

*Measuring Psychological Safety in Perioperative Teams:
Remembering Aristotle.*

The Mediating effect of Leader Inclusiveness

A Cross-Sectional Study

Mary Connaughton, RGN, RNID, H. Dip Specialist Nursing.

MSc. Clinical Research, National University of Ireland, Galway.

Supervisors: Ms. Sonja Khan, CRF UCHG, Galway.

Head of School: Ms. Carmel Malone FRCSI.

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DECLARATION FORM

I declare that this thesis, which I have submitted to the National University of Ireland Galway, in fulfilment with the requirements of this Msc in Clinical Research is my original work.

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ABSTRACT

Objective: This study examines the impact of psychological safety on the effectiveness of perioperative teams and the mediating effect of Surgeon and Anesthetists Inclusiveness as leaders within the operating theatre. Previous studies have demonstrated that psychological safety is central to effective team functioning and teamwork (Triplett & Loh 2018) and research in organisational psychology has shown psychological safety as a means to understanding teamwork, team learning and learning within an organisation (Edmondson & Lei 2014). However, there is limited research on its use in healthcare teams and in the perioperative arena and the underlying factors which can effect or foster psychological safety in cross-disciplinary teams. The main aims and objective of this thesis is to highlight literature on team effectiveness and make the connection between organisational psychology and healthcare teams, and enable researchers to use these concepts in a practical way in healthcare in operating theatre. This could enable teams to cope with a healthcare system which is growing in complexity by developing a culture of self-awareness, and an awareness of others, where all team members are not afraid to speak up and everyone is a stakeholder within the team (Salas et al 2005 & Edmondson 1999).

1.0 INTRODUCTION

Psychological safety and Team Effectiveness

The word ‘team’ is a word known to everyone and there is a growing body of literature and research to understand how teams work in business and management publications. However, literature and research on healthcare teams is not as plentiful, and a lot of research studies and publications use concepts in organisational psychology and business models as a benchmark. Brannick, Salas & Prince (1997) in their book on team performance makes the distinction between a ‘group’ and a ‘team’. They define a group as people who come together for a task or to solve a problem and do not stay together, whereas a ‘team’ has a future together and co-ordinate different tasks together to achieve a goal. The main goal of this Thesis, is to illustrate that psychological safety can enhance the way we as healthcare workers carry out these tasks by developing a ‘psychologically safe’ environment in the operating theatre.

Team Psychological safety could be described as people’s perceptions of the consequences of taking interpersonal risks in a team and when a person feels safe to discuss failures (Edmondson & Lei, 2014). Research suggests that team psychological safety is a critical factor in understanding phenomena such as teamwork, communication and team learning (Edmondson & lei, 2014; Edmondson, 1999). Research suggests that team learning and effectiveness can be achieved if an organisation nurtures psychological safety within a team structure (Ashauer & Macan 2013 & Edmondson 1999) which leads to an outcome of performance improvement and team effectiveness. “Organisational improvement from the psychological safety perspective, suggests that employees are motivated to innovate when the interpersonal environment is safe to take a risk with new ideas or creative endeavours” (Simonet, Narayan & Nelson 2015). Psychological safety is positively related to learning behaviours and an effective team performance, and it is an essential component in effective teams (Burke, Stagl, Salas, Pierce and Kendall 2006). In contrast to this, when teams have low levels of psychological safety, team members feel less confident expressing their ideas and this climate of restricted participation could have

a negative effect on team performance (De Dreu & Weinhart, 2003, & Edmundson 1999). Harrison and Klein (2007) & Wilkens and London (2006) also argue that high agreement among team members is reflective of a strong psychological safety climate with less conflict, competition and mistrust.

There is no better place to encourage and foster psychological safety than in healthcare teams and the operating theatre. In this environment, the challenges of teamwork and learning are becoming essential to good healthcare delivery and safety for the patient (Nembard & Edmundson 2006 & Fabri et al). However, Schaefer, Helmreich, & Scheidegger (1994) describe how human factors can have an impact on healthcare safety and 70 to 80% of medical errors are related to dynamics within the health care team. In healthcare organisations, it is critical for the delivery of good quality care delivery and the efficiency of hospital services that effective teams engage in team learning through psychological safety (Edmundson 2003 & Mathieu et al 2007). However, an effective team is not always defined by a high level of psychological safety, and a team can still carry out tasks effectively but all team members may not be a stakeholder in team decisions (Fransen et al). Ellis et al states that team effectiveness may be predicted by the social skills and collaborative ability of team members, and fostering psychological safety and encouraging an increased awareness of people's ability to speak up can enhance any team, be it healthcare teams or otherwise especially when the risk of harm to patients may be high.

In healthcare the main goal is to cure or treat an illness and to avert risk, using not just clinical knowledge and experience, but through ethical beliefs and good sound professional practices. Old ethical principles such as 'Beneficence' (to do good), 'Non Maleficence' (to do no harm) are two of the many concepts by which the foundation of Medical and Nursing professional practice are based (Beauchamp and Childress 1996). However, managing and avoiding risk for patients is not just an unconscious act, it involves planning and innovation and it cannot be done independently, especially in an operating theatre and it could be argued that ethical principles and the construct of psychological safety could be a learned concept in both Medicine and Nursing, and be part of the development and education of a modern healthcare system who has the basic ideals and concepts of organisational psychology

approach at its core. Organisational psychology and team effectiveness has yet been uncovered ground within the healthcare setting.

1.1 Project Aristotle

In 2013 'Google' carried out a study over 2 years of more than 200 teams to examine "What makes the perfect team?" The researchers found that individual traits did not have an impact on team effectiveness so they investigated and focused on group norms and culture traits. The study, which was based on data analysis, found that teams work best when their members feel they can take risks, can count on each other, and have clear goals and that their work matters. This work was called 'Project Aristotle', paying tribute to Aristotle's famous quote, "the whole is greater than the sum of its parts". This work discovered 5 key dynamics that set the most successful teams apart from other teams, Psychological safety, Dependability (team members get things done), Structure and Clarity (Team have clear roles), Meaning (work is personally important), and Impact (work matters and creates change). The results of the study showed that psychological safety was the most important dynamic for team effectiveness, and it underpinned the other 4 dynamics measured as illustrated in Fig.1, were Dependability, Structure and Clarity, The Meaning of Work, and the Impact of work. These four team traits proved to illustrate some of the successful outputs and effectiveness of the most effective teams at Google.



Fig. 1 (<http://rework.withgoogle.com/blog/five-keys-to-a-successful-google-team/>).

In all of the 180 teams investigated through the use of questionnaires, interviews and the study of group norms and comparing teams cohesiveness, the researchers concluded that the most effective team had the strongest ‘collective intelligence’. In other words, there was a culture of social sensitivity and each team member had a voice within the team (Duhigg 2016). The research team in Google concluded from their intensive literature search in organisational psychology publications on team effectiveness, that these actions described ‘Psychological Safety’ and thus the outcome of their ground-breaking research.

1.2 The Origins of Psychological Safety

The construct of psychological safety has long since been defined and discussed in organisational psychology in many publications. Maslow (1943) in his work on ‘A theory of human motivation’, believed that individuals possess a set of motivational systems which are unrelated to rewards and unconscious desires. He developed a 5 stage model entitled his ‘Hierarchy of Needs’. McLeod (2007) refers to Maslow’s theory and describes the need for Safety and self esteem needs (fig2), and states that

all humans need to feel safe from fear and feel secure, and they need to have self respect and respect from others.

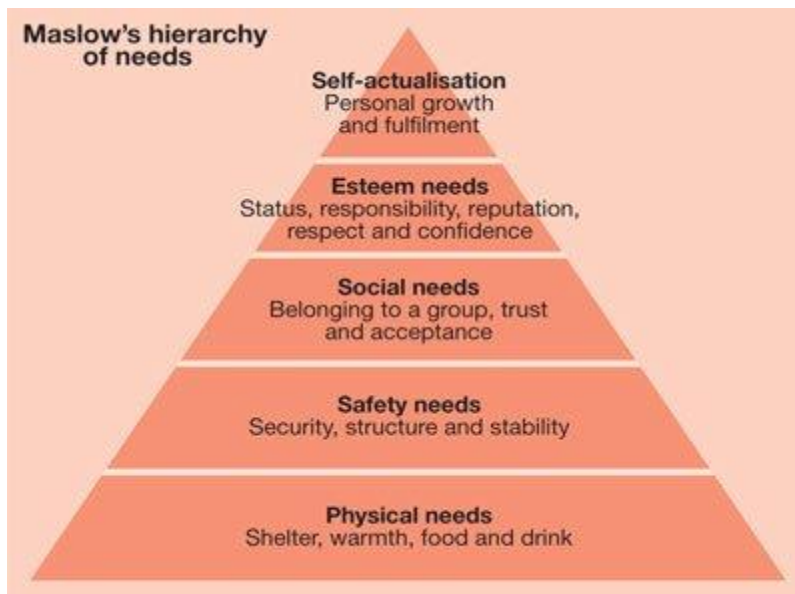


Fig.2 . <http://www.simplypsychology.org/maslow.html> : McLeod, S. A. (2007) Maslow's Hierarchy of Needs.

