The Effect of Team Size on Management Team Performance:

*The Mediating Role of Relationship Conflict and Team Cohesion*

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Abstract

The purpose of the present study was to create a better understanding of the processes and emergent states that can explain the relationship between team size (number of members) and team performance in management teams. Although many researchers have looked at the relationship between team size and team performance in for instance student teams, experimental groups, and production teams, there are very few studies that so far have looked at mediating variables in this relationship. Within research on management teams, there are also few studies that have looked directly at why and how team size affects team performance. This study tested the proposition that team size has a general negative effect on the performance of management teams, and that relationship conflict and team cohesion partially mediates this relationship. Data was collected from 215 management teams primarily from Norway and Denmark. The teams ranged in size from three to 23 with a mean of 7.37. The results showed that when tested separately, both relationship conflict and team cohesion mediated a negative effect of team size on team performance. When the mediators were tested in the same model, only team cohesion mediated the impact of team size on team performance. The findings indicate that team cohesion is the primary driver of the two mediators in explaining the negative effects of team size on team performance. Although relationship conflict is involved in the size-performance association, an increase in relationship conflict is most likely an effect of a decrease in team cohesion, which in turn sets off a negative spiral between the two mediators.
TEAM SIZE AND PERFORMANCE IN MANAGEMENT TEAMS

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The Effect of Team Size on Management Team Performance: The Mediating Role of Relationship Conflict and Team Cohesion

Research suggests that management teams play a significant role in the performance of the organization they are part of (Certo, Lester, Dalton, & Dalton, 2006; Hambrick, 2007; Hambrick & Mason, 1984). A well-functioning management team is therefore of value the surrounding departments and the organizations as a whole.

Team size is one factor that tends to create suboptimal conditions for performance and impact team performance negatively (Gooding & Wagner, 1986; Steiner, 1972). Although larger teams bring with them the potential for greater information-processing –and decision-making abilities (Carnevale & Probst, 1998), these potential benefits are often inhibited by damaging demands and team processes such as increasingly complex coordination, decreases in team members’ motivation, and more interpersonal problems (Steiner, 1972; K. Y. Williams & O’Reilly, 1998).

Very few studies have looked at the processes that can explain how team size affects performance in management teams (MT). To my knowledge, no studies have examined the potential mediators in the size-performance relationship in MTs and only Wheelan (2009) has looked at the relationship between size and performance in a sample that included MTs. In her study of 329 management –and project teams she found that larger teams consistently performed worse than smaller ones.

Due to the negative effects that can come with increases in team size, it can be important for MTs to take measures to address the potential damages to performance. Given the lack of research on the mediating variables in the size-performance relationship in MTs combined with Wheelan’s (2009) findings that larger MTs and project teams perform worse, I therefore aim to create a better understanding of the negative effects that team size may have on team performance.

Specifically, I examine to what extent there is a negative relationship between team size and team performance and ask what processes can help explain the relationship between team size and team performance in management teams. I investigate the possibility that interpersonal processes on a team-level suffer and in turn damage team performance, suggesting that larger MTs will experience worse performance through less team cohesion and more relationship conflict.
TEAM SIZE AND PERFORMANCE IN MANAGEMENT TEAMS

Clarifications and Definitions

Management Team

A management team can be defined as “a group of individuals, each of whom has a responsibility of leading some part of an organization, (and) who are interdependent for the purpose of providing overall leadership for a larger enterprise” (Wageman & Hackman, 2010, p. 477). Typically, a management team consists of a senior manager and the managers who report to him or her. MTs provide operational, strategic and institutional leadership for the organizational unit it heads (Bang & Midelfart, 2012).

An important goal of a management team is to create value for the organization over and above what managers create alone or together with their own department (Bang & Midelfart, 2016). When working together, management teams are engaged in activities such as informing each other, monitoring ongoing processes in the organization, advising each other, discussing issues, making decisions, and ensuring efficient coordination across organizational units (Bang & Midelfart, 2016).

Relationship Conflict

The literature on team conflicts often distinguishes between relationship conflict and task conflict (de Wit, Greer, & Jehn, 2012). Whereas task conflict refers to the disagreements of content of tasks that are to be performed, relationship conflict is the part of intragroup conflicts that specifically refer to interpersonal incompatibilities (Jehn, 1995). In accordance with Jehn (1995, p. 258) I define relationship conflict as “interpersonal incompatibilities between group members, which typically includes tension, animosity, and annoyance between members within a group”.

Team Cohesion

Cohesion refers to the social and motivational forces that bond members of a group together (Beal, Cohen, Burke, & McLendon, 2003). Beal et al. (2003) consider cohesion to consist of three such forces: interpersonal attraction, task commitment, and group pride. Interpersonal attraction refers to “a shared liking for or attachment to the members of the group”. Task commitment refers to “the extent to which a shared commitment to the group’s task exists”. Group pride refers to “the extent to which group members exhibit liking for the status or the ideologies that the group supports or represents, or the shared importance of being a member of the group (Beal et al., 2003, p. 995).
A Model of Team Performance

When setting the stage for how to think about team performance, it is useful to employ the input-process-output model (IPO) of teams as a basis (Forsyth, 2010). The model has been used as a framework by several team-performance and MT-performance researchers (e.g., Bang & Midelfart, 2012; Hackman, 2002) and suggests a number of processes that mediate the relationship between input and output factors.

The input factors are relatively stable and can be seen as setting the stage or conditions for performance. They include individual-level factors (e.g. knowledge and skills), team-level factors (e.g. size and diversity), and environmental-level factors (e.g. reward-systems outside the team and level of stress-factors in the environment) (Forsyth, 2010).

The output factors are the results that the team delivers (Hackman, 2002). Hackman (2002) emphasizes the importance of conceptualizing the results of a team more broadly than simply the product they deliver. He suggests that “if (the group) compromises their personal learning, or if members’ main reactions to having been in the group are frustration and disillusionment, then the costs of generating the group product were too high” (Hackman, 2002, p. 29). I take Hackman’s advice and measure MT-results on two of the levels he suggests; task performance and individual learning and satisfaction. In accordance with Bang and Midelfart (2016) who build on Hackman’s categorization of output factors I define task performance as the degree to which “the productive output of the [management] team meets or exceeds the standards of quantity, quality, and timeliness of the team’s clients – the people who receive, review, and/or use the output” (Hackman, 2002, p. 23). I define individual learning and satisfaction as the degree to which “the team-experience contributes positively to the learning and well-being of individual members, rather than frustrating, alienating, or deskilling them” (Bang & Midelfart, 2016, p. 3).

The process factors are defined by Marks, Mathieu, and Zaccaro (2001, p. 357) as “[team] members’ interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioural activities directed toward organizing taskwork to achieve collective goals”. Examples of processes in MTs are relationship conflicts, clear meeting goals, and continuous team learning (Bang & Midelfart, 2012).

In an attempt to clarify some of the variables in the IPO-model, Marks et al. (2001) suggested emergent states as a fourth construct of variables that vary with the input, process, and output constructs. Emergent states are cognitive, motivational, and affective states of the team and refer to “properties of the team that are typically dynamic in nature and vary as a
function of team context, inputs, processes, and outcomes” (Marks et al., 2001, p. 357). Examples of emergent states are team cohesion, team psychological safety, and team efficacy. Emergent states can be considered both inputs (in that they affect the processes of the team) and proximal outcomes (in that they are affected by other team-inputs and processes) (Marks et al., 2001).

Setting the extended IPO-model in the context of my thesis I suggest that MT-size is a relatively stable input factor that has a negative impact on two output variables: (1) task performance and (2) individual learning and satisfaction. My main research question is to examine how team size influences team performance. I suggest that one team process (relationship conflict) and one emergent state (team cohesion) partially explain the relationship between my input and output variables.

