Promoting team effectiveness: How leaders and learning processes influence team outcomes

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Introduction – The Importance of Teams

Coming together is a beginning.

Keeping together is progress.

Working together is success.

(Henry Ford)

During the last decades, organizational structures of firms (and in many aspects of life have) changed: competition toughened, the half-life of knowledge decreased, job specialization increased, pressure to be innovative augmented, and companies expanded internationally. As a result, conditions to survive in the market changed and the concept of teamwork emerged to meet the new requirements, and enable flexible and efficient working. Teams are seen as an ideal organizational entity because knowledge can be shared which improves (or might improve) performance (Tannenbaum et al., 1996).

Today, teams are an important cornerstone of organizations and most organizations rely on teams to fulfill their work and to obtain their goals (Tannenbaum et al., 1996). Thus, many of us already worked together for a longer period in a team and accomplished tasks in a work group. From our own experience we all know that teamwork can be joyful and productive. However, it might also happen that a collaboration among co-workers was rather unproductive and unpleasant leading us to the conclusion that we would have been more productive alone.

Despite such negative experiences, teams are considered a "mainstay of organizational life". But, not all teams are high performing teams and often the benefits of teamwork are attenuated by conflicts or problematic cooperation. So, it is of interest for researchers and practitioners to know more about the mechanisms of team work. In particular, it is interesting to know, how team performance can be promoted and what factors are associated with productive cooperation between team members.

The purpose of this work is to investigate the influence of team leadership and team learning processes on team outcomes and to find out how leadership behavior and team processes should be implemented to enable better team cooperation and performance. To explore this issue, this work is organized as follows: in chapter one, a theoretical overview on

issues of team work is presented. This chapter characterizes what a 'team' is, and which factors influence team outcomes. I give an overview regarding influencing factors by presenting the "Input-Process-Output" model. Furthermore, I argue that team leadership and team learning processes in particular are important within the context of team work. Thus, more details on team leadership and team learning processes will be given. Aside from that, I will show that it is necessary to consider which kind of team outcomes should be influenced and I present different outcomes of interest. Chapter one concludes with the main research questions that are to be answered in this work.

In chapter two, three, and four, different studies of the influence of "team leadership", "team learning processes" on "team outcomes" are presented. More precisely, chapter two and three deal with the important input factor "leadership". Therefore, chapter two describes two experimental studies that address the question of how leadership behavior influences different team outcomes and what role task structure plays. In Chapter three, I focus on a very specific (and rarely considered) team outcome: Affective similarity. Affective similarity is an indicator of team cohesion and I analyze which leadership behaviors influence the teams' affective similarity with the aid of a questionnaire study in Swiss organizations.

Chapter four focuses on one process factor, namely team learning and it deals with the question of how team learning processes are related to team effectiveness in short-term decision making teams and how learning can be influence by team climate factors.

Chapter five summarizes all findings and discusses future research needs, but also highlights implications for practitioners on how team cooperation and team effectiveness can be promoted.

Teams in Organizations

There are several definitions regarding the structure of a team. For Tannenbaum et al. (1996) a team is a "distinguishable set of two or more people who interact dynamically, interdependently, and adaptively toward a common and valued goal/objective/mission, who have been assigned specific roles or functions to perform, and who have a limited life-span of membership" (p. 504).

Groups – often used synonymous with the term "teams" – can be defined as "…a collective of individuals who are interdependent and interact face-to-face with one another" (Yammarino, 1996). Teams can also be defined as work groups that exist within an organization, have clearly defined members that are responsible for a certain task, product, or service (Hackman, 1987).

Other key issues of a team are for example (e.g., Hackman & Wageman, 2005): Teams consist usually of two or more individuals. Team members are often assigned to specific roles, and often perform specific tasks and/or have special knowledge and skills. Team members are interdependent, meaning that they interact to achieve a common goal or outcome. They also operate within a larger social context in which the team as a whole or individual team members interact with other teams or other employees.

For some researchers "team" has more connotations than "group", e.g the relationship between members of a team is stronger than between members of a group. Hence, groups might become teams when members work together for a longer time. But often, the terms "team" and "group" are used interchangeably in the literature (Guzzo & Dickson, 1999). Many other, more specific, labels for groups working in organizations can be used, e.g. autonomous work groups, self-managing teams, project teams, task forces, crews, cross-functional teams, action teams, committees, or quality circles. For the purpose of this work, the "team" and "group" are used interchangeably. Furthermore, I focus on different kinds of teams, i.e. "ad-hoc experimental teams" versus "real teams in organizations".

Input-Process-Output Model of Team Effectiveness

The organizational literature provides several models of team effectiveness (e.g. Cohen & Bailey, 1997; Gladstein, 1984; Hackman, 1987; McGrath, 1964). One of the most popular paradigms is the Input-Process-Output Model (IPO-Model). IPO models might differ in several aspects but have in common that specific "input factors", for example, group characteristics or organizational factors, lead to an "output" in form of group effectiveness or performance on the other side. Thereby, the influence of the input factor on the output factor is transported or mediated via "processes" (see two examples for IPO models in figure 1 and 2). This implies that resources of a group are transformed into a product via several processes. Important input factors are for example team leadership and group structure. In the recent

literature, I-P-O models are extended to I-P-O-I (Input-Process-Output-Input) models, whereby researchers argue that input is influenced by output in reverse as well (e.g. Ilgen, Hollenbeck, Johnson, & Jundt, 2005). In the following, possible input factors, processes, and outcome factors, often cited in I-P-O models, are explained.
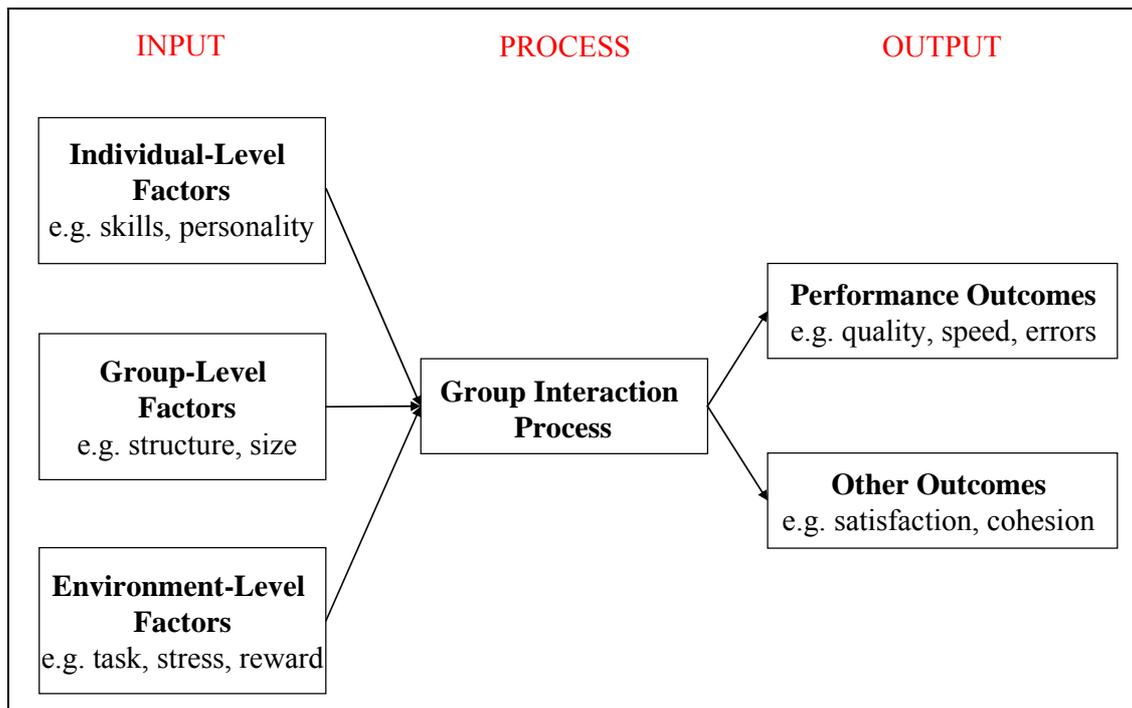
Figure 1: Input-Process-Output Model (McGrath, 1964)

Input

Input factors are all factors that can be manipulated in order to change processes and outcomes (Cohen & Bailey, 2007). According to McGrath (1964), input factors can be at the level of the individual, the group or the environment. In contrast, Gladstein (1984) only distinguishes between factors on the group level and factors on the organizational level, whereas Cohen and Bailey (2007) propose environmental, organizational, group, and task factors. Individual factors are for example skills of the individual group members, as well as attitudes (e.g. preference towards teamwork) and personality characteristics (e.g. extraversion, conscientiousness) (McGrath, 1964). Group size, group structure, and the level of "cohesiveness" (McGrath, 1964) or group composition (Gladstein, 1984), and tenure (Cohen & Bailey, 2007) are considered as input factors on the group level. Also team leadership is

mentioned by some authors (e.g. McGrath, 1991) as central input factor on team level. Input factors can also be found at higher levels, as the environment or the organization. These factors can be, for instance, reward structures, and the level of environmental stress (McGrath, 1964), industry characteristics (Cohen & Bailey, 2007) or resources offered by the organization as well as the whole organizational structure (Gladstein, 1984). Task design, like autonomy or interdependence is in the view of Cohen and Bailey (2007) also an important influencing factor, whereas Gladstein (1984) considers the nature of the task as essential moderating variable between team processes and team outcomes (see figure 2, right part). The next section focuses on team leadership as an input factor because it is considered to be the most important input factor for the purpose of this study.