Maslow's theories may have been the precursor to the construct of what motivates humans to work within a group to achieve a common goal. Reflecting this premise, Edmondson & lei (2014) state that psychological safety is about reducing interpersonal risk and helps people overcome anxiety within a group and feel they can express ideas, fears and opinions without judgement. Jerome (2013) believes that the 2 lower order needs in Maslow's theory (psychological and safety needs) may have a real application in organisational culture, and that through the positive interaction of management structures employees would reach a stage of self-actualization. This illustrates the point that any organisation or healthcare facility benefits greatly from employee engagement and fostering psychological safety within its teams. If you examine Maslow's Social needs and Esteem needs you also assume that these needs are also strongly related to the construct of psychological safety. The human need for

maintaining self esteem, confidence, their reputation and wanting to be accepted in a group or team could be many of the factors which prevent people from being able to speak up and avoid “interpersonal risk taking’. Therefore it could be argued that if any organisation or healthcare facility fosters the idea of psychological safety in team members, it would allow each person to meet these needs in a positive way and a more communicative, cohesive team dynamic would be created (Lerner 2015). The idea of psychological safety is an emerging concept and the literature suggests that gaining an awareness of it, could enhance human development and empower people to instigate change in their human development and in the development of work teams (Wanless 2016 & Fransen et al 2011).

The importance of employee engagement was examined by Kahn (1990) and in his study he outlined, the psychological conditions which determine people’s engagement or disengagement at work by examining two groups. Employees in a summer camp, and employees in an architecture firm. Kahn carried out qualitative research and proved that psychological safety affects employee’s willingness to work both cognitively and physically and emotionally at work (Edmondson & Lei 2014) and also a he found a direct correlation between psychological safety and employee engagement. Therefore, you could argue that healthcare employee engagement and attitudes between all team members in the operating theatre, is an integral part of the assurance of avoiding surgical risk or events for surgical patients (Prati & Pietrantonio 2014).

1.2 Leader Inclusiveness and the Operating Theatre

Leader inclusiveness is defined by Nembhard & Edmondson (2006) as “Words and deeds by a leader or leaders that indicate an invitation and appreciation for others contributions” and by its very nature should create a psychologically safe forum to speak up. However, the literature gives a more generalized version of the concept, for the purposes of this work, it refers to Consultant Surgeons and Consultant Anesthetists enrolled in this study.

As demonstrated by Google, psychological safety is a crucial component to producing an effective team and the literature describes the construct of leader inclusiveness and its impact on psychological safety in teams (Nembhard & Edmundson 2006, & Randel et al 2016). Interestingly, Oldham & Hackman (2010) describe surgical teams as a type of team where responsibility and accountability lies with the “Surgeon”, but to accomplish his or her work, the interaction between all team members is needed. They also state that members of the surgical team provide the lead member (Surgeon) all the assistance they can provide as the surgeon cannot function alone.

This point supports the work of Nembhard & Edmundson (2006), who found that leadership inclusiveness helps to overcome the effects of status differences through psychological safety and increasing team members engagement (Randel et al 2016). Similarly, Edmondson (2003) also states that surgeons have enormous power relative to other team members, and this may inhibit open discussion from lower-power members of the team. Building on these insights, the literature does support the case for the positive effects of leader inclusiveness if the leader fosters psychological safety in his or her team in the operating theatre. Leaders can also encourage team members to bring up new ideas and ensuring that there will be no negative results to their actions (Carmeli, Palmon & Ziv 2007).

However, in an exploratory study by Yue-Yung Hu et al (2016) it examined Surgeons’ leadership behaviour and how that through communication and information sharing between the Surgeon and surgical teams, this can enhance safety and team effectiveness. In essence, team leaders who promote learning by motivating and interacting with team members in the operating room, create direct invitation for others input (Edmondson 1994). Edmondson (1994) also postulated that a leader may work hard to promote psychological safety, but may not provide motivation for promoting change or learning in the team. However a study by (Carmeli, Palmon & Ziv 2010) proved in their findings that the inclusive leadership was positively linked to psychological safety and that “when leaders are open, accessible and available to employees, they feel safe to speak up with new ideas or issues”. In a study by Hue et al (2015) it was observed that transformational or team-orientated leadership has the potential to improve and enhance team cohesion and improved teamwork in the

operating theatre. However, Mazzocco et al (2009) observed that “when perioperative teams do not exhibit team behaviours, such as information sharing, briefing, enquiring and assertion this is related to negative patient outcomes postoperatively”.

The literature demonstrates that interactions within teams in a healthcare setting are characterised by effective communication, and psychological safety enables this interaction (O’Leary 2016), but communication difficulties between the Surgeon and other team members, can contribute to, not just increase risk, but also can cause delays during the procedure, which has a direct impact on team effectiveness and performance. Therefore, team members may feel unable to communicate information due to their fear of Surgeons, Nurse Managers (Halverson et al 2011) status and even if they see something fundamentally wrong, they may not be able to speak up. In an article by Rydon-Grange (2015) they examine the impact of psychological theories and failures in healthcare settings, and describe what they call as the “bystander effect”. They suggest when something goes wrong, there is a culture of fear, naming and shaming and no-one takes responsibility. However, if you apply the writings and beliefs of psychological safety to this concept, the fear of speaking up is absent and in its place a culture where all team members collaborate and exchange ideas and deal with situations where things go wrong, and develop ideas to prevent mistakes and errors.

1.3 Personality Traits and Team effectiveness

The work in project Aristotle illustrated that interpersonal issues can hinder team effectiveness and success (Duhigg 2016) and the most effective teams did not have individual ability or intelligence as the reason for its success. They suggested that the personality type of individuals could have a negative impact of team dynamics, and psychological safety.

There is a wide body of literature referring to many theories on personality types in the writings and theories of Karl Jung, who believed that “psychological preferences play a role in one’s judgement and relationship to the world” (Filbeck et al 2005). He describes two different personality types, introvert and extrovert. He describes an introvert as a person who is interested in the interior world, and extrovert is interested

in the exterior world (Stricker and Ross 1964). Many models have been developed on Jung’s theory, including the Myers-Briggs indicator which is widely used by many organisations today (Cohen 2013) and also the Big Five inventory (BFI) by Goldberg (1990) described and validated by McCrae and Costa (1987) which was cited and used in a study by Drosdeck et al (2015). McCrae and Costa (1987) and Goldberg (1990) developed 5 factors in personality traits, *Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness* (Matthews & Deary 1998) as outlined in Fig 4. The Big Five personality assessment was used by the researchers in ‘Project Aristotle’,

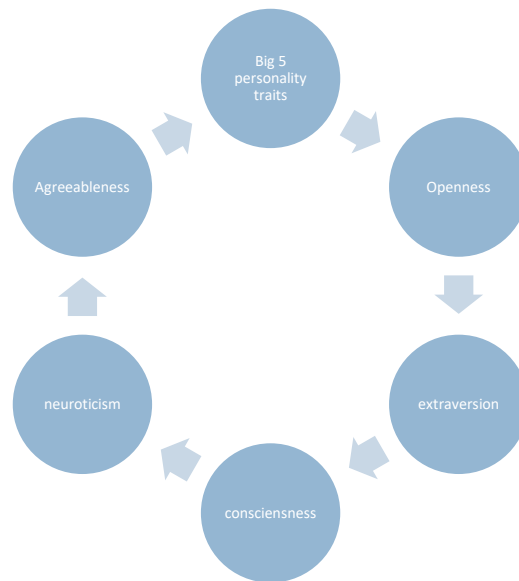


Fig.3 Adapted from Goldberg, L. R. (1990)

In a way to examine different personality types between team members by the use of a 44 item inventory developed by Goldberg (1993). This illustrated how these types and attributes can have an impact on team dynamics, negatively or positively. These instruments are widely used to illustrate that people’s psychological attributes play a role in ones judgement and concept of the world around them (Filbeck et al 2010). The goal of reflecting on personality type in the context of psychological safety, is to understand and appreciate the differences between team members in the operating theatre and I suggest that these instruments could be used in research in healthcare to enhance knowledge of healthcare teams in the operating theatre and otherwise to develop a culture of change, and promote team building and psychological safety. The literature on psychological safety has many studies on Surgeon personality types with

very few on other operating team members. In a study by Drosdeck et al (2015) of Surgeon and non-surgeon personalities were different and Surgeons scored lower on agreeableness and higher on extraversion than non-surgeons. Similarly, Gutierrez (2005) examined the effect of personality on the subjective well-being of 236 Nurses, and they found that Extraversion can have a positive effect on openness. One could argue by this premise that a person who is more self-expressive may be more open towards others, and may be also more open to psychological safety. Rosenthal et al (2013) also proved that surgical residents with these traits are associated with and highly relevant for “optimal surgical and team performance”. In healthcare research there have been many studies exploring personality types of surgeons and surgical teams, and the impact it may have on risk tolerance and risk aversion in the operating theatre (Contessa et al 2013), and it could be argued that personality traits could have an impact on the internal dynamics of a surgical team and their ability to function as a team and communicate their concerns which may increase risk for the surgical patient.