Previous Research on Size and Performance

Research on team size and team performance has a long tradition. Already in the early 1900s Ringelmann (1913) documented the tendency for teams to become increasingly more inefficient as they grow in size (Forsyth, 2010). Building on previous research, Steiner (1972) called this process loss. He noted that as a group increases in size it becomes increasingly more difficult to coordinate and motivate all the members thus leading to increased process loss. More recently, Mueller (2012) introduced the concept of relational loss, suggesting that as teams grow in size each individual member can experience decreases in his or her performance due to less available social support.

However, larger teams may still perform better than smaller ones although they experience process losses through problems related to motivation, coordination or social support. The literature typically views size and performance as dependent on two opposing forces. On the one hand process losses damage performance (Steiner, 1972; Wheelan, 2009). On the other hand, larger teams have better abilities to process information and create a more informed knowledge-base for decision-making that can improve performance (Carnevale & Probst, 1998; Haleblian & Finkelstein, 1993) (see theoretical perspectives-section for an in-depth discussion of how these perspectives interact).

Research suggests larger teams are associated with several negative outcomes. As team size increases there is more dissatisfaction within the group (Lundgren & Bogart, 1974; Thomas & Fink, 1963). Group members are more dissatisfied with their role in the group (Steiner, 1972), complain more about the group’s functioning (Steiner, 1972), perceive less
support from other members (Mueller, 2012), and identify less with the group (Cunningham & Chelladurai, 2004).

Wheelan’s (2009) study on management–and project teams complement these findings. She found that teams with three to six members experienced significantly more trust and structure within the team than teams with seven to ten members. The same difference was found when comparing teams consisting of seven to ten members with teams of eleven members or more.

Interestingly, Wheelan (2009) did the same comparison on perceptions of team productivity and effectiveness and found similar differences between team sizes. Smaller teams performed better than larger ones in each comparison. The effect additionally held when comparing teams of four to five members with teams of six to seven members. Another study on teams in the IT-sector found similar results in that larger teams were associated with lower performance (Sharma & Ghosh, 2007).

Similarly, in a meta-analysis on organizational subunits and subunit performance, Gooding and Wagner (1985) found that larger subunits were negatively related to performance measured both as efficiency and as the productive output of the subunit. However, subunits included many types of subunits ranging from work-groups to for instance departments, post offices and school units making it somewhat more difficult to know how representative these results are for size and performance in management teams.

With the aim of understanding the processes that explain how size affects performance in management teams I will in the next section describe a few particularly relevant theoretical perspectives.

**Theoretical Perspectives on Size and Performance**

Three perspectives are of particular importance in order to understand the relationship between team size and team performance. First, according to Steiner’s model of group productivity (Steiner, 1972), groups will always have a degree of process loss due to faulty coordination-processes and motivational loss. Second, the information/decision-making perspective (K. Y. Williams & O'Reilly, 1998) suggests larger teams will perform better through the availability of more cognitive resources. Third, the social categorization perspective (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) suggest that as teams increase in size they will experience more relational problems due to an increasing number of members from different subgroups. Below follows a brief summary of each perspective, their
relevance for MTs, and an integrated model of the information/decision-making and social-categorization perspectives (van Knippenberg, De Dreu, & Homan, 2004) discussed in relation to MT-size and performance.

**Steiner’s Model of Group Size and Productivity**

According to Steiner (1972), the actual productivity of a group consists of the group’s potential productivity minus process losses due to increases in size. The losses due to faulty processes happen through coordination problems and loss of motivation.

*Coordination problems* occur because when a group grows in size the number of coordination links possible in the group increase exponentially (Steiner, 1972). For instance, a group of three members only consists of three possible coordination links (i.e. member 1 and 2, 1 and 3, 2 and 3), a group of five consists of nine coordination links, and a group of seven consists of 21 possible coordination links. Therefore, as a group increases in size it will have progressively more difficulties with coordinating its members.

*Motivational problems* occur with increasing group size due to decreased identifiability of each member’s work (Steiner, 1972). As a group grows larger it is increasingly more difficult for a single member to identify his or her contribution to the group outcome. Each member’s contribution also becomes less visible to the other group members often leading to a social loafing effect where members put less effort into the group work (Steiner, 1972).

As the group size grows Steiner (1972) suggests that increases in process loss due to motivational and coordination problems override increases in potential productivity. Due to an exponential increase in coordination demands when team size increases, he suggest that the negative effects of increases in team size happens more rapidly for groups that are in need of high levels of interpersonal coordination.

The model of group size and productivity is important for the size-performance relationship in MTs for two reasons. First, members of MTs are often interdependent in a large portion of the work they do (Bang & Midelfart, 2012). They spend a lot of time discussing complex problems between one another, informing each other and making sometimes quite complex decisions (Bang & Øverland, 2009). Since increasing group size puts gradually more pressure on coordination demands and MTs are dependent on continuous interaction and cooperation, it is possible that process losses overrides potential increases in productivity quite rapidly and early on.
The Information/Decision-Making Perspective (IDMP)

The information/decision-making perspective suggests that the performance of a team will increase as more perspectives are added to it (K. Y. Williams & O'Reilly, 1998). The sums of different skills and abilities create a better foundation for making decisions and will thus increase team performance. Additionally, people with different skills and abilities may have access to different types of information outside the team. This access increases the team’s total information input even further (K. Y. Williams & O'Reilly, 1998). K. Y. Williams and O'Reilly (1998) suggest that the positive effects of more perspectives in a team are particularly beneficial for teams dealing with complex decisions and when team members are dependent on each other.

The information-processing perspective is relevant for the effects of size in MTs because they only consist of managers managing different parts of the organization. Therefore, adding another manager to the MT is synonymous with adding another perspective on the organization. Since a large portion of an MT’s time is spent on information-sharing and decision-making the information/decision-making perspective suggests a positive effect of team size on team performance.

The Social Categorization Perspective

The social categorization perspective is based on social identity theory and self-categorization theory (K. Y. Williams & O'Reilly, 1998). The main premises are that a significant part of our self-concept is based on perceived group-memberships, and that the choice of which groups we identify with (in-groups) is largely driven by the need for a positive self-concept and high self-esteem (Hogg & Abrams, 1988). In order to accentuate our positive social identities we also categorize people who are not part of our in-groups as out-group members.

Importantly, to elevate our positive social identities further, out-group members are often viewed in a more negative manner than the in-group members. This effect is called intergroup bias and does not occur due to social categorizations per se. Intergroup bias rather occurs when we perceive the out-group as a threat to our social identity. Such an identity threat is particularly likely to occur when groups are parsimoniously in competition and interdependent (van Knippenberg et al., 2004). We additionally tend to focus on within-group similarities and between-group differences to make our social identities increasingly more distinct (Turner et al., 1987).
Thus, how we are able to cooperate and perform together with other people is significantly based on whether we view them as in-group or out-group members. Even trivial and arbitrary categorizations can lead us to view out-group members as less trustworthy and cooperative than in-group members (Brewer, 1979). These effects will often be stronger the more positively we identify with the in-group (K. Y. Williams & O'Reilily, 1998). Additionally, if the characteristics we use to make the in-group/out-group-distinction are salient in the situation in which we are present, the in-group/out-group-distinction is more likely to be the focus of our attention (van Knippenberg et al., 2004).

