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EMPOWERING LEADERSHIP AND SAFETY BEHAVIOUR IN EXTREME WORK ENVIRONMENTS

by

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DECLARATION

I, Katinka Clack, declares that EMPOWERING LEADERSHIP AND SAFETY BEHAVIOUR IN EXTREME WORK ENVIRONMENTS is my own unaided work both in work and execution. All the resources I used in this study are cited and referred to in the reference list by means of a comprehensive referencing system. Apart from the normal assistance from my study leader, I have received no assistance, except as stated in the acknowledgements.

I declare that the content of this research article has never been used before for any qualification at any tertiary institution.

Katinka Clack

28/04/2017

Signature Date

ABSTRACT

Research purpose

The purpose of this study is to examine the extent to which both employees and leaders in extreme environments perceive the same levels of safety participation. Furthermore, this study examines the association between empowering leadership and team performance as well as empowering leadership and safety participation.

Research design, approach and methods

This study follows a quantitative approach as its main purpose is to establish relationships between constructs. As such, correlations and multiple regression analyses were conducted. Convenience sampling was applied to obtain the data. Firefighters and their immediate line officers (lieutenants) were surveyed. Five fire departments in small to medium cities were chosen in the Great Lakes and south-eastern regions in the United States (US). Questionnaires were distributed to 263 firemen, of which 186 were firefighters and 78 were their line officers/lieutenants.

Main findings

Results indicated that a positive association does not exist between firefighters' perceptions of safety participation and their leaders' perception of safety participation when control variables are added. Therefore, no significant relationship exists between firefighters' perceptions of safety participation and their leaders' perception of safety participation. Furthermore, the results also showed a positive association does not exist between empowering leadership and safety participation when control variables

are added. Consequently, no significant relationship exists between firefighters' reports of empowering leadership and lieutenants' reports of safety participation. Lastly, regarding empowering leadership and team performance, the results did not support a direct relationship between these two constructs.

Limitations

The results should be interpreted bearing in mind that they are applicable to the United States of America and may not be generalised to the South African context. Additionally, very little research has been conducted on empowering leadership and safety behaviour in extreme environments, and therefore the literature review was limited to other organisational environments. Lastly, only three cultural groups (White, Black and Hispanic) and only men participated in this study, so results may not be generalisable to other demographic groups. The study was only positioned in extreme environments, specifically in firefighting, therefore it is unclear whether the results can be generalised to other work environments.

Future Research

It is suggested that this study is replicated, firstly because little research has been done in extreme environments but, secondly, that it also be specifically replicated in South Africa. Indicated by the data, a lieutenant's age has a positive association with how he perceives his team's safety participation. This could be due to various reasons. For example, the more experienced the lieutenant the more comfortable he gets towards the extreme environment. Lastly, it is suggested that research is conducted to determine other leadership styles which could be effective in extreme environments.

Conclusion

Insight was given into the empowering leadership style in terms of team performance and safety behaviour. Furthermore, the relation between firefighters' perceptions of safety participation and their leaders' perceptions of safety participation was not confirmed.

Key words

Extreme environments, safety participation, empowering leadership, team performance

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1 INTRODUCTION

1.1 BACKGROUND

Extant studies on leadership highlight the presence of leadership behaviour and its importance in diverse situations such as schools, homes, sports, and other institutions. It has been explained and predicted based on various factors including the influence of the work context itself. In basic terms, a leader is one or more persons characterised by the ability to inspire their followers in order to achieve the organisation's overall objective (Winston & Patterson, 2006). Leadership is one of the most researched topics in the field of management and organisational behaviour. The concept of effective leadership primarily depends on a leader's capability to solve complex problems in organisations (Mumford, Zaccaro, Harding, Jacobs, & Fleishman, 2000). There are countless theories and exponentially more studies devoted to understanding which leadership behaviours are the most effective. Yet research on leadership in extreme environments is in fact one of the least researched areas in the field of leadership research (Hannah, Uhl-Bien, Avolio, & Cavarretta, 2009).

Although leadership is a key to success in many business situations, it is perhaps even more important in extreme situations because the situations can impact employees both mentally and physically. Hannah and colleagues (2009, p. 898) clarify that

extreme environments are identified by three characteristics: “(1) environments that threaten to cause massive physical, psychological or material consequences that occur in physical or psycho-social proximity of organisational members, (2) environments whose consequences are thought unbearable by those organisation members and (3) environments which may exceed the organisation's capacity to prevent extreme events from actually taking place.”

It is important to establish which types of leadership are most effective in extreme work situations because of the dangerous and stressful challenges employees operating in extreme environments encounter daily. In most instances leaders impact followers’ performance, beliefs and values (Winston & Patterson, 2006). It is of the utmost importance in critical situations to have a leader who can inspire and lead his or her team to obtain the team’s goals, but at the same time ensure that everyone involved is safe.

It is important then to explore which specific leadership styles would apply to teams who work in extreme environments. As suggested by Hoobler and Smallfield (working paper), team members can influence or dictate which leadership style the leader will engage in, or, as otherwise might be expected, leaders themselves may be the ones to decide on their leadership style. For example, extreme environments may call for more directive, heavy-handed leadership approaches.

In an extreme environment, leadership can make a critical difference in guiding employees to perform their duties in the correct, most expeditious and effective

manner, to the betterment of the lives of followers as well as customers. In life-or-death situations such as public safety and health occupations, it is important for a leader to eliminate potentially dangerous situations by effectively making decisions and leading team members while also ensuring their safety. In South Africa, as in other nations, many deaths and disabilities occur because of occupational accidents. According to Statistics South Africa (2011), 61% of all non-natural deaths are caused by accidental injury, part of which occupational deaths and accidents are categorised.

Based on the abovementioned background, the aim of this study is two-fold: First, to test whether one leadership style, i.e., empowering leadership, is effective in extreme environments. Empowering leadership is defined as leadership behaviours including delegating authority, promoting autonomous decision making and coaching (Sharma & Kirkman, 2015). Followers depend on their leader to be competent in giving them direction in stressful and dangerous situations that they encounter daily. An empowering leader delegating and sharing power can foster the development of new leaders (Hollander & Offermann, 1990). Second, to understand whether teams and leaders differ in their perceptions of the degree to which teams engages in safety behaviours. Teams were chosen in this study instead of individual-level followers, due to much of the work of those operating in dangerous work environments being organised into teams for example in the police, firefighting and military.

1.2 PROBLEM STATEMENT

As mentioned above, research about leadership in extreme environments is limited, but the research that has been conducted is essential to understanding this topic (Hannah et al., 2009). Wang, Law, Hackett, Wang, and Chen. (2005) concluded that minimal attention has been paid to the role employees play in influencing leaders' behaviour. In these extreme environments, it is clear that a team has to work with precision. Thus, it is critical for these types of teams to have leaders who can lead and influence the team to reach their goals of eliminating the hazards central to the extreme situation.

Research done by Hoobler and Smallfield (working paper) consisted of surveys that were given to a sample of 263 firefighters and lieutenants. Their research suggests that when subordinates engage in positive behaviour such as behaviours that help fellow workers, leaders observe these behaviours, think more positively of the team and should, in return engage in empowering leadership behaviour. "Empowering leadership has been defined as the process of raising others' self-efficacy perceptions" (Kark, Shamir, & Chen, 2003, p.248). Furthermore, leaders in these kinds of professions need to perform their duties by the most effective means to ensure that their teams, but also their customers, remain safe. But do leaders and teams always agree on what constitutes safe behaviour? Understanding whether these perceptions are shared between leaders and team members is essential because the leader needs to have a true perception of what is going on in the team. Furthermore, if the team is low in safety, the leader must know how to manage the team towards greater safety

behaviour. In the existing literature, it is clear that there is a need to pursue further investigation into the influence that leadership may have on safety participation and team performance.

1.3 PURPOSE STATEMENT

The purpose of this study is to conduct quantitative research on empowering leadership and safety behaviour to pursue two research objectives. First, the perceptions of safety behaviour amongst the leader and team members will be analysed in order to establish whether they share the same views. The purpose of this objective is that the results have the potential to assist leaders to determine the necessary safety behaviours leaders should display. Furthermore, leaders would benefit from knowing whether, in extreme situations, leaders and followers have similar perceptions regarding what constitutes leader safety behaviour. Secondly, the relation between empowering leadership and both team performance and safety behaviour will be tested. The purpose of this research question is to identify whether empowering leadership is an effective leadership style that can positively influence team members to improve their performance and increase their safety behaviours in extreme environments.

