The Relationship Between Team Psychological Safety and Team Effectiveness in Management Teams: The Mediating Effect of Dialogue

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Abstract

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This study is a response to the research and request presented by Bang and Midelfart (2010), to further investigate the effect dialogue can have on management team’s effectiveness. The purpose of the study was to investigate and explain the effect of team psychological safety on task performance and team member satisfaction, with dialogue as a mediator in this relationship. 215 Norwegian and Danish management teams in the private and public sector were studied. As expected, team psychological safety and team effectiveness was positively associated, supporting hypothesis 1a and 1b. Furthermore, dialogue was positively related to team effectiveness, supporting hypothesis 2a and 2b. Finally, the results indicate that dialogue partially mediates the relationship between team psychological safety and team effectiveness when controlling for management team size and team level.
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Introduction

Team psychological safety involves the team members’ perceptions of the consequences of taking interpersonal risks in specific contexts in the workplace (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). Past research has also found a clear indication that team psychological safety is positively related to team effectiveness (Edmondson, 1999; Bradley, Postlethwaite, Klotz, Hamdani & Brown, 2012). Furthermore, team psychological safety can help employees in expressing their opinions openly and share their knowledge (Collins & Smith, 2006), make suggestions for organizational improvement (Detert & Burris, 2007), and take initiative to incorporate new ideas (Baer & Frese, 2003). In sum, team psychological safety is an important prerequisite for team effectiveness. But how does team psychological safety influence team effectiveness?

Team psychological safety is an interpersonal construct that describes team members’ perceptions of the climate in a team (Edmondson and Lei, 2014). It is a state of mind related to feelings and emotions each team member experiences while being a part of a team (Edmondson, 1999; Edmondson & Lei, 2014). And these feelings must enable some behavior, which makes the team function more effectively. Edmondson (1999) found that team learning mediates the relationship between team psychological safety and performance, indicating that high levels of team psychological safety leads to team learning, and that team learning is a factor that contributes to increased team performance. Even though learning has been found to mediate this relationship, we still do not know if there are other mechanisms affecting this association. The current study is therefore examining another possible mediator in the relationship between team psychological safety and team effectiveness: dialogue. Dialogue is about the team members’ ability to openly express their opinions, be active listeners and explore and build on each other’s ideas (Bang & Midelfart, 2010; Isaacs, 1999). Researchers have found a positive relationship between dialogue and team effectiveness in management teams in the past (Bang & Midelfart, 2010; Isaksen & Sandnes, 2011). However, no researchers have yet examined the factors that can enable dialogue in management teams. Furthermore, not much research has yet been conducted on dialogue in management teams. The aim of this study is therefore to examine whether team psychological safety in management teams enables dialogue, and to further examine the
results found by Bang & Midelfart (2010) and see to what extent dialogical communication contributes to increased team effectiveness.

Why is dialogue potentially important for the functioning and effectiveness of management teams? With each member of a management team often representing a separate unit of the organization, they are able to offer expertise and views from a more comprehensive point of view, which makes a better foundation for organizational performance (Van Knippenberg, De Dreu, & Homan, 2004). Furthermore, since management teams are responsible for making decisions on behalf of the organization and solve problems that arise, it is crucial that the members are able to contribute intellectually, communicate clearly and listen actively to each other (Bang, 2008). This makes them more capable of analyzing the information gathered, and making the appropriate decisions on behalf of the organization as a whole (Bang, 2008; Cohen & Bailey, 1997).
Theory and hypotheses

Clarification of Concepts

Management teams. This study was conducted on management teams, which are the teams responsible for the overall performance of a business unit (Cohen & Bailey, 1997; Mohrman, Cohen, & Morhman, 1995). A management team can be defined as “a group of individuals, each of whom has a personal responsibility for leading some part of an organization, [and] who are interdependent for the purpose of providing overall leadership for a larger enterprise” (Hackman & Wageman, 2010, p.477). Their responsibilities often involve goal setting, decision making, prioritizing and coming up with strategies that are important for the organization (Wiersema & Bantel, 1992) which are accomplished by discussing issues, solving problems and monitoring overall processes (Flick, 1998; Smith, Smith, Olian, Sims, O’Bannon & Scully, 1994).

Team effectiveness. Hackman’s (2002) team effectiveness model is based on a three-dimensional concept of team effectiveness. He argued that teams are effective to the extent that they achieve results that meets or exceeds the expectations of others (task performance), grow team capabilities over time (team viability), and satisfying team member needs (individual satisfaction) (Hackman, 2002). In line with other researchers (e.g. De Dreu & Weingart, 2003; Nadler, Spencer & Associates, 1998), this study is using task performance and individual satisfaction as indicators of team effectiveness.

Task performance. Task performance can be defined as the management team’s ability to deliver performance results, which contributes to an increased added value to the organization and to decision quality (Bang et al., 2010; Hackman, 2002). It can be considered the productive output by a team (Hackman, 2002). In this context it refers to the management team members’ experience of the quality of their task results and decisions.

Individual satisfaction. Individual satisfaction can be defined as the degree to which the team members feels that being part of the management team contributes positively to their individual motivation, learning, development and personal well being (Hackman, 2002; Bang & Midelfart, 2010). By including both of these outcome variables, we are able to see results both on a performance level, and on a personal level.

Team psychological safety. Team psychological safety can be defined as a “shared belief that the team is safe for interpersonal risk taking” (Edmondson, 1999, p.354). It grows when members feel able to express their opinions, to disagree with one another, to ask ‘stupid’ questions and to make themselves vulnerable to one another (Edmondson, 1999).
Dialogue. Dialogue can be viewed as a type of communication that involves the balancing of expressing own views with listening to and exploring others’ opinions and ideas (Bang & Midelfart, 2010). In this study, dialogue is referred to as the degree to which the members of the management team have a learning attitude, listen to and explore each other’s ideas, express opinions clearly without devaluing others, and are able to build on each others’ ideas and views (Bang & Midelfart, 2012; Homan, Hollenbeck, Humphrey, Knippenberg, & Ilgen, 2008).