The relevance of the social categorization perspective to the present paper is based on two arguments. First, each manager in the MT will be part of (and represent) his or her own work group. This work group is the group that the manager is responsible for and interacts with on a day to day basis, thus potentially providing a basis for the manager’s social identity. A larger MT is synonymous with a larger number of perspectives and a larger representation of diverse subgroups as several researchers previously have pointed out (e.g. Amason & Sapienza, 1997; Simsek, Veiga, Lubatkin, & Dino, 2005). As van Knippenberg et al. (2004) notes, when a group becomes more diverse it is harder to find a common identity and to prevent the group from fracturing into subgroups. Heterogeneous groups tend to experience less commitment from its members, less cohesion, and more relationship conflict (Jehn, 1999; O'Reilly, Caldwell, & Barnett, 1989; Riordan & Shore, 1997). Substantial research suggest that being less cohesive and having more relationship conflicts often damage performance (Castaño, Watts, & Tekleab, 2013; De Dreu & Weingart, 2003; Rau, 2005; Tekleab, Quigley, & Tesluk, 2009) (see rationale and hypothesis section for an elaboration on this research). In this way larger MTs will have more problems with cooperation due to conflicts and subgroup formations, thereby damaging cohesion and performance.

Second, as an MT grows in size, the numbers of interpersonal relationships to develop, nurture, and coordinate increase exponentially. To illustrate briefly, an MT of four managers will have six interpersonal links whereas an MT of eight will have 28 interpersonal links. A consequence of such an exponential increase will be as Simsek et al. (2005, p. 73) puts it: “...as teams grow in size, opportunities for interaction and reciprocity among team members decrease; the quality and quantity of communication among team members thus diminish, and the likelihood of members withholding effort increases.” From a social categorization perspective such a decrease in interaction between team members is problematic. When there is a simultaneous increase in perspectives and decrease in opportunities to interact it will be
more difficult for the managers to view the MT as an in-group as it provides less opportunity to get to know everyone’s perspective and to create a base for a social identity. Managers in MTs are often interdependent, but still competing with each other for resources to be allocated to their own work-group or department (Bang & Midelfart, 2012). As mentioned earlier, the combination of being interdependent and in competition is often a trigger for intergroup bias and thus may serve to alienate the other managers as part of out-groups instead of in-groups.

So, viewed from a social categorization perspective larger MTs perform worse than smaller ones.

The Categorization-Elaboration Model (CEM)

van Knippenberg et al. (2004) have proposed a model (CEM) in order to understand the interactive effect of the social categorization perspective and the information/decision-making perspective on performance. Although initially intended as a model for understanding the effects of diversity on performance, the CEM provides great help in understanding how the two perspectives interact to predict the size-performance relationship in MTs. The relevance of the model to the size-performance relationship is due to (1) the parsimonious nature of size and diversity in management teams and (2) the focus on information-sharing and deep-level processing of diverse information which is a key task for MTs’ performance.

van Knippenberg et al. (2004) suggest that whether a team is able to benefit from their numerous diverse perspectives is contingent upon two key premises. First, teams that are not able to manage the relational problems that diversity brings with it will struggle to make use of their increased number of perspectives and potential to process information. These are relational problems such as relationship conflict, less liking of other team members, and lowered team cohesion and stems from social categorizations leading to interpersonal bias. This is in line with the social categorization perspective.

The second premise suggests that a team’s ability to benefit from the increased number of perspectives is dependent on (1) the nature of the task the team has to perform, (2) the ability the team has to process information on a deep level, and (3) the motivation the team has to process information on a deep level.

According to Bang and Midelfart (2012) MTs spend a large portion of their time on sharing information, discussing, and making both minor and major decisions. The information and decisions being discussed can often be of a quite complex nature. These are types of task
characteristics (task nature) that should benefit from more perspectives (van Knippenberg et al., 2004). However, according to CEM the ability of a team to process such complex information (task ability) is contingent upon time constraints. Given that MTs often have quite strict time limits when they meet (Bang & Øverland, 2009), larger teams may quickly begin to suffer in their ability to engage in deep-level processing. In relation to task motivation CEM suggests that team members’ motivation to process information at a deep level is contingent upon their accountability toward the end product or decisions. In this way larger MTs could potentially suffer as members in larger teams feel less accountable towards the result (Steiner, 1972).

It therefore seems that as the size of MTs becomes larger, the chances of intergroup biases increases at the same time as time constraints become larger and members become less motivated to contribute. Thus, according to CEM, increases in MT-size can quite rapidly damage performance by attenuating the positive effects of diversity and accentuating the negative ones.

**Rationale and Hypotheses**

As previously noted in the summary of research on the relationship between team-size and performance, larger teams tend to perform worse on their team tasks (e.g. Gooding & Wagner, 1985; Thomas & Fink, 1963) and be less satisfied (e.g. Lundgren & Bogart, 1974) compared to smaller teams. Further, the only study to my knowledge that included MTs as part of its sample (i.e. Wheelan, 2009) consistently found that larger teams performed worse than smaller ones. Additionally, the CEM suggest that negative effects of social categorizations may override or get in the way of the positive effects of increased information-processing and decision-making abilities for larger teams. I therefore suggest:

**Hypothesis 1:** There will be a negative relationship between management team size and management team performance.

**The Mediating Role of Relationship Conflict**

According to the input-process-output model (IPO) of team performance, relationship conflict is a process variable because it describes one way of how team members interact with each other. The IPO also suggests that process variables are helpful in describing the associations between stable input factors (i.e. team size in this thesis) and output factors (i.e. task performance and individual learning and satisfaction in this thesis).
As previously discussed, the CEM indicates that larger MTs will experience more relationship conflict. Further, the number of interpersonal links increases exponentially with team size. In line with Simsek et al. (2005) I suggest that larger MTs will experience more and more difficulties for everyone to get to know each other and for existing conflicts to be fixed or attenuated. By this reasoning there could potentially be a negative relationship between team size and relationship conflict.

Although scarce, research on team size and relationship conflict suggests further support for the association between team size and relationship conflict. In a study of 41 teams in electronic divisions, Pelled, Eisenhardt, and Xin (1999) found a moderate positive relationship between team size and relationship conflict. The average team size was 10 with a standard deviation of 3.2. Another study looking at 48 top management teams found the same results (Amason & Sapienza, 1997). Interestingly, teams in Amason and Sapienza’s (1997) study were much smaller, ranging from two to seven members. As much as 42 of the 48 teams consisted of two, three, or four members. These two studies indicate that the positive association between team size and relationship conflict holds for a wide range of team sizes.

Several meta-analyses also suggest that relationship conflict has reasonably consistent negative associations with team performance. The negative associations between relationship conflict and team performance seem to hold both for task performance and for team member satisfaction (De Dreu & Weingart, 2003; de Wit et al., 2012).

As noted by Steiner (1972), larger groups also experience process loss simply because they face greater challenges in terms of the practical coordination between members. Several studies have noted the tendency for members of larger groups to talk less with each other, have less time in the group to share their own ideas (Hare, 1952; Zenger & Lawrence, 1989) and to communicate in a more constrained and formal way (Smith et al., 1994; Wagner, Pfeffer, & O'Reilly, 1984). This can indicate that although some of the negative association between team size and performance could be accounted for by relationship conflict, performance also may suffer through other processes such as time spent on practical coordination and a lack of getting everyone to speak up about their ideas. By this logic, even setting relationship conflict aside, it could still be more difficult for larger teams to perform well because they simply have less chance to combine all their ideas and viewpoints into integrated common goals, strategies and efforts. Such an effect can be particularly viable in MTs due to the lack of time they have together in the first place. Team size could therefore
have a negative association with team performance over and above the association explained by relationship conflict.