1.4 RESEARCH OBJECTIVES

This study aims to examine perceptions of safety behaviour by testing the relationship between team leaders' perceptions versus team members' perceptions. Furthermore,

this study also aims to establish whether there is a positive relationship between empowering leadership and team performance and safety behaviour. As mentioned above, safety is a critical factor for teams in extreme environments.

1.5 PRACTICAL AND ACADEMIC VALUE AND CONTRIBUTION

This study aims to establish whether empowering leadership is an effective leadership style in extreme situations, that is, situations requiring handling safety risks and making life-or-death decisions. By testing these relationships quantitatively, this study hopes to inform human resource managers, both recruiters and trainers, about the potentially effective empowering leadership style for team leaders in extreme environments, and to also potentially enhance future safety behaviour in extreme environments. Extreme environments are potentially hazardous, so this research has the potential to not only make these workplaces operate more efficiently but to also contribute to worker safety and health.

The academic contribution of this study lies in its addition to the relatively small amount of research that exists on safety behaviour as well as in its value as a stepping stone for researchers to continue further investigating the topic. Establishing that leaders and team members share similar perceptions of safety behaviour has the potential to guide future research which may measure factors that can strengthen the degree to which perceptions are shared, for example, effective communication styles or trust in leaders. Furthermore, knowing empowering leadership is connected to safety behaviour and team performance may direct future researchers to measure other

leadership styles that can possibly enhance safety behaviour and team performance as well.

1.6 DELIMITATIONS

The present study contributes to a long history of research in the leadership field. However, to this study, the research may possibly not generalise across leadership contexts, as the study was done on leadership in extreme environments, that is, firefighting. Furthermore, the focus will be on leadership in teams and not leadership on an individual, that is, dyadic, level. So, results may not generalise to leaders who supervise work done by individuals working alone, rather than work performed in teams. Another possible limitation that may also be seen as a strength of the research, is that this study utilises established measures for all constructs. In this way, its contribution to the extant knowledge is easy to define, but the results are limited to the way in which each individual construct was operationalised by those who originally created the measurement tools.

1.7 DEFINITIONS

Extremes environments: environments that consist of physically, behaviourally and emotionally dangerous consequences such as firefighting, emergency work and defence forces (Hannah et al., 2009).

Safety Participation: helping co-workers, encouraging the safety program within the workplace, demonstrating initiative, and putting effort into improving safety in the workplace (Neal, Griffin, & Hart, 2000).

Empowering leadership: providing employees with more autonomy and responsibility in order to increase motivation, participant decision making and accountability for team outcomes (Ahearne, Mathieu, & Rapp, 2005).

Team performance: a multilevel process arising as team members engage in managing their individual and team-level task work and teamwork processes (Salas, Cooke, & Rosen, 2008).

2. LITERATURE REVIEW

It has been stated in previous research that it is critical to identify and classify effective leadership types or structures in extreme environments (Hannah et al., 2009). While this is a relatively young stream of research, existing academic literature on the topic does exist. In the following sections I will review the literature related to constructs in this study, as well as provide research evidence and theory to support my proposed hypotheses.

2.1 SAFETY BEHAVIOUR

It is critical for any organisation to understand and manage safety behaviour. The source of many organisational disasters can be traced back to management's lack of understanding and controlling the behaviours of their employees (Vinodkumar & Bhasi, 2010). In extreme environments, the concept of safety is highly important to grasp because of the life-or-death situations involved in such workplaces. The Alberta, Canada wildland fires that started on 3 May 2016 is an example of such a situation. More than 80,000 citizens had to be evacuated by Canadian emergency personnel

(BBC News, 2016) in a work environment characterised by dangerous smoke inhalation risks.

Although safety behaviour in extreme environments is a critical focus in organisational practice, less attention has been paid to the academic study of safety behaviours of individuals functioning in extreme environments (Flin & Yule, 2004). According to Zohar and Luria (2005, p.618), “safety behaviours are predicted primarily by supervisory safety practices, with top management’s commitment providing limited incremental effect.” The effect of leadership on safety behaviour has only begun to be examined from a research perspective over the last few decades (Hannah et al., 2009).

Effective leaders are responsible for motivating team members by inspiring them to go beyond the minimum safety standards (Mullen, Kelloway, & Teed, 2011). Additionally, Martínez-Córcoles, Schobel, Gracia, Tomas and Peiro. (2011) suggested that a leader could be the key to unlocking shared safety perceptions among his or her subordinates. When employees experience positive feelings towards their leader, they are more likely to cooperate in safety behaviour (Christian , Bradley, Wallace, & Burke, 2009). Research has also indicated that when organisations support employees and employees have high-quality relationships with their leaders, they tend to commit themselves to safety and to maintaining open communication (Fernández-Muñiz, Montes-Peón, & Vázquez-Ordás, 2014). In essence, the leadership function can either develop or destroy the safety climate, safety consciousness and safety behaviours within organisations. Safety climate can be defined as the perceptions that employees

have on the practices, policies, and procedures relating to safety (Griffin & Neal, 2000). Westaby and Lee (2003) defined safety consciousness of employees as having a positive attitude and a high awareness level toward acting safely in general. Smith, Eldridge, and DeJoy (2016) studied 398 full-time firefighters to determine if transformational leadership has the ability to enhance the safety consciousness of firefighters in general. Shamir, Chen, and Kark (2003), found that transformational leadership does have a positive impact on safety behaviour, which in turn, may yield additional positive outcomes that relate to other aspects of organisations.

So, leadership seems to play an important role in employees' safety behaviour. In extreme environments it is especially critical for team members to have an effective leader who behaves in an appropriate way regarding the safety of their team as well as society. Useem, Cook, and Sutton (2005) studied leadership decisions made in the South Canyon fire in Colorado in 1996. One of the results of their study indicated that the primary criterion for decision making by fire crew leaders is the safety of their team. According to this research done in the firefighting context, safety leadership is therefore critical in extreme environments, and it seems necessary to investigate whether both leaders and followers see safety behaviour in the same way and to the same extent. A manner in which safety behaviour can be measured is through safety participation. Clarke (2006) studied the relationship between safety climate and safety performance. He found that safety participation indicates employees' active involvement and commitment to safety. It is vital especially in an extreme environment for leaders to signal what behaviour is necessary for safe functioning, and for the team

to model that same behaviour. Leaders set the tone for safety, as argued above. Therefore, the safety perceptions of the leader and the team members should correlate with one another. The first hypothesis for this study is:

H1. There is a positive relation between firefighters' perceptions of safety participation and their leaders' perceptions of safety participation.

2.2 EMPOWERING LEADERSHIP

There may be a great need for the empowerment of firefighters and other workers in extreme environments as leaders cannot always be with them while they work. For example, in Australia fire brigades provide primary emergency response across 95% of the geographical land mass of Australia (Tuckey, Bakker, & Dollard, 2012). In these types of situations, leaders need to be able to effectively delegate necessary tasks to ensure that hazardous situations are contained. Conger and Kanungo (1988) state that an empowering leader has the ability to foster employees who are responsible and who can enjoy work-related authority. Additionally, Tuckey et al. (2012) define empowering leadership as the much needed motivation which enables employees to lead and manage work tasks by themselves. Amundsen and Martinsen (2014) states that facilitation and support of autonomy are key elements of empowering leadership.

Within the context of extreme environments, it is important for a leader or their empowered team to attempt to eliminate dangerous situations by making difficult decisions, and ensuring everyone's safety. Leaders who empower others should bring about positive changes in followers' behaviour related to motivation, quick adaption to

changes, and the enhancement of employee potential (Ahearne et al., 2005). This specific type of leadership, that is, empowering leadership, can be divided into two perspectives: leadership action and employee reaction to empowerment. Leadership action refers to the leader's actions in engaging in empowering leadership, such as giving employees more responsibility, whereas employee reaction refers to employees' reaction to the leader engaging in empowering leadership activities, such as being more motivated or performing on a higher level. This encompasses the notion of providing employees with more autonomy and sharing responsibilities which, in turn foster greater employee motivation. According to Chen, Sharma, Edinger, Shapiro, and Farh (2011), highly empowering leaders express to their teams that they are confident in the team's ability to handle challenging work which motivates participant decision-making, collaboration and autonomous management of their work, as well as accountability for team outcomes.

2.2.1 Empowering leadership and team performance

Druskat and Wheeler (2003) argue that empowered leaders have the ability to increase team performance by enhancing self-management competence and by increasing ownership over tasks and responsibilities. Based on previously mentioned findings related to empowering leadership, it can be assumed that this type of leadership can also be positively correlated with team performance. When leaders enhance team members' knowledge, autonomy and participative decision making, this will have a positive impact on team performance. The relationship that exists between a leader and his or her team members has been shown to impact team performance

positively (Srivastava, Bartol, & Locke, 2006). Understanding what transpires between team members and their leader to enhance team functioning can be explained by Social Exchange Theory.