In the Google study they also proved that personality types did not have an impact on team effectiveness but it did have an effect on psychological safety in a negative way, and the most effective teams had a high level of psychological safety. However, in healthcare settings and the operating theatre, many studies prove that Operating room personality types, in all personnel not just Doctors and Nurses, have an impact on operating theatre dynamics (Landers 2015). Many studies demonstrate that personality type can have an impact on team outcomes (Pearsall and Ellis 2006), and also on Surgeon and Nurses attitudes to teamwork and safety in the operating theatre (Prati & Pietrantonio 2014 & Preece & Cope 2016). A study by Timoney et al (2016) also examined the impact of Surgeon and Anesthetists personality type and relationship with each other on operating times and theatre efficiency. The study proved that, the ability of Surgeons and Anesthetists to work well together can have an impact on operating times. This evidence strengthens the argument for nurturing psychological safety in perioperative teams, and encouraging good interpersonal relationships between team members.

Personality type may have an impact on the ability of the team to learn, resolve conflict and the ability of team members to perceive risk and on individual coping skills (Filbeck & Hatfield 2005). However, many Phenomenologist's postulate that the only way to understand others is realise that others may not interpret the world in the way you do and their opinions must be considered as valid as your own opinion (Funder 2016). Layder (2004 p.56-57) also describes how our 'emotional intelligence' can make us aware of others feelings and emotions and this can help us to deal with and manage any negative interactions with others. Team emotional intelligence was measured by the research team in 'Project Aristotle' by using the 'Toronto Empathy Questionnaire', where items in the questionnaire included, *I am not really interested in how others feel* and *I enjoy making other people feel better* (Spreng et al 2009). The concept of team emotional intelligence, this gives weight to the idea that psychological safety and emotional intelligence in any team dynamic in the operating theatre or otherwise, is an important part of its function and success. This strengthens the argument that all members of the team in the operating theatre have a role to play in the internal dynamics of a team that fosters psychological safety and enables work tasks to be carried out efficiently and safely. The essential requirements for any team and the completion of tasks successfully, is directly related to the way a team interacts and team members must be willing to evaluate their actions and ideas objectively (Hu et al 2018). However, I would argue that communication through psychological safety enables successful task execution in all teams especially between all members in an operating theatre. The tasks within the operating theatre must be collaborative and all team members must be on the 'same page' regardless of individual skill (Salas et al 2005), as the surgical patient is their primary concern and focus, and a good team must be able to adapt to any given situation or problem (Fransen et al 2011).

However an effective team working in collaboration is not just about the daily tasks and work goals they must achieve. The literature refers to 'mental models' and describes 2 types, task-related models which are concerned with the environment and equipment processes or clinical knowledge, and Team related models are concerned with team cohesion and team behaviours (Zaccarro et al 1995). The emergence of these two models could be facilitated by a psychologically safe team environment, and the operating theatre shared mental models could both increase team efficiency

from a clinical standpoint and also strengthen a team’s ability to deal with risk and surgical events and enable tasks to be carried out safely.

However, Morgan et al (1994) & Dyer (1984) both argue that a team becomes more effective over time as they communicate better about tasks and learn to coordinate work tasks more efficiently. Several theorists and researchers also suggest that a team must develop through stages of development to reach a desired point of team success and efficiency and that most teams concentrate on content or tasks, to the detriment of feelings and team processes which could explain why teams which are good on paper, and have an excellent output may be actually underperforming as a team. Tuckman (1965) describes a developmental sequence in groups and teams which is illustrated in (fig.4).



Fig.4 Tuckman (1965) ‘Developmental Sequence in Small Groups’. *Psychological Bulletin.* 63 (6): 384-399.

Tuckman theorized that these 5 stages were necessary for all teams to grow and face problems, carry out daily tasks and find solutions. If you examine the *storming* and *norming* elements of Tuckman’s theory (Fig.2) he suggests that when *norming* a team should facilitate each other and there must be agreement and consensus. Psychological safety would enable a team to reach these goals, and similarly the stage of *performing* where a team should have a clear vision and purpose, fostering psychological safety would enable this stage to be reached successfully. I suggest that the idea or concept of team development and Tuckman’s 5 stages of team development, **forming-storming-norming-performing-adjourning**, through the lens

of psychological safety in healthcare and the operating theatre, could strengthen the case for encouraging core teams to stay together, develop and learn as a team, and complete and evaluate daily tasks safely as the nature of teams in the operating theatre are to change due to educational needs of Doctors and some Nurses (Rydon-Grange 2015; Kozlowski 2018).

1.4 Team Learning and Psychological Safety

Team learning refers to a process of action towards detecting, adapting and understanding changes in the environment, which could improve team performance (Ortega et al 2014 & Edmondson 1999). There is much published researched evidence that team learning enhances team performance (Ortega et al 2014) and this is even more important in healthcare and the operating theatre, where fostering psychological safety and enhancing safe care delivery can lower risk for the surgical patient. It is important to emphasize that team's ability to speak up and develop a psychologically safe and risk free work environment, is only a small part of allowing teams to learn. The action of team learning processes has its foundations in many publications past and present. From Kurt Lewin's theory of 'change' and 'Group dynamics', where he attempted to make a connection between psychology and the social world, and many of his theories are still used as a reference in organisations today. Lewin was the first psychologist to write about group dynamics, and coined the term through his field theory. He theorised that change in the 'cultural atmosphere' of a group requires the change of Leadership approaches and he believed that reflecting and managing social conflicts within groups, enables change and communication and learning (Burnes 2004). Similarly, much the writings on reflective practice, refer to the concept of "reflection in action". Reflection-in-action, as described by Mintz (2016) is described as the process by which people or professionals use both their technical knowledge and their theoretical knowledge in a given situation and develop a reflective ability to look at work processes and instigate change. Taylor (2010) also states that people can reflect on the way they do their work and not fall into boring work routines and coach themselves to enliven the way they look at work tasks, and make a change. Psychological safety enables team members to be reflective about work processes and

knowing that they have the opportunity to voice these feelings and be creative about change, is one of the positive attributes of psychological safety (Edmondson 1999).

In today's operating theatre there has never been a more complex, technically difficult work environment due to advancing surgical techniques and specialities. There is increasing pressure on surgical teams to learn new processes and share knowledge within the operating theatre to increase performance and provide a safe surgical experience for the surgical patient. However, developing a culture of change, or a modification of the current surgical processes, comes with it personal risk taking and uncertainty about the changes to be made (Kessel et al 2012). In a study by Edmondson et al (2001) of 16 cardiac teams in different centres, showed that surgical teams had to learn a new non-invasive cardiac procedure and they examined all the team's ability to learn and adapt to this new procedure. The main findings of the study were that the new technology was learned most successfully in the Cardiac teams where the Surgeon asked for the teams input and encouraged the contribution of each team member. The literature on team learning suggests that team effectiveness is not just based on 'technical learning', it is also based on 'organisational learning' and you could suggest that you cannot have team effectiveness and successful learning behaviours without both (O'Leary 2016 & Walshe and Shortell 2004).

Edmondson's Team learning model (Fig.3), illustrates that team psychological safety facilitates team learning behaviour (Ashauer & Macan 2012) and that for a team to learn they must challenge assumptions and must openly discuss their opinions in the group and learn from errors to develop a learning culture in the team.

Edmondson (1999) illustrates in her model below that 'Team leader' coaching or direction has an impact on the effectiveness and ability of a team to work together and function, and this supports the research hypothesis of the mediating effect of leaders which is going to be explored in this Thesis. The model also postulates that team beliefs or team types has an effect on team learning, in other words, individuals may not be open to learning or be afraid to speak up. This strengthens the case for fostering psychological safety in teams to promote learning and collaboration, and of course in an operating theatre, as the risk can be high for the patient so therefore group learning is paramount.

