

**Tom W. Reader, Kathryn Mearns, Claudia Lopes and Jouni Kuha**

## **Organizational support for the workforce and employee safety citizenship behaviors: a social exchange relationship**

**Article (Accepted version)  
(Refereed)**

**Original citation:**

Reader, Tom W., Mearns, Kathryn, Lopes, Claudia and Kuha, Jouni (2017) *Organizational support for the workforce and employee safety citizenship behaviors: a social exchange relationship*. *Human Relations*, 70 (3). pp. 362-385. ISSN 0018-7267

© 2016 The Authors

This version available at: <http://eprints.lse.ac.uk/66644/>

Available in LSE Research Online: July 2016

LSE has developed LSE Research Online so that users may access research output of the School. Copyright © and Moral Rights for the papers on this site are retained by the individual authors and/or other copyright owners. Users may download and/or print one copy of any article(s) in LSE Research Online to facilitate their private study or for non-commercial research. You may not engage in further distribution of the material or use it for any profit-making activities or any commercial gain. You may freely distribute the URL (<http://eprints.lse.ac.uk>) of the LSE Research Online website.

This document is the author's final accepted version of the journal article. There may be differences between this version and the published version. You are advised to consult the publisher's version if you wish to cite from it.

# **Organizational support for the workforce and employee safety citizenship behaviors: a social exchange relationship**

*Tom W Reader, Kathryn Mearns, Claudia Lopes and Jouni Kuha*

## **Abstract**

Employee safety citizenship behaviors (SCBs) are crucial to risk management in safety-critical industries, and identifying ways to encourage them is a priority. This study examines i) whether SCBs are a product of social exchanges between employees and organizations, and ii) the organizational exchanges (i.e. actual activities to support employees) that underlie this relationship. We studied this in the offshore oil and gas industry, and investigated whether organizational activities for supporting workforce health are a signal to employees that the organization supports them, and an antecedent to SCBs. Using questionnaires, we collected data from employees ( $n=820$ ) and medics ( $n=30$ ) on 22 offshore installations. Multilevel path analysis found that where activities to support workforce health were greater, offshore employees were more likely to perceive their organization to support them, and in-turn report more commitment to the organization and SCBs. This indicates SCBs are a product of social exchange, and provides insight on how organizations can influence employee engagement in them. It also suggests social exchange theory as a useful framework for investigating how organizational safety is influenced by workforce relations. We contributed to the social exchange literature through conceptualizing and demonstrating how organizational exchanges lead to reciprocal employee citizenship behaviors.

## **Keywords**

Social Exchange, Safety, Employee Health, Citizenship behavior

Safety citizenship behaviors (SCBs) refer to discretionary employee activities essential for managing risk in ‘safety-critical’ industries (where organizational performance depends upon safe operations) (Didla et al., 2009). Despite their importance, employee engagement in SCBs is inconsistent, and identifying ways to encourage them is a priority. Improving organizational-employee relations is proposed as a potential solution (Didla et al., 2009; DeJoy et al., 2010), with social exchange research showing that employees who believe their organization to support them are more likely to engage in discretionary, extra-role, and unrewarded organizational citizenship behaviors (OCBs) (Wayne et al., 1997; Rhoades and Eisenberger, 2002). Such observations have led to questions on i) whether employee SCBs are also a product of social exchanges between organizations and employees (where they enter into voluntary, tacit, and ongoing reciprocation of resources), and if so ii) what types of organizational exchange (the resources shared by an organization with its employees) lead to reciprocal employee SCBs (DeJoy et al., 2010; Mearns et al., 2010)? This latter question is fundamental to conceptualizing safety citizenship behavior as a product of social exchange, and highlights a research gap within the social exchange literature. Specifically, whilst social exchange research has shown OCBs to be a reciprocal response to employee perceptions of organizational support, little work has examined the concrete organizational exchanges that underlie this relationship (Cropanzano and Mitchell, 2005).

This study investigates whether organizational activities to support workforce health in the offshore oil and gas industry are associated with employee engagement in SCBs. We conceptualize that, due to the risky and physically demanding nature of offshore work (HSE, 2012; CAA, 2014), organizational activities to support workforce health will constitute a form of

‘organizational exchange’ and will signal to employees that the organization supports them, leading to reciprocal SCBs.

### **Theoretical framework**

SCBs are discretionary and prosocial safety activities (e.g. reporting unsafe behavior, suggesting safety improvements) essential to safety management due to their importance for managing risk (Conchie and Donald, 2009; Hoffman et al., 2003). Safety-critical organizations have typically relied on safety messaging to encourage employee participation in SCBs (e.g. emphasizing their importance). Yet, due to SCBs being discretionary and often unrewarded, such methods can be ineffective in motivating sustained employee engagement in them (e.g. staff can become weary of messaging). Instead, and drawing on social exchange theory, it is proposed that SCBs may be a reciprocal response to feeling cared for by an organization, and that improving organizational-workforce relations is a way to motivate employee engagement in SCBs (DeJoy et al., 2010; Didla et al., 2009). This resonates with a growing literature theorizing employee safety activities to be a product of organizational practices indirectly related to safety (Hollnagel, 2014; Turner and Gray, 2009; Probst et al., 2013). From this perspective, organizational practices on workforce relations and human resource management (e.g. job security, reward systems) are intertwined with safety management through shaping employee’ attitudes towards the organization (i.e. on their treatment), and their consequent motivation to engage in safety behaviors. To examine this in the current study, we conceptualize SCBs as a product of social exchange, and do this through reflecting on the social exchange and OCB literature.

Social exchange theory has been extensively used to understand workplace behavior, and draws on a diverse range of disciplines, including social psychology, anthropology, sociology,

and economics. Social exchange relationships are described as ongoing reciprocal exchanges of resources (e.g. services, care, money) between two parties, with exchanges being inter-dependent and generative of future obligations (Foa and Foa, 1980; Blau, 1964; Homans, 1958). Social exchange relationships do not involve explicit bargaining or a priori specification, and instead encompass discretionary cooperative behaviors that lead to the development of trusting and committed long-term relationships (Molm, 2003; Cropanzano and Mitchell, 2005).

Social exchange theory has been applied extensively to explain why employees undertake organizational citizenship behaviors, from which the concept of safety citizenship derives. Research shows that employees who have positive “perceived organizational support” are more likely to feel committed to their organization, and engage in OCBs (Wayne et al., 1997; Loi et al., 2006; Podsakoff et al., 2000). This is explained as a reciprocal response by employees to organizational activities for improving their organizational environment (e.g. fairness, resources) and social context (e.g. leadership, trust) (Allen et al., 2003; Rhoades and Eisenberger, 2002; Zagenczyk et al., 2010). Yet, studies have tended to only examine OCBs as a reciprocal response to employee beliefs about exchange relationships with organizations (e.g. perceived organizational support, or assessments of organizational policies), and not the actual ‘organizational exchanges’ (i.e. resources shared with employees) that underlie beliefs (Eisenberger et al., 2001; Butts et al., 2013; Cropanzano and Mitchell, 2005). Demonstrating that organizational exchange activities lead to citizenship behavior is fundamental to the notion that OCBs and SCBs are a product of social exchange, and is important for operationalizing how organizations might motivate employee SCBs.

