested by employees and as site managers conveyed solutions to employees. This behaviour was often practiced through answering questions, explaining work procedures, and instructing workers. Information was then transmitted from site managers to employees and from employees to site managers. The site managers also conveyed customers' wishes and demands to subcontractors. Safety-related contingent reward behaviours regarded assignment of

safety-related work task, such as cleaning up the site and fencing.

In the observed interactions, the material rewards contingent on performance, were primarily implicit, such as getting paid and receiving continued employment. However, the contracts were occasionally mentioned and sometimes explicitly renegotiated by the site manager and the subcontractors during the work phase, as tasks and demands changed. Psychological rewards on the other hand, were often made explicit and took the form of verbal acknowledgement related to the standard or quality of the performed task, such as saying "good job", "that looks nice" and "well done".

Active management-by-exception

The site managers practiced active management-by-exception leadership as they monitored work and followed up on earlier agreements to check whether the established standards, related to quality or work progression, were met. The nature of the exceptions involved issues such as managing corrections in faulty planning/coordination of work activities; correcting behaviour, e.g. late arrivals; correcting lacking safety measures/materials/personal protection equipment (PPE); monitoring the quality of material, e.g. the hardening of moulded concrete; correcting carelessness in material handling; correcting faulty carried out work; or adjusting subcontractor problems in the level of staffing or staff competence.

Site managers spent time both in on-site offices and outdoors at the construction site. In both places, monitoring behaviours were practiced. In the office, the site managers monitored e.g. plans, drawings, time schedule, offers, economy, subcontractor agreements and tenders. At the site, the managers monitored e.g. work progress, tidiness or materials. Monitoring behaviours were generally practiced at a superficial level, asking workers while passing them at the site how their work was progressing. Sometimes, however, monitoring was more profound, such as giving detailed corrections, for instance by instructing an assistant in the precise wording of an e-mail to a subcontractor.

Active management-by-exception primarily occurred as part of planned activities, such as performing inspection rounds of the sites to monitor work progress or previously identified problems. These rounds were commonly part of a daily routine, such as making two daily tours of the site. The rounds were also often a consequence of a safety or production meeting, as

Table 2. Standardized regression coefficients (β) and standard errors (S.E.) for the effects of observed transformational (TF) and passive/avoidant (PA) leadership on employees' ratings of management safety priority, commitment and competence, estimated under control of managers' age, managerial experience, company size, time at site, and employee' ratings of age and employment status.

	Control Model ^a β (S.E)	TF Model ^b β (S.E)	TF-PA Model ^c β (S.E)
<i>Fixed effects</i>			
Transformational leadership	–	0.18 (0.07)*	0.13 (0.06)*
Passive/avoidant leadership	–	–	–0.23 (0.06)**
<i>Random effects</i>			
Residual variation	0.88 (0.06)	0.88 (0.06)	0.87 (0.06)
Inter-group variation	0.04 (0.03)	0.02 (0.02)	0.00 (0.00)
<i>Fit indices</i>			
Log likelihood (lnL)	1078.6	1070.7	1060.0
Diff lnL compared to previous Model	–	7.9**	10.7**
AIC	1098.6	1092.7	1084

Note: $n = 394$. ICC = 0.12. Wald tests and χ^2 -tests of diff log likelihood: * $p < .05$, ** $p < .01$. Estimation method: maximum log likelihood (ML).

^aIncluding only the control variables.

^bIncluding the control variables, and the proportion of observed transformational leadership.

^cIncluding the control variables, and the proportion of observed transformational and passive/avoidant leadership.

these meetings often resulted in lists of issues that had to be checked at the site.

The active management-by-exception behaviours involved briefly pointing out the deviances or more elaborated explanations and instructions. Management-by-exception occasionally involved discussing with others how to handle deviations. Sometimes the site manager carried out the corrections himself. At other times indirect measures of corrections were used. For instance, rather than telling a worker to use PPE, the manager asked him: "Aren't you missing something?". One manager simply stared at a worker, making him feel uncomfortable, and thereafter told him what PPE the worker was lacking. Not all corrections were successful. For example, when told by the site managers to correct his PPE one worker simply changed work tasks to avoid using the requested PPE.

Observed leadership behaviours predicting construction site safety

The results from the mixed model regression analyses displayed in Table 2 disclose that the proportion of observed transformational and passive/avoidant leadership behaviours of construction site managers predicted employees' ratings of management safety priority, commitment and competence. Thus, hypothesis 1a and 2a were supported.

The results from the mixed model regression analyses displayed in Table 3 reveal that the portion of observed transformational leadership behaviours of construction site managers predicted the level of safety-related behaviours among construction employees. Thus, hypothesis 1b was supported. However, the proportion of observed passive/avoidant leadership did not predict the level of employees' safety-related

behaviours ($p = .280$). Hence, hypothesis 2b was not supported.