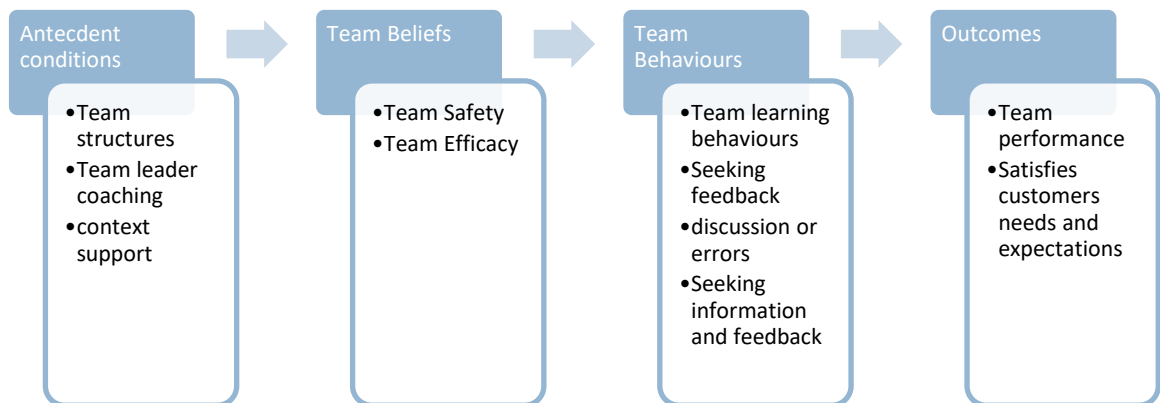


Fig.3 Edmondson, A. (1999) Psychological safety and learning behaviour in work teams. *Administrative Science Quarterly*, 44: 350-383.

When a team engages in learning behaviours, an effective team can detect changes in the environment, seek information and satisfy customer needs and increase team effectiveness and increase output and enhance performance. This model could be easily applied within the context of any healthcare setting, and in particular the operating theatre, where the risk to patients may be high. In a study by Mazzocco et al (2009), they concluded that a good team dynamic, or behaviours, have a direct impact on patient safety and lowering surgical risk and increasing patient safety in the operating theatre. In a paper by Walsh and Shortnell (2004), they advocate the need for a more transparent healthcare system where we would learn and communicate as healthcare workers to avoid further performance failures. The literature does suggest that learning behaviours in healthcare is essential to avoiding further errors and failures and team dynamics may have a direct impact on team learning behaviours.

The concept of ‘cumulative experience’ between team members is described by Vashdi et al & Weiss (1990) as the foundation of learning and competency and Hollenback et al (2012) theorizes that shared knowledge and an understanding of each other’s strengths and weaknesses can heighten team learning and performance. It is

also important to consider that teams develop cohesiveness at different rates and from learning and experience and teams should be given time to develop (Tuckman 1987) and I propose that nurturing psychological safety enables teams to develop together through good communication and being able to collaborate with no fear of censure from team members. In organisational psychology literature, which refers to task motivation, and theorises that team members are encouraged to be innovative and bring new ideas and promote collective learning in the team if there is a trusting and open culture in their team setting (Edmondson 1999).

However, Phitayakorn et al (2015), Fabri & Zayas-Castro (2008) describe the performance of an operating room team as both a technical and a non-technical set of skills, and safety and desired patient outcomes can be strengthened by healthy team learning behaviours in the operating theatre. Therefore, it could be hypothesized that psychological safety and the extent to which the construct allows individuals to take interpersonal risks, is a key driver of team learning and could reduce the human factor element to surgical risks in the operating theatre (Wanless 2016 and Bennet et al 2016).

2.0 Method

2.1 Design and Procedure

This is a cross-sectional, quasi-experimental study examining Psychological Safety across 7 perioperative teams in a 700 bed, public teaching Hospital in Co. Galway, Ireland. This study and questionnaires were approved by the **Hospital Ethics Committee, University Hospital Galway, Ireland.**

The study included Consultant Surgeons, Consultant Anesthetists, Nurses, Porters and healthcare assistants as part of the 7 teams chosen. The instrument used was 5 point likert scale questionnaires which participants working in the 7 theatres and disciplines had to complete and place in a box in each of the 7 theatres chosen or the questionnaires could be completed online. Participants were given a consent form and leaflet prior to completion of the questionnaires, to which they indicated if they would like a written or online format. The online format was survey monkey and the participants had 2 weeks to complete the questionnaires. Team psychological safety in the 7 teams was measured as a continuous variable, with 7 question or items on a 5 point likert scale, where value 7 indicated the highest level of team psychological safety. Psychological safety questionnaires were developed and validated by Edmundson (1999) and was used to collect data from Nurses, Porters and healthcare assistants. The items included, 1-strongly disagree to 7-strongly agree items included, *if you make a mistake on this team, is it often held against you*, *Members of the team are able to bring up tough issues and problems* and *Is it safe to take a risk on this team?*. Consultant Surgeons and Consultant Anesthetists were given a leader inclusiveness questionnaire from Carmeli, Palmer and Ziv's (2006) on leader Inclusiveness in psychological safety and also 3 items from the psychological safety questionnaire by Edmundson (1999) of which the internal consistency of the scale was determined as *Cronbach's alpha= 0.829*. The leader inclusiveness likert scale questionnaire (*Cronbach's alpha= 0.94*) was used to quantify and examine surgeon's levels of psychological safety and leader inclusiveness through their own eyes, by inverting the leader inclusiveness questionnaire to self reporting questions, as it The data collected was used to test the following hypotheses.

H1: The mediating effect of Consultant Surgeons and Anesethists leader inclusiveness has an effect on psychological safety in all 7 teams and individual disciplines within the teams.

The obtained data from survey monkey was analysed quantitatively using Microsoft Excel and analysed through **regression analysis and correlation**, to test the research hypotheses in all the items in the questionnaires.

2.2 Sample

The sample group of **n= 49** participants were selected as a non-probability or purposive sample. Non-Probability sampling is commonly used in social science research and is described as a process by which the investigator chooses groups and the area of study where the events or processes under investigation are most likely to occur (Silverman 2005 & Bazeley 2013). Non-probability samples can commonly rely on the idea of avoiding “Saturation” (Viet-This Tran 2017) and when choosing sample size and is considered a complex issue (Sandelowski 1995). On the basis of this, the questionnaires used in this study have been proven to have good ‘psychometric properties’ and have been used in many other publications, and therefore it could be argued that the sample size chosen would provide sufficient information on the subject under investigation. Inclusion criteria for the sample group included all team members working at least one year together within the disciplines chosen. Only 7 teams within an operating theatre of 16 theatres met the inclusion criteria and all members of the surgical team were included in the study, 7 Consultant Surgeons, 7 Consultant Anesethists, 3 Nurses, 7 porters and 7 healthcare assistants. The 7 teams chosen represented 7 surgical disciplines within the theatre, Orthopaedic, Cardio-thoracic, Plastics, ENT, Urology, Breast and Upper GI.

There is evidence in the literature to suggest that the impact of hierarchical systems within the healthcare and the operating theatre can have an effect on team performance and could inhibit communication and psychological safety (Weldon et al 2013) and on the basis of this evidence non-medical healthcare workers were included in the sample and also no other study was found in the literature on psychological safety that includes all healthcare workers not just Nurses and Doctors within the

operating theatre. I also suggest healthcare assistants and porters can have a significant effect on task performance and efficiency in an operating theatre and in the literature on psychological safety there is very limited references to non-medical healthcare workers within publications or research studies.

2.3 Informed Consent and documentation

Participants were invited to take part by email and word of mouth, and were given an invitation letter in the internal post within the operating theatre, which also contained an information leaflet, explaining the concept of Psychological safety and the potential benefits it could yield for perioperative teams. The consent form gave participants an opportunity to withdraw at any time, that participation is voluntary, and that all data would be confidential and would only be reviewed by authorised personnel reviewing the study. The participants were asked to place the consent form separately into the collection box along with the questionnaire in each box placed in the 7 theatres and 7 disciplines. Additional online questionnaires, and consent forms were completed by 2 participants online and added to the data for data analysis.