To achieve this, further consideration is required of how ‘organizational exchanges’ lead to reciprocal employee citizenship behaviors. Because employee OCBs are a form of pro-social

behavior that cannot be contracted or negotiated, they are conceptualized as being a response to social (e.g. providing services, care and support) rather than economical exchanges (e.g. pay) by an organization towards its workforce (Cropanzano and Mitchell, 2005). This draws on a 'signaling' perspective (Spence, 1973), where employees interpret organizational activities that support workers (e.g. training, workplace conditions, enabling performance) as a signal of the values and motives of the organization towards them (e.g. long-term commitment), which leads to positive perceived organizational support and reciprocal acts of citizenship (Suazo et al., 2009; Coyle-Shapiro and Conway, 2005; Eisenberger et al., 2004). In particular, organizational context is likely an important factor for determining the types of organizational activities that 'signal' organizational support. For example, organizational activities that address the specific challenges faced by workers in a given industry (e.g. work-life balance, information needs, trust in management) clearly demonstrate the organization's (e.g. management) attitude and responsiveness to the concerns of employees, and thus are likely to increase perceived organizational support and reciprocal citizenship behaviors (Bergeron et al., 2014; McNall and Roch, 2009). Research supports this perspective, for example studies in the creative industries show that employee perceptions of organizational acts to support creativity (e.g. ensuring access to information, treating new ideas openly) underlie perceived organizational support and willingness to engage in citizenship behaviors (Khazanchi and Masterson, 2011). Thus, for an organizational exchange to influence employee perceived organizational support (and lead to reciprocal commitment and SCBs), it must concretely address the needs of employees, and these needs are likely shaped by the context (e.g. industry) of work.

The current study examines this proposition in the safety-critical offshore oil and gas industry. Because work is physically challenging in this industry, we hypothesize that

organizational activities to support workforce health will ‘signal’ to employees that their organization cares for them, and lead to reciprocal employee commitment to the organization and SCBs. The purpose of exploring this is to advance both the occupational safety and social exchange literatures. On the former, we test whether SCBs are a product of social exchange between employees and organizations. The aim is to provide insight on how organizations can motivate employee engagement in behaviors critical for risk management, with social exchange theory being proposed as a framework through which to conceptualize how organizational practices on workforce relations and human resource management influence safety (Parker et al., 2001; Nahrgang et al., 2011). In terms of the social exchange literature, by showing SCBs and OCBs to be a consequence of organizational exchanges, we conceptualize and demonstrate how organizational exchanges influence employee citizenship behaviors.

### **Safety citizenship behavior as a product of social exchange**

Below we outline our hypotheses and conceptual model for examining whether SCBs are an outcome of social exchange relationships (Figure 1).

INSERT FIGURE 1 HERE

Initially, for organizational exchanges to lead to SCBs through a social exchange model, they must first be interpreted as a signal by employees that the organization supports them. In identifying which activities might achieve this, understanding the context of work appears critical.

As discussed in the previous section, the organizational exchanges that are likely to influence perceived organizational support are intertwined with the challenges facing a workforce, and the extent to which organizational activities address these. This likely depends on the characteristics of an industry and workforce, and, in specifying the organizational exchanges that might enhance perceptions of organizational support (and influence SCBs), it is important to identify pressing employee needs that the organization can address. For example, in the current study, we focus on the offshore oil and gas industry. This is a sector where employees are generally well-paid, educated, and have relatively high job-security, and thus can be argued to have quite good working conditions. Nonetheless, challenges remain. In particular, employees live on remote ‘installations’, and declining workforce health (e.g. aging workforce, increasing obesity, occupational illnesses due to long service) has become a major concern to employees and employers (HSE, 2012; CAA, 2014). Organizational activities to support and improve workforce health - for example health screening or providing healthy food - are voluntary (i.e. not regulated or mandated), and have little immediate or direct benefit to organizations, and thus might be conceptualized as a form of exchange (HSE, 2012; Mearns and Hope, 2005).

Hypotheses H1a and H1b test this, and examine whether employees working on offshore oil rigs acknowledge and positively perceive the influence of organizational activities to support their health. The purpose of such activities is to improve the physical and mental well-being of employees, and we focus on these because in the context of offshore oil and gas they address a need of employees (and signal the care of the organization for its employees) (Mearns and Hope, 2005). Hypothesis 1a examines whether employee assessments of health-support facilities are more positive on offshore oil and gas platforms (installations) that engage in greater activities to support workforce health (e.g. stress management, supplying healthy food). Hypothesis 1b



examines whether employee assessments of health-support facilities are associated with perceived organizational support for health, thus indicating employees to perceive such activities as a signal that the organization cares for their well-being (H1b). We hypothesize:

*Hypothesis 1a:* Organizational activities to support workforce health will be positively associated with employee assessments of health-support facilities.

*Hypothesis 1b:* Employee assessments of health-support facilities will be positively associated with employee perceived organizational support for health.

Hypothesis 2a–2f examine whether perceived organizational support for health is antecedent to SCBs.

Hypotheses 2a and 2b examine a direct relationship between employee perceived organizational support for health and employee citizenship, with the literature suggesting perceived organizational support for health is associated with employee safety attitudes (Basen-Engquist et al., 1998; Ribisl and Reischl, 1993; Colley et al., 2013). The mechanisms linking perceptions of organizational support for health and SCBs are somewhat basic, and relate to a direct form of reciprocation whereby perceived organizational support for health results in reciprocal employee citizenship activities. Thus, we explore a direct relationship between perceived organizational support for health and safety citizenship behaviors (H2a). Furthermore, because employees who perceive an organization to care for their health also tend to show enhanced work performance (Jones et al., 1995; Wilson et al., 2004; Browne, 2000), it is expected that perceived organizational support for health is also associated with OCBs (H2b), which has not been examined within the literature. We hypothesize:

*Hypothesis 2a: Employee perceived organizational support for health will be positively associated with engagement in safety citizenship behavior.*

*Hypothesis 2b: Employee perceived organizational support for health will be positively associated with engagement in organizational citizenship behavior.*

Next, and utilizing the social exchange mechanism commonly used to predict OCBs (Chen et al., 2009; Loi et al., 2006; Organ and Ryan, 1995), hypotheses 2c-2f test an indirect relationship between organizational support for health and employee SCBs. To do this, it is first necessary to show that perceived organizational support for health leads to positive perceived organizational support (from herein indicated by '(general)'). As previously discussed, research shows perceived organizational support (general) to be shaped by employee assessments of organizational activities for supporting the workforce (e.g. work-life balance), with such activities being a signal to employees that the organization supports them. Thus, it might be expected that perceived organizational support for health is positively associated with perceived organizational support (general) (H2c). Furthermore, and replicating previous research on social exchange (Rhoades and Eisenberger, 2002; Organ et al., 2006), we expect employee perceived organizational support (general) to subsequently be positively associated with commitment to the organization (H2d). Finally, and to complete the social exchange model, we examine whether high employee commitment to the organization is associated with greater engagement in SCBs. (H2e). In order to test whether organizational exchanges are also an antecedent to OCBs, we aim to replicate the finding that organizational commitment and OCBs are associated (H2f). Thus we hypothesize:

*Hypothesis 2c:* Employee *perceived organizational support for health* will be positively associated with *perceived organizational support (general)*.

*Hypothesis 2d:* Employee *perceived organizational support (general)* will be positively associated with *commitment to the organization*.

*Hypothesis 2e:* Employee *commitment to the organization* will be positively associated with *safety citizenship behavior*.

*Hypothesis 2f:* Employee *commitment to the organization* will be positively associated with *organizational citizenship behavior*.

The final set of hypotheses (H3a-H3c) relate to the influence of organizational activities to support workforce health upon actual employee health, and the potential influence of this upon SCBs. Organizational practices for supporting employee health have been shown to influence the well-being of employees and in-turn productivity, absenteeism, lawsuits, and staff turnover (Aldana, 2001; Grawitch et al., 2006). Thus, organizational activities to support workforce health might be expected to be positively associated with actual employee health (H3a). Furthermore, good employee health is shown to influence the mental well-being of workers (e.g. happiness, motivation), and workers' ability to manage job demands, willingness to engage in citizenship-like activities, involvement in safety incidents, and attitudes towards safety (Goetzel et al., 2007; Nahrgang et al., 2011; Clarke, 2010). An explanation for this relationship between employee health and job performance is that employee health influences the motivation and ability of workers to cope with the physical and cognitive demands of safety-critical work (Sparks et al.,

2001). Therefore, it might be expected that good employee health is associated with greater engagement in SCBs and OCBs (H3b-H3c). We hypothesize:

*Hypothesis 3a. Organizational activities to support workforce health will be positively associated with employee health*

*Hypothesis 3b. Employee health will be positively associated with engagement in safety citizenship behavior.*

*Hypothesis 3c. Employee health will be positively associated with engagement in organizational citizenship behavior.*

## **Methods**

### *Sample and procedure*

Data were collected from employees on 22 installations (Fixed Production platforms, drilling rigs, floating production storage and offloading vessels) in the UK North Sea. Hard-copy questionnaires were distributed to permanent operational staff on participating installations over an 8-week period. The questionnaires were distributed by installation medics (responsible for the health of offshore staff), who received a survey pack (with questionnaires, instructions, promotional materials) and training on introducing and disseminating the surveys to crew members. Independent data on organizational investment in health was collected through a second questionnaire that was completed by the medics on each installation.