Since relationship conflict tends to increase with team size, has a strong tendency to correlate negatively with team performance, and seems to override the potential positive effects of more constructive task-related conflicts, I suggest:

*Hypothesis 2*: Relationship conflict partially mediates the negative relationship between team size and team performance.

**The Mediating Role of Team Cohesion**

The CEM suggests that team cohesion is negatively impacted by social categorizations and interpersonal biases. In this way it is a state that could be negatively impacted when the detrimental effects of social categorizations override the positive effects of amongst others increased information-processing capabilities.

Similarly, researchers have pointed out that larger MTs have a greater number of perspectives and a larger likelihood of splitting up into multiple subgroups (Amason & Sapienza, 1997; Simsek et al., 2005; van Knippenberg et al., 2004). It becomes harder to gather around a common identity and the quality and time-span of interaction between team members decreases (Simsek et al., 2005; van Knippenberg et al., 2004). Members not having the time for thorough and high-quality conversations and not perceiving their identity to be connected to the group could all potentially impact cohesion in a negative way.

Research supports a negative relationship between team size and cohesion. In exercise groups and sport teams cohesion tend to decrease as the group size increases (e.g. Carron & Spink, 1995; Widmeyer, Brawley, & Carron, 1990). Similarly, in a meta-analysis on cohesion and performance Mullen and Copper (1994) found that group size moderated the effect of cohesion on performance such that in larger groups cohesion had a smaller effect on performance than in smaller ones. The rationale for their hypothesis was that larger groups tend to have very low levels of both cohesion and performance, thus limiting the variability in the cohesion-construct leading to a weaker effect of cohesion on performance. They suggested that smaller groups tend to have more variability in cohesion and performance and generally having a trend towards being more cohesive and performing better.

Several meta-analyses have also found a positive relationship between cohesion and performance. There has been done a vast amount of research on the relationship between cohesion and performance. Meta-analyses consistently show a positive relationship with task
performance (Beal et al., 2003; Castaño et al., 2013; Mullen & Copper, 1994). The relationship holds for a variety of performance measures such as multiple performance behaviours, performance outcomes, subjective assessments of performance and more objective measures of performance (Beal et al., 2003; Castaño et al., 2013). Castaño et al. (2013) additionally found that the relationship was particularly strong for teams and groups within the business area compared to sports teams, teams in laboratory settings, and teams comprised of students.

Research investigating the relationship between cohesion and satisfaction suggest a similar trend. Tekleab et al. (2009) found a strong positive relationship between team cohesion and team satisfaction. A relationship that was actually much stronger than the relationship between team cohesion and task performance. Additionally, on a broader level work-group cohesion has been linked to job satisfaction (Carless & De Paola, 2000).

However, in a similar manner to relationship conflict as a mediator, it does not seem likely that team cohesion fully can explain the relationship between size and performance. It is plausible that in addition to larger MTs being less cohesive, team performance will also simply suffer due to problems with practically coordinating the group in a beneficial way (Steiner, 1972). Therefore I suggest:

*Hypothesis 3:* Team cohesion partially mediates the negative relationship between team size and team performance.

**Relationship Conflict and Team Cohesion as Separate Mediators**

Although it is hypothesized that both team cohesion and relationship conflict explain parts of the relationship between team size and team performance, an unaddressed question is whether the two mediators explain different parts of the team size-performance relationship or if they are part of the same mechanisms. In other words, is relationship conflict still a mediator when controlling for team cohesion and vice versa? Two opposing arguments can be made with regards to this question.

On the one hand, studies on management teams and student teams have found that team cohesion and relationship conflict are negatively correlated with one another (Ensley, Pearson, & Amason, 2002; Tekleab et al., 2009). With reference to the Categorization-Elaboration Model (CEM) they also share some of the same explanations as to why they could relate to size: Specifically, I have previously suggested that they both are impacted by
intergroup bias. Larger teams can create more opportunity for subgroups to appear which tends to increase relationship conflict and decrease team cohesion.

Further, from a group developmental perspective (Tuckman, 1965; Tuckman & Jensen, 1977) Tekleab et al. (2009) have argued that teams usually will face some degree of relational conflicts in the beginning of the team’s life span, and that teams who are successful in resolving their conflicts develop strong team cohesion.

On the other hand, Tekleab et al. (2009) tested longitudinally the possibility that that more relationship conflict leads to less team cohesion which in turn leads to worse team performance. Interestingly, they found that although relationship conflict had negative effects on team performance, team cohesion did not mediate this relationship. Tekleab et al.’s (2009) findings could indicate that although relationship conflict and cohesion are related there are other variables than team cohesion which explains the effects of relationship conflict on team performance.

Similarly, team size may have some differential associations with relationship conflict and team cohesion. For instance, larger teams tend to have more formal communication patterns and fewer interactions between their members. More formal communication patterns and fewer interactions could possibly inhibit the development of high levels of cohesion since team members get fewer opportunities to interact with each other. However, one could argue that relationship conflict to a larger extent is dependent on the interaction of team members in order to appear.

In this way it is possible that relationship conflict is somewhat dependent on the interaction between team members whereas the absence of team cohesion is not. Additionally, since Tekleab et al. (2009) found that team cohesion did not mediate the relationship between relationship conflict and team performance I suggest:

*Hypothesis 4*: Controlling for team cohesion, relationship conflict partially mediates the relationship between team size and team performance

*Hypothesis 5*: Controlling for relationship conflict, team cohesion partially mediates the relationship between relationship conflict and team performance.
Method

Sample and Procedure

The questionnaire “effect”, which measures 27 variables related to management team functioning, was sent to the management teams by a link to the questionnaire in an email. Approximately 40% of the MTs were asked to fill out the questionnaire as part of a management team development program. The remaining 60% of the MTs were asked to participate as part of a research project. Participants were given a one-week deadline to fill in the questionnaire. An additional email was sent to those who did not respond within the deadline. All participants received a written feedback report for their management team based on the answers they gave in the questionnaire.

The final sample comprised 1332 respondents (44.9% female, 55% male) in a total of 215 management teams. Two respondents did not enter their sex. 45.3% did not give information about their age, and thus descriptive statistics for this variable will not be reported. Respondents entered their tenure in the team according to the predefined categories “less than one year” (19.1%), “1-2 years” (18.3%), “2-4 years” (20.6%), “4-6 years” (19.9%), and “more than 6 years” (5.7%). 16.4% did not enter information about their tenure.

The management teams were either located in Norway (65.1%) or Denmark (33.0%) with the exception of four teams located elsewhere. Further, 23.7% of the management teams came from organizations that were part of the governmental sector, 26.5% from organizations that were part of the county or municipal sector, and 49.8% of the management teams were part of organizations within either the private sector or a public enterprise.

The management teams also differed in where they were situated in the organizational hierarchy. 24.7% were top management teams (level-1 MTs), 35.3% were the management team directly below the top management team (level-2 MTs), whereas 40.0% were located further down in the organizational hierarchy (level-3 MTs). The MTs ranged from 3 members to 23 with a mean of 7.37 and a standard deviation of 3.78. The most common team sizes were 4 (14.4% of the teams) and 6 (also 14.4% of the teams), and only 12.6% of the management teams consisted of 11 team members or more.

Measures

With the exception of team size, all measures in my thesis consisted of items worded as statements that were rated on a 7-point likert-scale ranging from 1 (Totally disagree) to 4 (neither disagree nor agree) to 7 (Totally agree). The measures were part of a larger
questionnaire called “effect” developed by Bang and Midelfart (2015). The questionnaire comprised 124 items representing 27 measures. The measures were based on research synthesized in Bang and Midelfart’s (2012) book on effective management teams. For each variable the respondents typically rated their management team on four to eight items. Of the 27 measures in the questionnaire five were used in this master’s thesis. These five measures are described below and a table of all items belonging to each measure can be found in the appendix. With the exception of team size, individual scores on each of the five measures were aggregated to a team-level score and calculated as the mean of the individual responses within each team (justification for aggregation of individual scores is discussed in the data analyses-section). With the exception of team size, reliability was estimated for all measures. Reliability was calculated as Cronbach’s alpha at an individual level and considered sufficient at levels above .70 (Nunnally, 1978).