Processes

Processes are group behaviors that can be observed, are influenced by different input factors and affect the outcome. Internal activities of the work group are behaviors that are relevant to reach the groups' goal, like effort, or strategies used by the group (Brodbeck, 1996). Other examples for interaction processes are time spent together, communication, encouragement among group members (McGrath, 1964), conflicts, strategy discussion, boundary management (Gladstein, 1984), team learning activities (Edmondson, 1999) or processes directed on external entities, like conflict communication (Cohen & Bailey, 1997). There are lots of different approaches to capture team processes in a sufficient way. According to Marks et al. (2001), team processes are "members' interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioral activities directed towards organizing taskwork to achieve collective goals" (p. 357). Baker et al. (2003) coin the phrase "skill competencies" and report several behaviors that are necessary to reach enhanced team performance: Mutual performance monitoring, adaptability, supporting/back-up behavior, team leadership, conflict resolution, feedback, and closed-loop communication/information exchange. Also information processing is an important feature in solving tasks and problem situations (Hinsz et al, 1997). In one of the following sections of chapter one, team learning is described in more detail because it plays a special role in through its influence on outputs in the input-process-output framework.

Output

Output or outcome is the result of the team processes and conceptualized in a multidimensional way. Outputs can occur at different levels: the individual, group, unit, or organization (Cohen & Bailey, 2007). Output is usually defined by the degree to which a goal is reached (Brodbeck, 1996).

Although team outcome is often considered to be the main aim when supervisors influence team processes, it is hard to define the components of "team outcome". Often, this term is used synonymous with measures of performance or effectiveness. However, a closer look at several team models shows that performance or effectiveness is not necessarily the target or the main dependent variable. Measures of satisfaction, commitment or absenteeism (e.g. Cohen & Bailey, 1997) can be equally important. According to Cohen & Bailey (1997), group outcomes can occur at the individual, group, or organizational level and can be related to each other. They made the following distinction between three measures of team outcomes:

- Measures of performance effectiveness assessed in terms of quantity and quality of outputs, e.g. efficiency, productivity, response times, quality, customer satisfaction, and innovation,

- Member attitudes, e.g. employee satisfaction, commitment, and trust in management, and

- Behavioral outcomes, e.g. absenteeism, turnover, and safety.

In line with this Hackman (1987) makes a distinction between performance outcomes (performance quality, speed of solution, number of errors) and other outcomes (member satisfaction, cohesiveness, attitude change, sociometric structure). Thus, he suggests three criteria to evaluate group outcomes: 1) the result of the groups' work, i.e. quality or quantity of the output, 2) the willingness and capability of the group to continue working together in the future, and 3) the individual consequences of the collaboration, i.e. satisfaction, and physical and mental health.

A further complication when defining "team outcome" is nomenclature as similar variables might be labeled differently, e.g. "performance", "effectiveness", or "productivity"

(Brodbeck, 1996). Brodbeck (1996) gives an overview about operationalizations used by different authors on "work group effectiveness". According to his collection, effectiveness includes: innovation, performance (sales revenues, self-reported performance, delivery of products, productive outcome), production (number of products) or productivity (delivery of products and services), social criteria (ability of members to work together), satisfaction (with the team, with meeting customer needs, with extrinsic rewards and work), workers' values to personal criteria (satisfaction of members' needs). Sometimes, the term "performance" is also used for behavior that is relevant for group goals and therefore focuses more on the process component of outcomes, for instance effort, task commitment, knowledge, skills, coordination, conflict, supportiveness, etc. (Brodbeck, 1996).

In their team effectiveness model, Tannenbaum et al. (1996) put more emphasis on the promotion of team effectiveness and therefore suggest the following classification of team outcomes:

- Team changes: new norms, new rules, new communication processes and new patterns,

- Team performance: quality, quantity, time, errors, and costs, and

- Individual changes: attitudes, motivation, and mental models.

Guzzo and Dickson (1996) combine these different approaches and propose the following definition that includes a) group-produced outputs, b) the consequences a group has for its members, and c) the enhancement of a teams' capability to perform effectively in the future (p. 309).

Currently, most attention of researchers is directed towards measures of work group effectiveness, e.g. performance quality, speed of problem solving or the number of errors (McGrath, 1964). It should be mentioned, however, that other, more subjective criteria, are important consequences of group interactions, for instance, member satisfaction, group "cohesiveness", attitude change, and sociometric structure (McGrath, 1964). One recent outcome measure is "group emotion", which is often not included in all different models of team effectiveness yet. However, the organizational literature tends to focus more and more on "group emotions" (e.g. Barsade & Gibson, 1998). Because daily emotions can foster or hinder the effectiveness of team work, "group emotions" should be added as another possible outcome of group interactions in the models of group effectiveness.

Note that not every input or process factor is beneficial for all kinds of team outcomes; some output factors might even be mutually exclusive in certain situations. For example, smooth processes and good team climate can lead to individual satisfaction, but not necessarily to better team performance because there is no incentive to exert high effort. Similarly, conflicts can lead to innovative and new ideas or to deeper team processes that in turn can lead to better group performance. Further, easy tasks do not necessarily lead to better performance as they lead to boredom and a building up of routines that fail when the environment changes. This study does not only focus on team performance in form of measures of (objective) team effectiveness, also other outcomes are considered, like critical and independent thinking, self-rated group effectiveness or group emotions.
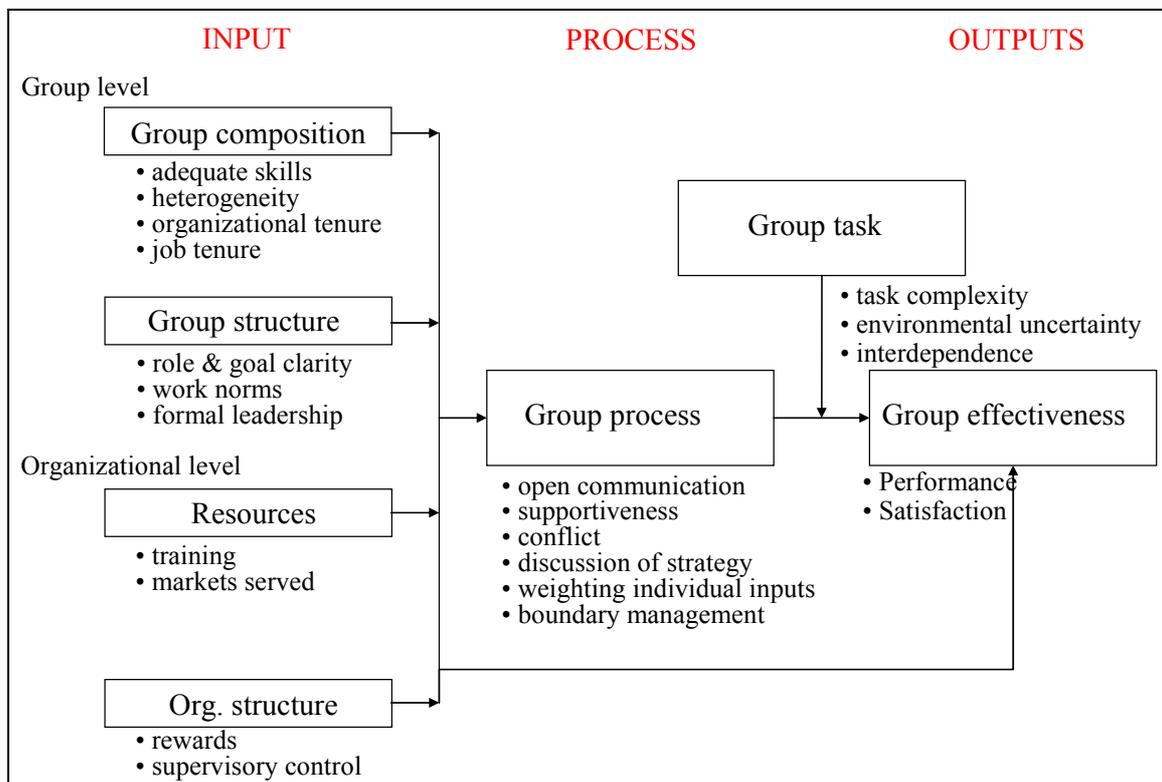
Figure 2: Input-Process-Output Model (Gladstein, 1984)

Integration

So, when taking a look at these models, it can be seen that obstacles to productive team work might enter at different points in Input-Process-Output (IPO) model. Typically, several elements cause problems or different problems occur at the same point of time. For example,

tasks can be too complex or not well organized (input, or moderator, see figure 1 vs. figure 2), leaders and team members can lack necessary skills, abilities or motivation or the combination of team members' skills and personalities is disadvantageous (input) and team processes are inappropriate (process) (Tannenbaum et al., 1996).