Social Exchange Theory (SET) is viewed as one of the most instrumental paradigms for understanding workplace behaviour (Cropanzano & Mitchell, 2005). SET, as defined by Settoon, Bennett, and Liden (1996), argues that when exchanges between individuals are of a social nature and built on trust and goodwill, there is an expectation that these exchanges will be reciprocated at some point in the future. Therefore, it can be expected that when a leader engages in empowering leadership, which gives team members more autonomy and responsibility, it should result in team members reciprocating by being more highly motivated which should result in higher team performance.

Furthermore, Srivastava et al. (2006) included sharing knowledge and team efficacy as dimensions that should increase team performance. Knowledge sharing is a team process where members share relevant knowledge and ideas. In this study, the information shared would be about safety and how to achieve it. It is the leader's responsibility to ensure that knowledge sharing about safety occurs since it is not a concept that naturally exists in teams. Team efficacy refers to team members feeling they can adequately implement the necessary behaviours to attain the desired team performance much like empowering leadership behaviour. Srivastava et al. (2006) expand on team efficacy by arguing that when leaders lead by example, it demonstrates their commitment to work and creates guidance for team members,

which leads to improved team performance. Theoretically, this type of modelling on the job can be called social learning theory (Decker, 2007). Decker (2007, p.47) argues that the social learning theory clarifies "that people do not merely react to external influences, as if they were unthinking organisms, but actually select, organise, and transform stimuli that impinge upon them." For this study leaders' perception of team performance was measured because leaders are in the best position to be the ones to judge their teams' level of performance (Dionne & Yammarino, 2004).

In sum, empowering leadership can contribute to team performance in extreme environments. A more empowered leader should be able to motivate and guide team members to execute appropriate team performance.

Hypothesis 2a: There is a positive association between firefighters' reports of empowering leadership and leaders' perceptions of team performance.

2.2.2 Empowering leadership and safety participation

As previously mentioned, leadership influences people's behaviour including safety participation in extreme contexts. In the existing literature, transformational leadership has mainly been used to explain the influence of leadership on safety. Transformational leadership can be defined as a leader altering the values and priorities of followers and encouraging them to perform beyond their expectations (Shamir et al., 2003). Empowering leadership is a related leadership concept, with Tung and Chang (2011) defining empowering leadership as the delegation of autonomy and employee motivation.

There are many components associated with empowering leadership as presented in the literature which are similar to transformational leadership. As stated previously, transformational leadership encompasses the encouragement of transforming employees' values and to motivate them to go beyond their expectations. Similarly, empowering leadership encourages autonomy and accountability from followers which leads to motivated and high performing working employees. Therefore, it can be assumed that empowering leadership may also influence the safety behaviour of followers. Empowering leaders enhance employee potential and self-efficacy. Moreover, they encourage self-management and participative decision making, coach, and engage in good communication and interaction with team members (Ahearne et al., 2005; Arnold, Arad, Rhoades, & Drasgow, 2000). All these components actively contribute to effective empowering leadership. Therefore, the second hypothesis for this study is:

Hypothesis 2b. There is a positive association between firefighters' reports on empowering leadership and leaders' perceptions of team safety participation.

3 RESEARCH DESIGN AND METHODS

3.1 RESEARCH APPROACH AND PARADIGMS

3.1.1 Research paradigm

Before conducting research, it is important that the researcher recognises the research paradigm from which they will approach the research. The research paradigm used for this study is the post-positivism philosophy. This paradigm is derived from the

positivist paradigm where the researcher views the world in a naive but realistic manner. According to Trochim (2006), positivism follows a science of observation and measurement as the only manner in which humans can explain their experiences. According to the positivist paradigm scientific observation is the only method to be used to explain what humans can view (Clark, 1998). Conversely, the belief of post-positivism is based in the idea that researchers are critically realistic, which allows the researcher to still apply science but not assume that their research methods will ensure certainty and objectivity, but rather an expected margin of error (Cooper, 2016). Within post-positivism there are assumptions which are described by Guba and Lincoln (1994). The first assumption is the ontological assumption. This assumption is defined as the form and nature of reality and what there is to know about the subject matter at hand. Post-positivist ontology is described as critically realistic, where the world is viewed realistically, but there are still imperfections. The second idea in this paradigm is the epistemology, which is defined as the perceived relationship between the research and the knowledge discovered. In the post-positivist paradigm, the relationship between researcher and knowledge is viewed as being rather objective.

3.1.2 Research approach

In general, research methodology can be approached in two ways, namely qualitative and quantitative. For the purpose of this study, the quantitative approach will be applied due to the large number of participants that necessitated the usage of a survey questionnaire. Secondly, that the usage of the questionnaire also eliminated potential researcher bias which could have developed through qualitative engagement with

subjects Therefore, the quantitative research approach is systematic and objective as it makes use of numerical data from a selected group from a population to generalise the findings to the population studied (Maree & Pietersen, 2012). Additionally, Ary, Jacobs, Razavieh, and Soresen (2009) state that the quantitative approach includes statistical methods that are used for testing hypotheses. The quantitative approach is applicable to the present study as the purpose of this study is to test different relationships with one another. Lastly, this approach was chosen because this study employs established, published, rigorous measures for all constructs.

3.2 Sampling

A sample is "a smaller (but hopefully representative) collection of units from a population used to determine truths about that population" (Field, 2005). The sampling for this study was conducted by Hoobler and Smallfield (working paper) in their study, *Effects of team helping on positive and negative leadership behaviors*. Non-probability sampling was used. This means that not all people in the population had equal opportunity to be selected for the sample. It was based on convenience sampling where the researchers contacted one fire department to participate in the study, and were then referred by the fire chief in that department to other local fire departments who then participated. The strengths of this sampling strategy lie in its simplicity, short duration of time and cost-effective qualities. The researchers surveyed firefighters and their immediate line officers (lieutenants), the latter of whom had direct influence on the team. Five fire departments in small to medium cities were chosen in the Great Lakes and south-eastern regions in the United States (US). Questionnaires were

distributed to 263 firemen, of which 186 were firefighters and 78 were their line officers/lieutenants. The researchers received 255 completed questionnaires, which accounted for a response rate of 97%. The demographics of the study can be seen in Table 1. These demographics to some extent represent the racial breakdown in the US, however Latinos are underrepresented as a group in the firefighting population.

Table 1: Sample demographics

	Firefighter	Line officer	Total
Average Age	38.33	47.11	42.72 years
Sex-male percentage[1]	100%	100%	100%
Race			
Caucasian (White)	88%	90%	89%
African-American (Black)	10.68%	6.67%	8.68%
Latino	1%	1%	1%

3.3 Data collection

With regards to this study, secondary data were obtained. Secondary data is the process of using data that were previously collected from another source. Using secondary data has advantages and disadvantages that the researcher must consider. In Table 2 the advantages and disadvantages, as described by Sørensen, Olsen, and Sabroe (1996), Hox and Boeije (2005) and Boslaugh (2007), are summarized. It is critical that the researcher ensures that the data being used is appropriate for his or

[1] With regards to the 100% male firefighter sample, this is not uncommon in the firefighting environment as this environment has historically been predominately a male occupation.

her research question. Typically, when researchers use secondary data they will utilise just the portion of the data pertaining to their research question or hypothesis. For the purpose of this study, three measures from the Hoobler and Smallfield study will be used to test the hypotheses. These three measures include: safety participation (both as reported by firemen and lieutenants), empowering leadership and team performance.

Table 2: Advantages and disadvantages of secondary data

Advantages	Disadvantages
Saving time	May not fit research question
Cost effective	No control over data collection methods
Size of the sample may be larger than what one can collect on his/her own	Quality of data
Reduces researcher's own bias	Confidentiality can be compromised
Allows for new research to be conducted on an existing data set	

3.3.1 Measures

The control variables of age and race were used. Age was simply measured by asking in the firefighters and lieutenants' survey, "What is your age?" Additionally, race was measured through five possibilities that were provided, namely, Caucasian, Black, African American, Hispanic, Asian and Other. The race groups Caucasians and African Americans were the only ones used due to the small representation of the other races.

Regarding the safety behaviour measure, the safety participation scale from Neal and Griffin (2006) was used. Safety participation was used to measure both lieutenant and firefighters' respective perceptions. An example item for safety participation (α = 0.89) in the firefighter and lieutenant survey is, "Team members promote the safety program within the department". Safety participation's Cronbach's Alpha is relatively high (above 0.85) which suggests high internal reliability (Pietersen & Maree, 2012b).