In total 820 offshore employees responded from 22 installations. Installations varied in size in terms of employees working on them (from 100 to 350), and the mean response rate was 28.5% (with an average of 35 respondents per installations), but varied considerably (10.3% to

94%). In terms of medics, 30 responded to the survey (as there are two medics on each installation), with an overall response rate of 68%.

The response patterns to the survey were not untypical for research in offshore locations, where workers have unusual operating patterns (e.g. rotations, night shifts). Of the operating staff, at least 75% had an operational role (e.g. drilling or maintenance crews), and 81% of crew had worked on their installation for more than one year. Ten percent of crew were aged 20-31, 27% were 31-40, 37% were 41-50, and 26% were over 50. Data on gender were not collected, as female staff are a small minority of offshore crew, and thus identifiable.

### *Measures*

Two surveys were utilized in this study, one for installation employees and one for medics. For installation medics, it was necessary to develop a new survey scale (as there was no existing measure) of organizational activities to support workforce health on offshore installations (please see Appendix 1 for this and the other newly developed scales). For installations where two medic questionnaires were returned, the final score was their average for this scale. For installation employees, a new set of survey scales were developed to measure how and whether employees perceived organizational activities to support their health. The 'employee assessments of health-support facilities' scale focused on employee beliefs about the facilities for supporting their health on their installation. Furthermore, measures of 'perceived organizational support for health' and 'employee health' were developed. All new scales were developed using a bottom-up process (i.e. with the HSE, installation medics, safety managers), and were informed by existing survey scales on health climate (Basen-Engquist et al., 1998; Eisenberger et al., 2004; Golaszewski and Fisher, 2002; Ribisl and Reischl, 1993). All other survey scales (perceived

organizational support (general); commitment to the organization; safety citizenship behavior; organizational citizenship behavior) were based on reliable and valid existing measures, and source references are reported in table 1.

INSERT TABLE 1 HERE

### *Analyses*

In order to conduct the multilevel analysis, a hierarchical data set was created by matching the medics' answers describing the facilities for supporting employee health at an installation to the employees' answers from that installation. We then examined the association between the facilities available for supporting employee health, and the employee assessment of those facilities (and organizational support for health) alongside their responses to the other psychometric dimensions measured in the questionnaire.

The analysis was carried out in two steps. First, an observed variable was calculated for each of the constructs in the model. For organizational activities to support workforce health (which was measured in the medics survey) and for employee health this variable was a sum-score index, as explained in Table 1 and Appendix 1. For the rest of the constructs, the factorial structure of the scales used to measure them in the workforce questionnaire was inspected separately for each scale, using initially Exploratory Factor Analysis (EFA) for new scales and Confirmatory Factor Analysis (CFA) for existing scales. Factor scores from the final measurement models were then derived for each of the variables to serve as data in the next step of the analysis. Second, using these variables, all hypotheses were tested simultaneously in a multilevel path analysis model to examine both within- and between-installation relationships.

The analyses were carried out using the MPlus 7.3.1 software (Muthén and Muthén, 2012). Prior to conducting these analyses we examined the potential associations of age with the variables of the model, and found all of them to be uncorrelated.

## **Results**

### *i) Establishing measurement models*

For the *employee assessment of health-support facilities* scale, EFA was performed in order to examine whether particular items grouped together due to underlying common factors. An EFA with maximum likelihood and orthogonal rotation method revealed a three-factor model that explained 44.5% of the initial variance, with six items being removed due to low factor loadings ( $< .40$ ). The scales were thematically labelled i) *managing personal health* (3 items; mean=4.03; SD=.54), ii) *support for healthy eating* (4 items; mean =3.62; SD=.78), and iii) *support for managing stress* (3 items; mean=3.23; SD=.82). The factorial scale was then tested through confirmatory factorial analysis for this three-factor model where the factors were allowed to be correlated [ $\chi^2(32)=153.1, p<.001; CFI=.939; RMSEA=.068$ ].

For the other scales in the questionnaire, we tested one-factor models using CFA. For each of the scales used in the study, we report below on the CFA data, the  $\chi^2$  test statistic of overall goodness of fit and its  $p$ -value, RMSEA, and CFI (all adjusted for clustering of individuals within installations, as explained by Muthén and Satorra 1995), as well as the scale internal consistency (Cronbach's Alpha). Means and standard deviations (SD) are also reported. Conventional guidelines for these statistics suggest that a model fits well if Comparative Fit Index (CFI) exceeds .93 (Byrne, 1994) and RMSEA is less than .08 (Browne and Cudeck, 1993) and ideally less than .05 (Steiger, 1990). For Cronbach's Alpha, the widely accepted cutoff point

for good scale reliability is .70 (Nunnally, 1978). Assessment of the measurement models revealed a moderate to good fit for each of the scales, with some variation depending on which statistic we focus on (with the fit being typically more satisfactory according to CFI and Cronbach's Alpha than RMSEA). The statistics for the *perceived organizational support (general)* scale were: Alpha=.93;  $\chi^2(104)=755.3$ ,  $p<.001$ ; CFI=.886; RMSEA=.087 (mean=3.39; SD=.74). For *perceived organizational support for health* they were: Alpha=.85;  $\chi^2(2)=32.0$ ,  $p<.001$ ; CFI=.972; RMSEA=.135 (mean=3.11; SD=.66). For employees' *commitment to the organization* they were: Alpha=.93;  $\chi^2(5)=39.09$ ,  $p<.001$ ; CFI=.979; RMSEA=.091 (mean=3.68; SD=.78). For *safety citizenship behavior they were* Alpha=.85;  $\chi^2(9)=100.6$ ,  $p<.001$ ; CFI=.904; RMSEA=.111 (mean=4.15; SD=.48). Finally, for *organizational citizenship behavior they were*: Alpha=.89;  $\chi^2(27)=276.7$ ,  $p<.001$ ; CFI=.906; RMSEA=.106 (mean=3.61; SD=.66). These statistics are also summarized in Appendix 2, and means, standard deviations, and correlations of the study variables are reported in Table 2 (the latter including also the measures of organizational support and employee health, which were defined as number of positive responses to a set of items, rather than from factor analyses).

INSERT TABLE 2 HERE

The factor analyses examined the measurement properties by using full-information maximum likelihood estimation, using all observed items for a given scale for each respondent. The factor scores derived from the analyses were then defined unless a respondent answered none of the questions for a scale. All the scores were thus calculated for 809 of the 820 individual respondents. However, because data from the medic questionnaire was not obtained from 2



installations, the 41 individuals from these installations were omitted from the next stage of the analysis, leaving data from 768 individuals from 20 installations (mean=38, SD=19).