The aim of this work is to focus on factors that promote team effectiveness. Input-Process-Output models help for that purpose since they provide a framework that visualizes different influences on team outcomes. Research on this descriptive model of group behavior helps understanding which empirical associations between input, process, and output variables exist (Hackman, 1987). However, IPO models might be less useful to generate knowledge which helps to manage work teams. To enable a deeper understanding and also an improvement of team work, it is necessary to focus on pieces of this framework. This work focuses on Input- and Process factors that can be shown to play an important role within the context of team work. Additionally, as many studies focus on measures of team effectiveness or efficiency as outcome variable, there are also other important outcome variables that will be taken into consideration.

Zaccharo et al. (2001) demonstrate that leadership is the most important input factor on team effectiveness and team learning processes play an important role within the context of team performance as teams act in a dynamic environment (e.g. Edmondson, 1999; West, 1996). Hence, these two influences are of interest for the purpose of this work. Because not all input or process factors lead to a favorable outcome, different outcomes—ranging from self-rated group effectiveness, and objective group performance, to critical thinking and group emotions— are variables of interest in this work. The next sections describe "team leadership" and "team learning" in more detail.

Input: Team Leadership

Team leadership is an important characteristic of effective team performance and is supposed to influence almost every variable in the team effectiveness model (Tannenbaum et al., 1996). Interactions between a supervisor and her or his subordinates are crucial for team outcomes (e.g. Zaccaro et al., 2001) and team leaders are a key factor for the success or failure of teams. Although we already know a lot about leadership (e.g. Fleishman et al., 1991 counted 65 different leadership classification systems) there is relatively little literature

regarding the effective management of teams (and not individuals) by leaders and the influence of managers on team processes (and not individual subordinates' actions). Kozlowski et al. (1996) note that "existing models are limited in their ability to provide prescriptions to guide team leadership and to enhance team development" (p. 255). Therefore the question arises: "what kind of leadership behavior is appropriate for team-based environments?"

There are lots of different approaches explaining leadership behavior and leadership success. A general definition is that "leadership is a set of observable activities that occur in a group comprising a leader and followers who willingly subscribe to a shared purpose and work jointly to accomplish it" (Yammarino, 1996, p. 191). However, that definition does not address the question which kind of leadership behavior will be most effective for the teams' outcome. In the following sections, two different models on the influence of leadership on team work are presented.

General Model of Leader Behavior and Team Effectiveness

Based on a model of leadership functions (Fleishman et al., 1991), Zaccaro et al. (2001) use a functional approach to explain how team leaders influence team effectiveness. A functional approach means that tasks are specified that team leaders have to accomplish in order to ensure teams functionality and fulfill the teams' needs to be effective. In contrast, there are other leadership theories that specify particular leadership behaviors (see next section, e.g. Burke et al., 2006).

According to the functional leadership model (see figure 3), leaders have to fulfill the following tasks in order to enable smooth team processes (figure 3, left side): first, they have to structure, search, and evaluate information regarding the team's goals that have to be accomplished within the organization and the tasks a team is assigned to. Second, when the team's goals are established and the team task is clear, the team leader is responsible to make a concrete plan how the goals can be achieved and how team resources should be coordinated. Third, he or she has to manage personnel resources: So, for example, he/she selects team members, motivates the team as a whole, gives feedback or trains the personnel. The last task is the management of material resources, as, for instance, obtaining and allocating material. The four different leadership behaviors influence the teams' processes, e.g. cognition

(development of shared mental models, information processing, and development of meta-cognition), motivation (e.g. group cohesion, and collective efficacy), affect (e.g. control of conflicts, groups' emotional norms, emotional contagion and development of group-level emotion, and emotional composition/diversity), as well as coordination (information acquirement, monitoring, resource distribution). All these stimulated team processes lead in turn to the groups' effectiveness.
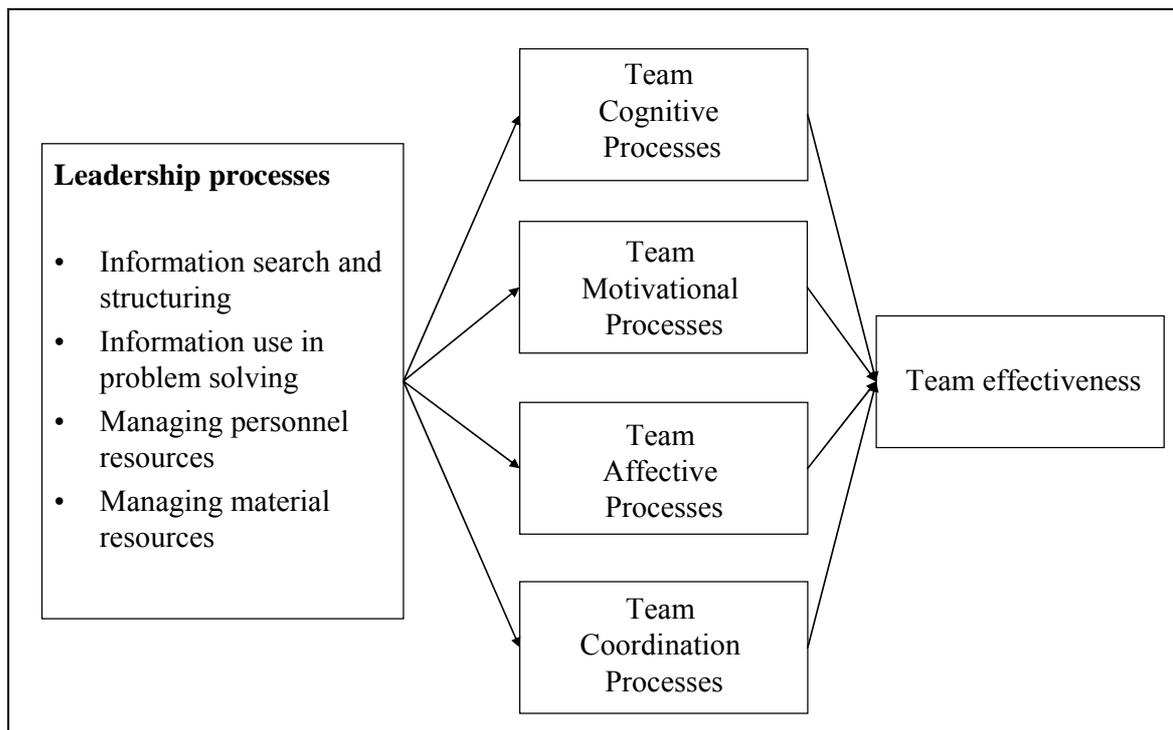
Figure 3: Functional team leadership model (Zaccaro et al., 2001, p. 458)

This model is useful to determine differential influences a team leader can have, e.g. on affect vs. on coordination, but the model does not specify a concrete leadership style. In order to link team processes and team performance to specific leadership styles, the model of Burke and colleagues is presented in the next section (2006).

Leadership Behavior Functional in Teams

Optimally performing teams are characterized by several aspects: They need to be real, have a direction and structure, have support within the organization and get coaching in order

to reach optimal performance (Hackman, 2002). Burke et al. (2006) integrate the requirements proposed by Hackman (2002) with the functions specified in the model of the earlier section (Zaccaro et al., 2001). They specify tasks a leader has to accomplish in order to enable optimal team performance. An overview of this model is given in figure 4. Within this model, specific leadership styles (e.g. transactional, transformational, etc.) are assigned to different leadership tasks (e.g. managing resources, doing coaching, etc.).

In this model, leadership behavior is divided into a task-focused and a person-focused leadership style. Task-focused behavior refers to task accomplishment; the leader promotes task understanding in giving and explaining all information relevant for the task. Person-focused leadership behavior, on the other hand, facilitates team interactions or team development.
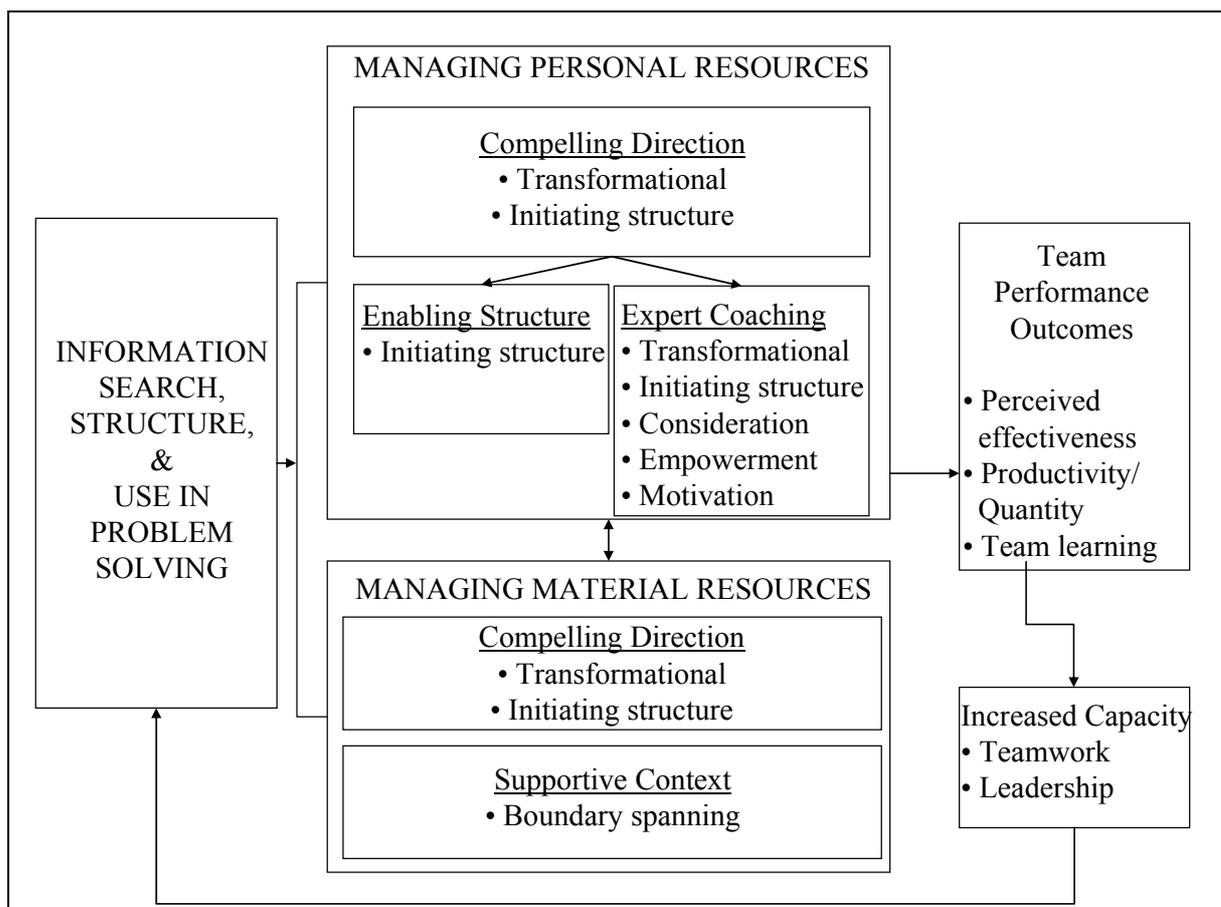
Figure 4: Team leadership framework (Burke et al., 2006, p. 290)