Ahearne et al.'s (2005) empowering leadership measure was used. This measure includes 12 items for *leadership empowerment behaviour (LEB).* LEB was assessed from the firefighters' perspective, using four multi-item subscales that focused on (a) "enhancing the meaningfulness of work" (three items, α = 0.76; example item: "My lieutenant helps me understand how my objectives and goals relate to that of the company"), (b) fostering participation in decision making (two items, α = 0.92; example item: "My lieutenant makes many decisions together with me"), (c) expressing confidence in high performance (two items, α = 0.90; example item: "My lieutenant believes that I can handle demanding tasks"), and (d) providing autonomy from bureaucratic constraints (three items, α = 0.86; example item: "My lieutenant allows me to do my job my way"). The subscales' Cronbach's alphas are relatively high which indicates internal reliability. We proceeded to collapse across the dimensions, and use this measure as one scale.

Lastly, in terms of the team performance measure, Conger et al.'s (2000) measure was used, consisting of five items (α = 0.85). An example item is, "Most of our tasks are accomplished quickly and efficiently." This measure's internal reliability, as for

empowering leadership and safety participation, is relatively high. This scale was included in the lieutenant survey, so this variable is most accurately described as team leaders' perceptions of their team's performance.

Data were collected quantitatively through the use of paper-based questionnaires by the authors Hoobler and Smallfield. Two pen-and-paper questionnaires were separately used to obtain the data. The first questionnaire was distributed to all the line officers (lieutenants) and asked lieutenants to report on measures related to their team members, including the team performance measure as described above. The second questionnaire was distributed to each member of each individual firefighting team. The response format for all items (except gender, age and race) was 7-point Likert-type scales. Questions were asked about perceptions of their lieutenants, their team, and themselves as individuals, as well as their job and their work environment. All participants completed the questionnaires during their firefighting shifts and returned them to the researchers when the researchers were on-site. The surveys were colour-coded so the responses from each lieutenant were able to be matched to the responses from his team members.

3.4 DATA ANALYSIS

Data analysis refers to the researcher making sense of the data by first preparing it for analysis and then running tests to delve deeper into understanding associations in the data. For the purpose of this study, various statistical tests where applied to the data. The statistical programme SPSS 24.0 was used to analyse the data. To test the hypotheses stated for this study, multiple regression was implemented. According to

Pallant (2013, p.154), “multiple regression is used to explore the relationship between one continuous dependent variable and a number of independent variables or predictors”. Pallant states that multiple regression is based on correlation, but in a more sophisticated manner to explore the interrelationship between multiple independent variables, including control variables. Furthermore, Pietersen and Maree (2012a) state that this technique differs from simple linear regression as it can include more than two variables. In terms of the current study, multiple regression for each hypothesis will be used as follows:

Hypothesis 1

Before multiple regression is applied, the firefighters’ scores on safety participation will be aggregated to establish the average score within each team. Before the control variables are entered, a correlation matrix will be calculated and examined to establish if there is any relationship among the control variables and study variables. If there is a relationship with study variables, the control variables will be entered in step one of the regression equation. Lieutenants’ perceptions of safety participation will be used as the dependent variable and the firefighters’ perceptions of safety participation will be used as an independent variable, the latter of which will be entered in step two of the regression. The purpose of this statistical test is to be able to examine how much variance in the dependent variable is explained by the independent variables. With regards to hypothesis one, the purpose will be to calculate whether the team perceptions of safety participation (for firefighters) can significantly predict the lieutenants’ perceptions of team safety participation.

Hypothesis 2

In H2a the firefighters' reports on empowering leadership will be used as the independent variable and the reports of lieutenants on team performance and team safety participation will be used as the dependent variables, respectively. Before multiple regression is applied, the firefighters' score on empowering leadership will be aggregated in order to establish the average score among firefighters in the team. As done in H1, a correlation matrix will be examined to establish if there is any relationship between the control variables and study variables. Thereafter, the control variables (age and race) will be entered if a relationship was found. Secondly, empowering leadership will be entered as the independent variable. As for hypothesis 2b, the purpose is to calculate how much variance empowering leadership can explain in safety participation and team performance, respectively.

3.5 ASSESSING AND DEMONSTRATING THE QUALITY AND RIGOUR OF THE PROPOSED RESEARCH DESIGN

To ensure a sound research study, it is the researcher's responsibility to choose a research design that provides accurate information in the right context in order to produce generalisable results. Therefore, the researcher should consider factors such as reliability and validity. While secondary data is being used for this study, it is still important to ensure that the original researchers' data collection methods were valid and reliable. In this study, the researchers used a quantitative research design and two questionnaires, to avoid common source bias. Contributing to the rigour of the

present study, all the measures used by Hoobler and Smallfield were originally published in high quality journals where they were subjected to peer review, and have been used in multiple research studies since. Below the rigour of Hoobler and Smallfield's data is discussed.

3.5.1 VALIDITY

Validity refers to the extent to which an instrument measures what it was developed to measure. According to Pietersen and Maree (2012b) there are various different types of validity to consider, namely, content validity, face validity, construct validity, and criterion validity.

Content validity is the extent to which an instrument includes the complete content domain of the particular construct. Therefore, content validity can be ensured when researchers present a provisional version of their instrument to experts.

Face validity refers to the degree to which an instrument appears to measure what it is supposed to measure. Researchers can apply this validity by allowing experts to scrutinise the instrument to ensure a high degree of validity.

Construct validity is a critical part of measurement scale validity. Construct validity refers to how well the constructs are covered by the instrument or how well the instrument accurately measures the theoretical construct is was designed to measure.

Criterion validity refers to the degree to which the instrument accurately predicts outcomes in a given area. There are two types of criterion validity namely predictive and concurrent validity. Predictive validity refers to the instrument being used to predict

future performance. Conversely, concurrent validity refers to the instrument being designed to test present performance. It is important that a researcher ensures that the correlation between the instrument and criterion is high to have high criterion validity.

With regards to the validity of measures used for the current study, no published evidence was found on any of the measures undergoing a full scale-development process. However, each measure (safety participation, empowering leadership and team performance) has been used in other published work as seen in Table 3.

Table 3: Examples of study measures used in other published work

Safety Participation	Empowering Leadership	Team performance
Neal & Griffin (1997)	Beecroft, Dorey & Wenten (2008)	Conger, Kanungo, Menon, & Mathur (1997)
Martinez-Corcoles, Schobel, Gracia, Tomas, & Peiro (2012)	Conger & Kanungo (1988)	Rowold & Heinitz (2007)
Neal &Griffin (2006)	Hui (1994)	Carless, Wearing, & Mann (2000)

3.5.2 RELIABILITY

According to Pietersen and Maree (2012b) reliability refers to the ability of an instrument to be used at different times or by different participants of the same population and still produce the same results. As with validity, reliability consists of various types. For the purpose of this study only test-retest reliability and internal reliability will be discussed

Test-retest reliability is defined as the administration of the instrument to the same subjects on two or more occasions. The two sets of scores are then compared with one another and a correlation coefficient is obtained. If the coefficient is close to one there is high reliability whereas when the coefficient is closer to zero, there is low reliability. This type of reliability can be seen in the safety behaviour measure (Neal & Griffin, 2006), as it was measured at two time points over a five year period of subsequent levels of accidents.

Internal reliability states that a construct is measured by various items and these items should have a high degree of similarity in responding among items. The coefficient used to measure internal reliability is called Cronbach's Alpha. This coefficient is based on inter-item correlations (Pietersen & Maree, 2012b). The guideline for this coefficient is as follows:

- between 0.7 and 0.9 = high reliability
- between 0.6 and 0.5 = moderate reliability
- between 0.4 and lower = low reliability

3.6 RESEARCH ETHICS

All ethical considerations were adhered to during the data collection process. It is critical for any researcher to conduct his or her research according to ethical principles. During the Hoobler and Smallfield study many ethical considerations were applied. These considerations included obtaining informed consent, protecting anonymity, ensuring voluntary participation and confidentiality, and keeping the data in secure

and safe storage. Before each participant completed the questionnaire, he or she had to sign an informed consent form which enlightened participants about the purpose of the study as well as ascertained permission to use the information gathered. All participants were guaranteed that their responses were anonymous. The researchers ensured anonymity through not including any names with the data, and each participant only received a participant number. The researchers ensured that all participants were notified that their participation in the study was on a voluntary basis via the cover letter. Lastly, all data were kept confidential and only the researchers had access to demographic information provided. To safeguard and secure the data collected, the researchers ensured that it was stored on a password protected computer.