National culture as an antecedent to transformational leadership behaviour

Transformational leadership was found to be more common among the Swedish than the Danish construction managers, see Table 4. The beta coefficient 1.05 indicated that transformational leadership behaviours were 1.05 standard deviations ($\approx 15\%$) more common at the Swedish than the Danish construction sites. Thus, hypothesis 3 was supported.

Discussion

This study included the development of a third-party observational method to observe, categorize and quantify transformational, active transactional and passive/avoidant managerial leadership behaviours. The inter-rater reliability of the method was found to be acceptable, showing an 80% overlap between two independent observers. The criterion validity of the method was tested against employee ratings of construction site safety and found acceptable: both transformational and passive/avoidant leadership behaviours were found to correspond to critical aspects of construction site safety.

The transformational leadership behaviours used by the construction site managers were primarily observed in production-oriented problem-solving, where site managers made sure that different perspectives were considered by stimulating inter-individual and collective problem-solving processes. Observed transformational leadership behaviours also included addressing and utilising specific goals and capabilities of individuals; role modelling and verbal elaborations

Table 3. Standardized regression coefficients (β) and standard errors (S.E.) for the effects of observed transformational (TF) and passive/avoidant (PA) leadership on employees' ratings of safe work behaviour, estimated under control of national context, managers' age, managerial experience, company size, time at site, and employee' ratings of age and employment status.

	Control Model ^a β (S.E.)	TF Model ^b β (S.E.)	TF-PA Model ^c β (S.E.)
<i>Fixed effects</i>			
Transformational leadership	–	0.14 (0.07)*	0.13 (0.07)*
Passive/avoidant leadership	–	–	–0.04 (0.06)
<i>Random effects</i>			
Residual variation	0.97 (0.07)	0.96 (0.07)	0.96 (0.07)
Inter-group variation	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<i>Fit indices</i>			
Log likelihood (lnL)	1104.3	1100.0	1099.5
Diff lnL compared to Control Model	–	4.3*	0.5
AIC	1124.3	1122.0	1123.5

Note: $n = 394$. ICC = 0.05. Wald tests and χ^2 -tests of diff log likelihood: * $p < .05$, ** $p < .01$. Estimation method: maximum log likelihood (ML).

^aIncluding only the control variables.

^bIncluding the control variables, and the proportion of observed transformational leadership.

^cIncluding the control variables, and the proportion of observed transformational and passive/avoidant leadership.

Table 4. Standardized univariate regression coefficients (β) and standard errors (S.E.) for the effect of national context on the proportions of observed transformational leadership, estimated under control of the managers' age, managerial experience, time at site, company size, and employee' ratings of management safety priority, commitment and competence, safety-related work behaviour, age, and employment status. β represents the Swedish levels ($n = 22$) in relation to the Danish ($n = 15$).

	Effect of national context	
	β	S.E.
Transformational leadership	1.05*	0.40

Note: * $p < .05$.

of higher-order ideals; and communicating the importance of ongoing work tasks and realization of goals, by describing how specific tasks at hand were vital for the success of the entire project.

The observed transformational leadership behaviour among construction site managers was found to be positively associated with employees' ratings of construction site safety, in terms of management safety priority, commitment and competence, and employees' safety-related work behaviour. Grill *et al.* (2017) and Hoffmeister *et al.* (2014) have previously outlined the importance of transformational leadership for occupational safety in the construction industry. The results of the current study confirm previous findings, but with a research design resistant to common method bias and independent of employee ratings of leadership behaviour; thus making the argument for the importance of transformational leadership even stronger.

Possible mechanisms underlying a positive influence of transformational leadership on occupational safety have been presented within the full-range leadership theory (Clarke 2013). Transformational leadership is typically described in terms of motivating

employees by providing them with antecedent stimuli to safe work behaviour, while the management of reinforcement contingencies is referred to as contingent reward leadership (Antonakis *et al.* 2003, Bass and Bass 2008). However, Bass has also (contrarily) suggested that "psychological" contingent reinforcement may actually be an important aspect of transformational leadership (Bass and Riggio 2006). Indeed, Choudhry (2014) demonstrated how safety-related behaviour among employees at construction sites may be influenced primarily by contingent consequences and only secondarily by antecedent stimuli. Similarly, Agnew and Daniels (2010) concluded that an effective antecedent gets a behaviour to occur once, but that it is the role of a consequence to get it to occur again.