Task-focused leadership. There are three different categories of task-oriented leadership behavior: transactional leadership, initiating structure and boundary spanning. *Transactional leadership* builds upon dyadic exchanges between the leader and the subordinate of reward (by the leader) for applied effort (by the followers). A contract or agreement specifying work objectives is set up between the leader and the follower; when the contract is fulfilled and the goal is accomplished, the subordinate is rewarded (Avolio & Bass, 2000). *Initiating structure* means that the leader reduces ambiguity by giving a direction (also called "directive leadership"). The influence of directive leaders is built upon formal hierarchical structures, i.e., position power. These leaders assign goals, and provide the necessary input to accomplish these goals; in an extreme case they can also make use of commands to reach their goals (Pearce et al., 2000). The last task-focused leadership activity, *boundary spanning*, involves collaboration with other teams or other organizations to increase resources or build networks. As can be seen in figure 4, task-oriented leadership in form of initiating structure is especially important when managing material and personnel by providing a clear direction. Boundary spanning, however, is having a more supportive function. It is also noteworthy that these behaviors do not address team-relevant issues, for instance collaboration of the subordinates.

Person-focused leadership. Four categories of person-focused leadership can be found in this model (Burke et al., 2006): Transformational leadership, consideration, empowerment, and motivation. As the focus of this work are person-oriented leadership styles, that are especially important in the context of team work, I only briefly describe these behaviors in this section and describe them in greater detail in the next sections: *Transformational leadership* is considered as very similar to the concept of "charisma". Leaders act via an inspiring vision and high performance goals and they encourage their subordinate to adopt these goals through sharing values of the leader. As a consequence, subordinates perform beyond expectations. *Consideration* means that the leader considers needs of followers and builds mutual trust. *Empowerment*, also called empowering leadership behavior (Pearce et al., 2003), is leadership behavior that emphasizes and enables the development of followers' self-management skills. *Motivation* refers to the promotion of continued effort, even in cases of difficulty. As can be seen in figure 4, these person-oriented leadership styles are especially important in the context of expert coaching, in form of developing and motivating team members. Transformational leadership is additionally relevant when providing a compelling direction.

In a meta-analysis, relationships between different task-focused and person-focused leadership behaviors and team performance outcomes, such as perceived effectiveness, team productivity/quantity and team learning (see right part of figure 4) were analyzed. Task-focused leadership, taken as a whole, explained 11% of the variance with regard to perceived team effectiveness, and 4% of the variance with regard to measures of team productivity. As the sample of studies on task-focused leadership and team learning was not large enough, this relationship could not be examined.

Person-focused leadership behavior, taken as a whole, accounted for more variance in team outcomes: 13% of the variance in perceived team effectiveness, 8% in team productivity, and 31% in team learning. Subgroup analyses show that transformational leadership, consideration, and empowerment were positively related to measures of perceived team effectiveness. Regarding measures of productivity, transformational leadership and empowerment were most beneficial, whereas for team learning only empowerment explained variance, as there were nearly no studies on transformational leadership and team learning that could be included in this meta-analysis.

So, person-oriented leadership behavior seems to be the most promising leadership approach to promote team outcomes. According to Burke et al. (2006), this leadership approach is divided into four categories: motivation, consideration, transformational leadership, and empowerment. But, as consideration and motivation are part of the transformational leadership framework (e.g. Bass & Avolio, 1999) and to some extent also of the empowering leadership framework (Arnold et al., 2000), I will focus on transformational and empowering leadership theory in this work.

Transformational Leadership

Transformational leadership is in the focus of many researchers for over 20 years now (Felfe, 2006). This leadership theory has its origin in the work on Webers' "charisma" (e.g. Weber, 1924, cited in Pearce et al., 2003) and has been developed in Burns' work on political leaders (Burns, 1978) who distinguishes between ordinary and revolutionary leaders. Bass (e.g. 1990) advances this theory by integrating it into the "full range model of leadership", which is the most popular and best established leadership theory at the moment. This model postulates three different dimensions of leadership behavior that ranges from the absence of

leadership (laissez-faire leadership) over transactional leadership to transformational leadership. Because laissez-faire leadership is equivalent to the opposite of leadership, this part of the theory will not be presented here.

Transactional leadership is defined as rational exchange of effort and rewards between the leader and the follower. Leaders recognize the needs of followers, and clarify how needs can be satisfied (gratification, promotion, etc.); in return, followers spend effort and fulfill the goals set by the leader (contingent reward). Similarly, if goals are not accomplished, needs of followers are not satisfied.

Transformational leadership is the core component of the full range model of leadership. This leadership behavior aims at the "transformation" of subordinates' needs to higher order needs of the organization through leaders' instilling of his or her goals. A leader motivates his/her subordinates to spend extra effort, to perform beyond expectations and to accomplish the organizational goals via convincing communication of a common vision. So, the subordinates adopt the mission, goals and strategies of the leader and the organization, respectively (e.g. Bass & Avolio, 1990; Bass, 1999). Four components of transformational leadership were found:

- Individualized consideration: The leader supports his/her subordinate in her/his development by providing learning opportunities. He/she also shows empathy, recognizes and respects individual needs.

- Intellectual stimulation: The leader encourages her/his subordinates to question the status quo, and to look at problems from different angles; he/she appreciates intellect and new and creative ways of thinking, and fosters subordinates' willingness to change.

- Inspirational motivation: The leader communicates a vision, shows enthusiasm, provides an optimistic view towards the future and demonstrates confidence that all goals can be achieved and that goal achievement changes the future positively. Additionally, he/she encourages her/his subordinates to consider emerging problems as challenge and chance.

- Idealized influence: Idealized influence is the highest step of transformational leadership. The leader becomes a role model, reaches confidence in her/his vision, and creates a sense of a "common mission".

The relationship between transactional leadership and the components of transformational leadership can be seen in figure 5. Transactional leadership is considered to be a basic leadership style that relies on mutual exchange principles and leads to the expected effort and expected performance at the side of the followers; the follower will accomplish the goals set by the leader with the intention to get the announced reward. Transformational leadership builds on transactional leadership, and in showing individual consideration, intellectual stimulation, inspirational motivation, and idealized influence subordinates internalize the vision, adopt the common mission and spend extra effort in order to reach higher order goals. This then leads to better or even extra-role performance, i.e. performance that goes beyond expectations. So, transformational leadership leads subordinates to not just carry out their duty, but extend their formal role requirements and engage in voluntary activities for the organizations' benefit without expecting rewards.

Figure 5: Full Range Model of Leadership (Avolio & Bass, 2000)

Measurement. Avolio and Bass developed a questionnaire to capture the full range of leadership concept (Multifactor Leadership Questionnaire, Avolio & Bass, 2000). This questionnaire comprises transformational, transactional, and laissez-faire leadership. Transformational leadership is represented by 20 items that can be matched to its four

dimensions: individual consideration, intellectual stimulation, inspirational motivation, and idealized influence attributed and idealized influence behavior (descriptions see above). The items can be found in table 1. All items are answered on a five-point scale ranging from "not at all" to "frequently, if not always".