Although mostly based on measures in English, the questionnaire “effect” was developed in Norwegian and translated into Danish as the sample of MTs were mainly Norwegian and Danish. The translations into Danish were done by Dansk Psykologisk Forlag. The translations were then independently quality-checked by three Danish professors of Psychology.

Team size. Team size was the actual number of team members belonging to the management team.

Relationship conflict. The relationship conflict measure was slightly altered, but heavily based on the work of Jehn (1995) and consisted of four items. Reliability for the measure was estimated at $\alpha = .899$.

Team cohesion. The team cohesion measure was based on work by Beal et al. (2003) and Mullen and Copper (1994) and consisted of six items. Reliability was estimated to $\alpha = .877$.

Task performance. Task performance was based on the work of Hackman (2002) and measured with eight items. Reliability was estimated to $\alpha = .894$.

Individual learning and satisfaction. The individual learning and satisfaction measure was based on the work of Hackman (2002) concept of team member satisfaction. The measure consisted of five items. The scale’s alpha was calculated and was above suggested minimum value ($\alpha = .862$.)
Data Analyses

All analyses were performed in SPSS v22. The macro “PROCESS” written by Preacher and Hayes (2004) for SPSS was added in order to test indirect effects for significance.

Aggregation. This study investigates differences between management teams, not individuals. Thus, it was necessary to aggregate the individual responses within each team to a team score on each measure with the exception of team size. First of all, it is important to note that items within each measure were designed to facilitate the aggregation process by asking the respondents to rate statements worded as observations of the team, and not as statements of experiences between the respondent and the other team members. As an example, item three on the relationship conflict measure was worded as “There are personal conflicts between some members of the management team” and not as “I have personal conflicts with some members of the management team”. Thus, the items measuring relationship conflict refers to the respondent’s experience of relationship conflict between the team members and not to the respondent’s experience of relationship conflicts between the respondent and the other team members.

In order to justify aggregation statistically, Biemann, Cole, and Voelpel (2012) suggest that the team members’ scores within each team has to be sufficiently in agreement with each other (inter-rater agreement) and sufficiently reliable.

When each participant is responding on multiple items, \( r_{WG} \) should be used to calculate agreement between respondents (Biemann et al., 2012). Somewhat simplified, \( r_{WG} \) is a measure of the difference between (1) the expected within-group variance of individual scores if the respondents were to answer randomly, and (2) the observed within-group variance of individual scores (Biemann et al., 2012). The \( r_{WG} \)-scores normally range from 0 to 1 and can be “interpreted as the proportional reduction in [within-group] error variance” (LeBreton & Senter, 2007). Thus, a score of .6 can be understood as a 60% decrease in error variance within a team.

To justify aggregation based on \( r_{WG} \) values, George (1990) has suggested that groups that score below .70 should be excluded. However, researchers have criticized a cut-off point of .70 as simply being an arbitrary and highly categorical value that has not been given much consideration (LeBreton, Burgess, Kaiser, Atchley, & James, 2003). Additionally, the .70 criteria for cut-off is often referenced back to James, Demaree, and Wolf (1984), although
what “James et al. (1984) actually said regarding the .70 cut-off criteria for $r_{WG}$ was…nothing” (Lance, Butts, & Michels, 2006).

Instead, Biemann et al. (2012) and LeBreton and Senter (2007) suggest cut-off points for $r_{WG}$-values should be considered in relation to the type of research that is done, and that $r_{WG}$-values should be viewed on a continuum where .00-.30 = “lack of agreement, .31-.50 = “weak agreement”, .51-.70 = “moderate agreement”, .71-.90 = “strong agreement”, and .91-1.00 = “very strong agreement”. They note that when aggregation scores are used in for instance recruitment—or promotion processes, strong agreement is necessary. For research purposes where one looks at general trends across many teams, it may be sufficient with moderate agreement. In this study a moderate agreement of .50 was considered sufficient, since one would expect some variation in the individual perceptions of team processes, states and performance. For instance, there should be natural variations in the level of relationship conflicts team members pick up on.

Biemann et al. (2012) further suggest that it is very likely that some groups will be low in agreement. Instead of losing statistical power by excluding the percentage of groups that are low in agreement, Biemann et al. (2012) suggest that main analyses are conducted both with and without the low-agreement groups. If excluding the low-agreement groups does not change the results markedly, the authors recommend including the low-agreement groups as well. In a similar fashion, LeBreton and Senter (2007) suggest that the percentage of $r_{WG}$-values above the cut-off point is calculated, and that if a high percentage of the $r_{WG}$-values are above cut-off point the researcher does not remove any of the groups with low $r_{WG}$. The mean $r_{WG}$ should be reported and be above the cut-off point (Biemann et al., 2012; LeBreton & Senter, 2007), which in this case is .50.

Based on these propositions I decided to calculate the mean $r_{WG}$-value for each measure and the percentage of management teams that had $r_{WG}$-values above the suggested cut-off point of .50 for each measure. As seen in table 1, both the mean $r_{WG}$-value and the $r_{WG}$-values for the majority of management teams for each measure was above .50. Thus, based on calculations of inter-rater agreement, aggregation was considered justified.

To justify aggregation, scores between team members and between management teams should also be sufficiently reliable. In order to estimate reliability I calculated ICC(2) (intra-class correlation coefficient) in line with recommendations from LeBreton and Senter (2007) and Biemann et al. (2012). The ICC(2) takes into account both the variance within each team and the variance between each team. Somewhat simplified, the ICC(2) can be interpreted as
the proportion of variance that is attributed to between-team variance compared to the variance that is attributed to variations in scores within teams (LeBreton & Senter, 2007). It therefore becomes a measure of how meaningful it is to aggregate the individual scores to team scores. A high ICC(2)-score represents large between-team variance and low within-team variance.

As with $r_{WG}$-values, researchers have emphasized the importance of not solely relying on one specific arbitrary cut-off criteria across all types of studies and purposes for aggregation (Lance et al., 2006). LeBreton et al. (2003) found that the ICC(2) value for aggregation in organizational research tends to be lower than the often cited .70 cut-off criteria for reliability analyses. Specifically, they found that lower levels of reliability were due to a restriction of variance in job performance-measures rather than individuals having very different views on the same phenomena. For this reason I operate with a cut-off criterion of .50 for the performance-measures. As can be seen in table 2 in the results-section, there was considerably less variability in the performance measures than the other measures, indicating the possible presence of a restriction of variance in these measures (task performance and individual learning and satisfaction). Cut-off criteria of .50 for performance measures and .70 for all other measures were therefore selected for the ICC(2)-values.

Additionally, it is suggested that $\eta^2$ (eta-squared) is calculated to make sure a satisfying proportion of the total variance exist as between-group (between-teams) variance (Bliese & Halverson, 1998). All eta-squared values were above the suggested minimum value by Georgopoulos (1986) of .20.

Cronbach’s alpha, mean $r_{WG}$-values, percentage of MT’s above an $r_{WG}$-value of .50, mean ICC(2), and $\eta^2$ are presented in table 1 for each measure.