Past Research on Team Psychological Safety

Team psychological safety describes a climate where the members feel safe to take interpersonal risks in the team (Edmondson, 1999). Those in a team who experience a high degree of team psychological safety are less likely to focus on self-protection, and rather focus on the team as a whole (Edmondson, 2003). Edmondson (2003) claim this is the case because in a psychologically safe environment, team members feel free to express concerns, doubts about themselves and their needs related to development. Edmondson (1996) found a similar trend in her research on teams of nurses. Those with a high sense of psychological safety reported more errors than others because they felt more comfortable speaking up. Being in this type of environment means the members feel comfortable being themselves and more able to show vulnerability because they know they can trust the team to support and respect them for it (Edmondson, 1999; McAllister, 1995).

The Relationship Between Team Psychological Safety and Task Performance

Edmondson (1999) found that teams that have developed team psychological safety cooperate better than those who have not. Furthermore, she found that the higher degree of team psychological safety the members report, the larger the chance is for the team to learn from their mistakes, and for improved team effectiveness. She suggests that team members are more likely to seek and ask for help when feeling psychological safe because it relieves concern about how others will react (Edmondson, 2003).

Simons and Peterson (2000) found that when team members feel psychologically safe with each other, they are more likely to engage in constructive discussions and less likely to misinterpret each other. A plausible reason for this is that team psychological safety can help enhance the involvement of team members and contribute to making the interaction among them more intense without endangering the harmony, which again will have a
positive effect on task performance (Bradley, Postlethwaite, Klotz, Hamdani, & Brown, 2012). Additionally, when team members do not feel psychologically safe with one another, they are more likely to interpret ambiguous behavior of others negatively and ineffective team behavior may arise, which can have a destructive effect on task performance (Mishra, 1996).

An important aspect of task performance is the quality of the tasks a team completes (Hackman, 2002). Weick (2002) found that for a team to engage in quality improvement, they need to be able and willing to try new procedures and technologies and simultaneously be open to giving and receiving feedback throughout the transition. He argues that this can be more risky and difficult to achieve unless team psychological safety is present because the members can then feel less encouraged to question practices, share ideas and challenge the team. Dutton and Ashford (1993) and MacDuffie (1997) also found a negative impact on quality improvement when team psychological safety is absent. They found that team members in a hostile environment are less likely to participate in problem-solving activities. This is important because a hostile environment is actually more likely to lead to behavior that diminishes effective and high quality teamwork (Argyris & Schön, 1978).

The Relationship between Team Psychological Safety and Individual Satisfaction

Since the members of the team who report feeling a higher degree of psychological safety are better able to express their needs for development (Edmondson, 2003), they are also more capable of reflecting on these needs, which can increase their chances of personal development and satisfaction (McAllister, 1995). Employees who report feeling psychological safe within their team also report feeling supported and encouraged by their team members and leader, in addition to feeling able to voice their concerns and develop new skills (Edmondson, 2003). These feelings are likely to enhance the employees’ self-determination and interest in their work (Deci & Ryan, 1987). Additionally, team psychological safety is likely to enhance individual engagement and the willingness to try out new and novel ways of doing things, discussing issues and learning from these behaviors (Edmondson, 1996, 1999). It is also likely to enhance the willingness to invest oneself more at work (Mayer, Davis, & Schoorman, 1995; McAllister, 1995).

H1a: Team psychological safety is positively related to task performance
H1b: Team psychological safety is positively related to individual satisfaction
The Relationship Between Dialogue, Task Performance and Individual Satisfaction

Past Research on Dialogue. William Isaacs (founder of the dialogue-project at MIT) defines dialogue as "a sustained collective inquiry that compose everyday experience” (Isaacs, 1999, p.25). He describes dialogue as a conversation in which people think together, and rather than focusing on your own certainty, it is about listening to others in the team to see possibilities you might not otherwise have been able to see (Isaacs, 1999). As Argyris and Schöön (1987) claims, the source to productive communication is the combination of stating your own opinion while exploring the opinion of others. If a management team is able to achieve this balance when communicating, they are successfully using dialogue (Argyris & Schöön, 1987). More specifically, dialogue refers to the ability of the team members to openly express their opinions with each other, listen to others’ opinions, and explore their ideas and views (Bang & Midelfart, 2010). It also involves building on each other’s ideas, and never belittling others when discussing important matters (Bang & Midelfart, 2012; Flick, 1998). Rather than attempting to coerce others, dialogue involves truly listening with empathy, expressing assumptions, and searching for conceptual innovations (Isaacs, 1999).

Isaacs (1999) claims that dialogue is essential to performance because it promotes collective thinking and communication. Weisbord (1987) states that dialogue is a form of communication where those involved are mindful of each other’s intentions and experiences. Although there are relatively few empirical studies of dialogue in organizations and teams, there are a number of empirical studies on a “conceptual sibling” of dialogue: constructive controversy (D. Tjosvold, personal communication, May 21, 2015). According to Johnson (2008), constructive controversy is characterized by team members expressing their views openly, listening with curiosity to others’ views, trying to see the issue from the opposing perspective, being willing to change one’s mind, disagreeing without implying that the other is incompetent, and being able to both bring out differences in positions and combining various positions into one new, creative position. Studies have shown that constructive controversy promotes performance and can help teams develop higher quality decisions and solutions to complex problems (Johnson & Johnson, 2006; Tjosvold & Chen, 2002). Additionally, in a study on students, they found that constructive controversy encourage students to think creatively, view problems from different perspectives and come up with more high-quality ideas (Tjosvold & Chen, 2002).
Exploring and building on each other’s ideas is an important practice in a management team (Smith, Smith, Olian, Sims, O’Bannon, & Scully, 1994). Researchers have found that teams who spend time exploring each other’s views perform better than those who do not (Homan, Humphrey, Ilgen, Hollenbeck, Van Knippenberg, & van Kleef, 2008). Additionally, this type of creative processing of information involving the exploration of different views and open discussions has been shown to have a very positive effect on the performance and results of a team (Van Knippenberg, van Kleef, & De Dreu, 2007). When a team is using dialogue, they are actively exploring each other’s views, and when they do so, it enables them to see the whole picture, and how each member of the team is a unique part of the process (Ellinor & Gerard, 1998).