Table 1: Multifactor Leadership Questionnaire, Transformational Leadership (Avolio & Bass, 2000)

Dimension	Items: My supervisor:
INDIVIDUAL CONSIDERATION	Spends time teaching and coaching. Treats me as an individual rather than just as a member of a group. Considers me as having different needs, abilities, and aspirations from others. Helps me to develop my strengths.
INTELLECTUAL STIMULATION	Re-examines critical assumptions to question whether they are appropriate. Seeks different perspectives when solving problems. Gets me to look at problems from different angles. Suggests new ways of looking at how to complete assignments.
INSPIRATIONAL MOTIVATION	Talks optimistically about the future. Talks enthusiastically about what needs to be accomplished. Articulates a compelling vision of the future. Expresses confidence that goals will be achieved.
IDEALIZED INFLUENCE	BEHAVIOR: Talks about his or her most important values and beliefs. Specifies the importance of having a strong sense of purpose. Considers the moral and ethical consequences of decisions. Emphasizes the importance of having a collective sense of mission. ATTRIBUTED: Instills pride in me for being associated with him/her. Goes beyond self-interest for the good of the group. Acts in ways that build my respect. Displays a sense of power and confidence.

With regard to transactional leadership, three components are captured in this questionnaire: contingent reward, management-by-exception active and passive. Also, items to measure the absence of leadership, namely laissez-faire leadership, are included. The MLQ is an extensively validated and often used measure of transformational and transactional leadership (Judge et al., 2006). Several studies demonstrate the validity and the factor structure of this questionnaire, although it is acknowledged that the factor structure can vary across different organizational contexts (e.g. Antonakis, Avolio, & Sivasubramaniam, 2003) and the dimensions of transformational leadership are highly intercorrelated (e.g. Judge et al., 2006). The most recent meta-analysis (Judge & Piccolo, 2004) report the following validity coefficients of transformational leadership that are corrected for measurement and sampling error: .58 for follower job satisfaction, .71 for satisfaction with the leader, .53 for follower motivation, .27 for leader job performance, .26 for group or organization performance, and .64 for leader effectiveness. With regard to the criterion validity of the German version of the MLQ, different relationships with internal and external criteria are found: the four transformational leadership scales are correlated with measures of extra effort, efficiency and satisfaction with the leader that are included in the MLQ (internal validity). Transformational leadership is also related to affective commitment towards the organization (strongest relationships for idealized influence), as well as to organizational citizenship behavior OCB (strongest relationship for inspirational motivation) (e.g. Felfe, 2006). Thus, the MLQ represents a reliable and valid diagnostic instrument to capture transformational leadership behavior.

Consequences of transformational leadership. It is well established and several meta-analyses show that transformational leadership is associated with individual outcomes (e.g. DeGroot et al., 2000), i.e. performance, organizational citizenship behavior, and satisfaction. There are fewer studies that are conducted at the team level. But, also within the context of team performance, the tendency that transformational leadership positively influences team outcomes becomes visible. Several authors show a positive influence of transformational leadership on team outcomes in experimental tasks: it is found that transformational leadership leads to better solution quality in creativity tasks, enhances leadership satisfaction, and group cohesiveness (Hoyt & Blascovich, 2001; Jung, 2001; Sosik, 1997). Groups in the

transformational leadership condition also produced more ideas (Jung, 2001), and made higher ratings with regard to group performance and extra effort (Sosik, 1987).

But also in the field research the beneficial effect of transformational leadership on group outcomes is found; positive correlations with managerial and self-ratings of performance (Pearce & Sims, 2002) and with performance ratings in the military context (Lim & Ployhart, 2004) were reported. Keller (1992) showed that transformational leadership is related to project quality and to budget and schedule performance in teams. It was demonstrated that transformational leadership significantly predicts unit performance of army platoons and that this relationship is partially mediated via the units' perception of cohesion and potency; thus, transformational leaders create a feeling of mutual commitment and collective confidence that leads to better group performance. Similarly, it is also shown that military groups whose leaders received a transformational leadership training outperform groups with an eclectic leadership training (Dvir et al., 2002). Transformational leadership is also found to create a team climate that supports innovation, so that all team members are committed to innovation. This climate in turn is related to team innovation itself (Eisenbeiss, van Knippenberg, & Boerner, 2008). A group of Korean firms led by leaders scoring higher in transformational leadership were more cohesive and reported higher effectiveness (Jung & Sosik, Schaubroeck). Transformational leadership is also related to higher team creativity of teams that were heterogeneous with respect to their educational background (Shin & Zhou, 2007). Groups felt more self-confident when led by a leader with a high transformational leadership score (Sivasubramaniam, 2002). Hofmann and Jones (2005) find that transformational leadership is positively related to the groups' collective personality regarding openness, agreeableness, extraversion and conscientiousness. These leaders can also create a groups' affective climate (Pirola-Merlo et al., 2002).

Transformational leadership is effective in a wide variety of contexts (e.g. business, military, hospitals, educational context; Bass, 1999); so, it is even found that the transformational leadership style of conductors promotes the success of orchestras when the orchestra was in a positive mood. When the orchestra is in a bad mood, however, transformational leadership is no longer beneficial (moderator effect, Boerner & von Streit, 2006).

I conclude this section on transformational leadership with a meta-analytic result that investigates the relationship between transformational leadership and productivity ($k = 5$,

N(team) = 330) and perceived team effectiveness (k = 19, N(team) = 1291) (Burke et al., 2006). They find effect sizes of r = .34 for team effectiveness and r = .25 for productivity, that were all significant.

Empowering Leadership

Definition. Leader roles shifted over the past years; the role of many leaders has changed from a traditional role with focus on supervision to a role that also required more coaching skills and that is less hierarchical. Providing more scope for collaboration helps subordinates to develop their own competences (Tannenbaum et al., 1996). The main component of empowering leadership is to empower teams to work together on their own and to encourage team members to develop self-management or self-leadership skills.

Social Cognitive Theory (Bandura, 1986), Cognitive Behavior Modification Research (Meichenbaum, 1977), and Participative Goal-setting Research (Erez & Arad, 1986) serve as a theoretical background for this leadership theory. Social Cognitive Theory assumes that the leader can serve as a role model and shows self-management behaviors that in turn lead to self-management behaviors on the side of followers. By stressing the important aim of empowering leadership by learning and self-management of followers, the cognitive behavior modification approach is useful for leaders to teach their followers how they can make use of their experiences of problems Failure can be cognitively restructured into learning experiences which can be helpful for difficult situations in the future. Although the empirical evidence of participative goal-setting (e.g. Locke & Latham, 2002) is not consistent, it can be assumed that defining goals in a participative way (leaders together with subordinates) strengthens the commitment of followers and leads to more effort towards the accomplishment of the goal.

Empowering leadership is a heterogeneous concept and comprises different leadership behaviors: Coaching (e.g. Edmondson, 1999; Hackman & Wageman, 2005), facilitative leadership (Hirst et al., 2004), participative leadership (e.g. Kahai et al., 1997) Unleader, SuperLeadership, or leader of self-managing teams (e.g. Manz & Sims, 1987; Nygren & Levine, 1996). All these different concepts are summarized in the term "empowerment" or "empowering leadership" (e.g. Arnold et al., 2000; Burke et al., 2006; Pearce et al., 2003).

This leadership theory has its origin in the work of Manz and Sims (1987) on leaders of self-managing teams. They introduced the idea that – in the context of self-managing teams – the role of a leader or supervisor shifts to that of a coach or facilitator to ensure that the team gains responsibility and is able to set goals, plans strategies and reflects on performance on their own, without being instructed by the supervisor. These leaders encourage teams to have high performance expectations, to set goals participatively, to be self-critical and evaluate the teams' performance, but also to experiment with new ideas or ways of task accomplishment (e.g. Manz & Sims, 1987). They also foster opportunity thinking, teamwork, self-development, and self-reward (Pearce & Sims, 2002). Nygren and Levine (1996) expanded these behaviors with encouragement of interactions, enabling constructive conflict resolution, and establishing a strong identification with the team/creating team spirit.

Coaching means that the leader encourages the team to actively engage in task accomplishment and he or she "help[s] members make coordinated and task-appropriate use of their collective resources in accomplishing the teams' work" (p. 269). He or she leaves the team enough range to act on its own, but gives feedback in order to enable learning from experience. Coaching aims at a strong engagement in interpersonal problem solving of the team followers and at a feeling of responsibility for the results of their collaboration (Wageman, 2001). Similarly, Edmondson (e.g. 1999, 2003, 2004) characterizes a coaching leader by a person that encourages participation of all team members und is present in case of problems. A subcomponent is participative leadership (e.g. Kahai et al., 1997) which implies that the leader includes its team in his or her decisions. In a similar vein, Hirst et al. (2004) use the term facilitative leadership to characterize a leader that creates positive relationships among team members, encourages productive conflict resolution, and creates an atmosphere where ideas and opinions can be communicated openly.

Pearce et al. (2003) subsume all these different concepts under the term "empowering leadership" which is characterized as follows (p. 300):

- Encouraging opportunity thinking,

- Encouraging self-rewards,

- Encouraging self-leadership,

- Encouraging in participative goal-setting, and

- Encouraging teamwork.