*ii) Multi-level path analysis*

A multi-level path analysis model was fitted to estimate the model outlined in Figure 1. All study hypotheses were tested within this model, and the results for them are reported in Figure 2 and Table 3. The model consisted of a cumulative sequence of multilevel (random intercepts) linear models for the variables shown in Figure 2, in the order of the blocks of the variables shown there (with employee health included in the same block as the three measures of employee assessment of health-support facilities, and these four conditional on organizational activities to support workforce health and conditionally associated with each other). In the model for each response variable, all variables in all preceding blocks were included as explanatory variables, and only those coefficients that corresponded to the research hypotheses are shown explicitly in the Figures and Table 3. The random effects (random intercepts) of the multilevel models are included in order to allow for possible residual correlations resulting from clustering of individuals within installations. The random effects for the three measures of employee assessment of health-support facilities were allowed to correlate, while all other correlations between the random effects were clearly nonsignificant and were omitted.

INSERT TABLE 3 HERE

INSERT FIGURE 2 HERE

As can be seen in Table 3, all study hypothesis were confirmed (i.e. the corresponding null hypothesis of no association was rejected, at the 5% level of significance) except the following. Hypothesis 1a (*Organizational activities to support workforce health* will be positively associated with *employee assessments of health-support facilities*) was only partially confirmed, with organizational activities to support workforce health being positively associated with the healthy eating subscale of employee assessment of health-support facilities (but not the managing stress and personal health subscales). Furthermore, hypothesis 2a (Employee *perceived organizational support for health* will be positively associated with engagement in *safety citizenship behavior*) and hypothesis 2b (Employee *perceived organizational support for health* will be positively associated with engagement in *organizational citizenship behavior*) were not confirmed.

## **Discussion**

We discuss the implications of the study findings in the sections below.

### *Social exchange and occupational safety*

For the first time, safety citizenship behaviors are shown to be an outcome of social exchange, with organizational activities to support workforce health being an antecedent to this relationship. Although our findings are associative, they contribute to a body of research showing that employee safety practices are associated with aspects of human resource management and workforce relations (e.g. use of temporary workers, lean production, job security, communication quality, employee satisfaction) (Fabiano et al., 2008; Longoni et al.,

2013; Parker et al., 2001; Probst et al., 2013; Nahrgang et al., 2011). Such effects have been explained variously, for example, job insecurity reduces knowledge and motivation for reporting safety incidents. Crucially, through utilizing social exchange theory and evidencing organizational support for workforce health to be antecedent to safety citizenship, we suggest a framework through which to conceptualize how organizational practices on workforce relations influence safety.

This builds on work arguing that organizational safety is intertwined with seemingly unrelated aspects of organizational performance (Hollnagel, 2014). It implies that workforce relations and human resources strategies are integral to effective safety management, with employee safety behaviors being a response to beliefs about treatment by their organization. Extending this perspective, we can explore how other aspects of workforce management (e.g. training opportunities, procedural justice, fair reward systems) influence SCBs (i.e. through influencing employee perceived organizational support). Conversely, practices that do not signal perceived organizational support to employees (e.g. short-term contracts, job insecurity, poor support for well-being), might be expected to negatively influence safety behaviors. Furthermore, where organizations are engaging in good practices to support their workforce, ensuring their employees are aware of this is crucial to influence SCBs.

Finally, this study draws novel associations between the concepts of occupational 'health' and 'safety'. Traditionally, interactions between the two have focused on how employee health is influenced by safety management. For example, the administration of personal protective equipment (e.g. hard hats to avoid personal injury), development of safety protocols (e.g. to avoid accidents during maintenance routines), and design of safe equipment (e.g. to reduce occupational illnesses) (Zanko and Dawson, 2012; Mearns and Hope, 2005). As an alternative,

we examined whether employee health influences safety, and a relationship was found between employee health and safety citizenship (but not organizational activities to support health). This relationship might be explained by the influence of employee health (i.e. physical and mental well-being) upon performance through its effect on the cognitive (i.e. motivation, satisfaction) and physical (i.e. energy) abilities of employees. To examine these relationships, a number of new measures were developed, and they might be utilized to conduct further research within this domain.

### *Social exchange and employee citizenship*

Alongside indicating SCBs as a product of social exchange between organizations and employees, the current study addresses a research gap within the social exchange literature (Molm, 2003; Cropanzano and Mitchell, 2005). It does this by testing a more comprehensive social exchange model, whereby the influence of actual organizational exchanges upon employee citizenship behaviors was examined. Specifically, based on social exchange research, organizational exchanges were conceptualized as social (e.g. care and support, training) that lead to various forms of reciprocal behaviors from employees. This has not previously been shown, and we tested this through examining the influence upon SCBs and OCBs of activities for supporting workforce health within the offshore oil and gas sector. Through adopting a multi-level design, we found that where organizations engage in more activities to support workforce health (e.g. investing in a high-quality diet), their employees are more likely to engage in SCBs and OCBs.

This augments research showing that OCBs are a reciprocal response to perceived organizational support, and indicates concrete organizational exchanges to underlie this

relationship. The multilevel path analysis found the social exchange mechanism to account almost entirely for the influence of organizational exchanges upon SCBs and OCBs. Yet, whilst the general reciprocity mechanism that underlies employee OCBs and SCBs might remain constant (i.e. perceived organizational support and reciprocal employee organizational commitment and OCBs: Wayne et al., 1997; Rhoades and Eisenberger, 2002), the organizational exchanges that drive this are likely to be specific to the needs of organization and employees. For example, in the offshore environment, health is issue of concern for many employees, who rely considerably upon the installation for supporting their well-being (e.g. providing healthy and high-quality meals, managing stress). Future research may wish to further investigate how the organizational activities that underpin such exchanges are influenced by the characteristics of an industry (e.g. knowledge industries, academia), and the needs of employees within that domain (e.g. job security, recognition of work). This reflects calls to better understand how organizations elicit and sustain reciprocal exchanges with employees, and also the multidimensionality of citizenship behaviors and their antecedents (Cropanzano and Mitchell, 2005; Marinova et al., 2010).

It also leads to a key practical implication from the study. In the context of offshore oil and gas, supporting employee health appears a potentially fruitful approach for developing positive perceived organizational support and reciprocal SCBs. This is due to the health challenges faced by employees, the importance of health for good performance, the ability of organizations to concretely address this issue, and the relatively good working conditions of offshore employees (e.g. employees are already well-paid). In some safety-critical industries, for example aviation (where fatigue is a major issue), activities to support employee health may also lead to improved employee perceptions of organizational support and SCB. However, in other

domains (e.g. healthcare), investing in employee health may not have the same impact as in offshore environments (as it is perhaps not such a key issue to employees, and harder for organizations to influence), and employees may have differing challenges that have greater priority (e.g. work-life balance). Ensuring that organizational activities to improve workforce relations address issues that have both symbolic and instrumental value (i.e. that an issue of importance is addressed in a way that is useful) to employees is critical if they are to be successful, and this can only be achieved through considering the organizational context. Practically, this involves a level of ‘diagnosis’ to understand the challenges and needs facing employees within a given industry, the ability of the organization to address them, and the likely short and long-term impact upon employee attitudes towards the organization.

## **Limitations**

A number of study limitations require consideration.

First, although the relationship between organizational safety outcomes and investment in workplace health has been explored previously (Mearns et al., 2010), objective safety data was not collected. Furthermore, we could not assess whether organizational activities to support workforce health predicted safety citizenship, and a longitudinal design is required to do this.

Second, the relationship between organizational activities to support workforce health was only significant for one of the employee assessment of health-support facilities scales. This may be because employees do not perceive the organizational activities to support health, or have pre-existing high expectations on the services provided by the organization (e.g. providing a gym). In addition, no direct relationship was found between perceived organizational support for health and OCBs and SCBs, with the relationship being explained only by the social

exchange mechanism. Also, organizational activities to support workforce health and employee health were not associated, and this may be due to limitations in the sensitivity of our measures (e.g. on health, which focused on crude measures such as BMI).

Third, whilst the data was multi-level in nature (collected from both offshore workers and medics), it was cross-sectional. Data were collected and matched from two independent sources, and standard psychometric scales were applied, alongside new measurements. Yet, these measures were self-report, which created the possibility for social desirability effects and common method bias (Podsakoff et al., 2003). In particular, the measurement of organizational exchange relied on installation medics reporting on organizational health support activities, and these were not validated.