At the construction sites in the present study, the mechanism underlying the influence of transformational leadership on site safety seems to consist of a combination of antecedent stimuli and contingent consequences. Firstly, the site managers provided their employees with antecedent stimuli inducing safe work behaviour: intellectual stimulation prompted employees to contribute their opinions in discussions; inspirational motivation prompted employees to put in extra effort; and individualized consideration prompted employees to care more for themselves and others. Secondly, contingent reinforcing transformational leadership provided by the managers included attention, approval, appreciation, encouragement, and the implementation of employees' suggestions. Such complementary leadership behaviour may have further augmented the effects of antecedent transformational leadership behaviours on employees' safety-related behaviour, through positive reinforcement. Future transformational leadership research may gain from paying more attention to the reinforcement contingencies of employees' behavioural responses to

antecedent transformational leadership stimuli. It may be beneficial to more unambiguously incorporate the contingent reinforcing transformational leadership behaviours that correspond to associated antecedent transformational leadership behaviours, into the conceptual theoretical framework of transformational leadership in full-range leadership theory.

Transformational leadership was also found positively associated with management safety priority, commitment and competence, a core element of construction site safety climate (Kines *et al.* 2011). Climate can be understood as a collection of common overt behaviours learned and maintained by a set of similar social and environmental contingences defining a given setting or context (Sugai *et al.* 2012, Grill 2018). These shared behavioural learning experiences include numerous reinforcement contingencies from various sources. Being subjected to leadership behaviours is one basic aspect of such shared behavioural learning experiences (Hofmann *et al.* 2017). Hofmann *et al.* (2017) argue that having a shared experience of leadership may be the prime aspect of the safety climate in workgroups and organizations. The shared behavioural learning experiences of individuals within a group include group members repeatedly observing what kind of behaviour is recognized and rewarded by their leaders (Dragoni 2005, Alvero *et al.* 2008). Such observational learning may be fundamental in the shaping of construction site safety climate (Alvero and Austin 2004, Alvero *et al.* 2008). The influence of transformational leadership on construction site safety climate may hence be understood primarily in terms of providing people with similar safety-related learning experiences (Choudhry, 2014).

Similarly, the effects of idealized influence through role modelling may augment both safety-related work behaviour and construction site safety climate. Site managers' safety-related work behaviour is typically modelled before multiple employees and may therefore influence several employees at a time, consequently contributing to their shared behavioural learning experience. Role modelling may hence be of particular importance for safety leadership in the construction industry. Indeed, Wu *et al.* (2016) demonstrate how modelling and imitation can progress through contractor levels, from owner through main contractors to subcontractors, and argue that role modelling exerted the widest range of influence on the safety climate in construction projects.

The site managers' passive/avoidant leadership behaviour was displayed through passively correcting mistakes or deviations from standards related to work

tasks, work progress, planning or drawings, as identified by employees, subcontractor or customers, and by avoiding the management of such acknowledged mistakes or deviations. Observed passive/avoidant leadership behaviour among construction site managers was found to be negatively associated with construction site safety, in terms of management safety priority, commitment and competence. This finding accentuates the negative influence of passive/avoidant leadership among construction site managers on safety climate also found in previous questionnaire studies (Toderi *et al.* 2016, Grill *et al.* 2017). Passive/avoidant leadership was found to explain variation in management safety priority, commitment and competence, beyond the variation explained by transformational leadership. This supports the conclusion of Kelloway *et al.* (2006), that passive and transformational leadership are not the opposite ends of the same continuum, but empirically distinct constructs.

Passive/avoidant leadership is at best reactive and includes corrective leadership behaviours that are performed only after non-compliance, mistakes, or deviations have occurred. The influence of such reactive leadership on safety is probably conditioned by the manner in which the deviations are managed. However, reactive leadership implies that the manoeuvring room is restricted because the deviations have already caused problems and the manager is working uphill from the onset. At construction sites, delayed responses to urgent questions may prove devastating. In addition, employees' experiences of absent or delayed leadership actions on behalf of site managers may be interpreted as a crucial piece of information in employees' perceptions of construction site safety climate, because absent or delayed actions may rightfully be interpreted as deficiencies in management safety priority, commitment or competence.

Active transactional leadership was the leadership behaviour most frequently observed among the site managers, encompassing 66% of all observed leadership behaviours. Transactional leadership is assumed to lay the ground for transformational leadership: "transactions are at the base of transformations" (Avolio 1999, p. 37). Implicit in this argument is the view that transactional leadership constitutes the bulk of managers' leadership behaviours and that transformational leadership is a vital, but quantitatively smaller ingredient. Our study provides this theoretical assumption with empirical support.