Table 2: Empowering Leadership Questionnaire ELQ (Arnold et al., 2000)

Dimension	Items: My supervisor:
LEADING BY EXAMPLE	Sets high standards for performance by his/her own behavior.
	Works as hard as she/he can.
	Works as hard as anyone in my work group.
	Sets a good example by the way he/she behaves.
	Leads by example.
PARTICIPATIVE DECISION-MAKING	Encourages work group members to express Ideas/suggestions.
	Iistens to my work group's ideas and suggestions.
	Uses my work group's suggestions to make decisions that affect us.
	Gives all work group members a chance to voice their opinions.
	Considers my work group's ideas when he/she disagrees with them.
	Makes decisions that are based only on his/her own ideas.
COACHING	Helps my work group see areas in which we need more training.
	Suggests ways to improve my work group's performance.
	Encourages work group members to solve problems together.
	Encourages work group members to exchange information with one another.
	Provides help to work group members.
	Teaches work group members how to solve problems on Their own.
	Pays attention to my work group's efforts.
	Tells my work group when we perform well.
	Support my work group's efforts.
	Helps my work group focus on our goals.
	Helps develop good relations among work group members.
INFORMING	Explains company decisions
	Explains company goals
	Explains how my work group fits into the company
	Explains the purpose of the company's policies to my work group.
	Explains rules and expectations to my work group.
	Explains his/her decisions and actions to my work group.

Dimension	Items: My supervisor:
SHOWING CONCERN/INTERACTING WITH THE TEAM	Cares about work group members' personal problems.
	Shows concern for work group members' well-being.
	Treats work group members as equals.
	Takes the time to discuss work group members' concerns patiently.
	Shows concern for work group members' success.
	Stays in touch with my work group.
	Gets along with my work group members.
	Gives work group members honest und fair answers.
	Knows what work is being done in my work group.
	Finds time to chat with work group members.

Measurement. Arnold et al. (2000) developed and validated a questionnaire on empowering leadership and found evidence for five different dimensions of empowering leadership:

- Leading by example: Empowering leaders display behaviors that show that the leader is committed to his work (like working hard). So, he or she acts as a role model for the team.

- Participation in decision-making: The leader uses the information and input of the team members in making decisions.

- Coaching: The leader helps team members to become self-reliant, e.g. in suggesting performance improvements.

- Informing: The leader disseminates information on organizational goals, policies and missions.

- Showing concern/interacting with the team: The leader stays in touch with its team and he or she works closely with the team as a whole.

The items and their attribution to the five dimensions can be found in table 2. All items are answered on a five-point scale, ranging from "not at all" to "frequently, if not always".

Arnold et al. (2000) found support for the five factor structure of the Empowering Leadership Questionnaire (ELQ) in two studies. They also showed that the instrument is very reliable. But, it is also mentioned that the intercorrelations between the five factors are quite

high. With regard to construct validity, it was shown that the subscales of the ELQ are strongly and positively correlated with subscales of the Managerial Practices Survey (MPS, Yukl, 1989): Informing, planning, clarifying, consulting, inspiring, recognizing, monitoring, problem solving, supporting, team building, networking, delegating, monitoring, and rewarding, as well as with the consideration and initiating structures subscales of the LBDQ (Stogdill, 1963). These results support the idea that the empowering leadership construct is related to other leadership behaviors. Interestingly, this questionnaire was not compared to behaviors measured with the well established instrument, the Multifactor Leadership Questionnaire (Bass & Avolio, 2000; see last section on transformational leadership for details). So far, no studies on the external validity (correlations with external criteria, i.e. satisfaction with the leader, commitment or performance) are published.

Consequences of empowering leadership. The aim of empowering leadership is to assign a larger degree of accountability to the team and thereby empowering it (e.g. Kirkman & Rosen, 1999). Empowerment refers to the state that a team gains power, autonomy, and influence. Within the context of experimental studies, it is found that participative leadership leads to more supportive remarks on a collective brainstorming task (Kahai et al., 1997). Groups with a participative leader also discuss more information in a hidden profile group decision task compared to directive leadership (Larson et al., 1998).

In the field, it is found consistently that empowering leadership is related to better team processes, learning and reflection. So, it could be demonstrated that coaching leads to a feeling of psychological safety within the team that allows experimenting and team learning (e.g. Edmondson, 1999). Additionally, coaching influenced the "ease to speak up" regarding concerns and problems that in turn led to a better technology implementation in the case of a hospital (e.g. Edmondson, 2003). "Speaking up" also facilitates faster reactions towards problems that occur during technology implementation (Carroll & Edmondson, 2002). Empowering leadership was also found to be related to team learning processes, for instance sharing information, communicating openly, giving and seeking feedback (Nygren & Levine, 1996). It also leads to more team reflexivity that in turn is associated with better team performance (Kirkman & Rosen, 1999). Empowering leadership was also found to be correlated with innovation ratings (Burpitt & Bigoness, 1997).

Tannenbaum and colleagues (1998) reported a beneficial effect of empowering leadership training: teams with leaders who were trained to show empowering behaviors engaged more

in learning behaviors, like discussions, criticism and suggestions and feedback. These behaviors maximize learning experiences. That is especially important as experience alone does not necessarily lead to learning (e.g. Pisano et al., 2001).

So, empowering leadership is especially beneficial for team processes and team learning behaviors. With regard to team performance, the relationship is less clear. Although Larson et al. (1998) found that teams with an empowering leader discuss more information, they do not come to better decisions. Also Kahai and colleagues (1997) found that teams with empowering leaders display better team processes, but that these teams do not propose more final solutions. Somech (2006) even documents a negative relationship between empowering leadership and in-role performance. Similarly, no relationship between empowering leadership and manager, customer, and self-ratings of team performance is found (Pearce & Sims, 2002). Srivastava et al. (2006), however, report that empowering leadership is positively related to knowledge sharing and team efficacy in management-teams of hotels, which in turn was positively associated with hotel property performance. Yun, Faraj & Sims (2005) report mixed results regarding empowering leadership and team performance of trauma resuscitation teams, depending on trauma severity and team experience: empowering leadership was less beneficial compared to directive leadership when trauma severity of patients is high. But, when the patient is not severely injured or the team is not inexperienced, empowering leadership is better with regard to performance quality indicating that empowering leadership is especially conducive for team performance in cases of low trauma severity and high team experience.

I conclude this section on empowering with a meta-analytic result that investigates the relationship between empowering leadership and productivity ($k = 5$, N(team) = 622), perceived team effectiveness ($k = 15$, N(team) = 829) and team learning ($k = 3$, N(team) = 200) (Burke et al., 2006). They find effect sizes of $r = .47$ for team effectiveness, $r = .32$ for productivity, and $r = .56$ for team learning, that were all significant.

Comparison of Transformational and Empowering Leadership

When taking a closer look at the descriptions of the two aforementioned leadership theories and the items to measure these leadership behaviors in table 1 and 2, it can be seen that transformational leadership is aligned with motivating, inspiring, and planning, whereas

empowering leadership can be characterized by consulting, delegating, supporting, developing, managing conflict, and team building (Pearce et al., 2003). A more detailed comparison is presented in table 3.

Table 3: Summary and comparison of transformational and empowering leadership

	Transformational leadership	Empowering leadership
Theoretical background	Sociology of Charisma ("Charismatische Herrschaft", Weber, 1946) Charismatic leadership (House, 1977)	Social cognitive theory (Bandura, 1986) Behavior modification (Meichenbaum, 1977) Participative goal setting (Locke & Latham, 1990)
Representative Leadership Behaviors (Pearce & Sims, 2002)	▪ Providing vision ▪ Expressing idealism ▪ Using inspirational communication ▪ Having high performance expectations	▪ Encouraging independent action ▪ Encouraging opportunity thinking ▪ Encouraging teamwork ▪ Encouraging self-development ▪ Participative goal-setting ▪ Encouraging self-reward
Dimensions of the MLQ and ELQ	See table 1	See table 2
Level of influence	Individual, can cascade to other organizational levels	Group/team
Nonverbal behaviors/stylistic device	▪ Stylistic devices: e.g. alliterations, metaphors, comparisons ▪ use of emotion	not mentioned in literature
Intended behavior of the followers	▪ willingness to develop ▪ gaining new perspectives ▪ transformation of individuals' followers needs in higher order needs (of the organization) ▪ trust in the leader → motivation → extra-effort → higher performance	▪ participation ▪ express one's ideas/opinions; opportunity thinking ▪ feeling responsible for teams' performance ▪ interaction with other team members → self-leadership → reflection and team learning
Consequences for the team	Aims at team performance and team cohesion	Aims at team processes and accountability

Transformational leadership concentrates on the ability of a leader to inspire followers to adopt the leaders' vision and to move beyond self-interest, and to get involved for long-term goals (Bass, 1999). Empowering leadership, in contrast, is based on behaviors that mainly aim at the development of self-management skills of the followers (Arnold et al., 2000). Thus, transformational leaders use a common mission to motivate followers. Usually, transformational leadership addresses the individual team member, but the positive influence and motivation cascades to other organizational levels, for instance the team as a whole, a unit or even the whole organization. In contrast, the empowering leader does not set a common goal or vision. He or she aims at the capability of the team to manage itself: Empowering leaders encourage team interactions and cooperation that results in groups that set own goals, find their own way of task accomplishment and reflect on current and past performance. Thus, they assign accountability to the team. This leadership style is exclusively directed toward the team.

As a consequence of these different behaviors, followers led by a transformational leader are highly motivated, and spend extra effort, what leads to better performance. When all individuals within a team are led in this way, all individual team members show high performance that results in a better overall group performance. In contrast to that, groups led by an empowering leader set own goals and find their own way to perform the given task. As team members give each other feedback, reflect, and communicate openly on successful and unsuccessful ways of task accomplishment, and as furthermore each individual team member brings in its own, particular competence, the team has a broad amount of information at its disposal. Besides, as feedback is exchanged among team members, e.g. on suboptimal ways of task accomplishment or inappropriate goals, a correction of inappropriate procedures is enabled. This shared knowledge and expertise as well as the adaptation of task accomplishment leads to better team performance.