Finally, the multi-level path analysis was performed on a relatively low number of analytical units (Maas and Hox, 2005). On the level of installations, having data only from 20 of them reduces the statistical power for testing those hypotheses which concern installation-level variables, so increasing the number of installations represented should be a priority in future research. On the level of individuals, response rates were low in some locations, and this might be accounted for by various reasons (e.g. lack of organizational commitment to supporting the research). Nonetheless a successful measurement model was established through CFA. Future research may wish to use alternative data collection methods, such as employee performance data and objective safety data, or real-time metrics of health behavior.

## **Conclusions**

This study demonstrated that organizational activities to support workforce health are antecedents to employee safety citizenship behaviors, and this was explained by a social

exchange theory. This contributes to the occupational safety literature by demonstrating and providing a framework through which to understand how organizational practices related to workforce management impact upon safety. In addition, we contributed to the social exchange literature through conceptualizing and illustrating how organizational exchanges influence reciprocal employee OCBs and SCBs, with the types of organizational exchanges likely to encourage citizenship being specific to the industry and needs of a workforce.

### **Acknowledgments**

We would like to acknowledge Lorraine Hope for her work in supporting data collection

### **Funding**

This work was supported by the UK Health and Safety Executive (RR376)



## References

- Aldana S. (2001) Financial impact of health promotion programs: A comprehensive review of the literature. *American Journal of Health Promotion* 15: 296-320.
- Allen DG, Shore LM and Griffeth RW. (2003) The role of perceived organizational support and supportive human resource practices in the turnover process. *Journal of Management* 29: 99-118.
- Barling J and Frone M. (2004) *The psychology of workplace safety*. Washington: APA books.
- Basen-Engquist K, Hudmon KS, Tripp M, et al. (1998) Worksite health and safety climate: Scale development and effects of a health promotion intervention. *Preventive Medicine* 27: 111-119.
- Bergeron D, Ostroff C, Schroeder T, et al. (2014) The dual effects of organizational citizenship behavior: Relationships to research productivity and career outcomes in academe. *Human Performance* 27: 99-128.
- Blau PM. (1964) *Exchange and power in social life*: Transaction Publishers.
- Browne J. (2000) Benchmarking HRM practices in healthy work organizations. *American Business Review* 18: 50-61.
- Browne M and Cudeck R. (1993) Alternative ways of assessing model fit. In: Bollen A and Long J (eds) *Testing structural equation models* Newbury Park, CA: Sage, 136-162.
- Butts MM, Casper WJ and Yang TS. (2013) How important are work–family support policies? A meta-analytic investigation of their effects on employee outcomes. *Journal of Applied Psychology* 98: 1-25.

- Byrne BM. (1994) Testing for the factorial validity, replication, and invariance of a measuring instrument: A paradigmatic application based on the Maslach Burnout Inventory. *Multivariate Behavioral Research* 29: 289-311.
- CAA. (2014) Safety review of offshore public transport helicopter operations in support of the exploitation of oil and gas. UK: Civil Aviation Authority.
- Chen Z, Eisenberger R, Johnson KM, et al. (2009) Perceived organizational support and extra-role performance: which leads to which? *The Journal of Social Psychology* 149: 119-124.
- Clarke S. (2010) An integrative model of safety climate: Linking psychological climate and work attitudes to individual safety outcomes using meta-analysis. *Journal of Occupational and Organizational Psychology* 83: 553-578.
- Colley SK, Lincolne J and Neal A. (2013) An examination of the relationship amongst profiles of perceived organizational values, safety climate and safety outcomes. *Safety Science* 51: 69-76.
- Conchie S and Donald I. (2009) The moderating role of safety-specific trust on the relation between safety-specific leadership and safety citizenship behaviors. *Journal of Occupational Health Psychology* 14: 137-147.
- Coyle-Shapiro J and Conway N. (2005) Exchange relationships: Examining psychological contracts and perceived organizational support. *Journal of Applied Psychology* 90: 774-781.
- Coyle-Shapiro J and Kessler I. (2000) Consequences of the psychological contract for the employment relationship: A large scale survey. *Journal of Management Studies* 37: 903-930.

- Cropanzano R and Mitchell MS. (2005) Social exchange theory: An interdisciplinary review. *Journal of Management* 31: 874-900.
- DeJoy D. (2005) Behavior change versus culture change: Divergent approaches to managing workplace safety. *Safety Science* 43: 105-129.
- DeJoy D, Della L, Vandenberg R, et al. (2010) Making work safer: Testing a model of social exchange and safety management. *Journal of Safety Research* 41: 163-171.
- Didla S, Mearns K and Flin R. (2009) Safety citizenship behaviour: a proactive approach to risk management. *Journal of Risk Research* 12: 475-483.
- Eisenberger R, Armeli S, Rexwinkel B, et al. (2001) Reciprocation of perceived organizational support. *Journal of Applied Psychology* 86: 42-51.
- Eisenberger R, Jones JR, Aselage J, et al. (2004) *Perceived organizational support*.
- Eisenberger R, Stinglhamber F, Vandenberghe C, et al. (2002) Perceived supervisor support: Contributions to perceived organizational support and employee retention. *Journal of Applied Psychology* 87: 565-573.
- Fabiano B, Currò F, Reverberi AP, et al. (2008) A statistical study on temporary work and occupational accidents: specific risk factors and risk management strategies. *Safety Science* 46: 535-544.
- Foa EB and Foa UG. (1980) Resource theory. In: Gergen K, Greenberg M and Willis R (eds) *Social Exchange*. Springer, 77-94.
- Geller E, Roberts D and Gilmore M. (1996) Predicting propensity to actively care for occupational safety. *Journal of Safety Research* 27: 1-8.

- Goetzel R, Shechter D, Ozminkowski R, et al. (2007) Promising practices in employer health and productivity management efforts: findings from a benchmarking study. *Journal of Occupational and Environmental Medicine* 49: 111-130.
- Golaszewski T and Fisher B. (2002) HeartCheck: The development and evolution of an organizational heart health assessment. *American Journal of Health Promotion* 17: 132-153.
- Grawitch M, Gottschalk M and Munz D. (2006) The path to a healthy workplace: A critical review linking healthy workplace practices, employee well-being, and organizational improvements. *Consulting Psychology Journal: Practice and Research* 58: 129-147.
- Hoffman D, Morgeson F and Gerras S. (2003) Climate as a moderator of the relationship between LMX and content specific citizenship behaviour: Safety climate as an exemplar. *Journal of Applied Psychology* 88: 170-178.
- Hofmann D and Morgeson F. (1999) Safety-related behavior as a social exchange: the role of perceived organizational support and leader-member exchange. *Journal of Applied Psychology* 84: 286-296.
- Hollnagel E. (2014) *Safety-I and Safety-II: The Past and Future of Safety Management*, Farnham: Ashgate Publishing.
- Homans GC. (1958) Social behavior as exchange. *American Journal of Sociology*: 597-606.
- HSE. (2012) *Health and Safety Statistics*, Suffolk: Health and Safety Executive.
- Jones B, Flynn D and Kelloway E. (1995) Perception of support from the organization in relation to work stress, satisfaction, and commitment. In: Sauter S and Murphy L (eds) *Organizational risk factors for job stress*. Washington, DC: APA, 41-52.