4. RESULTS

4.1. RELIABILITY

To determine the internal consistency (reliability) of the constructs used for this study, Cronbach's Alphas were determined for each construct's items. A Cronbach's Alpha higher than .70 indicates high reliability between the items. With regards to the Hoobler and Smallfield study, it was clear that all measures used reached high reliability as was stated in section 3.1.1. All measures used in the current study had a Cronbach's Alpha higher than 0.75.

4.1.1. Reliability of firefighters' reports on safety participation scale

The Cronbach's Alpha for firefighters' reports on safety participation scale was .810 (See table 4). This result is higher than the estimated alphas reported in previous research which indicates a high reliability between 0.7 and 0.9 (Pietersen & Maree, 2012b). Therefore, the safety participation scale demonstrates high internal consistency, hence it is reliable for the purpose of this study.

Table 4: Reliability of firefighters' report on safety participation scale

Safety Participation Scale	
Cronbach's Alpha	N items
.810	3

4.1.2. Reliability of the lieutenants' reports on team safety participation scale

Table 5 contains the Cronbach's Alpha for lieutenants' reports on safety participation scale. The Cronbach's Alpha was .899 which is higher than the estimated alphas reported in previous research which indicates a high reliability between 0.7 and 0.9 (Pietersen & Maree, 2012b). Thus, the safety participation scale presented a high internal consistency and is therefore reliable for the purpose of this study.

Table 5: Reliability of the lieutenants' reports on team safety participation scale

Safety Participation Scale	
Cronbach's Alpha	N items
.899	3

4.1.3. Reliability of the empowering leadership scale

The Cronbach's Alpha for the empowering leadership scale was .860 (See table 6). Therefore, the empowering leadership scale shows high internal consistency due to the Cronbach's alpha being above the recommended values of .70 and .90 (Pietersen & Maree, 2012b). The empowering leadership scale is thus reliable for the purpose of this study.

Table 6: Reliability of the empowering leadership scale

Empowering Leadership Scale

Cronbach's Alpha	N items
.860	12

4.1.4. Reliability of the team performance scale

Table 7 represents the Cronbach's Alpha calculated for the team performance scale. The Cronbach's Alpha was .813, which is higher than the estimated values recommended in previous research of between .07 and .90 (Pietersen & Maree, 2012b). Therefore, the team performance scale is reliable for the purpose of this study.

Table 7: Reliability of the team performance scale

Team Performance Scale

Cronbach's Alpha	N items
.813	5

4.2. Correlation

Correlations were computed amongst the four scales and the proposed control variables with the sample size of 177. Correlation analyses were used to determine the relationships between lieutenants' and firemen's perception on safety participation and the influence of empowering leadership on team performance and safety participation. In table 8 all the correlations between the scales and control variables can be viewed.

Observing table 8 there are several correlations that are significant. A correlation is perceived as significant when the p-value is either less than 0.01 (two-tailed) which is considered highly significant or less than 0.05 (two-tailed) which is considered significant. Therefore, it can be viewed that lieutenants' reports on team performance are strongly correlated with lieutenants' reports on safety participation, with a r=0.00 p-value <.01. This indicates a very strong relationship between team performance and safety participation, when both constructs were reported by the lieutenants. However, there is no correlation between firefighters' report on safety participation and lieutenants' reports on team performance as there is a r=0.499 p-value >0.01. Another strong correlation is between firefighters' reports on safety participation and age in years of firemen. There is a significant relationship between these two measures with r=0.026 p-value 0.05. Lastly, there is a strong correlation between lieutenants' reports on safety participation and age in years of lieutenants. These two measures demonstrate a significant relationship with a p-value of 0.004.

4.3. ZERO-ORDER CORRELATIONS OF VARIABLES FROM HYPOTHESES

Before conducting multiple regression analyses to test both hypotheses, inclusive of the control variables, I first observed the correlation matrix to determine whether there was support for the hypotheses given the zero-order correlations. The first hypothesis concerning firemen's safety participation and lieutenants' perception of team's safety participation revealed a significant relationship ($r = 0.009$; $p < 0.01$), indicating a positive, strong relationship between the two constructs. So, firefighter's perceptions of safety participation do seem congruent with their leaders' perceptions of that same team's safety participation.

Hypothesis 2a stated that there is a positive association between firefighters' reports of empowering leadership and leaders' perceptions of team performance. The two constructs are not significantly correlated ($r= 0.22$; n.s.). Therefore, results indicate no relationship between the two constructs. Empowering leadership is further tested in hypothesis 2b, which stated there should be a positive association between empowering leadership and lieutenants' perceptions of team safety participation. Table 8 indicates a significant relationship ($r=0.003$; $p < 0.01$) between firefighters' reports of empowering leadership and lieutenants' reports of team safety participation.

Table 8: Correlations

		Team Performance Lieutenants Reports	Empower Leadership Fireman Reports	Safety Participation Fireman Reports	Safety Participation Lieutenants Reports	Race White Fireman	Race White Lieutenants	Age in years Lieutenants	Age in years Fireman
Team Performance Lieutenants Reports	Pearson Correlation	1	.094	.052	.565**	.070	.004	-.037	.007
Empower Leadership Fireman Reports	Pearson Correlation	.094	1	.221*	.065	-.216*	.046	.096	.100
Safety Participation Fireman Reports	Pearson Correlation	.052	.221**	1	.201**	-.037	-.069	.146	.175*
Safety Participation Lieutenants Reports	Pearson Correlation	.565**	.065	.201**	1	.031	-.047	.279**	.031
Race White Fireman	Pearson Correlation	.070	-.216*	-.037	.031	1	-.024	.004	-.125
Race White Lieutenants	Pearson Correlation	.004	.046	-.069	-.047	-.024	1	-.183	-.008
Age in years Lieutenants	Pearson Correlation	-0.37	.096	.146	.279**	.004	-.183	1	.127
Age in years Fireman	Pearson Correlation	.007	.100	.175*	.031	-.125	-.008	.127	1

*. Correlation is significant at the level 0.05 (2-tailed) **. Correlation is significant at the level 0.01 (2-tailed) N=177

4.4. HYPOTHESIS TESTING

Hypothesis 1

A multiple regression analysis was performed on the two constructs tested in hypothesis 1--firefighters' perceptions of safety participation and their leaders' perceptions of safety participation--but in a more rigorous way that included appropriate control variables. Hypothesis 1 stated that there is a positive relation

between safety participation from two vantage points—the firefighters' and lieutenants' views. The aim of conducting a multiple regression analysis was to understand the predictive value of firefighters' reports of safety participation in predicting lieutenants' reports on safety participation, inclusive of demographic factors which could potentially affect this relationship.

Table 9 provides the results of the multiple regression model. Lieutenants' and firefighters' age and race were used as control variables and entered in the first step of the regression equation, with lieutenants' reports of safety participation serving as the dependent variable. Firefighters' reports of safety participation served as the independent variable, and was entered in step 2. For model 1, 9.5% of the total variance in the dependent variable is explained. Model 2 explained little more variance at 9.6%. In this analysis, lieutenants' reports of safety participation were not predicted by firefighters' reports of safety participation due to the relation between these variables at step 2 not being significant ($r = 0.04$; n.s.). Therefore, hypothesis 1 was not supported. However, one of the control variables, lieutenants' age, did predict lieutenants' reports of safety participation ($r= 0.04$ $p < 0.01$). In supplementary analyses, only that significant control variable was entered in step 1, in exploratory fashion. The results can be viewed in Table 10.

Table 9: Multiple regression results for firefighters' and lieutenants' reports on safety participation

MODEL	UNSTANDERDISED COEFFICIENTS		STANDARDISED COEFFICIENTS	t	Sig	R Square
	B	Std. Error	Beta			.095
(1) Constant	4.222	1.137		3.714	.000	
Race White Fireman	.087	.512	.017	.169	.866	
Race White Lieutenant	.056	.630	.009	.089	.930	
Age in years Lieutenant	.039	.013	.301	3.010	.003	
Age in years Fireman	-.012	.011	-.111	-1.123	.264	
						.096
(2) Constant	4.035	1.221		3.306	.001	
Race White Fireman	.091	.515	.018	.177	.860	
Race White Lieutenant	.068	.633	.011	.107	.860	
Age in years Lieutenant	.038	.013	.296	2.919	.004	
Age in years Fireman	-.013	.011	-.116	-1.158	.250	
Safety Participation Fireman	.039	.090	.018	.043	.666	

a. Dependent Variable: Safety Participation Lieutenants

From Table 10 it is evident that firefighters' reports of safety participation are still not a predictor of lieutenants' reports of safety participation when using just the single, significant control variable (lieutenants' age) in the regression analysis (r= 0.04; n.s.). Hypothesis 1 is not supported. The third model conducted excluded all control variables. Table 11 provides the results of the third model. It is evident from Table 11 that when the control variables are excluded, that firefighters' reports of safety participation do have a significant relationship with lieutenants' reports of safety participation (r= 0.18; $p < 0.01$). Yet, I choose to report the most conservative version

of the tests performed, as methodologists recommend, and the conclusion is that H1 is not supported.