This exploration of ideas can also foster creative thinking and innovative behavior, which is linked to team psychological safety and team effectiveness (Edmondson, 1999; Ayuso et al., 2006; Bandura, 1988). Innovative behavior involves the production and implementation of novel and useful ideas (Mumfort & Gustafson, 1988; Kanter, 1988) and this type of behavior can have positive self-evaluative consequences such as individual satisfaction and feelings of self-pride (Bandura, 1988). Dialogue has through research been linked to innovative behavior because it facilitates an open and dynamic communication, which again is likely to enhance task performance (Ayuso, Rodriguez, & Ricart, 2006) and individual satisfaction (Bandura, 1988). When suggesting ideas to the team, or coming up with a creative solution to a problem, dialogue can enhance active listening and respectful exploration of these ideas (Flick, 1998; James, Clark, & Cropanzano, 1999), which again is likely to empower the person who suggested them and motivate others to engage in innovative behavior as well (Scott & Bruce, 1994).

Five Main Elements of Dialogue

Dialogue has been operationalized in this study as consisting of five main elements: learning attitude, perspective taking, direct and respectful communication, exploration, and building on ideas (Bang & Midelfart, 2012).

**Learning attitude.** Learning attitude entails that the members of the team are engaged in conversations with an attitude of wanting to understand each other because they know they can learn from one another and generate new perspectives on the basis of the experience and knowledge of others (Ellinor & Gerard, 1998; Bang & Midelfart, 2010).
Perspective taking. The ability to keep an open mind to new perspectives, and not just to one’s own perspective is essential to dialogue (Isaacs, 1999). It is about acknowledging that your own perspective is just one of many, and that others can contribute just as much with their input as you can (Bang & Midelfart; Isaksen & Sandnes, 2011). Once team members are able to keep an open mind to new suggestions, it enables them to see matters from different viewpoints, and thus change directions when necessary (Isaksen & Sandnes, 2011). The main reason perspective taking is so important in dialogue is that it makes it possible to understand what others are thinking, not to mention understanding how they got there (Bang & Midelfart, 2012).

Direct and respectful communication. Expressing your own opinions clearly while avoiding devaluation of others can be quite challenging, yet necessary to constructive communication (Johnson & Johnson, 2006). In dialogue, the challenge is to be able to express opinions openly and directly, while simultaneously validating others and their competence (Bang & Midelfart, 2012; Tjosvold & Tsao, 1989). Speaking up when disagreeing is an important part of dialogue, but the key is to consider how you communicate these differences in opinions (Bang & Midelfart, 2012).

Exploration. Listening and exploring each other’s ideas and opinions is the fourth element in dialogue and it is also essential to team psychological safety (Flick, 1998; Edmondson, 2003). As Edmondson (1999) found, discussing differences of opinion openly is essential to discover gaps and make changes accordingly, but this happened in her study first when the team members reported feeling team psychological safety (Edmondson, 1999). Bohm, Factor and Garrett (1991) found, when studying effective teamwork, that dialogue is strongly connected to trust in a team, because it encourages true collaboration and active listening. Furthermore, this trust and collaboration empowers the harmony in the team and enables the members to communicate thoughts and feelings to each other (Bohm et al., 1991; Holton, 2001).

Building on each other’s ideas and views. It can be a challenge for a management team to effectively build on each other’s ideas and views, especially when these ideas and views differ from each other (Mosvick & Nelson, 1996; Flick, 1998). This is where a learning attitude and respectful communication is important, and the mindset that others may know something that we do not (Bang & Midelfart, 2010). Flick (1998) claims that it is first when we listen with the right attitude that we can build on each other’s ideas and views.
properly. This does not mean that there never are any disagreements, but that these disagreements are discussed in an open and respectful matter (Bang & Midelfart, 2010).

**Clarifying the Difference between Dialogue and Debate**

It is important to clarify the difference between the terms dialogue and debate, which are at times used in the same context (Flick, 1998). While dialogue refers to gathering and exploring opinions from different aspects in order to reach common grounds, debate is built more on persuasion, competition and on winning the discussion (Ellinor & Gerard, 1998; Flick, 1998). Ellinor and Gerard (1998) present an overview of the major differences between dialogue and debate. While dialogue focuses on seeing the context between fragments, debate focuses more on the differences between fragments. Dialogue explores assumptions while debate defends or justifies assumptions (Flick, 1998). And while using dialogue involves learning through exploration and sharing of ideas, debate is more about convincing, selling or telling others how it is (Ellinor & Gerard, 1998; Flick, 1998). Finally, the goal of dialogical communication is about creating shared opinions among the team while the goal of a debate is to achieve consensus on one single opinion (Ellinor & Gerard, 1998). Dialogue has been shown to be essential to both avoid destructive teamwork and to stimulate learning and development in organizations (Bohm et al., 1991; Ellinor & Gerard, 1998; Flick, 1998; Isaacs; 1993, 1999). As Isaacs (1999) highlights, it is essential for a team to express disagreements and differences in opinion among the members, but the discussions are deeper and more thorough when using dialogical communication which involves communicating with respect and a desire to learn.