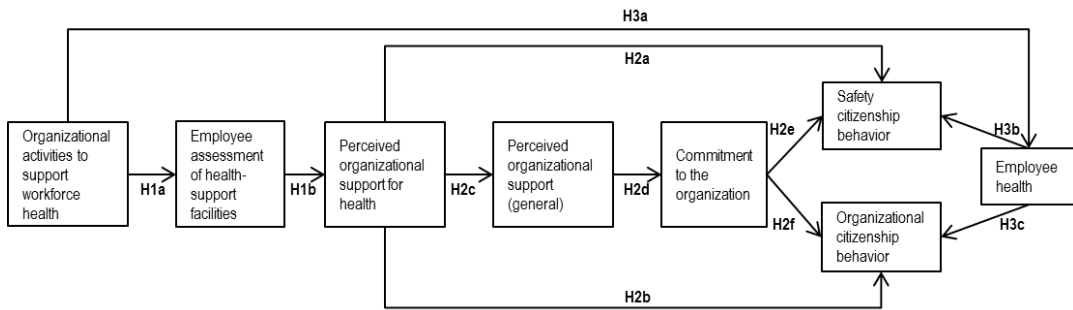
- Khazanchi S and Masterson SS. (2011) Who and what is fair matters: A multi-foci social exchange model of creativity. *Journal of Organizational Behavior* 32: 86-106.
- Klein R. (2010) *Principles and Practice of Structural Equation Modeling*, New York: Guilford Press.
- Kuwabara K and Sheldon O. (2012) Temporal dynamics of social exchange and the development of solidarity: “testing the waters” versus “taking a leap of faith”. *Social Forces*: 91.
- Little R and Rubin D. (2002) *Statistical analysis with missing data*, New York: John Wiley and Sons.
- Loi R, Hang-Yue N and Foley S. (2006) Linking employees' justice perceptions to organizational commitment and intention to leave: The mediating role of perceived organizational support. *Journal of Occupational and Organizational Psychology* 79: 101-120.
- Longoni A, Pagell M, Johnston D, et al. (2013) When does lean hurt?—an exploration of lean practices and worker health and safety outcomes. *International Journal of Production Research* 51: 3300-3320.
- Maas CJ and Hox JJ. (2005) Sufficient sample sizes for multilevel modeling. *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences* 1: 86-92.
- Marinova SV, Moon H and Van Dyne L. (2010) Are all good soldier behaviors the same? Supporting multidimensionality of organizational citizenship behaviors based on rewards and roles. *Human Relations* 63: 1463-1485.
- McNall LA and Roch SG. (2009) A social exchange model of employee reactions to electronic performance monitoring. *Human Performance* 22: 204-224.
- Mearns K and Hope L. (2005) *Health and well-being in the offshore environment: The management of personal health*: Health and Safety Executive.

- Mearns K, Hope L, Ford MT, et al. (2010) Investment in workforce health: Exploring the implications for workforce safety climate and commitment. *Accident Analysis & Prevention* 42: 1445-1454.
- Mearns K, Whitaker S and Flin R. (2003) Safety climate, safety management practice and safety performance in offshore environments. *Safety Science* 41: 641-680.
- Molm LD. (2003) Theoretical comparisons of forms of exchange. *Sociological Theory* 21: 1-17.
- Molm LD, Schaefer DR and Collett JL. (2007) The value of reciprocity. *Social Psychology Quarterly* 70: 199-217.
- Muthén BO and Satorra A. (1995) Complex Sample Data in Structural Equation Modeling. *Sociological Methodology* 25: 267-316.
- Muthén LK and Muthén BO. (2012) Mplus. *The comprehensive modelling program for applied researchers: User's guide* 5.
- Nahrgang JD, Morgeson FP and Hofmann DA. (2011) Safety at work: a meta-analytic investigation of the link between job demands, job resources, burnout, engagement, and safety outcomes. *Journal of Applied Psychology* 96: 71-94.
- Nunnally J. (1978) Psychometric theory, McGraw-Hill, New York, NY.
- Organ D, Podsakoff PM and MacKenzie SB. (2006) *Organizational citizenship behavior: Its nature, antecedents, and consequences*, Thousand Oaks, CA: Sage.
- Organ D and Ryan K. (1995) A meta-analytic review of attitudinal and dispositional predictors of organizational citizenship behavior. *Personnel Psychology* 48: 775-802.
- Parker SK, Axtell CM and Turner N. (2001) Designing a safer workplace: Importance of job autonomy, communication quality, and supportive supervisors. *Journal of Occupational Health Psychology* 6: 211-228.

- Podsakoff P, MacKenzie S, Painea J, et al. (2000) Organizational citizenship behaviors: a critical review of the theoretical and empirical literature and suggestions for future research. *Journal of Management* 26: 513-563.
- Podsakoff P, Scott B, Mackenzie J, et al. (2003) Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology* 88: 879-903.
- Probst TM, Barbaranelli C and Petitta L. (2013) The relationship between job insecurity and accident under-reporting: A test in two countries. *Work & Stress* 27: 383-402.
- Rhoades L and Eisenberger R. (2002) Perceived organizational support: A review of the literature. *Journal of Applied Psychology* 87: 698-714.
- Ribisl K and Reischl T. (1993) Measuring the climate for health at organizations: Development of the worksite health climate scales. *Journal of Occupational and Environmental Medicine* 35: 812-824.
- Simard M and Marchand A. (1995) A multilevel analysis of organisational factors related to the taking of safety initiatives by work groups. *Safety Science* 21: 113-129.
- Sinclair R and Tetrick LE. (2004) Pay and benefits: The role of compensation systems in workplace safety. In: Barling J and Frone M (eds) *The psychology of workplace safety*. Washington: APA Books.
- Sparks K, Faragher B and Cooper C. (2001) Well-being and occupational health in the 21st century workplace. *Journal of Occupational and Organizational Psychology* 74: 489-509.
- Steiger JH. (1990) Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research* 25: 173-180.

- Suazo MM, Martínez PG and Sandoval R. (2009) Creating psychological and legal contracts through human resource practices: A signaling theory perspective. *Human Resource Management Review* 19: 154-166.
- Tsui A, Pearce J, Porter L, et al. (1997) Alternative approaches to the employee-organization relationship: does investment in employees pay off? *Academy of Management Journal* 40: 1089-1121.
- Turner N and Gray GC. (2009) Socially constructing safety. *Human Relations* 62: 1259-1266.
- Wayne SJ, Shore LM and Liden RC. (1997) Perceived organizational support and leader-member exchange: A social exchange perspective. *Academy of Management Journal* 40: 82-111.
- Wilson M, Dejoy D, Vandenberg R, et al. (2004) Work characteristics and employee health and well-being: Test of a model of healthy work organization. *Journal of Occupational and Organizational Psychology* 77: 565-588.
- Zagenczyk TJ, Scott KD, Gibney R, et al. (2010) Social influence and perceived organizational support: A social networks analysis. *Organizational Behavior and Human Decision Processes* 111: 127-138.
- Zanko M and Dawson P. (2012) Occupational health and safety management in organizations: a review. *International Journal of Management Reviews* 14: 328-344.