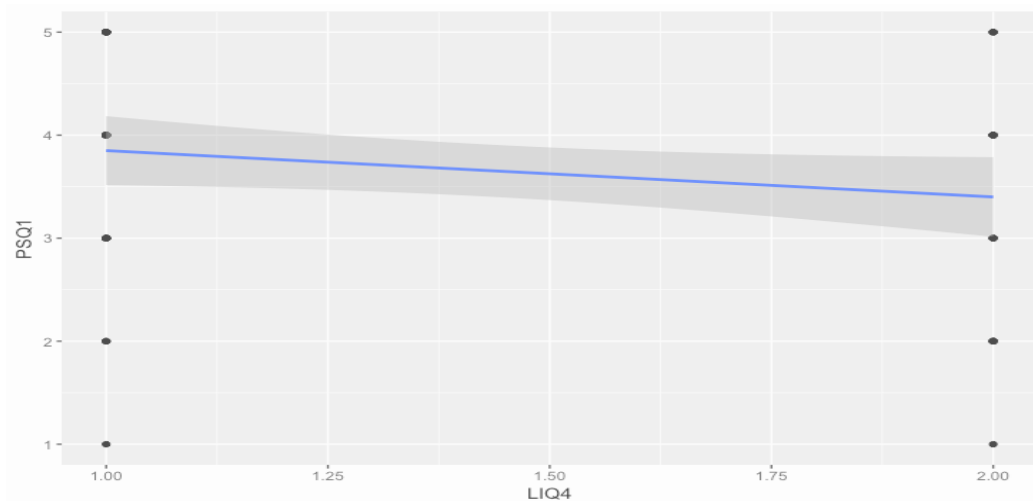
3.0 Statistical Analysis and Results

The data collected was analysed by Microsoft excel using linear regression to examine **(H1)** - The mediating effect of leader Inclusiveness (Consultant Surgeons and Anesthetists, has an effect on levels of psychological safety in the 7 teams and the analysis was also used to compare the individual effects of Consultant Surgeons and Anesethists on all team members through analysis of survey items. Questionnaire items were used to examine the mediating effect and impact of Consultants on all other team member's psychological safety, in other words examining whether Consultants believe they play a part in the ability of other team members to feel they can speak up and take an interpersonal risk on each team examined.

Fig. 4. PSQ1 v LIQ4

PSQ1: If you make a mistake on this team, is it often held against you?

LIQ4: I am attentive to new opportunities to improve work processes presented to me, by this team.



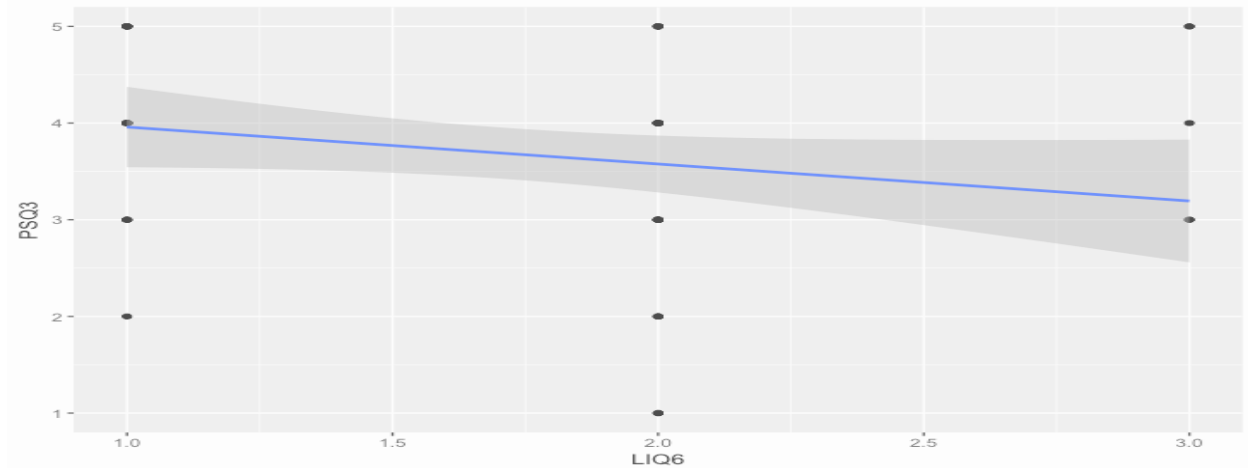
Linear Regression

H₀ :Responses are Independent				
H₁ :Responses are not Independent				
lm(formula = PSQ1 ~ LIQ4, data = PSLIDataMerge) Residuals:				
Min	1Q	Median	3Q	Max
-2.85	-0.85	0.15	0.60	1.60
Coefficients:				
Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	4.3000	0.3868	11.117	<2e-16 ***
LIQ4	-0.4500	0.2558	-1.759	0.0831 .
Conclusion: Responses are independent since p=0.0831>0.05				
Comment: Responses are negatively correlated r=-0.20860775				

Fig 5 PSQ3 v LIQ6

PSQ3: People on this team sometimes reject others for being different

LIQ6: This team is ready to listen to my requests



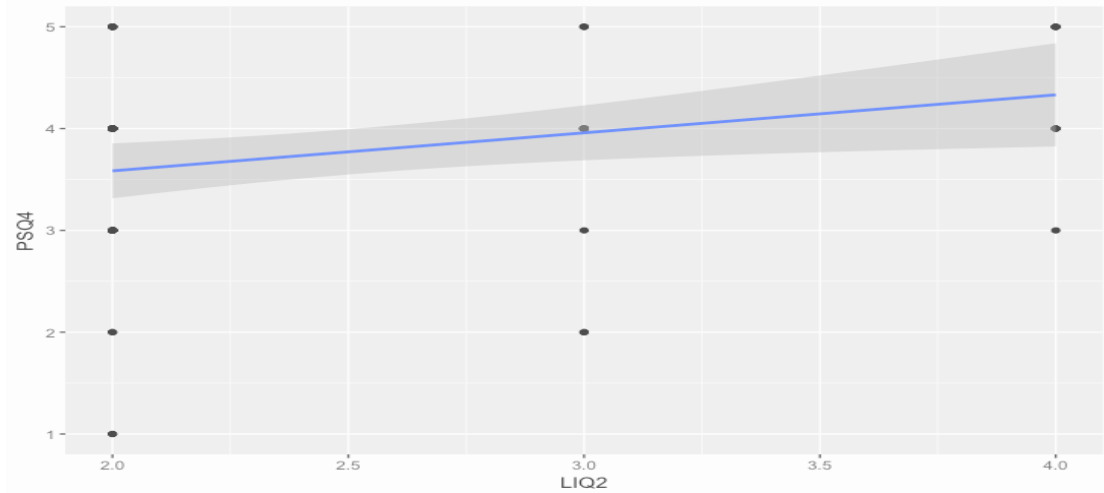
Linear Regression

H₀ : Responses are Independent				
H₁ : Responses are not Independent				
lm(formula = PSQ3 ~ LIQ6, data = PSLIDataMerge)				
Residuals:				
Min	1Q	Median	3Q	Max
-2.57647	-0.57647	0.04118	0.98235	1.80588
Coefficients:				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.3412	0.4077	10.65	3.93e-16 ***
LIQ6	-0.3824	0.2249	-1.70	0.0937 .
Conclusion: Responses are independent since p=0.0937 >0.05				
Comment: Responses are negatively correlated r=-0.20191399				

Fig. 6 PSQ4 v LIQ2

PSQ4: it is safe to take a risk on this team.

LIQ2: It is safe to take a risk on this team



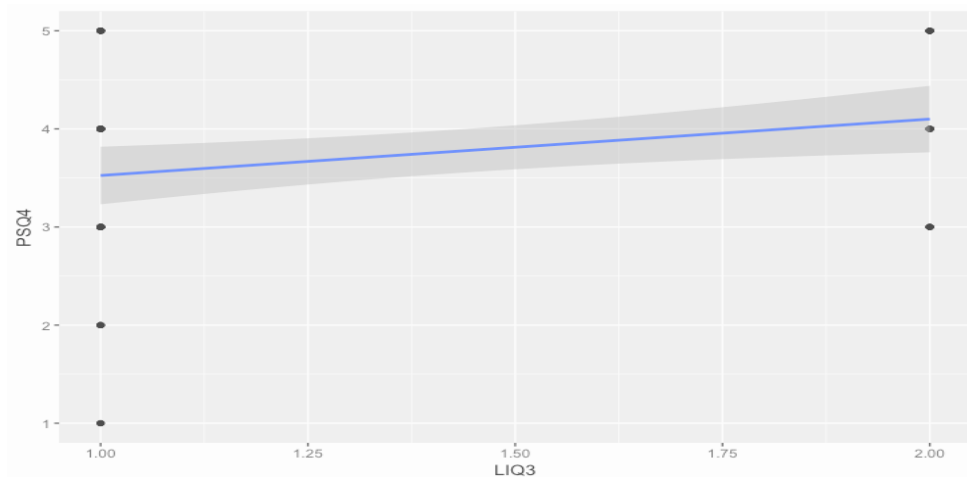
Linear Regression

H₀ : Responses are Independent				
H₁ : Responses are not Independent				
lm(formula = PSQ4 ~ LIQ2, data = PSLIDataMerge)				
Residuals:				
Min	1Q	Median	3Q	Max
-2.5848	-0.5848	0.0419	0.4152	1.4152
Coefficients:				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	2.8381	0.3966	7.156	7.44e-10 ***
LIQ2	0.3733	0.1523	2.452	0.0168 *
Conclusion: Responses are dependent since p=0.0168 ≤ 0.05				
Comment: Responses are positively correlated r=0.28501140				

Fig.7 PSQ4 v LIQ3

PSQ4: it is safe to take a risk on this team.