Holton (2001) states that dialogue is the form of communication where we can learn to put our assumptions and judgments aside and actively listen to others and reflect individually and as a team upon the ideas that arise.

**The Relationship between Dialogue, Task Performance and Individual Satisfaction**

Little research have been conducted looking at the relationship between dialogue and task performance in management teams, but several researchers have found that dialogue is essential in a team to achieve learning and development in groups and organizations (Ellinor & Gerard, 1998; Isaacs, 1999; Jabri, 2004). However, Bang and Midelfart (2010) conducted a study where they examined the relationship between dialogue and team effectiveness in
management teams. They found a strong positive relationship between dialogue and all three aspects of team effectiveness (task performance, team viability and individual satisfaction). Yet, more studies are found on the term “constructive controversy”, which is a concept very similar to dialogue (Bang, 2010; Isaacs, 1999). Constructive controversy has been found to promote performance appraisals that provide quality feedback and increase motivation among managers and employees (Tjosvold & Halco, 1992). Although this relationship has not yet been explored much in management teams, researchers have found that constructive controversy is of great value for teamwork by facilitating self-management and by successfully finding effective solutions to team tasks (Alper, Tjosvold, & Law, 1998; Chen & Tjosvold, 2002).

From the research conducted by Bang and Midelfart (2010) on dialogue and effectiveness, they found no management teams with a small degree of dialogue and a high degree of effectiveness, nor any management teams with a high degree of dialogue and a small degree of effectiveness. What they did find was that dialogue was positively related to how satisfied the team members were with their results, how strongly connected they were with each other and how satisfied they were with being a part of the team.

According to Flick (1998), dialogue can have several advantages for the individuals in a team. She argues that when people feel listened to and understood; they also feel respected and valued as individual team members (Flick, 1998). Additionally, through dialogical communication, where each team member feel their opinions are heard and that they are able to listen to, and explore other’s opinions openly, they are simultaneously likely to build courage and confidence to continue being involved in the dialogue (Flick, 1998). In this sense, dialogue enables a positive circle of communication in the management team.

**H2a:** Dialogue is positively related to task performance

**H2b:** Dialogue is positively related to individual satisfaction

**Dialogue as Mediator Between Team Psychological Safety and Team Effectiveness**

Edmondson (2003) proposed that team psychological safety allowed team members to speak up about their concerns and problems directly, because it alleviated concerns about repercussions. This is essential in order to achieve task performance, because it reduces error, which can be very costly for an organization (Coombs, 2007). From Edmondson’s (2003) research at a hospital environment, she found that a sense of team psychological
safety make it easier for the employees to speak up regardless of the boundaries. Even though this term “speaking up” has not been defined as a specific variable in Edmondson’s study, this study attempts to see if dialogue could be the appropriate explanation.

Researchers have emphasized that quality relationships foster a well-managed dialogue, which in turn helps the team solve issues, strengthen their relationships and be productive (Tjosvold & Chia, 1989; Tjosvold & Tsao, 1989). Team psychological safety tends to be developed and maintained in cooperative situations and absent or destroyed in competitive and individualistic situations (Johnson & Johnson, 2006; Johnson & Johnson, 1995). Kahn (1990) found that those who felt free from risk in a team were more likely to share ideas and be engaged when they believed any criticism would be constructive rather than destructive. Furthermore, the belief that others view themselves as being competent is particularly important in this context, because those who feel their capability is in question are more likely to keep their opinions to themselves in fear of harming their reputation (Edmondson & Moingeon, 1998), and this lack of participation will be harmful for the dialogue in a team (Flick, 1998). In sum, the level of team psychological safety is likely to affect the way members interact with one another, in addition to their ability to solve tasks (Edmondson, 2003).

Edmondson (1999) found that team learning mediated the relationship between team psychological safety and task performance. Furthermore, Bang and Midelfart (2010) found that dialogical communication is positively associated with team effectiveness and negatively associated with task and relationship conflict. This study attempts to look at a combination of these findings from a different perspective by exploring whether dialogue acts as a mediator in the relationship between team psychological safety and team effectiveness.

Could it be that team psychological safety enables the team to use dialogue, and that this is what contributes to high quality tasks and satisfied team members?

**H3a:** Dialogue mediates the relationship between team psychological safety and task performance

**H3b:** Dialogue mediates the relationship between team psychological safety and individual satisfaction
Control Variables

Studies have shown that team size and the level of the management team can influence team processes and effectiveness (Ingham, Levinger, Graves, & Peckham, 1974; Wheelan, 2009; Edmondson, Roberto & Watkins, 2003). Large teams may be more prompt to foster negative group effects, which can have a negative impact on team effectiveness (Haleblian & Finkelstein, 1993). Furthermore, the management teams in this study consist of three different levels. Research suggests that lower level management teams can differ from top management teams in terms of responsibility and accountability, which can affect performance and effectiveness (Floyd & Lane, 2000; Haleblian & Finkelstein, 1993). It is therefore necessary to control for these two variables in the analyses of this study.
Method

Design and Procedure

This study is based on self-report data from a sample of 215 management teams, with 135 being Norwegian and 80 being Danish teams from both public and private sector. The members rated their respective management teams on several dimensions of team effectiveness, using a questionnaire called effect, based on the research described in the book “Effective leader groups” (Bang & Midelfart, 2012). About 40 % of the respondents answered the survey as an introduction to a leadership development course. The other 60 % were asked directly whether they were willing to participate in a research project. All management teams received an e-mail with a web link inviting them to answer the questionnaire with a deadline of 1 week. The participants in the survey received a written report after completing the questionnaire including the scores of their management team and feedback on the questionnaire results. The mean response rate across the management teams was 96,9 %.