Table 10: Multiple regression results for firefighters and lieutenants reports on safety participation with lieutenants' age as only control variable

MODEL	UNSTANDERDISED COEFFICIENTS		STANDARDISED COEFFICIENTS	t	Sig	R Square
	B	Std. Error	Beta			0.078
(1) Constant	4.013	.590		6.796	.000	
Age in years Lieutenant	.036	.012	.279	2.909	.004	
						.080
(2) Constant	3.819	.725		5.270	.000	
Age in years Lieutenant	.036	.013	.273	2.799	.006	
Safety Participation Fireman	.041	.088	.045	.464	.644	

a. Dependent Variable: Safety Participation Lieutenants

Table 11: Multiple regression results for firefighters and lieutenants reports on safety participation with no control variables

MODEL	UNSTANDERDISED COEFFICIENTS		STANDARDISED COEFFICIENTS	t	Sig	R Square
	B	Std. Error	Beta			.040
(1) Constant	4.627	.400		11.568	.000	
Safety Participation Fireman	.184	.069	.201	2.662	.009	

a. Dependent Variable: Safety Participation Lieutenants

Hypothesis 2a

Hypothesis 2a stated that there is a positive association between firefighters' reports of empowering leadership and lieutenants' reports of team performance. In the correlation matrix, there is not a significant zero-order relationship between empowering leadership and team performance. As with hypothesis 1, the age and race of both firefighters and lieutenants were used as control variables. For models 1 and 2 it is clear that there was no significant change as the total variance explained stayed the same, at 0.08%. It is evident in Table 12 that team performance is not predicted by empowering leadership (r= -0.00; n.s.). Therefore, hypothesis 2a is not supported.

Table 12: Multiple regression results for empowering leadership and team performance

MODEL	UNSTANDERDISED COEFFICIENTS		STANDARDISED COEFFICIENTS	t	Sig	R Square
	B	Std. Error	Beta			.008
(1) Constant	5.901	.683		8.639	.000	
Race White Fireman	.250	.308	.084	.810	.420	
Race White Lieutenant	.031	.378	.009	.082	.935	
Age in years Lieutenant	-.002	.008	-.032	-.306	.761	
Age in years Fireman	.000	.006	-.008	-.077	.939	
(2) Constant	5.902	.723		8.183	.000	.008
Race White Fireman	.244	.317	.082	.771	.433	
Race White Lieutenant	.033	.381	.009	.086	.931	
Age in years Lieutenant	-.002	.008	-.310	-.294	.769	
Age in years Fireman	.000	.007	-.007	-.069	.945	
Empower Leadership Fireman	-.004	.044	-.009	-.082	.935	

a. Dependent Variable: Team Performance Lieutenants

Additionally, after all control variables were excluded from the regression analysis, hypothesis 2a was still not supported (r=0.05; n.s.) (see Table 13).

Table 13: Multiple regression results for empowering leadership and team performance without control variables

MODEL	UNSTANDERDISED COEFFICIENTS		STANDARDISED COEFFICIENTS	t	Sig	R Square
	B	Std. Error	Beta			.009
(1) Constant	5.615	.239		23.507	.000	
Empower Leadership Fireman	.052	.042	.094	1.237	.218	

a. Dependent Variable: Team Performance Lieutenants

Hypothesis 2b

Hypothesis 2b stated that there is a positive association between firefighters' reports of empowering leadership and lieutenants' reports of team safety participation. The control variables were the same as in hypotheses 1 and 2a. For hypothesis 2b, model 1, the total variance explained is 9.5% and for model 2 it is 9.7%. In Table 14 it is evident that empowering leadership was not predictive of safety participation (r=0.591 p-value > 0.01). However, lieutenants' age was a statistically significant predictor of safety participation (r= 0.04; p < 0.01). Two additional multiple regression models were conducted as in hypothesis 1.

Table 14: Multiple regression results for empowering leadership and safety participation

MODEL	UNSTANDERDISED COEFFICIENTS		STANDARDISED COEFFICIENTS	t	Sig	R Square
	B	Std. Error	Beta			.095
(1) Constant	4.222	1.137		3.714	.000	
Race White Fireman	.087	.512	.017	.169	.866	
Race White Lieutenant	.056	.630	.009	.089	.930	
Age in years Lieutenant	.039	.013	.301	3.010	.003	
Age in years Fireman	-.012	.011	-.111	-1.123	.264	
						.097
(2) Constant	4.426	1.202		3.682	.000	
Race White Fireman	.027	.526	.005	.050	.960	
Race White Lieutenant	.076	.633	.012	.120	.905	
Age in years Lieutenant	.039	.013	.307	3.308	.003	
Age in years Fireman	-.012	.011	-.107	-1.071	.287	
Empower Leadership Fireman	-.039	.073	-.055	-.540	.591	

a. Dependent Variable: Safety Participation Lieutenants

The second model was conducted with only the lieutenants' age as a control variable. The results can be viewed in Table 15. With age as the only control variable, hypothesis 2b is still not supported (r= -0.05; n.s.). Additionally, when the control variables were excluded from the analysis, as reported in Table 16, empowering leadership still did not predict safety participation (r= 0.05; n.s.). H2b was unsupported.

Table 15: Multiple regression results for empowering leadership and safety participation with age as only control variable

MODEL	UNSTANDERDISED COEFFICIENTS		STANDARDISED COEFFICIENTS	t	Sig	R Square
	B	Std. Error	Beta			0.078
(1) Constant	4.013	.590		6.796	.000	
Age in years Lieutenant	.036	.012	.279	2.909	.004	
						.083
(2) Constant	4.245	.676		6.274	.000	
Age in years Lieutenant	.037	.012	.286	2.956	.004	
Empower Leadership Fireman	-.049	.069	-.068	-.708	.481	

a. Dependent Variable: Safety Participation Lieutenants

Table 16: Multiple regression results for empowering leadership and safety participation without control variables

MODEL	UNSTANDERDISED COEFFICIENTS		STANDARDISED COEFFICIENTS	t	Sig	R Square
	B	Std. Error	Beta			.004
(1) Constant	5.367	0,35		15,347	.000	
Empower Leadership Fireman	.053	.062	0,065	.851	.396	

a. Dependent Variable: Safety Participation Lieutenants

5. DISCUSSION

The purpose of this study was two-fold. Firstly, I sought to determine whether firefighters and their lieutenants share the same perceptions regarding levels of safety participation in the team. Secondly, I aimed to establish whether empowering leadership is associated with team performance and safety participation, respectively.

As such, two hypotheses were developed. Hypothesis 1 stated that there is a positive relation between firefighters' perceptions of safety participation and their leaders' perceptions of safety participation. The results indicated that a positive relation does not exist between these perceptions of firefighters and leaders. In that test, the only significant relationship was between the lieutenants' age (a control variable) and their perceptions of the team's safety participation. When lieutenants' age was removed, a positive relation between firefighters' perceptions of safety participation and lieutenants' perceptions of safety participation was detected. While existing literature (Smith, Eldridge & DeJoy 2016) has evidenced that leaders' perceptions of safety participation can influence the effects a leader has on the safety of a team, these findings were not replicated here, and H1 was not supported.

The unexpected and not hypothesized relationship between lieutenants' age and their reports of the team's safety participation could be explained in various ways. It could be that the older a lieutenant is, the more comfortable he becomes in dangerous situations and the more he assumes the team is acting "safely enough". Furthermore, lieutenants who are older and have been with their team for a longer period may not even assess situations as potentially unsafe due to the experience they have gained over the years, so they may view any behaviour in the team as relatively safe behaviour.

Hypothesis 2 was divided into 2a and 2b. Hypothesis 2a stated that there is a positive association between empowering leadership and leaders' perceptions of team performance. When conducting the multiple regression analysis, there was no direct

relationship between empowering leadership and team performance. As with hypotheses 1 and 2b, another multiple regression analysis was performed without the control variables. However, even without the control variables, there was still not a significant relationship between empowering leadership and team performance. Therefore, hypothesis 2a was unsupported.