The distinction between empowering and transformational leadership is demonstrated in several empirical studies. Pearce et al. (2003), for example, conduct exploratory and confirmatory factor analyses on three different samples and present evidence for a typology of leadership that included four distinct leadership behaviors: transformational, empowering, directive, and transactional leadership. Also Pearce and Sims (2002) provided factor analytical evidence for the distinction of empowering and transformational leadership.

There are a few studies that compare the influence of transformational and empowering leadership on team outcomes. One purpose of this work is to address the question of which of the two leadership behaviors is more influential on team outcomes and if their effectiveness depends on the measured outcome. Thus, **Chapter two** contains two experimental studies on the influence of transformational and empowering leadership behavior on team performance. **Chapter three** deals also with the comparison of transformational and empowering leadership and describes a field study on the influence of leader behavior on group emotions. Because different indicators of team outcomes are used in the three presented studies (chapter two and three), e.g. objective group performance, originality, critical thinking, and group emotions, conclusions on differential effects of each leadership behavior can be presented.

Factor "Process": Team Learning

Learning in Organizations

Team processes are the interfaces between team characteristics and team outcomes. Hence, many researchers ask for a more process-oriented approach when investigating teams instead of simply correlating input factors with team outcomes (e.g. Brauner & Orth, 2002). One important team process, especially in environments that change quickly, is learning. Learning is vital for the development of an organization and can be seen as a competitive advantage of organizations (e.g. Edmondson & Moingeon, 1998). Thus, it ensures organizational survival. Learning can take place on different levels – i.e. the individual, the team and the whole organization (see table 4).

According to the model of learning in organizations (Crossan et al., 1999), learning is considered to be a multilevel process; different processes that link one level to another take place on each level (see table 4, right side). The starting point of learning is an individual. During its work, an individual recognizes certain patterns within its experiences and develops insights ("intuiting"). These insights are then explained to one-self or to other people within the organization ("interpreting"). In communicating insights to others, and in finding a common interpretation, learning moves beyond individual processes: insights are transferred to other people and interpreted with the help of language and common knowledge is developed. Thus, "interpreting is a social activity that creates and refines common language, clarifies images, and creates shared meaning" and "becomes embedded within the

workgroup" (Crossan et al., 1999, p. 528). That leads to common knowledge and understanding, changes in ideas, and new actions ("integrating"). During integration, communication is the most important process as only communication enables the development of a shared understanding and a coordination of actions. In the last step of the learning process, insights that occured at the individual and team level are embedded within the organization. Thus, certain routines and rules are developed.

Table 4: Three levels of learning in organizations (Crossan, Lane, & White, 1999)

Level	Process	Inputs/Outcomes
Individual	Intuiting	Experiences
		Images
		Metaphors
	Interpreting	Language
		Cognitive map
		Conversation/dialogue
Group	Integrating	Shared understandings
		Mutual adjustment
		Interactive systems
Organization	Institutionalizing	Routines
		Diagnostic systems
		Rules and procedures

It should be mentioned, however, that learning is no unidirectional process, but that learning feeds forward from the individual to the team and the organization, but that institutionalized learning also has an impact on the individual or group. Thus, the basic mechanism of learning is the sharing of ideas and the development of a common meaning.

Learning at the last level - organizational learning – is a concept of high interest today and many researchers deal with this kind of learning in organizations. Organizational learning means the modification of organizational goals to more realistic ones depending on reflected experience and current perceptions (Argyris & Schön, 1978, see next section).

Organizational Learning

Organizational learning takes place when problems or errors occur; as a consequence, single-loop learning or double-loop learning can emerge (see figure 6). Single-loop learning means that employees correct mistakes in applying organizational actions or strategies that fit with organizational goals, values, plans, or rules, but without questioning or modifying them. In contrast, double-loop learning implies an analysis of reasons or causes that led to problems. As a consequence, organizational norms, plans or goals are modified and—when indicated—adapted to new circumstances.
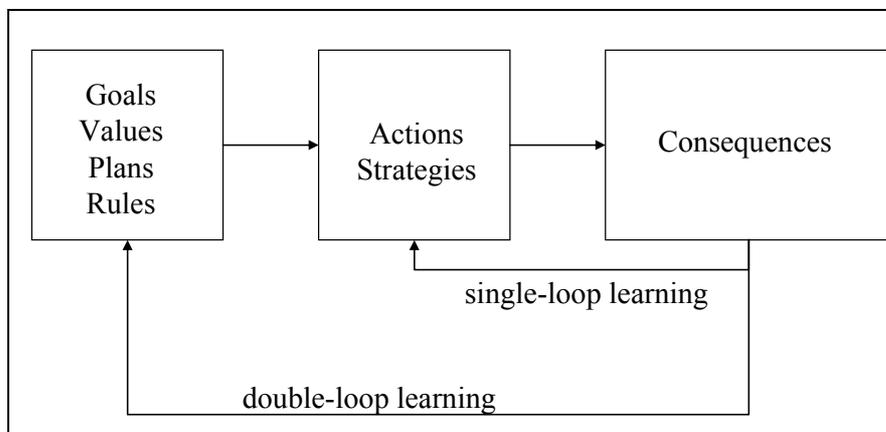
Figure 6: Organizational learning (Argyris & Schön, 1978)

It should be kept in mind that most learning activities within organizations take place on an individual level: It is the employee who has to update existing knowledge and learn new procedures and skills in undertaking actions, reflecting upon them, and modifying them in an ongoing way (Schön, 1994). As the employee gets new ideas and acquires knowledge and skills in observing his or her colleagues, getting feedback from them, or interacting with them, learning can also be considered as social (Carroll et al., 2002; Crossan et al., 1999), especially, as much work in organizations is assigned to teams. Hence, team learning is in the focus of this work.

Team Learning

Team learning is an „iterative team process in which information is (1) acquired, (2) distributed, (3) both convergently and divergently interpreted, and (4) stored and retrieved. (van Offenbeek, 2001, p. 306). Team learning leads to "a change in the range of the team's potential behaviors" (van Offenbeek, 2001, p. 306) and in its collective level of skills and abilities through shared experience (Ellis et al., 2003). Taking a closer look at the definition of learning, the model of organizational learning (see figure 6), and also the level model of learning (see table 4), it emerges that learning is always a cycle of action and reflection. Transferring this to teams means that teams should reflect on past performance, analyze causal structure for success or failure of undertaken actions, try new actions, analyze them, modify them, try again, reflect and so forth. Accordingly, Edmondson (2002) divides team learning in a reflective and an active part.

Reflective team learning. Reflection means that the team is developing collective insight by sharing information, seeking feedback about performance, discussing errors or problems and experimenting to gain insight (Edmondson, 2002). West (e.g. 1996) also mentions the importance of reflexivity that is defined as "the extent to which group members overtly reflect upon the groups' objectives, strategies, and processes and adapt them to current or anticipated endogenous or environmental circumstances" (p. 559). Carter and West (1998) developed an instrument to measure team reflexivity. They found two dimensions of team reflexivity: task reflexivity and social reflexivity. Task reflexivity is characterized by a teams' reflection on objectives, methods, strategies, task accomplishment, and decisions, whereas social reflexivity measures mutual support and conflict solving capabilities. Also Schippers et al. (2007) developed an instrument to capture "reflexivity", they also found two different factors (evaluation/learning and discussing processes). In contrast to Carter and West (1998) they focus more on the depth of reflection. The factor "evaluation/learning" refers to a shallow level of reflection and is characterized by reflection on previous actions and finished business. In contrast, "discussing processes" is related to a deeper level of reflection, i.e. it is reflected how tasks are usually accomplished in the team, how communication is structured, and which norms or values exist.

Also Hirst et al. (2004) consider team reflexivity as an important part of the learning process and define it as consisting of discussion of divergent opinions, reflection about optimal accomplishment of team tasks, acting against routine, challenging existing

assumptions, and discussion of practiced methods. Druskat and Kayes (2000) focus as well on the reflective part of team learning in defining learning as knowledge and information acquiring and sharing to find out what improves or hinders effective team performance. One very specific learning behavior is "speaking up", an open dialogue among team members that is characterized by speaking up with observations, concerns, and questions (Edmondson, 2003). The work of van Offenbeek (2001) focuses on the information processing perspective of reflective learning in emphasizing the importance of information acquisition, distribution, interpretation, storage and retrieval.

As it can be seen in these different definitions, communication, information exchange and reflection are the most important processes that enable active team learning. Reflection takes place very quickly and frequently, but reflection can also be a planned process (e.g., post-action reviews or half-time of sports teams) that occurs less frequently (Edmondson, 2003). West (2000) assumes learning can take place before, during or after task accomplishment. During such reflective phases, teams ask questions like "What are we learning? What can we do better? What would we change?" These questions are followed by plans and an implementation of plans, or action.