Sample

The sample of 215 management teams consists of a broad range of sectors, both private and public, including: economy and finance, consultancy, health care, administration, transportation, culture and education. The management teams consist of 1332 managers in Norway and Denmark.

The size of the management teams differs from small teams with only 2 members to large teams of up to 23 members. The average management team consists of 7 members. The gender distribution is approximately equal across the management teams with a total percentage of 54,1 % males and 45,9 % females. In the current sample, 23 % of the teams are top management teams, 33 % are middle-level management teams and 44 % are lower management teams.

Measures

The questionnaire “effect” consists of 27 scales that attempt to capture the management team’s effectiveness. The scales are identified and presented in the book “Effektive ledergrupper” (Bang & Midelfart, 2012) and are a result of a comprehensive review of international team research since 1970, and based on the authors’ own research on Scandinavian management teams.
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Each scale in the study consists of 2-8 questions on a 7-point Likert-scale. In sum, the participants answered 124 questions. However, this study concentrates on the following variables: Team psychological safety (7 questions), dialogue (7 questions), task performance (8 questions), and individual satisfaction (5 questions).

Operationalization of variables

Team psychological safety. Team psychological safety was operationalized based on Edmondson’s (1999, p.356) definition, which is “a shared belief that the team is safe for interpersonal risk-taking… and that the team will not embarrass, reject or punish someone for speaking up”. The scale was based on the respondent’s response to the following seven items:

1) If you make a mistake in this management team, it is often held against you (reversed).
2) It is easy to bring up problems and controversial issues in this management team.
3) It is safe to take a risk in this management team.
4) It is difficult to ask other management team members for help (reversed).
5) It can easily go against you if you openly express your opinions in the management team (reversed).
6) It is easy to query any issues in the management team.
7) There is little room for expressing your uncertainty in the management team (reversed).

Dialogue. Dialogue was operationalized based on the definition by Ellinor and Gerard (1998), Isaacs (1999) and Schein (1993), and measured based on the respondent’s response to the following seven items:

1) Members of the management team freely express their views and opinions to each other.
2) We listen carefully to each other’s views and opinions in our management team.
3) We frequently explore each other’s ideas and views.
4) The way we discuss matters in the management team shows that we truly believe that we can learn from each other.
5) We rarely try to build upon each other's ideas in the management team (reversed).
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6) Sometimes during discussions I feel belittled by certain members of the management team (reversed).

7) We easily understand each other's perspectives during discussion in the management team.

**Task performance.** Task performance was operationalized as the respondent’s response to the eight items below. The scale was based on Jehn, Northcraft and Neale’s (1999) scale “Perception of group performance”, in addition to parts of a “Decision quality” scale by Amason (1996). The following eight items were asked:

1) Our management team is very successful in its efforts.
2) Our management team does not perform well as a team (reversed).
3) You are given useful input when you bring up an issue in the management team.
4) We receive positive feedback on our performance as a management team.
5) It is difficult to see what added value the management team contributes to our organization (reversed).
6) We consistently make high quality decisions in our management team.
7) The vast majority of decisions made by the management team turn out to be beneficial for the organization.
8) Those affected by the decisions of the management team are generally very satisfied with the decisions we make.

**Individual satisfaction.** Individual satisfaction was operationalized based on Hackman’s (2002) definition of member satisfaction, which he defined as “the group experience, on balance, contributes positively to the learning and personal well being of individual team members” (Hackman, 2002, p.28). A scale based on this definition was created by Bang and Midelfart (2012) and was based on the respondent’s response to the following five questions:

1) I develop my professional competencies by participating in this management team.
2) Working in this management team contributes to my learning.
3) I really enjoy working together with my management team colleagues.
4) Being part of this management team has had little impact on my development as a leader (reversed).
5) I get a lot of energy from our management team meetings.

Main Analysis

**Aggregation.** A group phenomenon can only be measured by observation or by aggregation of individual data. These observations can be performed by external or internal observers (team members). The unit of analysis in this study is at the team level, and observation is therefore used as a method, and the team members are referred to as the observers of the phenomena’s studied. In order to justify this being an appropriate measurement, there needs to be a consistency between the team members’ responses within each management team. It is therefore necessary to measure the inter-rater reliability (Rwg) to examine the agreement between the observers (James, Demaree & Wolf, 1984). See the specific data on aggregation values for this study on Table 1.

**Control Variables.** In the analysis, two potential confounding variables were controlled for: Management team size and level of management. All analyses were done in SPSS version 22.0. Linear regression analysis was used to examine the relationship. All correlations were statistical significant even when controlling for management team size and team level. See table 6 and 7 for the values from the analyses including the control variables.

**Statistical Analysis.** The assumptions of normality and linearity were examined for all measures. Mahalanobis distance was measured based on a chi-square distribution in order to measure to extent to which cases might be multivariate outliers. The critical value will change with the number of predictors. This study has two predictors and the value (mahalanobis distance) is estimated to 13.82 (Tabachnick and Fidell, 2013). The maximum Mahalanobis distance in this study was 20.90, which indicates there were no multivariate outliers.
Results

Descriptive Statistics

This study used SSPS 22.0 for all statistical analyses. Descriptive statistics with means, standard deviations, Alpha, Rwg, ICC(2) are presented in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Alpha</th>
<th>Rwg</th>
<th>ICC(2)</th>
<th>Eta²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task performance</td>
<td>5.30</td>
<td>.66</td>
<td>.82</td>
<td>.74</td>
<td>.67</td>
<td>.37</td>
</tr>
<tr>
<td>Individual satisfaction</td>
<td>5.45</td>
<td>.76</td>
<td>.86</td>
<td>.61</td>
<td>.58</td>
<td>.31</td>
</tr>
<tr>
<td>Team psychological safety</td>
<td>5.83</td>
<td>.71</td>
<td>.89</td>
<td>.68</td>
<td>.60</td>
<td>.32</td>
</tr>
<tr>
<td>Dialogue</td>
<td>5.15</td>
<td>.77</td>
<td>.88</td>
<td>.68</td>
<td>.70</td>
<td>.39</td>
</tr>
</tbody>
</table>

The statistical measure of inter-rater reliability generally ranges from 0 to 1.0, where .70 is the recommended value (Lance, Butts & Michels, 2006). However, this recommendation has been criticized as being inappropriate because in many situations, it seems unlikely that there is no response bias present (Brown & Hauenstein, 2005; Smith-Crowe, Burke, Cohen & Doveh, 2014). Research has later suggested that .50 is an appropriate value for inter-rater reliability (Guzzo, Yost, Campbell & Shea, 1993). The aggregated values for this study ranges from .60 to .74, which are all within the recommended values.