**Figure 1. Hypothesized model of safety citizenship behavior as a product of social exchange.**

**Table 1. Study measures**

<b>Scale</b>	<b>Scale description</b>	<b>Source</b>	<b>Purpose</b>
Organizational activities to support workforce health	Thirteen items on organizational activities to support workforce health. These included whether the organization provided information on health, screening for health conditions, and facilities to support health. Medics indicated whether these measures were in place (or had been in place during the last year), and an index was created by adding up the number of positive responses. For installations where two medic questionnaires were returned, the final score was their average	The scale was developed with installation medics and HSE staff	To test Hypothesis 1a
Employee assessment of health-support facilities	Sixteen statements on employee assessments of health-support facilities on the installation. Items focused on personal health (e.g. exercise), health eating (e.g. ability to avoid unhealthy foods), and stress management. Participants responded using a 5-point Likert scale (1=Strongly Disagree / 5=Strongly Agree)	Items were based on Golaszewski & Fisher's (2002) health promotion measures, and developed through discussions with installation medics and the HSE	To test Hypotheses 1a and 1b
Perceived organizational support for health	Four items relating to perceived organizational support for health. An example item: "This operating company values healthy workers". Participants responded using a 5-point Likert scale (1=Strongly Disagree / 5=Strongly Agree)	The scale was developed with installation medics and HSE staff.	To test Hypotheses 1b, 2a, 2b, and 2c
Perceived organizational support (general)	Sixteen items measuring staff perceptions of organizational support for their general well-being. An example item: "The operating company shows very little concern for me". Participants responded using a 5-point Likert scale (1=Strongly Disagree / 5=Strongly Agree)	Measured using Eisenberger et al.'s (2002) scale	To test Hypotheses 2c and 2d
Commitment to the organization	Five-item scale for measuring employee feelings of commitment to the installation they worked on (e.g. feeling of belonging, pride, contribution). An example item: "I feel a strong sense of belonging to this installation". Participants responded using a 5-point Likert scale (1=Strongly Disagree / 5=Strongly Agree)	Items were taken from Coyle-Shapiro & Kessler (2000)	To test Hypotheses 2d, 2e and 2f
Safety citizenship behavior	Six items on 'safety citizenship' (e.g. monitoring workmate behavior, correcting potential safety problems, informing management about safety problems). Example item: "I make suggestions to management for improving the safety of the work environment". Participants responded using a 5-point Likert scale (1=Strongly Disagree / 5=Strongly Agree)	Items for this scale were developed from scales by Geller and colleagues (1996) and Simard and Marchand (1995)	To test Hypotheses 2a, 2e, and 3b
Organizational citizenship behavior	Nine items measuring the extent to which participants engage in organizational citizenship behaviors (e.g. improving and revising work procedures, informing management about unproductive practices). An example item: "I make suggestions to improve work procedures". Participants responded using a 5-point Likert scale (1=Not at all / 5=To a great extent)	Items taken from scales reported by Coyle-Shapiro & Kessler (2000) and Tsui et al. (1997)	To test Hypotheses 2b, 2f, and 3c
Employee health	Four items measuring participant' health, fitness and dietary habits were developed with installation medics and HSE staff. Details on employee Body Mass Index, dietary habits, health and unhealthy behaviors (e.g. smoking, exercise) were recorded. A health index was calculated from these measures as the sum of scores assigned to individual items. The index has values 0–7	The scale was developed with installation medics and HSE staff	To test Hypotheses 3a, 3b, and 3c

**Table 2. Means (M) and standard deviations (SD) of the study variables used in the multi-level model reported in Table 3, and their correlations at the employee level (lower diagonal) and aggregated to the installation level (upper diagonal) in the sample which was used for fitting the model**

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1. Organizational activities to support workforce health (Installation-level variable)	10.01	1.59	1.00	.21	.15	.46	.23	.19	.04	.04	.20	.43
2. Employee assessment of personal health support	.01	.92		1.00	.86**	.83**	.52	.08	.16	-.15	-.07	.57*
3. Employee assessment of support for managing stress	.00	.93		.66**	1.00	.80**	.40	-.10	.14	-.35	-.07	.60*
4. Employee assessment of support for health eating	.00	.95		.49**	.69**	1.00	.49	-.07	.22	-.15	.10	.64*
5. Perceived organizational support for health	.00	.92		.42**	.47**	.42**	1.00	.70**	.41	.17	.15	.06
6. Perceived organizational support (general)	.02	.97		.37**	.41**	.32**	.73**	1.00	.53	.49	.39	-.12
7. Commitment to the organization	.00	.98		.34**	.30**	.24**	.48**	.56**	1.00	.60*	.71**	.01
8. Safety citizenship behavior	-.01	.93		.22**	.13**	.09	.20**	.19**	.32**	1.00	.66*	-.24
9. Organizational citizenship behavior	.00	.94		.17**	.11*	.07	.17**	.22**	.30**	.47**	1.00	.10
10. Employee health	14.09	5.52		.13**	.09*	.09*	.00	.02	.00	.11*	.12**	1.00

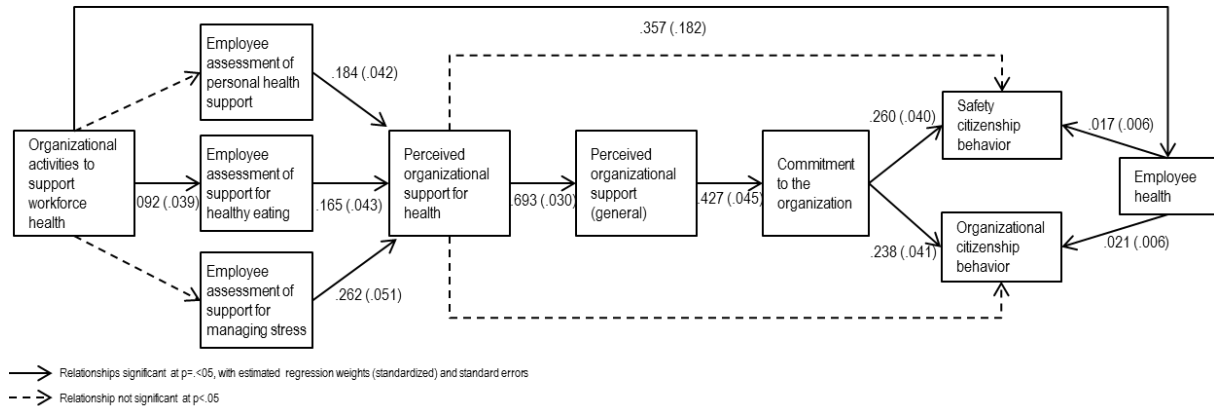
Note: n = 768, \* p < .01 \*\* p < .001

**Table 3. Multi-level path analysis model to test safety citizenship behavior as a product of social exchange**

Response variable	Explanatory variable ( <i>and hypothesis tested</i> )	$\beta$	SE	<i>p</i>
Employee assessment of personal health support	Organizational activities to support workforce health ( <i>H1a</i> )	.034	.036	.334
Employee assessment of support for managing stress	Organizational activities to support workforce health ( <i>H1a</i> )	.020	.043	.646
Employee assessment of support for healthy eating	Organizational activities to support workforce health ( <i>H1a</i> )	.092	.039	.018
Employee health	Organizational activities to support workforce health ( <i>H3a</i> )	.357	.182	.049
Perceived organizational support for health	Employee assessment of personal health support ( <i>H1b</i> )	.184	.042	<.001
	Employee assessment of support for managing stress ( <i>H1b</i> )	.262	.051	<.001
	Employee assessment of support for healthy eating ( <i>H1b</i> )	.165	.043	<.001
Perceived organizational support (general)	Perceived organizational support for health ( <i>H2c</i> )	.693	.030	<.001
Commitment to the organization	Perceived organizational support ( <i>H2d</i> )	.427	.045	<.001
Safety citizenship behavior	Commitment to the organization ( <i>H2e</i> )	.260	.040	<.001
	Employee health ( <i>H3b</i> )	.017	.006	.004
	Perceived organizational support for health ( <i>H2</i> )	.085	.053	.110
Organizational citizenship behavior	Commitment to the organization ( <i>H2f</i> )	.238	.041	<.001
	Employee health ( <i>H3c</i> )	.021	.006	.001
	Perceived organizational support for health ( <i>H2b</i> )	.004	.054	.943

*Note:* Only coefficients corresponding to the research hypotheses are shown, but the model for each response variable also includes all variables preceding it as additional explanatory variables. SE = standard error, H = hypothesis.

**Figure 2. Final multi-level path analysis model of safety citizenship behavior as an outcome of social exchange.**



*Note:* Only paths corresponding to the research hypotheses are shown, but the model for each response variable also includes all variables preceding it as additional explanatory variables.