LIQ3: It is easy for me to ask members of this team for help



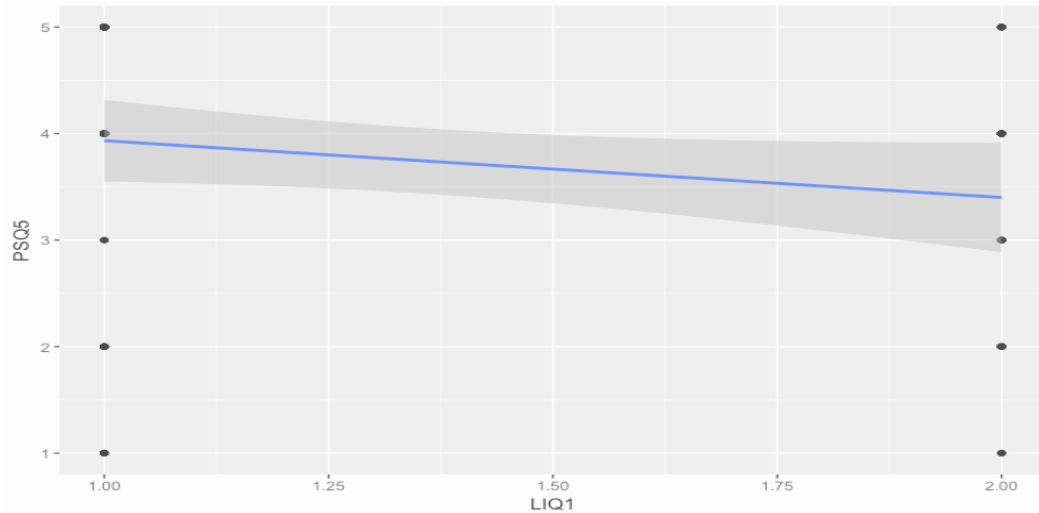
Linear Regression

H₀ : Responses are Independent				
H₁ : Responses are not Independent				
lm(formula = PSQ4 ~ LIQ3, data = PSLIDataMerge)				
Residuals:				
Min	1Q	Median	3Q	Max
-2.525	-0.525	-0.100	0.475	1.475
Coefficients:				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	2.9500	0.3392	8.697	1.19e-12 ***
LIQ3	0.5750	0.2244	2.563	0.0126 *
Conclusion: Responses are dependent since $p=0.0126 \leq 0.05$				
Comment: Responses are positively correlated $r=0.29679684$				

Fig. 8 PSQ5 v LIQ1

PSQ5: it is safe to take a risk on this team.

LIQ1: It is easy for me to ask members of this team for help



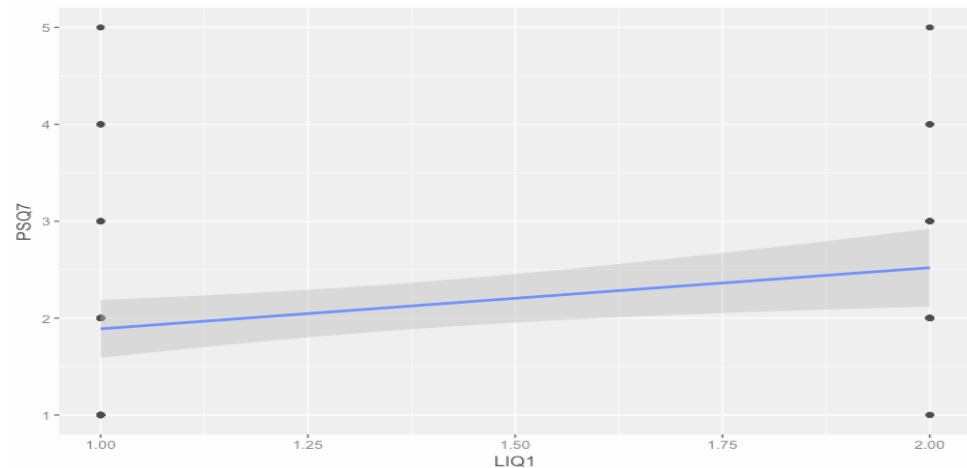
Linear Regression

H₀ : Responses are Independent				
H₁ : Responses are not Independent				
lm(formula = PSQ5 ~ LIQ1, data = PSLIDataMerge)				
Residuals:				
Min	1Q	Median	3Q	Max
-2.9333	-0.4000	0.3333	1.0667	1.6000
Coefficients:				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.4667	0.4624	9.66	2.2e-14 ***
LIQ1	-0.5333	0.3213	-1.66	0.102
Conclusion: Responses are dependent since p=0.102>0.05				
Comment: Responses are negatively correlated r=-0.19735347				

Fig. 9 PSQ7 v LIQ1

PSQ7: Working with members of this team, my unique skills and talents are valued and utilized. .

LIQ1: It is easy for me to ask members of this team for help



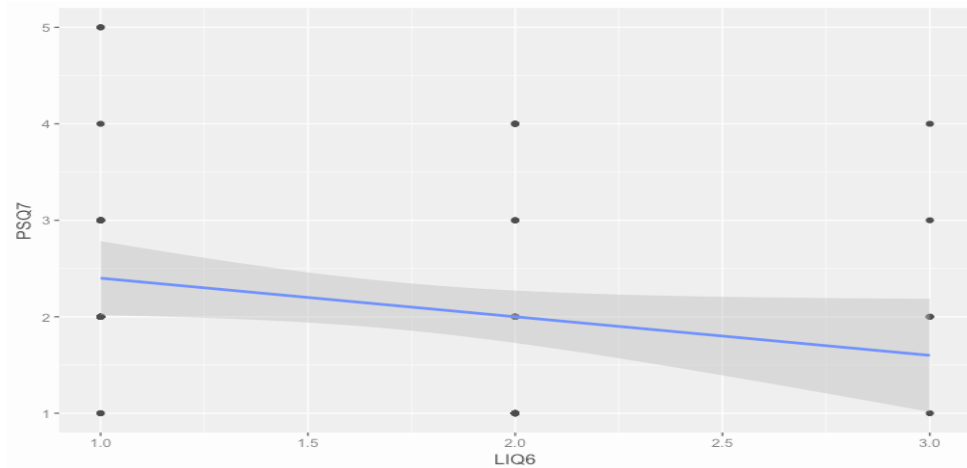
Linear Regression

H₀ : Responses are Independent				
H₁ : Responses are not Independent				
lm(formula = PSQ7 ~ LIQ1, data = PSLIDataMerge)				
Residuals:				
Min	1Q	Median	3Q	Max
-1.5200	-0.8889	0.1111	0.4800	3.1111
Coefficients:				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.2578	0.3608	3.486	0.000864 ***
LIQ1	0.6311	0.2507	2.517	0.014183 *
Conclusion: Responses are dependent since $p=0.014183 \leq 0.05$				
Comment: Responses are positively correlated $r=0.29198088$				

Fig 10 PSQ7 v LIQ6

PSQ7: Working with members of this team, my unique skills and talents are valued and utilized. .

LIQ6: This team is ready to listen to my requests



Linear Regression

H₀ : Responses are Independent				
H₁ : Responses are not Independent				
lm(formula = PSQ7 ~ LIQ6, data = PSLIDataMerge)				
Residuals:				
Min	1Q	Median	3Q	Max
-1.4	-1.0	0.0	0.6	2.6
Coefficients:				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	2.8000	0.3764	7.439	2.28e-10 ***
LIQ6	-0.4000	0.2076	-1.926	0.0582 .
Conclusion: Responses are dependent since p=0.0582>0.05				
Comment: Responses are negatively correlated r=-0.20973224				

3.1 Discussion of Results

In question 1 of the non-consultant questionnaire, *If you make a mistake on this team, is it often held against you?* And question 4 of the leader inclusiveness questionnaire, *I am attentive to new opportunities to improve work processes presented to me, by this team.* Responses were observed to be negatively correlated ($r = -0.20860775$), and a weakly non-significant relationship between the two responses ($p = 0.0831$). Question three of the non-consultant questionnaire, *people on this team sometimes reject others for being different,* and question 6 of the leadership inclusiveness response *This team is ready to listen to my requests,* was also observed to be negatively correlated ($r = -0.20191300$) and also the responses reflected a weak positive relationship ($p = 0.0937$).