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Alpha</th>
<th>$r_{WG}$</th>
<th>$r_{WG}$ %2</th>
<th>ICC(2)</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship conflict</td>
<td>.90</td>
<td>.57</td>
<td>61.6</td>
<td>.81</td>
<td>.50</td>
</tr>
<tr>
<td>Team cohesion</td>
<td>.88</td>
<td>.65</td>
<td>77.8</td>
<td>.72</td>
<td>.40</td>
</tr>
<tr>
<td>Task performance</td>
<td>.89</td>
<td>.74</td>
<td>88.7</td>
<td>.68</td>
<td>.37</td>
</tr>
<tr>
<td>ILS$^1$</td>
<td>.86</td>
<td>.62</td>
<td>71.7</td>
<td>.58</td>
<td>.31</td>
</tr>
</tbody>
</table>

$^1$ Individual learning and satisfaction

$^2$ Percentage of teams with an $r_{WG}$-value above .50
Statistical analyses. Assumptions of normality and linearity were examined for all measures. None of the measures violated these assumptions. Bivariate correlations and standard multiple regression was conducted using Pearson’s r. Additionally, bootstrapping with the macro “PROCESS” written for SPSS by Preacher and Hayes (2004) was conducted in order to test for significance of indirect effects in the mediation hypotheses.

Control variable. The data for this thesis was collected from management teams situated at different levels in the organizational hierarchy. Management team level (MTL) can potentially be a confounding variable by affecting relationship conflict, team cohesion and management team performance. Floyd and Lane (2000) suggest that management teams process different types of information and engage in different types of behaviors depending on their hierarchical placement in the organization. Top management teams in particular tend to process information that is highly complex, ambiguous, and contradictory (Nadler et al, 1998, cited in Bang & Midelfart, 2012). Top management teams also tend to consist of more individualistic, competitive, and ambitious managers (Hambrick, 1994; Katzenbach, 1998). These characteristics could potentially damage performance, increase relationship conflicts and decrease team cohesion by making the top management team less cooperative and face more difficult and complex problems to solve.

As a result of the possible correlation with several of the variables in my thesis, MTL (placement of the management team in the organizational hierarchy) was controlled for. MTL was measured using an ordinal scale where teams were either the top management team (level 1), the team directly below the top management team (level 2), or a team further down in the organizational hierarchy (level 3).

Results

Means, standard deviations, and bivariate correlations are presented in table 2. As seen in table 2, MT-level had a significant negative correlation with team size and significant positive correlations with team cohesion and task performance. MT-level was therefore included in the subsequent analyses.

Hypothesis 1 predicted a negative relationship between team size and team performance. As previously mentioned, team performance was measured by two separate measures, namely task performance and individual learning and satisfaction. As seen in table 2, the bivariate correlations show that there was a significant negative correlation between
team size and task performance, \( r = -0.38, p \leq 0.001 \) and between team size and individual learning and satisfaction (ILS), \( r = -0.23, p \leq 0.001 \). When controlling for MT-level, the partial correlations were marginally lower than the bivariate ones, and team size was still negatively correlated with task performance, \( r = -0.35, p \leq 0.001 \) and with ILS, \( r = -0.22, p \leq 0.001 \). Hypothesis 1 was therefore supported.

Table 2

*Means, standard deviations, and zero-order correlations for all variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. MT-level</td>
<td>2.15</td>
<td>0.79</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Team size</td>
<td>7.33</td>
<td>3.69</td>
<td>-0.22***</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Relationship conflict</td>
<td>2.57</td>
<td>1.17</td>
<td>-0.13</td>
<td>0.23***</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Team cohesion</td>
<td>5.32</td>
<td>0.84</td>
<td>0.21**</td>
<td>-0.32***</td>
<td>-0.71***</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Task performance</td>
<td>5.29</td>
<td>0.66</td>
<td>0.17*</td>
<td>-0.38***</td>
<td>-0.55***</td>
<td>0.81***</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>6. ILS</td>
<td>5.45</td>
<td>0.77</td>
<td>0.06</td>
<td>-0.23***</td>
<td>-0.61***</td>
<td>0.80***</td>
<td>0.75***</td>
<td>-</td>
</tr>
</tbody>
</table>

1Individual learning and satisfaction

\*p \leq .05 **p \leq .01 ***p \leq .001

In order to examine hypotheses 2 and 3, Baron and Kenny’s (1986) four steps for testing mediating effects was followed as shown in figure 1. First, variance in the predictor-variable should account for a significant amount of variance in the mediator (the a-path). Second, variance in the mediator should account for a significant amount of variance in the criterion-variable when controlling for the predictor (the b-path). Third, variance in the predictor-variable should account for a significant amount of variance in the criterion-variable (total effect/c-path). Fourth, when controlling for the mediator, the relationship between the predictor and criterion (direct effect/c’-path) should be non-significant (full mediation is present) or significantly reduced compared to the total effect (partial mediation is present).
TEAM SIZE AND PERFORMANCE IN MANAGEMENT TEAMS

Figure 1. Illustrates Baron & Kenny’s four steps for mediation.

However, Baron and Kenny’s (1986) four steps for mediation have recently been criticized by several researchers (Hayes, 2009; Holmbeck, 2002). An important critique is directed towards Baron and Kenny’s (1986) fourth step of deciding that there is a significant decrease from the total effect to the direct effect. If controlling for the mediator shows that the direct effect is smaller than the total effect, Baron and Kenny (1986) do not offer any significance-test of the decrease from the beta-coefficient for the total effect to the beta-coefficient for the direct effect. Subsequently we do not know whether the decrease is observed by chance or how certain we can be of the presence of a partial mediation (Hayes, 2009), making the likelihood higher for committing a type II error.

Another problem is that by only following the steps by Baron and Kenny (1986), one runs the risk of committing a type I error and conclude on a full mediation being present, when there is no mediating effect present in the population. Such a mistake can occur if there is a minor change in the absolute value of the regression coefficient from the total effect-path to the direct effect-path. If at the same time the total effect is significant and the direct effect is non-significant we run the risk of incorrectly rejecting the null hypothesis (Holmbeck, 2002).

In order to solve some of the limitations with Baron and Kenny’s (1986) approach I additionally ran significance tests of the indirect effects using bootstrapping with Preacher and Hayes’ (2004) PROCESS-macro for SPSS. Bootstrapping has been suggested by several simulation studies as one of the more effective tests of significance for indirect effects (MacKinnon, Lockwood, & J. Williams, 2004; J. Williams & MacKinnon, 2008).
In order to test hypotheses 2 and 3 I therefore followed the four steps suggested by Baron and Kenny (1986) and additionally tested indirect effects for significance using Preacher and Hayes (2004) PROCESS macro.

H2 predicted that relationship conflict would partially mediate the negative relationship between team size and both measures of team performance. The hypothesis was partially supported. In line with H2, relationship conflict partially mediated the relationship between team size and task performance (see table 3 for Baron and Kenny’s four steps). When controlling for relationship conflict the association between team size and task performance decreased from $\beta = -.36, p \leq .001$ to $\beta = -.26, p \leq .001$, thus indicating a partial mediation. Supporting this indication, bootstrapping with the PROCESS-macro revealed a significant indirect effect, $B = -.02, LLCI = -.032, ULCI = -.008$, with confidence level set to 95% (note that the test of bootstrapping gives the unstandardized beta-coefficient, not the standardized one).

However, deviating somewhat from H2, relationship conflict fully mediated the relationship between team size and ILS (see figure 2 for statistics on all four steps). When controlling for relationship conflict the association between team size and ILS decreased from $\beta = -.22, p \leq .001$ to $\beta = -.10, ns$, thus indicating a full mediation. Supporting this indication, bootstrapping with the PROCESS-macro revealed a significant indirect effect, $B = -.02, LLCI = -.043, ULCI = -.012$, with confidence level set to 95%.