ICC(2) is an estimate of intraclass correlations comparing the variability within a group to the variability across groups. It is the reliability of the aggregated scores from the variables.

The Eta values show that approximately .30 – .40 of the total variance may be attributed to differences between teams. It is the ratio of the between sum of squares to the total sum of squares (Guzzo, Yost, Campbell & Shea, 1993).

The alpha coefficient is an estimate for the reliability of the individual team scores, and all the values are considered sufficient, since all levels exceed .70 (Peterson, 1994).
Hypothesis 1a and 1b predicted a positive relationship between team psychological safety, task performance and individual satisfaction. Both hypotheses were fully supported, as demonstrated in Table 2 and 3 (H1a: r=.72, p<.001; H1b: r=.70, p<.001). Furthermore, as demonstrated in Table 6 and 7, they were also supported when controlling for management team level and team size (H1a with control variables: r=.72, p<.001; H1b with control variables: r=.70, p<.001).

Hypothesis 2a and 2b predicted a positive relationship between dialogue, task performance and individual satisfaction. Both hypotheses were fully supported, as demonstrated in Table 2 and 3 (H2a: r=.80, p<.001; H2b: r=.75, p<.001). As shown in Table 6 and 7, both hypotheses were also significant when controlling for management team level and team size (H2a with control variables: r=.51, p<.001; H2b with control variables: r=.54, p<.001).
**Figure 3.** Scatter plot showing the correlation between team psychological safety and task performance.

**Figure 4.** Scatter plot showing the correlation between team psychological safety and individual satisfaction.
Figure 3 and 4 illustrate the relationship between team psychological safety, task performance and individual satisfaction through scatter plot graphs. As shown, it is a clear relationship between team psychological safety and both variables measuring team effectiveness. As the figure shows, none of the management teams experience low levels of team psychological safety and high levels of team effectiveness. Nor does any management teams appear to have high levels team psychological safety and low team effectiveness.

Figure 5. Scatter plot showing the correlation between dialogue and task performance.
Figure 6. Scatter plot showing the correlation between dialogue and individual satisfaction.

Figure 5 and 6 illustrate the relationship between dialogue, task performance and individual satisfaction through scatter plot graphs. As shown, there is also a clear positive relationship here between the variables. Similar to Figure 3 and 4, none of the management teams experience low levels of dialogue and high levels of team effectiveness, nor high levels dialogue and low team effectiveness.

Finally, Figure 7 illustrates the relationship between team psychological safety and dialogue though a scatter plot graph. Similarly, the relationship is clearly positive, and none of the management teams appear to experience low levels of team psychological safety and a high level of dialogue.
Examination of mediated effects through regression analysis

In order to explore hypotheses 3a and 3b and examine the mediation effect of dialogue on both measures of team effectiveness, a multiple regression analysis was conducted. The variance inflation factor (VIF) was checked in order to measure how much multicollinearity (correlation between predictors) exists in the regression analysis. The VIF numbers for this study is between 2.8 and 3.3, which indicates that they are moderately correlated, which means there are no concerns with multicollinearity because the value is lower than 10 (Field, 2012).

In order to test mediation there are certain prerequisites that need to be fulfilled according to Baron and Kenny (1986). For this study, the following steps must be examined: First, the independent variable (team psychological safety) must correlate with the outcome variables (task performance and individual satisfaction). Secondly, team psychological safety must be correlated with the mediator (dialogue). Thirdly, dialogue must correlate with
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task performance and individual satisfaction, when controlling for team psychological safety. Finally, the relationship between team psychological safety, task performance and individual satisfaction must disappear (full mediation) or be reduced (partial mediation) when controlling for dialogue. All the prerequisites for conducting a mediation analysis were satisfied in the present study, and the values found from the analyses are shown below in Table 4 through Table 7.

Table 4

Mediated effect of team psychological safety on task performance through dialogue (n=215).

<table>
<thead>
<tr>
<th>Step</th>
<th>Effect</th>
<th>SE</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>TPS -&gt; TP</td>
<td>.72</td>
<td>.04</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Step 2</td>
<td>TPS -&gt; D</td>
<td>.86</td>
<td>.04</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Step 3</td>
<td>D -&gt; TP</td>
<td>.53</td>
<td>.06</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Step 4</td>
<td>TPS' -&gt; TP</td>
<td>.20</td>
<td>.06</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mediated effect</td>
<td>.45</td>
<td>.06</td>
<td>&lt;.001</td>
<td>.34</td>
</tr>
</tbody>
</table>

Team psychological safety = TPS
Dialogue = D
Task performance = TP

Table 5

Mediated effect of team psychological safety on individual satisfaction through dialogue (n=215).