### Appendix 1. Health scales developed for the study

Scale	Purpose	Items
Organizational activities to support workforce health scale (for medics)	To ascertain the level of health support provided by offshore installations to their employees, installation medics indicated no (0) or yes (1) as to whether the following had been provided in the past 12 months, or were currently in place. The scale was developed with the HSE and installation medics, and scores were calculated through adding up the number of positive responses to each question. For installations where two medic questionnaires were returned, the final score was their average.	Medics indicated whether there were facilities to support and improve employee health for the following: 1. Information on health screening 2. Blood pressure screening 3. Cholesterol screening 4. Diabetes screening 5. Health risk assessments 6. Information about exercise 7. Exercise facilities 8. Information about smoking 9. Activities for helping stop smoking 10. Stress management program 11. Stress training 12. Info about diet 13. Healthy eating program
Employee assessment of health-support facilities (for employees)	This scale examined offshore employee perceptions on the facilities available for supporting their health. The scale was developed with the HSE and installation medics. Three factors were identified for the scale:  Factor 1: Organizational support for managing personal health Factor 2: Organizational support for healthy eating Factor 3: Organizational support for managing stress	Participants were asked to indicate, on their installation, if it was possible to (1 Strongly agree - 5 Strongly Disagree): 1. Get advice relating to work related health issues (Factor 1) 2. Get advice relating to improving personal health (Factor1) 3. Get assistance to quit smoking (e.g. gum, patches) (Factor 1) 4. Eat bran or other high fiber foods (Factor 2) 5. Take aerobic exercise regularly 6. Get reasonably good sleep 7. Drink clean water 8. Eat a balanced diet (Factor 2) 9. Get advice to manage/lose weight 10. Get advice on drinking or alcohol related problems (Factor 3) 11. Manage stress levels (Factor 3) 12. Avoid salt in foods (Factor 2) 13. Avoid foods with a high fat content (Factor 2) 14. Get advice for stress management (Factor 3) 15. Use a well-equipped gym regularly

## 16. Relax when off shift

Employee health scale	Participants were assigned a score to estimate their level of personal health. This was a composite measure (developed with the HSE and installation medics), adding up scores from the following (potential 0 – 7 range):	Participants were asked to provide information on: <ol style="list-style-type: none"><li>1. Their weight in kilos and height in meters in order to calculate BMI. Participants were scored '2' for a BMI &lt;25, '1', for a BMI 25-30, and '0' for a BMI &gt;30.</li><li>2. How often they engaged in healthy eating (eating fresh fruit, vegetables, healthy options, avoiding salt, eating bran, avoiding fried food, avoiding desserts, avoiding sugary drinks). For each item, participants scored 0 for never/rarely, 1 for a few times a week, and 2 for once a day/every meal. The average score was taken and rounded either up or down.</li><li>3. How often they managed to get the recommended amount of exercise (at least 30 minutes, 3 times a week)? Participants were scored 0 for never, 1 for rarely/occasionally, and 2 for I use the gym at least three times a week / I get sufficient physical activity in my work (for some, offshore work is highly physical in nature).</li><li>4. Whether they had taken part in any organized health promotion activities. Participants were scored 0 for no and 1 for yes.</li></ol>
-----------------------	--	---

---

## Appendix 2. Confirmatory factorial analysis of the six survey scales

### Employee assessment of health support activities (10 items)

Model	Chi-square	p-value	CFI	RMSEA
3 correlated factors	153.1	<.001	.939	.068
Factor 1: Employee assessment of personal health support (3 items, Cronbach's Alpha=.74)				
Factor 2: Employee assessment of support for healthy eating (4 items, Cronbach's Alpha=.81)				
Factor 3: Employee assessment of support for managing stress (3 items, Cronbach's Alpha=.80)				

#### Perceived organizational support (general) (16 items)

Model	Chi-square	p-value	CFI	RMSEA	Cronbach's Alpha
1 factor	755.3	<.001	.886	.087	.93

#### Perceived organizational support for health (4 items)

Model	Chi-square	p-value	CFI	RMSEA	Cronbach's Alpha
1 factor	32.0	<.001	.972	.135	.85

#### Commitment to the organization (5 items)

Model	Chi-square	p-value	CFI	RMSEA	Cronbach's Alpha
1 factor	39.0	<.001	.979	.091	.93

#### Organizational citizenship behavior (9 items)

Model	Chi-square	p-value	CFI	RMSEA	Cronbach's Alpha
1 factor	276.7	<.001	.906	.106	.89

#### Safety citizenship behaviors (6 items)

Model	Chi-square	p-value	CFI	RMSEA	Cronbach's Alpha
1 factor	100.6	<.001	.904	.111	.85

Notes: CFI = comparative fit index, RMSEA = root mean square error of approximation.

**Corresponding author:**

Tom W Reader  
Department of Social Psychology  
London School of Economics  
LONDON  
WC2A 2AE  
UK  
[t.w.reader@lse.ac.uk](mailto:t.w.reader@lse.ac.uk)

Tom Reader is an Associate Professor of Organizational Psychology at the London School of Economics (LSE). He completed a PhD in psychology at the University of Aberdeen, and is an expert on the relationship between social psychology and safety practices in high-risk organizations (e.g. aviation, healthcare, financial trading, energy). Dr Reader's research examines how beliefs and behaviors in relation to organizational safety are a product of the social context and environment within which employees, stakeholders, and organizations operate. In particular, his research examines the relationship between national culture and safety culture, group dynamics and assessments of risk, perceived organizational support and safety practices, and developing novel methods for capturing safety incidents (e.g. patient observations of unsafe practice in healthcare) within organizations. He has published in *Risk Analysis*, *Human Factors*, *BMJ: Quality and Safety*, *Safety Science*, and *Journal of Occupational and Organizational Psychology*.

**Other author(s):**

Kathryn Mearns  
Amec Foster Wheeler  
ABERDEEN  
Scotland  
UK  
[k.j.mearns@gmail.com](mailto:k.j.mearns@gmail.com)

Kathryn Mearns, currently Principal Human Factors Consultant at the Clean Energy Division, Amec Foster Wheeler, has 25 years of experience in research, teaching and consultancy for a range of safety critical, high reliability industries. She was a senior academic at the University of Aberdeen working with the offshore oil and gas industry, conventional power generation, air traffic management and the healthcare sector. Dr Mearns left academia in 2012 and since then she has worked as a Human Factors Specialist for the Health and Safety Executive and ConocoPhillips UK Ltd. Her specific areas of expertise cover risk perception, safety culture and climate, health climate, safety leadership, incident investigation, non-technical skills training (crew resource management), and stress and fatigue. Her work has featured in *Risk Analysis*, *Journal of Occupational Health Psychology*, *Safety Science*, and *Accident Analysis and Prevention*.



Claudia Lopes  
Africa Voices and University of Cambridge  
CAMBRIDGE  
UK  
[claudia@africasvoices.org](mailto:claudia@africasvoices.org)

Claudia Abreu Lopes is Head of Research and Innovation at Africa Voices, and teaches Statistics and Methods at the Department of Politics and International Studies, University of Cambridge. Dr Lopes was previously a Teaching Fellow in Social Psychology at the London School of Economics and Political Science (LSE), where she completed a PhD in Social Research Methods. Her work examines the impact of new communication technologies and audience interactivity upon political participation in Africa, and she is an expert in on media context, digital methods and public opinion research. She has published in the *International Journal of Consumer Studies* and *Telematics and Informatics*.

Jouni Kuha,  
Department of Methodology  
London School of Economics  
LONDON  
WC2A 2AE  
UK  
[J.Kuha@lse.ac.uk](mailto:J.Kuha@lse.ac.uk)

Jouni Kuha is an Associate Professor of Statistics and Research Methodology at the London School of Economics, UK. He is a statistician whose methodological research focuses on latent variable modeling, analysis of cross-national survey data, problems with measurement error and missing data, and other topics which are motivated by applications of statistics in the social sciences. Dr Kuha also collaborates with others on substantive social-science research on topics such as the role of education in social class mobility, public attitudes to the police, immigrant fertility, and exit poll forecasting of election results. His work has featured in the *Journal of the Royal Statistical Society*, *Sociological Methods & Research*, and the *British Journal of Sociology*