H3 predicted that team cohesion would partially mediate the relation between team size and both measures of team performance. The hypothesis was partially supported in the same manner as H3.

In line with H3, team cohesion partially mediated the relationship between team size and task performance. When controlling for team cohesion the relationship between team size and task performance decreased from $\beta = -.36, p \leq .001$ to $\beta = -.13, p \leq .01$, indicating a partial mediation. A significance test of the indirect effect using bootstrapping revealed a significant indirect effect, $B = -.04, LLCI = -.059, ULCI = -.024$, with confidence level set to 95%. However, deviating somewhat from the predicted partial mediating effect, team cohesion fully mediated the relationship between team size and ILS such that when controlling for team cohesion the relationship between team size and ILS decreased from $\beta = -.22, p \leq .001$ to $\beta = .02, ns$. Bootstrapping revealed a significant indirect effect, $B = -.05, LLCI = -.075, ULCI = -.030$, with confidence level set to 95%.
H4 predicted that the relationship between team size and both measures of team performance would be partially mediated by relationship conflict when controlling for team cohesion. Similarly, H5 predicted that the relationship between team size and both measures of team performance would be partially mediated by team cohesion when controlling for relationship conflict. To test H4 and H5 I ran two multiple regression analyses including team size, relationship conflict, and team cohesion in both analyses. One analysis included task performance as the outcome variable, the other included ILS as the outcome variable. Thus, if the two mediators describe different mediating effects they should both still predict team performance when included in the same model.

The multiple regression analyses revealed that when the two mediators and team size were included in the same model, relationship conflict did not predict task performance, $\beta = .04, p = .537$ or ILS, $\beta = -.09, p = .132$. Thus, H4 was not supported.

However, team cohesion significantly predicted task performance, $\beta = .79, p \leq .001$, and ILS, $\beta = .77, p \leq .001$. Additionally, team size significantly predicted task performance when controlling for relationship conflict and team cohesion, $\beta = -.13, p \leq .01$, but did not significantly predict ILS when controlling for relationship conflict and team cohesion, $\beta = .02, p = .661$. Tests using bootstrapping to test for indirect effects with team cohesion as the mediating variable when controlling for relationship conflict revealed a significant indirect effect of team size on task performance $B = -.02, LLCI = -.035, ULCI = -.011$ and of team size on individual learning and satisfaction, $B = -.03, LLCI = -.041, ULCI = -.012$ with confidence levels set at 95%.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Relationship conflict</th>
<th>Team cohesion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TP₁</td>
<td>ILS₂</td>
</tr>
<tr>
<td>1. a-path</td>
<td>.21**</td>
<td>.21**</td>
</tr>
<tr>
<td>2. b-path</td>
<td>-.49***</td>
<td>-.59***</td>
</tr>
<tr>
<td>3. c-path (total effect)</td>
<td>-.36***</td>
<td>-.22***</td>
</tr>
<tr>
<td>4. c'-path (direct effect)</td>
<td>-.26***</td>
<td>-.10</td>
</tr>
</tbody>
</table>

1. Task performance

Table 3: Standardized beta-coefficients for Baron and Kenny's four steps arranged by mediator and performance measure

$^* p \leq .05 \quad ^{**} p \leq .01 \quad ^{***} p \leq .001$
TEAM SIZE AND PERFORMANCE IN MANAGEMENT TEAMS

Thus, H5 was partially supported. In line with H5, team cohesion partially mediates the relationship between team size and task performance when controlling for relationship conflict. Deviating somewhat from H5, team cohesion fully mediates the relationship between team size and ILS when controlling for relationship conflict.

Discussion

This study investigated some of the possible explanations for why and how increases in team size can affect team performance in 215 management teams. 188 of the MTs comprised three to ten members, and 27 of the teams comprised 11-23 members. Findings indicated that there is a negative relationship between team size and team performance (measured as both task performance and individual learning and satisfaction) in management teams. When introducing relationship conflict and team cohesion as mediating factors between size and task performance, both of the mediating variables explained parts of the association. When testing relationship conflict and team cohesion as mediators for the association between size and ILS, both of the mediators fully explained the negative association between size and ILS.

However, when both mediators were included in the same model, relationship conflict did no longer explain any part of the association between team size and both measures of team performance. Instead, team cohesion alone partially explained the association between team size and task performance and fully explained the association between team size and ILS.

The categorization-elaboration model (CEM) (van Knippenberg et al., 2004) integrates the information/decision-making perspective (Carnevale & Probst, 1998; Halebian & Finkelstein, 1993) and the social categorization perspective (K. Y. Williams & O'Reilly, 1998) in order to predict team performance. From the perspective of CEM, the findings suggest that the larger an MT is the more difficult it becomes for the team to gain the benefits of more perspectives and processing capabilities. The findings indicate that a more common effect of having more members in the MTs is that disruptive team processes gets in the way of the benefits. Specifically, viewed from the CEM-perspective, an increase in team size seems to make it more likely for subgroups to form and for interpersonal biases to appear. As a consequence, the team struggles to function as a unit (lower team cohesion) and perform worse.
The finding that only team cohesion was a significant mediator when it was included in the same model as relationship conflict suggests that team cohesion is the most potent explanatory variable of the two. A possible interpretation may be that larger teams experience less team cohesion which fuels a negative spiral between team cohesion and relationship conflict where team cohesion is the primary driver. Several researchers have suggested that team cohesion set a foundation for effective communication (Ensley et al., 2002; Smith et al., 1994). Team cohesion may create a better understanding of how the other team members think and feel, thus preventing some of the misunderstandings and unfavorable interpretations of other team members’ opinions and behaviors that tend to feed into relationship conflicts (Ensley et al., 2002). A decrease in team cohesion may therefore lead to more relationship conflict.

Implications for Practice

The results highlight the important role team cohesion plays in explaining the relationship between team size and team performance. The findings do not necessarily suggest that MTs have to be small, but rather that it is particularly important for larger MTs to be aware of the importance of building cohesion in the team. One of the key issues with increased team size highlighted in this study is that it becomes more difficult for team members to get to know each other and build meaningful relationships (through intergroup biases), which can make the integration of ideas into great decision-making difficult (van Knippenberg et al., 2004). The communication process becomes more formal and restricted which can damage the free-flowing conversations necessary for creative ideas (Smith et al., 1994).

One possible implication of this is that larger teams might benefit from actively dividing more of the time spent on meetings into small group discussions. By doing so every member is more involved in the meetings, there is more opportunity to gain a deeper understanding of fellow team members’ thoughts and experiences, and it may be easier to discuss issues that need to be discussed in depth.

Another implication of the need to build team cohesion would be to have a strong focus on agreeing upon a clear purpose for the MT and have clear and specific meeting goals for each meeting. Research with student teams and sports teams suggest that effective goal-setting at the group level has consistent positive associations with team cohesion (Carron, Spink, & Prapavessis, 1997; Klein & Mulvey, 1995; Senécal, Loughead, & Bloom, 2008).
Additionally, goal-setting theory suggests that goals should be specific and hard to achieve (but perceived as obtainable) (Locke & Latham, 2006). Research on goals in groups suggests that there should be a clear connection between individual goals and group goals (Locke & Latham, 2006). Therefore, if larger groups wish to build stronger perceptions of cohesion, it may be a good idea to focus on involving all team members in the process of defining a clear purpose for the MT. In order to involve all members in the process, a beneficial strategy would be to discuss the purpose of the MT in smaller groups and subsequently deciding on a team purpose with all the members present.