The proportion of transformational leadership behaviour was higher among site managers in Sweden than in Denmark. This supports previous

findings indicating that cultural conditions at Swedish construction sites seem to be more favourable for safety-promoting leadership than conditions at Danish construction sites (Grill *et al.* 2017). Grill (2018) argue that leadership practices are reproduced within cultural entities through shared behavioural learning (Sugai *et al.* 2012), i.e. that similar leadership behaviours performed by different managers within the same culture are subjected to similar reinforcement processes. Transformational leadership behaviours may be more accepted, appreciated and acknowledged (i.e. reinforced) by senior construction managers and subordinate construction employees at Swedish than at Danish construction sites. Through subsequent stimulus generalization processes (Osnes and Lieblein 2003), managers with similar behavioural learning histories develop similar behavioural habits of conducting leadership.

However, the influence of transformational and passive/avoidant leadership on construction site safety was found in both countries, indicating that these leadership behaviours are important for safety, regardless of cultural embedment. This is in accordance with previous research that found transformational leadership to be effective across cultures (Dorfman *et al.* 1997, Den Hartog *et al.* 1999). Construction site managers occupy a middle manager position that is complex and distinct from other managerial positions in the construction industry, and from managerial work in other occupational sectors (Styhre and Josephson 2006). Styhre and Josephson's research was conducted in Sweden and our findings are based on a Swedish and Danish sample. However, the work situation for construction site managers is similar in other parts of Europe, such as in the UK (Djebarni 1996). Furthermore, as managerial work in general becomes more complex, placing increasing demands on managers also in other occupational sectors to coordinate interacting employees, subcontractors, and external organizations, the results of this study might well apply also to middle managers outside of the construction industry. The relative frequency of transformational and active transactional leadership behaviour found in this study is probably generalizable to middle managers in most industrial sectors in Europe. Also, the significance of transformational and passive/avoidant leadership for managers to provide safe and healthy working environments for their employees probably applies also to managers on other hierarchical levels as well as managers in other industrial sectors in Europe. However, context-specific data is needed to obtain the qualitative aspects in managerial

work of the day-to-day leadership behaviours outlined in the present study. Consequently, the present study needs to be replicated with managers on other hierarchical levels, in other occupational sectors, and in other cultural contexts, in order to anchor interventions in this field on a comprehensive understanding of the constitution of transformational and passive/avoidant leadership.

Limitations

An inherent challenge in observational research is that researchers by their mere presence may influence the object under study and thereby the data. In the present study, the managers knew that the study focused on safety at the site, and this may have encouraged managers to increase their attention to safety issues. Correspondingly, all interactions where we identified indications of the site manager being influenced by the presence of an observer were safety-related. The researchers did not, however, take a specific interest in safety-related interactions since the focus was on managerial behaviour in all types of interactions. Since this was not articulated to the managers we consider that the observers' presence did not largely influence the results.

The naturalistic setting of the observations, and the interactive nature of the phenomenon under study, is also likely to have reduced the risk of managers' self-conscious behavioural adjustments. The managers were performing their normal job where they were obliged to react adequately to the persons they interacted with (Sillars 1991). After the observations were completed, the managers were asked whether being under observation had influenced their behaviour. Some of them, especially those that were observed by two researchers simultaneously, stated that it took a bit of getting used to, but that they in general had behaved as usual and that the work sequence that had been observed gave a fair reflection of their day-to-day work.

Conclusion

It has been argued that transformational leadership research needs to return to the drawing board to develop consistent behavioural leadership constructs (Van Knippenberg and Sitkin 2013, Behrendt *et al.* 2017), and to reconnect with the real-life practices of managerial leadership (Alvesson and Sveningsson 2003b). This study contributes to such efforts by thoroughly scrutinizing and describing the actual behavioural content of basic leadership practices, i.e.

unravelling what managers actually do. In addition, we have clarified what consequences the observed leadership practices may have on an essential organisational outcome like occupational safety. The results of this study provide descriptions of concrete context-specific leadership behaviours, linked to safety outcomes and employable in every-day managerial work. This finding contributes to safety leadership practice by providing descriptions of how safety leadership can be enacted by site managers at construction sites.

The proportion of observed transformational leadership practiced by the construction site managers was positively associated, and passive/avoidant leadership negatively associated, with construction site safety. This finding suggests that the bulk of leadership behaviours, i.e. active transactional leadership, should be pooled with a high degree of transformational behaviours and a low degree of passive/avoidant behaviours, in order to augment safety performance.

This study offers a method for measuring safety leadership, potentially valuable for practitioners aiming to evaluate or develop safety leadership abilities among managers or other leaders in the construction industry, and possibly in other occupational sectors. We suggest this method of measuring leadership to be applied in future research, tested in other contexts, and related to other outcomes, in the pursuit of furthering our understanding of leadership and its effects on organizational outcomes.

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