However, Question 4 of the non-consultant questionnaire, *it is safe to take a risk on this team* (interpersonal risk), and question 2 of the leadership inclusiveness questionnaire, *it is safe to take a risk on this team,* was positively correlated ($r = 0.28501140$) and responses reflect a positive relationship in the responses ($p = 0.0168$) This reflects a similar attitude between consultants and others in the perioperative team towards interpersonal risk and psychological safety. Similarly, question 4 of the non-consultant questionnaire *it is safe to take a risk on this team* and question 3 of the leadership inclusiveness questionnaire *it is easy for me to ask members of this team for help,* also reflect a positive relationship between responses ($p = 0.0126$) and are also positively correlated ($r = 0.29679684$) in keeping with the research hypothesis. Question 5 of the non-consultant questionnaire *it is safe to take a risk on this team* and question 1 of the leader inclusiveness questionnaire, *it is easy for me to ask members of this team for help,* were also negatively correlated ($r = 0.19735347$) and responses showed a weakly non-significant result ($p = 0.102$). Question 7 of the non-consultant questionnaire, *working with members of this team, my unique skills and talents are valued and utilized,* and Question 1 on the leader inclusiveness questionnaire *it is easy for me to ask members of this team for help,* were observed to have a positive relationship ($p = 0.014183$) and were positively correlated ($r = 0.29198088$) also in line with the research hypothesis. Finally, Question 7 *Working with members of this team, my unique skills and talents are*

valued and utilized, and Question 6 *This team is ready to listen to my requests* from the non-consultant questionnaire and the leadership inclusive questionnaire similarly, reflected a positive relationship in keeping with the research hypothesis ($p= 0.0582$), but were negatively correlated ($r = -0.20973224$).

These results reflect a varied response but however do demonstrate a relationship between the impact of leader inclusiveness positive and negative on psychological safety in the other perioperative team members. Some results that demonstrate a negative correlation or relationship may be due to chance or sample size and” a non-significant result does not mean there is no association in the population” (Hulley et al 2013). Therefore, you could assume that this analysis does reflect the research hypothesis and there is an association between leader inclusiveness and the impact it has on perioperative teams in the population chosen. However, this thesis may be a starting point for further research on a larger scale into the benefits of psychological safety in perioperative and healthcare teams in an attempt to formulate a way to implement psychological safety on a practical level.

Table 1. Comparing Statistical analysis, correlation and p value of survey items.

PS= Psychological safety questionnaire (non-consultant) **LI**= leadership inclusiveness questionnaire.

<i>Questions</i>	<i>Correlation (r)</i>	<i>P value</i>
PSQ1 v LIQ4	r = - 0 .20860775	p= 0.0831
PSQ3 v LIQ6	r = -2019191399	p= 0.0937
PSQ4 v LIQ2	r = 0.28501140	p= 0.0168
PSQ4 v LIQ3	r = 0.29679684	p= 0.0126
PSQ5 v LIQ1	r = -0.19735347	p= 0.102
PSQ7 v LIQ1	r = 0.29198088	p= 0.014183
PSQ& v LIQ6	r = -0.20973224	p= 0.0582

This thesis empirically measured and examined the mediating effect of consultant surgeons and Anaesthetist's leadership on levels of psychological safety in other members of the perioperative team included in the study.

The research data and evidence have proved that leaders that appreciate others contributions and opinions, and redefine the possible negative impact status or hierarchy can have on other team members in an operating theatre, which can hinder psychological safety.

However, there is no doubt from the wide literature search or research publications and studies available, that the construct of psychological safety is an important emerging concept in organisational psychology and future management publications. The main goal of this thesis is to create an awareness of the importance of team dynamics which should be given a greater platform in the delivery of a quality of care for patients in our healthcare system and future healthcare strategies.

4.0 Limitations

This study is not without its limitations and was carried out in the researcher's workplace which may have caused subject bias due to the fact that some of the participants may have wanted to give intentionally positive answers to survey questions. Subject bias is defined by Hulley et al (2013) as where the research participants intentionally enhance their answers to change the way the information is perceived or they may have interpreted the questions or the rating scale badly. This may be the case in this study, especially in the case of the Porters and Healthcare assistants as the researcher was a Nurse and they may feel they must give positive answers. However the use of confidential questionnaires and the information leaflet provided enabled the participants to give their honest opinions. Another limitation to the study may be, that the team members in each team examined, could have seen this questionnaire as an opportunity to express negative feelings about the teams relationship, without a negative outcome, this may have a direct impact on the validity of the data collected. The self reporting nature of the leader inclusiveness questionnaire may have its limitations also, as the introspective ability of the Consultants might affect the way they answered the questions. However, on the questionnaires given to Consultants, I omitted the self reporting element to the

questionnaire, as I wanted the Consultants to answer as they would about being a member of the team and not as a leader, as an attempt to reduce reporting bias. Other possible limitations to the study may have been the sampling method used, although appropriate for the type of research question, convenience sampling has its disadvantages and advantages. Advantages, because of the speed at which the data can be collected, the low cost, and the disadvantages of this type of sampling may limit the generalization of results. The questionnaires used have great psychometric properties, however the use of interviews may have provided richer data, and to avoid further biases the study could have been carried out in an operating theatre in a different hospital.

5.0 Conclusion and Indications for further research.

The operating room is a clinically complex, high cost, and highly resourced area in any hospital, and its safety and efficiency is directly related to good communication, good team cohesion and good team dynamics between all team members, not just Nurses and Doctors. With advances in surgical specialities and new techniques, there has never been a greater need for the successful co-ordination of all members of the perioperative team, to maintain safety and develop a good quality standard for all surgical patients. However, most of the health strategies and efforts to enhance operating theatre efficiency has been on cost, and are financially driven by hospital managers within health services (Fong et al 2016) and sometimes using business models such as Lean and Six-Sigma to increase efficiency and output. Although you could argue that the practical application of these business models and strategies, have been of benefit to our health services, there is still a need to explore and examine the inner working of healthcare teams. I postulate that an organisational psychology focus, such as enabling Hospital managers to foster psychological safety and develop a more team centred approach could shift the focus from the outer working of the hospital to the working element within, where the way teams communicate and work and have an impact on the practical care of patients on a day to day basis.

Emerging evidence and research on psychological safety and many organisational psychology publications reflect a need for a team centred approach. This thesis has emphasised the impact each team member can have on team outcomes and that hierarchical structures and some personality types can leave other team members

feeling disenfranchised. Health services have for many years used team member's innovative ideas and participation as a catalyst for changes within our clinical areas, and psychological safety enables people to be innovative and collaborate with team members and not be afraid to speak up. The benefits of psychological safety are not just in the area of innovation, but also in the lowering of risk, especially in the operating theatre. I have already described team learning and its impact on any team, and with a psychologically safe environment healthcare workers and employees would feel safe to discuss failures and mistakes. This openness within the operating theatre with team members, including leaders can create an environment where every voice and opinion matters, therefore lowering the risk of surgical events due to individual human factors providing a positive, and safe experience for every surgical patient.

It seems apparent from the literature searches in this Thesis, that there is a need for further research into perioperative teams and the impact a good team dynamic can have on not just efficiency, but quality of care and communication. Organisational psychology is at its infancy in an Irish healthcare setting and the way teams communicate could have an impact on operating theatres cost and staff retention. However, the construct or idea of fostering psychological safety needs a framework for the practical application of its use in healthcare, within all disciplines and non-medical staff. There is little or no research studies on all elements of a perioperative team in the operating theatre for instance, porters and healthcare assistants, and they're impact on the running and efficiency of an operating theatre .However, with emerging we are research and publications on the importance of team cohesiveness in healthcare we are but a step away from a culture of psychological safety within all healthcare teams and teams in the operating theatre.

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7.0 Appendices

Appendix 1.

Psychological Safety Sample questionnaire: Leader Inclusiveness (*Consultants Questionnaire*).

8 items, with 3 items adapted from Carmelli, Palmer and Ziv (2006) *

Answer the questions by choosing: 1=strongly disagree, 5=strongly agree. (5 point likert scale questionnaire)

1. *I am open to hearing new ideas from this team*
2. *It is safe to take a risk on this team*
3. *It is easy for me to ask members of this team for help*
4. *I am attentive to new opportunities to improve work processes presented to me by this team. (reversed)**
5. *No one on this team would act in a way to deliberately undermine my efforts.*
6. *This team is ready to listen to my requests. (reversed)**
7. *Members of this team openly discuss emerging problems with me. (reversed)**

Appendix 2.