However, MTs should also consider the level of task interdependence between team members. In a meta-analysis on team cohesion and performance, Gully, Devine, and Whitney (1995) found that team cohesion has markedly stronger associations with team performance for teams that are particularly interdependent in the tasks they perform. Thus, the degree to which larger teams should pay attention to building team cohesion also varies with the tasks they perform. It may be particularly important for large MTs who are also engaged in highly interdependent tasks to spend some extra time on goal-setting for the team and regularly dividing their team into smaller discussion-groups. For large MTs who are more engaged in simply informing each other about progress in each manager’s department and to a lesser extent engaged in complex decision-making activities, it may not be as fruitful to spend time on building cohesion.

Limitations

Several limitations exist with the methods in this study. As with many other correlational studies where data is gathered through questionnaires there are potential issues with a common method bias and causal inferences.

With the exception of team size, all variables in my thesis were self-report and part of the same questionnaire. Social desirability has for instance been cited as a source of common-method bias in self-report studies (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) and is particularly relevant in this study. Social desirability is likely to attenuate scores on relationship conflict and accentuate scores on team cohesion and team performance. All of the teams in this thesis received a feedback report on their responses. Scores may also be somewhat more identifiable in smaller teams than in larger ones. Therefore, it is difficult to rule out with complete certainty that smaller teams answer in a more socially desirable way and thus score lower on relationship conflict and higher on team cohesion and performance.
TEAM SIZE AND PERFORMANCE IN MANAGEMENT TEAMS

A related limitation is that teams experiencing high levels compared to low levels of relationship conflict tend to be more accurate in their performance assessments (Breugst, Patzelt, Shepherd, & Aguinis, 2012). Since all measures with the exception of team size were subjective assessments, it is important to question whether larger teams who experience more relationship conflict are simply more realistic in their performance assessments.

Causal inferences should also be made with caution, especially in relation to the interplay between team performance and the two mediators (relationship conflict and team cohesion). Several researchers have pointed out the dynamic nature between team performance and various process variables (e.g. Hackman, 2012; Marks et al., 2001). Thus, it may be that increases in team size sets off a negative spiral between performance and team cohesion. It could for instance be that increases in team size lead to more practical coordination problems which lead to worse performance. Worse performance could in turn make team members identify less with the team and as a result the team becomes less cohesive and experience more relationship conflict. This study does not rule out such an explanation, and a likely interpretation is that there is a dynamic interplay between team cohesion, relationship conflict and team performance.

Future Research

First, future research should take these limitations into consideration. Especially in terms of causal inferences it would be beneficial to have longitudinal studies on the interplay between relationship conflict, cohesion, and performance. An illustrating example of the benefits of these types of studies is Tekleab et al.’s (2009) longitudinal study which found that team cohesion did not mediate the effect of relationship conflict on team performance. In a similar manner future research could look longitudinally at other predictors of team cohesion, as well as the associations between team cohesion and team performance.

Second, since the findings in my thesis suggest that cohesion partially mediates the size-performance relationship, future research should aim at identifying other mediators that can account for the remainder of the unexplained variance. Steiner (1972) suggests that motivational problems can explain some of the performance losses experienced as teams grow in size. The extent to which team members’ degree of motivation to participate explains any variance over and above team cohesion is therefore an interesting question. Given the important role intergroup bias may play in preventing the benefits of increased team size, the degree of constructive controversy (Tjosvold, 1986) and dialogue (Bang & Midelfart, 2010;
TEAM SIZE AND PERFORMANCE IN MANAGEMENT TEAMS

Levine, 1994) in an MT are also potential mediators in the size-performance relationship that would be interesting to test for.

Third, level of task interdependence within the management teams should be added as a moderator to the model tested in this thesis, or in combination with some of the other proposed mediating variables above. Task interdependence has previously been suggested as a moderator of the association between team cohesion and team performance (Gully et al., 1995), and between team size and team performance (Steiner, 1972; van Knippenberg et al., 2004). More research on task interdependence in relation to team size and team performance would therefore be particularly beneficial for practitioners in order to understand the size-performance association in more depth and be able to predict whether team size has strong negative effects on team performance.

**Conclusion**

No studies to my knowledge have previously looked at mediating factors in the relationship between team size and team performance in management teams. Mediating factors are important to identify because they explain why an association is present. Thus, if we wish to understand and change the effect team size has on team performance in management teams, mediating variables are a key target.

By taking into consideration the interactions of positive and negative effects of team size on team performance, this study found that there was a general tendency for team performance to decrease as team size increased. Adding to previous research, team cohesion and relationship conflict partially mediated this effect when tested in separate models. When cohesion and relationship conflict was tested in the same model, relationship conflict was no longer a significant mediator. Team cohesion still partially mediated the effect of size on team performance.

The findings from my thesis suggest that it is important for larger management teams to focus on processes that can build team cohesion. Team cohesion is likely the primary driver of the two mediators, which sets off a negative spiral between team cohesion and relationship conflict.

Team cohesion only partially mediated the effect of team size on team performance. Future research should aim at identifying other mediators in this relationship. Possible mediators are amongst others motivational problems, dialogue, and constructive controversy. Management teams play an important role in the organizations they belong to and often do
not have the freedom to decide on the number of members comprising the team. Furthering the understanding of why and when team size impact team performance negatively or positively will help management teams reach their potential and make better decisions for the organizations they are part of.
References


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## Appendix

*Items for all measures.*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship conflict</td>
<td>There is not much friction among members of the management team (R).</td>
</tr>
<tr>
<td></td>
<td>There are members of the management team who do not work well together.</td>
</tr>
<tr>
<td></td>
<td>There are personal conflicts between some members of the management team.</td>
</tr>
<tr>
<td></td>
<td>There are some negative tensions among members of the management team.</td>
</tr>
<tr>
<td>Team cohesion</td>
<td>Our management team is not particularly cohesive (R).</td>
</tr>
<tr>
<td></td>
<td>I feel proud to belong to this management team.</td>
</tr>
<tr>
<td></td>
<td>There are not many team members who would be willing to exert themselves for the success of this management team (R).</td>
</tr>
<tr>
<td></td>
<td>The management team members seem to really like one another.</td>
</tr>
<tr>
<td></td>
<td>The management team members rarely take an overall perspective on the matters we discuss (R).</td>
</tr>
<tr>
<td></td>
<td>The management team is a tightly knit group of people.</td>
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<tr>
<td>Task performance</td>
<td>Our management team is very successful in its efforts.</td>
</tr>
<tr>
<td></td>
<td>Our management team does not perform well as a team (R).</td>
</tr>
<tr>
<td></td>
<td>You are given useful input when you bring up an issue in the management team.</td>
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<tr>
<td></td>
<td>We receive positive feedback on our performance as a management team.</td>
</tr>
<tr>
<td></td>
<td>It is difficult to see what added value our management team contributes to our organization (R).</td>
</tr>
<tr>
<td></td>
<td>We consistently make high quality decisions in our management team.</td>
</tr>
<tr>
<td></td>
<td>The vast majority of decisions made by the management team turn out to be beneficial for the organization.</td>
</tr>
<tr>
<td></td>
<td>Those affected by the decisions of the management team are generally very satisfied with the decisions we make.</td>
</tr>
<tr>
<td>Individual learning and satisfaction</td>
<td>I develop my professional competencies by participating in this management team.</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Working in this management team contributes to my learning.</td>
</tr>
<tr>
<td></td>
<td>I really enjoy working together with my management team colleagues.</td>
</tr>
<tr>
<td></td>
<td>Being part of this management team has had little impact on my development as a leader (R).</td>
</tr>
<tr>
<td></td>
<td>I get a lot of energy from our management team meetings.</td>
</tr>
</tbody>
</table>