These findings contradict the current literature on empowering leadership and team performance. Little research has been done on the relationship between empowering leadership and team performance. However, most of what has been done does support the notion that a leader empowering his employees should positively affect their performance. Authors such as Srivastava et al. (2006) and Druskat and Wheeler (2003) suggest that empowering leadership increases team performance. So, previous literature suggests that hypothesis 2a should be supported, but in the current study this was not found. But why? Some research finds that empowering leadership only has an indirect relationship with team performance (Srivastava et al., 2006). Srivastava and coauthors (2006) developed a model which suggested that empowering leadership is indirectly linked with team performance through knowledge sharing as a team process and team efficacy as an emergent state. Knowledge sharing and team efficacy mediated the relation between empowering leadership and team performance. It can therefore be argued that a leader will only influence a team's performance indirectly, by encouraging knowledge sharing and team efficacy. In this way, perhaps the current study lacked the necessary mediating mechanisms to find relations between empowering leadership and team performance.

Additionally, this could also be the reflection of the leadership style itself. As stated before, little research has been conducted on empowering leadership and team performance, and none on these two constructs have been tested in an extreme environment. It could be argued that as beneficial as the empowering leadership style is, as suggested by the literature, it may not be applicable in an extreme environment such as firefighting. The firefighting environment is classified as an extreme environment as a result of the life-or-death situations experienced on a daily basis, similar to the military. The leadership style most recognisable in the military context is that of autocratic leadership (Wong, Bliese, & Mcgurk, 2003). An autocratic leader is a leader who has total control over decision making. The hierarchal system the military follows ensures that procedures are followed and all personnel are kept safe. Therefore, extreme work environments may call for a more directive and controlling leadership style. Teams of this type may need a leader who is less empowering and more directive to ensure duties are conducted in the safest possible manner. Therefore, the lack of supported findings could be the result of a mismatch between empowering leadership and the firefighting environment.

Hypothesis 2b postulated that there is a positive association between empowering leadership and lieutenants' perceptions of safety participation. As with hypothesis 1 the initial tests showed no relation between empowering leadership and safety participation. But when control variables were excluded, a significant relationship between empowering leadership and safety participation was evidenced. Existing literature has reported that empowering leadership has a positive association with

safety performance (Martínez-Córcoles et al, 2011), yet in this study, hypothesis 2b was not supported. Martinez-Corcoles, Schobel, Gracia, Tomas, and Peiro (2012) conducted a study on empowering leadership and safety participation in nuclear plants. In their study, the authors stated that nuclear plants are defined as high risk organisations. Due to the high risk of fatalities, if safety is not considered, nuclear plants could also be classified as extreme environments. These authors came to the conclusion that empowering leadership does influence safety participation but only when empowering leadership includes collaborative learning. Collaborative learning can be defined as the transmission and co-construction of knowledge. Therefore, regarding the current study, since the additional influence of collaborative learning was not tested, perhaps this is why the relation between empowering leadership and safety was not supported in hypothesis 2b.

5.1. LIMITATIONS

A number of limitations of this study need to be discussed in light of the results presented. Firstly, in performing the literature review, the number of articles were relatively small due to the limited published research available on leadership and safety in extreme environments. Hence, hypotheses were drawn using various articles which have studied these topics in organisational, more “white collar” environments. This could have contributed to the proposed ideas not being validated in the selected sample and all hypotheses remaining unsupported. Secondly, the data obtained for this study was retrieved from the United States of America (USA), and the degree to which the findings generalize to a South African context, the origin of this mini-

dissertation, remains untested. Specifically, this US sample contained three cultural/ethnic groups, namely, Caucasians, African Americans, and Hispanics, whereas a large number of cultural groups exist in South Africa. Additionally, the sample included only men. It could be argued that a more gender balanced sample could have contributed to the results, as women are generally considered to be more cautious than men and this may therefore impact their safety participation. Lastly, I positioned my study about leadership and safety behaviour in extreme environments. But the study design did not include comparing the results for firefighters to results obtained in a sample of workers not in extreme environments. It is therefore unclear whether the results of this study apply specifically to extreme environments such as firefighting only, or whether they can be generalised to all working environments.

5.2. DIRECTION FOR FUTURE RESEARCH

As mentioned in 5.1, the current study cannot be generalised to the South African context. Therefore, the study could be replicated in South Africa to formulate results more applicable to the South African environment and to begin to assess external generalisability. Extreme environments that could be considered in South Africa are mining or police. South Africa is a country that has a very high crime rate and therefore could be an ideal setting in which to replicate this study. Doing so could enhance what we know about leadership in extreme environments in South Africa. Additionally, replicating this study in the South African context would be interesting due to the diverse cultures represented in the workforce. There are various cultural differences in the black community alone and how each culture approaches leadership could vary,

as well as its effects on outcomes such as team performance and safety participation. Lastly, future research may focus on whether the relationship between leadership and team performance varies based on firefighters' employment status--whether they are permanently employed or volunteers. Numerous firefighters, especially in the Western Cape region, are voluntary firefighters belonging to the Voluntary Wildfire Services. Their employment situation may affect the degree to which they feel loyal and respect their leader, which could play a role in their performance.

Furthermore, future research should explore the relation between safety participation and lieutenants'/leaders' age. The strong relation between lieutenants' age and their perceptions of team safety participation could have been because the more advanced the lieutenant's age, the more comfortable they become with the dangerous environment, as argued above. This is but one of the questions that remain unanswered when it comes to leader and team perceptions of safety, and the impact of leadership on team safety and performance.

LIST OF REFERENCES

Ahearne, M., Mathieu, J., & Rapp, A. (2005). To empower or not to empower your sales force? An empirical examination of the influence of leadership empowerment behavior on customer satisfaction and performance. *Journal of Applied Psychology*, *90*(5), 945–955. http://doi.org/10.1037/0021-9010.90.5.945

Amundsen, S., & Martinsen, O. (2014). Empowering leadership : Construct clarification, conceptualization, and validation of a new scale. *Leadership Quarterly*, *25*(3), 487–511. http://doi.org/10.1016/j.leaqua.2013.11.009

Arnold, J., Arad, S., Rhoades, J., & Drasgow, F. (2000). The empowering leadership questionnaire : The construction and validation of a new scale for measuring leader behaviors. *Journal of Organizational Behaviour*, *21*, 249–269.

Ary, D., Jacobs, L., Razavieh, A., & Soresen, C. (2009). *Introduction to research in education* (8th ed.). Belmont, CA: Cengage Learning.

BBC News. (2016, May 8). Canada wildfire: Alberta blaza threatens neighbouring province. *BBC*. Alberta. Retrieved from http://www.bbc.co.uk/news/world-us-canada-36238076

Boslaugh, S. (2007). *An Introduction to Secondary Data Analysis*. *Secondary Data Sources for Public Health: A Practical Guide*. England: Cambrige University Press.

Chen, G., Sharma, P. N., Edinger, S. K., Shapiro, D. L., & Farh, J.-L. (2011). Motivating

and demotivating forces in teams: Cross-level influences of empowering leadership and relationship conflict. *Journal of Applied Psychology*, *96*(3), 541–557. http://doi.org/10.1037/a0021886

Christian, M. S., Bradley, J. C., Wallace, J. C., & Burke, M. J. (2009). Workplace safety: A meta-analysis of the roles of person and situation factors. *Journal of Applied Psychology*, *94*(5), 1103–1127. http://doi.org/10.1037/a0016172

Clark, A. (1998). The qualitative-quantitative debate: Moving from positivism and confrontation to post-positivism and reconciliation. *Journal of Advanced Nursing*, *27*, 1242–1249. http://doi.org/10.1046/j.1365-2648.1998.00651.x

Clarke, S. (2006). The relationship between safety climate and safety performance: A meta-analytic review. *Journal of Occupational Health Psychology*, *11*(4), 315–327. http://doi.org/10.1037/1076-8998.11.4.315

Conger, J. A., & Kanungo, R. N. (1988). The empowerment process: Integrating theory and practice. *Academy of Management Review*, *13*(3), 471–482. http://doi.org/10.5465/AMR.1988.4306983

Conger, J. A., Kanungo, R. N., & Menon, S. T. (2005). Charismatic leadership and follower effects. *Journal of Organizational Behavior*, *21*(7), 747–767. http://doi.org/10.1002/1099-1379(200011)21

Cooper, M. M. (2016). Distinguishing critical and post-positivist research. *College Composition and Communication*, *48*(4), 556–561.

Cropanzano, R., & Mitchell, M. S. (2005). Social Exchange Theory : Interdisciplinary review. *Journal of Management*, *31*(6), 874–900. http://doi.org/10.1177/0149206305279602

Decker, P. J. (2007). Social Learning Theory and leadership. *Journal of Management Development*, *5*(3), 46–58. http://doi.org/10.1108/eb051615

Dionne, S., & Yammarino, F. (2004). Transformational leadership and team performance. *Journal of Organizational Change Management*, *17*(2), 177–193. http://doi.org/10.1108/09534810410530601

Druskat, V. U., & Wheeler, J. V. (2003). Managing from the boundary : The effective leadership of self-managing work teams. *Academic of Management Learning and Education*, *46*(4), 435–457. http://doi.org/10.2307/30040637

Fernández-Muñiz, B., Montes-Peón, J. M., & Vázquez-Ordás, C. J. (2014). Safety leadership, risk management and safety performance in Spanish firms. *Safety Science*, *70*, 295–307. http://doi.org/10.1016/j.ssci.2014.07.010

Field, A. (2005). Everything you ever wanted to know about statistics. In *Discovering statistics using SPSS* (2nd ed., pp. 1–36). London: Sage Publications.