Psychological Safety Sample Questionnaire (*Nurses, Porters and Healthcare Assistants*)

Adapted from Edmundson (1999), 7 items.

Answer the questions by choosing: 1=strongly disagree, 5=strongly agree. (5 point likert scale questionnaire).

- 1. *If you make a mistake on this team, is it often held against you?***
- 2. *Members of this team are able to bring up problems and tough issues.***
- 3. *People on this team sometimes reject others for being different.***
- 4. *It is safe to take a risk on this team.***
- 5. *It is difficult to ask other members of this team for help.***
- 6. *No-one on this team would deliberately act in a way that undermines my efforts.***
- 7. *Working with members of this team, my unique skills and talents are valued and utilized.***

APPENDIX 3.

While not part of the research hypothesis, the measurement and comparison of the mean psychological safety in each surgical discipline was measured using Minitab statistical software using one way Anova to compare the mean level of psychological safety in all the 7 teams reflecting leader inclusiveness and involvement within each team and using the likert scale items. I coded the survey to identify information from respondents by their team and identified team types by surgical disciplines. This demonstrates the possible practical uses of measuring and comparing quantitatively team effectiveness in clinical practice. I have also emphasised the use of any organisational psychology construct or theory in healthcare, is difficult to apply to clinical practice. However, the measurement of psychological safety in teams may have a future in healthcare and may enable healthcare workers and hospital managers to be self reflective and understand what makes an effective team work and provide safe, open communication in the operating theatre.

Measuring Psychological Safety levels of each of the 7 teams

Team A: ENT

Descriptive Statistics: Con. Surgeon, Con. Anaes, Nurse 1, nurse 2, nurse 3, porter and healthcare assistant.

Analysis of Variance

Variable	Mean	StDev	Variance
Con. Surgeon	1.571	0.535	0.286
Con. Anaes	1.571	0.535	0.286
Nurse 1	2.714	1.496	2.238
nurse 2	2.571	1.618	2.619
nurse 3	2.857	1.069	1.143

porter	2.286	1.890	3.571
healthcare Ass.	2.714	1.496	2.238

Team 2: Plastics

Descriptive Statistics: Con. Surgeon, Con. Anaes, Nurse 1, nurse 2, nurse 3, porter and healthcare assistant.

Variable	Mean	StDev	Variance
Con. Surgeon	2.0000	0.000000	0.000000
Con. Anaes	1.857	0.690	0.476
Nurse 1	3.143	1.069	1.143
nurse 2	3.143	1.069	1.143
nurse 3	2.857	1.345	1.810
porter	3.286	0.756	0.571
healthcare Ass.	2.714	1.254	1.571

On team 2, Anaesthetic consultants indicated high level of positive response (Mean=1.857, SD=0.690). This followed by consulting surgeons (Mean=2.000, SD=0.000), showing positive response from the medical fraternity. Healthcare assistant (Mean=2.714, SD=1.254) followed the two other professionals on positive response of the respondents. Nurse 3 followed closely on positive response (Mean=2.857, SD=1.345). Porter (Mean=3.286, SD=0.756) indicated less levels of positive response on less agreement on psychological safety.

Team 3: Urology

Descriptive Statistics: Con. Surgeon, Con. Anaes, Nurse 1, nurse 2, nurse 3, porter and healthcare assistant.

Variable	Mean	StDev	Variance
Con. Surgeon	2.000	1.000	1.000
Con. Anaes	1.857	0.690	0.476
Nurse 1	2.857	1.215	1.476
nurse 2	2.429	1.512	2.286
nurse 3	3.286	1.254	1.571
porter	3.714	1.890	3.571
healthcare Ass.	3.000	1.633	2.667

On team 3, Anaesthetic consultants indicated high level of positive response (Mean=1.857, SD=0.690). This followed by consulting surgeons (Mean=2.000, SD=1.000), showing positive response from the medical fraternity. Nurse 3 followed closely on positive response (Mean=2.714, SD=1.380). Healthcare assistant (Mean=3.000, SD=1.633) followed the two other professionals on positive response of the respondents. Porter (Mean=3.714, SD=1.890) for nurse 3 indicated less levels of psychological safety.

Team 4: Ortho

Descriptive Statistics: Con. Surgeon, Con. Anaes, Nurse 1, nurse 2, nurse 3, porter and healthcare assistant.

Analysis of Variance

Variable	Mean	StDev	Variance
Con. Surgeon	1.429	0.535	0.286
Con. Anaes	1.286	0.488	0.238
Nurse 1	3.143	1.864	3.476
nurse 2	3.571	1.134	1.286
nurse 3	3.857	0.900	0.810
porter	3.429	1.718	2.952
healthcare Ass.	3.286	0.756	0.571

On team 4, Anaesthetic consultants indicated high level of positive response (Mean=1.429, SD=0.535). This followed by consulting surgeons (Mean=1.714, SD=1.113), showing positive response from the medical fraternity. Nurse 3 followed closely on positive response (Mean=2.714, SD=1.380). Healthcare assistants (Mean=3.143, SD=1.215) followed the two other professionals on positive response of the respondents. Porter (Mean=3.429, SD=1.512) for nurse 3 indicated less levels of positive response in psychological safety.

Team 5: Cardio-thoracic

Descriptive Statistics: Con. Surgeon, Con. Anaes, Nurse 1, nurse 2, nurse 3, porter, and healthcare Assistant.

Analysis of Variance

Variable	Mean	StDev	Variance
Con. Surgeon	1.714	0.756	0.571
Con. Anaes	2.000	0.577	0.333
Nurse 1	3.429	1.397	1.952
nurse 2	3.000	1.915	3.667
nurse 3	3.000	1.291	1.667
porter	3.429	0.976	0.952
healthcare Ass.	2.286	0.756	0.571

On team 5, Anaesthetic consultants indicated high level of positive response (Mean=1.714, SD=0.756). This followed by consulting surgeons (Mean=2.000, SD=0.577), showing positive response from the medical fraternity. Nurse 2 and nurse 3 followed closely on positive response (Mean=3.000, SD=1.291) on nurse 3 and (Mean=3.000, SD=1.915) for nurse 2. Healthcare assistant (Mean=3.143, SD=1.215) followed the two other professionals on positive response of the respondents. Porter (Mean=3.429, SD=1.512) for nurse 3 indicated less levels of positive response on less agreement on psychological safety.

Team 6: Breast

Descriptive Statistics: Con. Surgeon, Con. Anaes, Nurse 1, nurse 2, nurse 3, porter and healthcare assistant.

Analysis of Variance

Variable	Mean	StDev	Variance
Con. Surgeon	1.429	0.535	0.286
Con. Anaes	1.714	1.113	1.238
Nurse 1	3.286	1.113	1.238
nurse 2	3.143	1.215	1.476
nurse 3	2.714	1.380	1.905
porter	3.429	1.512	2.286
healthcare Ass.	3.143	1.215	1.476

On team 6, Anaesthetic consultants indicated high level of positive response (Mean=1.429, SD=0.535). This followed by consulting surgeons (Mean=1.714, SD=1.113), showing positive response from the medical fraternity. Nurse 3 followed closely on positive response (Mean=2.714, SD=1.380). Healthcare assistant (Mean=3.143, SD=1.215) followed the two other professionals on positive response of the respondents. Porter (Mean=3.429, SD=1.512) for nurse 3 indicated less levels of positive response on less agreement on psychological safety.

Team 7: Upper GI

Descriptive Statistics: Con. Surgeon, Con. Anaes, Nurse 1, nurse 2, nurse 3, porter and healthcare assistant.

Analysis of Variance

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Variable	Mean	StDev	Variance
Con. Surgeon	1.714	0.488	0.238
Con. Anaes	1.143	0.378	0.143
Nurse 1	3.714	1.113	1.238
nurse 2	3.143	1.215	1.476
nurse 3	3.000	1.291	1.667
porter	3.000	1.414	2.000
healthcare Ass.	2.857	1.864	3.476

On team 7, Anaesthetic consultants indicated high level of positive response (Mean=1.143, SD=0.378). This followed by consultant Surgeons (Mean=1.714, SD=0.488), showing a positive response from the medical fraternity. Healthcare assistants (Mean=2.857, SD=1.864) followed the two other professionals on positive response of the respondents. Nurse 3 and porter (Mean=3.000, SD=1.291) for nurse 3 (Mean=3.000, SD=1.414). Nurse 2 showed a positive response to psychological safety (Mean=3.143, SD=1.215) with nurse 1 having the lowest levels of positive response on psychological traits on average (Mean=3.714, SD=1.113).

From the 7 teams, consultants showed positive effects on psychological safety implications on all of the other members of the perioperative teams, who took part in the study. This indicates that most of the respondents showed varied levels of psychological safety within the study.