<table>
<thead>
<tr>
<th>Step</th>
<th>Effect</th>
<th>SE</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>TPS -&gt; IS</td>
<td>.70</td>
<td>.03</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Step 2</td>
<td>TPS -&gt; D</td>
<td>.86</td>
<td>.04</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Step 3</td>
<td>D -&gt; IS</td>
<td>.51</td>
<td>.07</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Step 4</td>
<td>TPS' -&gt; IS</td>
<td>.31</td>
<td>.07</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mediated effect</td>
<td>.45</td>
<td>.08</td>
<td>&lt;.001</td>
<td>.28</td>
</tr>
</tbody>
</table>

Team psychological safety = TPS
Dialogue = D
Individual satisfaction = IS
Table 4 and 5 show the values for this study in regards to Baron and Kenny’s four steps (Baron & Kenny, 1986). The correlations show that team psychological safety is positively related to task performance (r=.72, p<.001), and individual satisfaction (r=.70, p<.001), which supports hypothesis 1a and 1b, and is in line with Baron and Kenny’s step 1 for examining mediation (Baron & Kenny, 1986). The correlations also show that dialogue is positively related to task performance (r=.51, p<.001) and individual satisfaction (r=.54, p<.001), which supports hypothesis 2a and 2b. Furthermore, the relationship between team psychological safety and task performance was substantially reduced (.72 \rightarrow .20) when controlling for dialogue, which indicates a partial mediation. Similarly, the relationship between team psychological safety and individual satisfaction was also substantially reduced.
(0.70 → 0.35) when controlling for dialogue. This supports all steps required by Baron & Kenny (1986) for examining mediation and it shows that there is partial mediation for both models.

Table 6 and 7 show the values from the same analysis when controlling management team size and team level. As shown, all values are still significant even when including the control variables.

Figure 7. Correlations between variables when controlling for management team size and team level and mediated effect of dialogue on team psychological safety and task performance.
Note: * mediated effect of dialogue on team psychological safety and task performance

Figure 8. Correlations between variables when controlling for management team size and team level and mediated effect of dialogue on team psychological safety and individual satisfaction.
Note: * mediated effect of dialogue on team psychological safety and individual satisfaction
Figure 7 and 8 show the correlations between the variables when controlling for management team size and team level and the mediation effects for both models.

Baron and Kenny’s (1986) four-step model of mediation has been criticized because some of the steps they include are unnecessary, given that it is only really the indirect effect that matters in a mediation-analysis. The direct effect can help with the interpretation, but it does not say much about the mediation (Fields, 2012; Hayes, 2013).

Hayes (2013) suggested that the mediation effects can be examined in a more sufficient way and he has therefore developed a program in SPSS called PROCESS. Therefore, an additional analysis was conducted based on this program. All values found, which include bootstrapping to test the significance of the mediated effects, are included in Tables 3-7.

The “Sobel test” has been commonly used in the past as a significance test to determine whether the reduction in the effect of the independent variable, after including the mediator, is statistically significant (Fields, 2013). However, the Sobel test has been criticized for being conservative and working best with a large sample and normal distribution (Hayes, 2013). Another popular method of testing the indirect effect that has become increasingly popular is bootstrapping (Bollen & Stine, 1990). Bootstrapping is a non-parametric method that relies on random sampling with replacement to measure the accuracy of the data (Hayes, 2013). Bootstrapping was done though SPSS and PROCESS in this study and repeated 1000 times.
Discussion

This study highlights the importance of team psychological safety in management teams, and suggests that it enables dialogue in management teams. The study indicates that there is a strong association between the degree of dialogue and team effectiveness, both on a performance level and on a personal level for the team members. Furthermore the results show that dialogue partially mediates the relationship between team psychological safety and team effectiveness. In other words, it appears that it is not only team psychological safety that causes team effectiveness; it is partially due to the dialogical communication it enables within the management team. It seems that when the management team share a belief of being safe from interpersonal risk taking (Edmondson, 1999), team members are prone to engage in open and respectful discussions, feeling they can learn something from one another and generally try to explore each others’ views and ideas while building on these without fear of being belittled, which again leads to team effectiveness.

Although the mediation effects are large, it did not result in full mediation. A plausible explanation for finding partial mediation can be that the study does not include other mediators that can influence this relationship (Hackman & Oldham, 2010; Judge, Bono, Ilies & Gerhardt, 2002). For instance, Edmondson (1999) found that learning also mediates the relationship between team psychological safety and team effectiveness in management teams.

The results of this study represent a first step in establishing that in addition to learning (Edmondson, 1999), dialogue also has a mediating effect on the relationship between team psychological safety and team effectiveness. The implication of this result is that people’s belief of being safe from interpersonal risk taking (Edmondson, 1999) will affect their ability to engage in dialogical communication and accomplish team effectiveness. Moreover, while it has been established that team psychological safety fosters team learning behavior (Edmondson, 1999), we now know it is a enabling factor for dialogue as well – and that both of these team behaviors contribute to team effectiveness.

With limited research on dialogue in management teams, this is the first study to examine and find a mediating relationship between team psychological safety, dialogue and team effectiveness in management teams. This finding can be valuable considering that management teams tend to have large roles and responsibilities in organizations and the power to set overall goals, strategies, priorities and make decisions that can be vital to the organizational performance (Bang & Midelfart, 2012; Hackman, 1990). Future research
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should further examine this mediating relationship and include other possible mediators as well to learn more in order to further explore these findings.

Facilitating Team Psychological Safety in Management Teams

The results from this study indicate that if team psychological safety is present in a management team, dialogical communication is likely to occur, which has a positive effect on team effectiveness. But how can a management team facilitate team psychological safety? Based on the operational definition of the variable in this study and from previous research (Edmondson, 1999; Edmondson & Lei, 2014), team psychological safety is a “shared belief that the team is safe for interpersonal risk taking” (Edmondson, 1999, p.354). This shared belief can be developed first and foremost by the leader of the team, but also with an effort from each individual member.