Flin, R., & Yule, S. (2004). Leadership for safety: Industrial experience. *Quality and Safety in Health Care*, *13*(suppl 2), ii45-ii51. http://doi.org/10.1136/qshc.2003.009555

Griffin, M. A., & Neal, A. (2000). Perceptions of safety at work: A framework for linking

safety climate to safety performance, knowledge, and motivation. *Journal of Occupational Health Psychology*, *5*(3), 347–358. http://doi.org/10.1037/1076-8998.5.3.347

Guba, E., & Lincoln, Y. (1994). Competing Paradigms in Qualitative Research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105–117). Sage Publications.

Hannah, S. T., Uhl-Bien, M., Avolio, B. J., & Cavarretta, F. L. (2009). A framework for examining leadership in extreme contexts. *Leadership Quarterly*, *20*(6), 897–919. http://doi.org/10.1016/j.leaqua.2009.09.006

Hollander, E. P., & Offermann, L. R. (1990). Power and leadership in organizations: Relationships in transition. *American Psychologist*, *45*(2), 179–189. http://doi.org/10.1037/0003-066X.45.2.179

Hoobler, J., & Smallfield, J. (n.d.). *Effects of team helping on positive and negative leadership behaviors*.

Hox, J., & Boeije, H. (2005). Data Collection, Primary vs. Secondary.pdf. *Encyclopedia of Social Measurement*. http://doi.org/10.1016/B0-12-369398-5/00041-4

Kark, R., Shamir, B., & Chen, G. (2003). The two faces of transformational leadership: Empowerment and dependency. *Journal of Applied Psychology*, *88*(2), 246–255. http://doi.org/10.1037/0021-9010.88.2.246

Maree, K., & Pietersen, J. (2012). The quantitative research process. In K. Maree

(Ed.), *First Steps in Research* (Revised ed, pp. 145–153). Pretoria: Van Schaik Publishers.

Martínez-Córcoles, M., Gracia, F., Tomás, I., & Peiró, J. M. (2011). Leadership and employees' perceived safety behaviours in a nuclear power plant: A structural equation model. *Safety Science*, *49*(8–9), 1118–1129. http://doi.org/10.1016/j.ssci.2011.03.002

Martinez-Corcoles, M., Schobel, M., Gracia, F., Tomas, I., & Peiro, J. (2012). Linking empowering leadership to safety participation in nuclear power plants: A structural equation model. *Journal of Safety Research*, *43*(3), 215–221. http://doi.org/10.1016/j.jsr.2012.07.002

Mullen, J., Kelloway, E. K., & Teed, M. (2011). Inconsistent style of leadership as a predictor of safety behaviour. *Work & Stress*, *25*(1), 41–54. http://doi.org/10.1080/02678373.2011.569200

Mumford, M. D., Zaccaro, S. J., Harding, F. D., Jacobs, T. O., & Fleishman, E. A. (2000). Leadership skills for a changing world: Solving complex social problems. *Leadership Quarterly*, *11*(1), 11–35.

Neal, A., & Griffin, M. A. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of Applied Psychology*, *91*(4), 946–953. http://doi.org/10.1037/0021-9010.91.4.946

Neal, A., Griffin, M., & Hart, P. (2000). The impact of organizational climate on safety

climate and individual behavior. *Safety Science*, *34*, 99–109.

Pallant, J. (2013). Multiple Regression. In *SPSS Survival Manual* (5th ed., pp. 154–174). Berkshire-England: McGraw-Hill Companies.

Pietersen, J., & Maree, K. (2012a). Overview of statistical techniques. In K. Maree (Ed.), *First Steps in Research* (11th ed., pp. 225–259). Hatfield-Pretoria: Van Schaik Publishers.

Pietersen, J., & Maree, K. (2012b). Standardisation of a Questionnaire. In *First Steps in Research* (11th ed., pp. 213–222). Hatfield-Pretoria: Van Schaik Publishers.

Salas, E., Cooke, N. J., & Rosen, M. A. (2008). On teams, teamwork, and team performance: Discoveries and developments. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, *50*(3), 540–547. http://doi.org/10.1518/001872008X288457

Settoon, R. P., Bennett, N., & Liden, R. C. (1996). Social exchange in organizations : Perceived organizational support , Leader-Member Exchange , and employee reciprocity. *Journal of Applied Psychology*, *81*(3), 219–227.

Shamir, B., Chen, G., & Kark, R. (2003). The two faces of transformational leadership : Empowerment and dependency. *Journal of Management*, *88*(2), 246–255. http://doi.org/10.1037/0021-9010.88.2.246

Sharma, P. N., & Kirkman, B. L. (2015). Leveraging leaders: A literature review and future lines of inquiry for empowering leadership research. *Group & Organization*

Management, *40*(2), 193–237. http://doi.org/10.1177/1059601115574906

Smith, T. D., Eldridge, F., & DeJoy, D. M. (2016). Safety-specific transformational and passive leadership influences on firefighter safety climate perceptions and safety behavior outcomes. *Safety Science*, *86*, 92–97. http://doi.org/10.1016/j.ssci.2016.02.019

Sørensen, H. T., Olsen, J., & Sabroe, S. (1996). A framework for evaluation of secondary data sources for epidemiological research. *International Journal of Epidemiology*, *25*(2), 435–442. http://doi.org/10.1093/ije/25.2.435

Srivastava, A., Bartol, K., & Locke, E. (2006). Empowering leadership in Mmanagement teams: Effects on knowledge sharing, efficacy, and performance. *Academy of Management Journal*, *49*(6), 1239. http://doi.org/10.5465/amj.2006.23478718

Statistics South Africa. (2011). Mortality and causes of death in South Africa, 2011 : Findings from death notification. *Statistical Release P0309.3*, (July), 1–127. http://doi.org/Statistical release P0309.3

Trochim, W. M. K. (2006). Positivism & Post-Positivism. Retrieved August 29, 2016, from http://www.socialresearchmethods.net/kb/positvsm.php

Tuckey, M. R., Bakker, A. B., & Dollard, M. F. (2012). Empowering leaders optimize working conditions for engagement: A multilevel study. *Journal of Occupational Health Psychology*, *17*(1), 15–27. http://doi.org/10.1037/a0025942

Tung, H., & Chang, Y. (2011). Effects of empowering leadership on performance in management team. *Journal of Chinese Human Resources Management*, *2*(1), 43–60. http://doi.org/10.1108/20408001111148720

Useem, M., Cook, J., & Sutton, L. (2005). Developing leaders for decision making under stress : Wildland firefighters in the South Canyon fire and its aftermath. *Academic of Management Learning and Education*, *4*(4), 461–485.

Vinodkumar, M. N., & Bhasi, M. (2010). Safety management practices and safety behaviour: Assessing the mediating role of safety knowledge and motivation. *Accident Analysis and Prevention*, *42*(6), 2082–2093. http://doi.org/10.1016/j.aap.2010.06.021

Wang, H., Law, K. S., Hackett, R. D., Wang, D., & Chen, Z. X. (2005). Leader-member exchange as a mediator of the relationship between transformational leadership and followers' performance and organizational citizenship behavior. *Academy of Management Journal*, *48*(3), 420–432. http://doi.org/10.5465/AMJ.2005.17407908

Westaby, J. D., & Lee, B. C. (2003). Antecedents of injury among youth in agricultural settings: A longitudinal examination of safety consciousness, dangerous risk taking, and safety knowledge. *Journal of Safety Research*, *34*(3), 227–240. http://doi.org/10.1016/S0022-4375(03)00030-6

Winston, B., & Patterson, K. (2006). An integrative definition of leadership. *International Journal of Leadership Studies*, *1*(2), 6–66.

Wong, L., Bliese, P., & Mcgurk, D. (2003). *Military Leadership : A Context Specific Review*. http://doi.org/10.1016/j.leaqua.2003.08.001

Zohar, D., & Luria, G. (2005). A multilevel model of safety climate: Cross-level relationships between organization and group-level climates. *Journal of Applied Psychology*, *90*(4), 616–628. http://doi.org/10.1037/0021-9010.90.4.616