First, in order to develop team psychological safety, it is essential that the leader encourages and makes it feel easy and safe for the team to bring up problems, questions and difficult matters, because this will make them feel more comfortable showing vulnerability and express needs for development (Edmondson 2003; McAllister, 1995). It is also important for the leader to inspire the team to take chances and ask for help when feeling stuck or confused (Nembhard & Edmondson, 2006). This type of support and encouragement from the leader will welcome questions and open discussions, and make the team members more likely to feel team psychological safety in the team and in their interactions with each other (Nembhard & Edmondson, 2006). Behavior like asking questions and engaging in opening discussions can be perceived as being interpersonally risky and thus be more likely to transpire when team psychological safety is present (Edmondson & Lei, 2014).

Furthermore, since cooperation and mutual support is essential to develop team psychological safety, it can be helpful for a leader to engage the management team in tasks where they are interdependent. In this way the team members can learn to combine their strengths and needs and learn how to ask for help and support from each other. This is also likely to enable supportive behavior in the future and increase the likelihood for developing team psychological safety and thus dialogical communication.

The significance of team psychological safety for the management team’s effectiveness is likely to depend on the complexity of the tasks the team is facing (Edmondson et al., 2003), and in particular the extent of cooperation that is required by the
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team (Wageman, 1995). This is something that should be taken into consideration when reviewing the results of the current study, and furthermore something that should be considered for future research on this topic.

**Challenges to Team Psychological Safety in Management Teams**

It is likely that achieving team psychological safety and dialogue is more difficult in large management teams in comparison to small management teams. Researchers have found that feelings of cohesion and team psychological safety is more likely to develop in a smaller team rather than in a large team with more than fifteen members (Barna, 1994; Kostopoulos & Bozionelos, 2011). The larger a management team is, the higher the risk is for people to be misunderstood when speaking up and that discussions can wander off topic (Mosvick & Nelson, 1996). Therefore, it is especially important that leaders in large management teams are aware of this potential threat and therefore tries to facilitate team psychological safety by the actions mentioned above.

Another factor that is likely to affect the level of team psychological safety are the norms, values and organizational structure of the company the management team belongs to (Edmondson & Mogelof, 2006). Edmondson and Mogelof (2006) found that organizational characteristics can affect team members’ perceptions of team psychological safety and consequently prevent dialogical communication within the team. Since the data in this study is based on self-reported measures, this cannot be accounted for, but is rather a suggestion for future research.

Finally, it is important to consider that even though a management team has developed team psychological safety, it is possible that the effects become less significant over time. A plausible reason for this can be that the team members spend more time getting to know each other and become more comfortable with each other, which can result in more casual conversations rather than work-related conversations. This may be a potential threat to task performance in particular, and it is therefore important for a leader to acknowledge if the conversations quickly starts to wander off topic, so that they can tackle this issue immediately and avoid it from interfering from their work and focus.

**Limitations and suggestions for future research**

There are several limitations to this study. All variables are measured with the same questionnaire, by the same individuals, at the same time. This makes the likelihood of
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having common-method variance high, because it may create artificial and high correlations among the variables (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). When the same individuals have responded to the criteria variables and the process variables, this can potentially threaten the validity of the results. Furthermore, all responses from the management teams to the questions about team psychological safety, dialogue and team effectiveness are self-reported. This can be a potential source of bias and participants may respond in a way that they believe is socially desirable rather than how they actually perceive things (Donaldson & Grant-Vallone, 2002; Moorman & Podsakoff, 1992). A suggestion for future research is to separate the respondents of the variables and have an objective observer of a management team measure the degree of dialogue, while using self-reports to measure the degree of team psychological safety.

A second limitation of this study is concerning construct validity of the scale measuring dialogue. The operational definition of dialogue is based on a combination of the research by Bang and Midelfart (2012), Ellinor and Gerard (1998) and Isaacs (1999), and although the elements seem to be used repeatedly by different dialogue researchers, we have yet to establish a consistent operational definition to the construct. A suggestion for future research is to conduct more empirical research on dialogue to establish a better theoretical framework for the term and avoid it from being confused with other related variables.

Third, this study is based on management teams in Norway and Denmark. More research including cross-cultural comparisons are needed, both in terms of countries and industries, on the relationship between team psychological safety, dialogue and team effectiveness. In some cultures, management teams may be more hesitant to openly ask questions, provide feedback and engage in discussions because this might be considered impolite or rude (Edmondson & Lei, 2014). It is therefore encouraged to examine this relationship across different cultures, organizations and countries to further understand and validate the constructs: team psychological safety and dialogue.

Forth, most research on team psychological safety is based on either quantitative or qualitative data. Edmondson (1999) is the only researcher thus far to have used a combination of both methods to measure team psychological safety, and she encourages more researchers to do so (Edmondson & Lei, 2014). Since team psychological safety is a social phenomenon, field observations can help capture the complexity and enhance precision when using it as a supplement to qualitative data, like in this study (Edmondson & Lei, 2014).
Finally, as mentioned it is possible that the effects of team psychological safety can change or decrease over time (Collins & Smith, 2006). More longitudinal research is encouraged to examine this effect further, and to better assess this cause and effect relationship. This can also contribute to a more dynamic perspective of this interpersonal construct and its effect on team learning and dialogue in management teams over time.
Conclusion

The aim of this study was to examine to what extent team psychological safety enables dialogue and team effectiveness in management teams. The results of the study support that team psychological safety is essential for a management team to engage in dialogical communication and thus to function effectively as a team. However, there are other elements that also mediate the relationship between team psychological safety and team effectiveness, like for instance team learning (Edmondson, 1999). Management teams are therefore likely to benefit from facilitating team psychological safety in order to enable dialogical communication, team learning and effective teamwork. More research, both quantitative and qualitative is needed in order to validate the construct of dialogue. Furthermore, future research should incorporate objective measures for assessing the variables to avoid risk of common method variance.
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