Active team learning. Action—the other side of learning behavior—refers to improvements produced by making a change, achieving closure on a decision, implementing results of an experiment, finalizing a plan, improving performance or transferring new knowledge to others (Edmondson, 2002). Active learning is the result of reflective learning in form of a change in the behavioral repertoire of the team (van Offenbeek, 2001) or the creation of new processes and practices (Zellmer-Bruhn & Gibson, 2006). So, for example, the implementation of a new technology in a hospital can be seen as important active learning (e.g. Edmondson, 2003).

Consequences of reflective and active team learning. What is exactly the function or the benefit of these learning behaviors? As team members interact with each other, knowledge and skills of one team member can be transferred to his or her colleagues and result in a larger amount of team knowledge or skills. It is also supposed that establishing cause-and-effect chains through reflection after action leads to better preparation for future challenges and therefore to better organizational performance (Tjosvold et al., 2004). Additionally, team members share unique information and information on what enables or disables team performance; that facilitates problem resolution and improves team performance.

Van Offenbeek (2001) showed that, in situations in which learning is necessary, a higher frequency of learning activities leads to better performance. These are mostly situations with information overload and ambivalent cues. Also Edmondson (1999) found evidence that learning behavior is associated with observer performance ratings in teams of a manufacturing company. It is also demonstrated by several authors that objective performance indicators, i.e successful technology implementation or customer and supervisor ratings, benefit from learning activities within teams (e.g. Edmondson, 2004; Carter and West, 1998). De Dreu (2002) focuses on the moderating effect of reflexivity. He finds that minority dissent in combination with reflexivity is related to innovation and team effectiveness in organizational teams. Also Tjosvold et al. (2004) report relationships between reflexivity and innovation. Bunderson and Sutclitte (2003) showed that teams' learning orientation is related to better objective performance indicators, such as performance-to-plan and profit-per-unit. Druskat and Kayes (2000) found that learning and performance in short-term project teams is related to each other. On the other hand, the absence of learning behavior often can lead to disadvantages and worse performance (Dougherty, 1992).

These findings suggest that team learning is an important and functional team process. Note, however, that learning does not emerge automatically (Edmondson, 2003) as teams, for instance, reflect, but do not act. Equally possible, teams neither reflect nor act (Edmondson, 2002). There are several factors that influence the rate of learning behavior, such as power, or status (Edmondson, 2003), team diversity (Fay et al., 2006; Schippers et al., 2003), team climate (e.g. Edmondson, 1999), cooperative goals or outcome interdependence (e.g. De Dreu, 2007; Tjosvold et al., 2004), characteristics of the team members, i.e. personality or cognitive ability (Ellis et al., 2003), and team experience (Pisano et al., 2001).

In this section I argued that learning is important for organizational success and that an important level of learning is the team. Furthermore, it was shown that team learning can be divided into an active and a reflective part and that team learning is often found to be related to team performance and can be influenced by different factors. Thus, one aim of this work is to shed light on various aspects of team learning. Hence, **Chapter four** contains a study on learning in ad-hoc teams. The aim of this study is to distinguish and observe different forms of team learning (reflective learning, precondition of active learning, and active learning) in a hidden profile decision making task and to find out how the various forms of team learning

are related to different aspects of team performance. Additionally, the role of shared goals and team safety climate in the context of team learning are examined.

Summary of Research Questions

I will conclude this introduction chapter by summarizing the questions with regard to team leadership and team learning that are addressed in this work:

I.   What kind of leadership behavior (transformational and empowering) is more beneficial with respect to team outcomes?

II. Does the influence of team leader behavior vary depending upon the measured outcome variable (group performance, originality, critical thinking, and group emotion) and on the situation (e.g. degree of task structuredness)?

III. What kind of learning behaviors can be observed in ad-hoc groups and are they conducive to team outcomes, such as performance?

IV. Does the influence of learning behavior on group performance depend on the operationalization of group performance: self-rated group effectiveness (satisfaction with the cooperation) versus objective group performance?

V.   What are the antecedences of team learning?

The next chapters describe different studies on team leadership and team learning. At the end, this work summarizes the research findings and also ways through which better team outcomes can be reached. This work concludes with practical implications, and an outline for future research is provided.

Chapter 2

The Influence of Leadership Behavior on Different Aspects of Team Performance

Theoretical Background

It is widely accepted that team leadership is an important factor in the success or failure of teams (Gladstein, 1984; Zaccaro, Rittman, & Marks, 2001). Nevertheless, most research in the field of leadership has focused on the supervisor–subordinate dyad. As Yammarino and colleagues have shown, however, perceptions of leader behavior often vary more within groups than between groups (e.g., Yammarino & Dubinsky, 1994). For this reason, findings from research on leadership and individual performance cannot be easily generalized to the team context. More research is needed to investigate how leader behavior influences team-level outcomes as opposed to individual-level outcomes (Kozlowski, Gully, Salas, & Cannon-Bowers, 1996).

There are a number of rival conceptualizations of leadership and theories of which leadership behaviors are effective. In fact, Fleishman and colleagues identified 65 different taxonomies that have been developed to define leadership (Fleishman et al., 1991). There is some consent that, in the team context, this diversity can be reduced to, four leadership behaviors: directive, transactional, transformational, and empowering leadership (e.g. Manz & Sims, 1991; Pearce et al., 2003), or five behaviors, respectively, when directive leadership is divided into directive and aversive leadership (Pearce & Sims, 2002). The question thus arises as to which type of leadership is most effective for teams. A meta-analysis showed that person-focused leadership behaviors, such as transformational and empowering leadership, are particularly beneficial for team outcomes, like productivity, effectiveness and team learning (Burke et al., 2006). Among those approaches, the theory of transformational leadership is the most established one. Researchers and practitioners in this field claim that transformational leadership works like a magic bullet, positively influencing a wide range of outcomes (Bass & Avolio, 1999; Podsakoff, MacKenzie, Moorman, & Fetter, 1990). The theory of empowering leadership, on the other hand, is conceptually rather diverse and not yet well established, although it is particularly important and meaningful in the team context as it describes how leaders can empower teams to work together. Research on empowering leadership has shown that this leadership behavior is particularly beneficial for team processes, team reflection, and critical and responsible thinking (e.g., Yun, Faraj, & Sims, 2005).

In this paper, we would like to compare these two leadership behaviors, but also to pose the question regarding the "best" leadership behavior somewhat differently. Our aim is to

determine which outcomes are positively influenced by which type of leadership. Despite calls for a direct comparison of transformational and empowering leadership behaviors, no systematic empirical comparison of the two has yet been published (Arnold, Arad, Rhoades, & Drasgow, 2000; Houghton & Yoho, 2005). So far, these two leadership behaviors have only rarely been compared in the field (e.g. Pearce & Sims, 2002) and—to our knowledge— never in an experimental setting. The present studies address this research gap by comparing the influences of transformational leadership, and empowering leadership, but also to compare both of them to a task-focused leadership behavior, that is claimed to be less effective than the person-focused ones, namely directive leadership. In our study, we are interested in various team outcomes and would like to identify specific advantages and disadvantages of empowering, transformational, and directive leadership behavior. We chose an experimental approach that enables causal inferences to be drawn (Brown & Lord, 1999). As previous research has shown that the context of leadership can impact leadership effectiveness (contingency theories of leadership; e.g., Vroom & Yetton, 1973), we examined team performance on three different tasks to draw even more differentiated conclusions on leadership effectiveness in the team context.

Transformational Leadership

Transformational leaders aim at creating positive change in their followers by communicating their goals and articulating a vision that is appealing and inspiring (Avolio & Bass, 1988). These leaders set high performance goals and provide shared values and norms that give meaning to the work. They thus motivate their followers to invest extra effort, which results in enhanced performance (Burke, Stagl, Klein, Goodwin, Salas, & Halpin, 2006). Transformational leaders provide an idealized model for their followers and thus mobilize follower commitment (Avolio & Bass, 1988).

Four components of transformational leadership have been identified: individualized consideration, intellectual stimulation, inspirational motivation, and idealized influence (e.g., Antonakis, Avolio, & Sivasubramaniam, 2001). Individualized consideration indicates the degree to which the leader acts as a mentor, observes followers' developmental needs, and promotes growth. Intellectual stimulation is the degree to which the leader invites his or her followers to think in new ways and to consider problems from different angles. Inspirational motivation reflects the degree to which the leader provides motivation and articulates an

attractive vision of the future. Idealized influence represents the degree to which the leader is trusted, admired, and respected (Bass & Avolio, 2000).

Several meta-analyses provide evidence for the relationship between transformational leadership and performance (e.g., DeGroot et al., 2000). Specifically, this type of leadership behavior is related to subordinate effectiveness, commitment, and—to some extent— subordinate effort and satisfaction (e.g. Podsakoff et al., 1990). Although transformational leadership can be directed towards different social entities—e.g., individuals, groups, or whole branches and organizations—most of the studies considered in the meta-analyses were limited to individual-level outcomes. As it remains unclear whether the mechanisms of leader influence are the same in an individual and a group context, findings cannot be generalized to the group level. In the following, we therefore focus on results found in group settings.

For the most part, transformational leadership has been found to be positively related to group outcomes. For example, in an experimental setting, Hoyt and Blascovich (2003) found that groups with a transformational leader produced qualitatively better solutions than did groups with a transactional leader. Likewise, other research in experimental settings has found groups with a transformational leader to produce more creative ideas and unique ideas (Jung, 2001), to find more original solutions, to make more supportive remarks, to perceive their performance as better, and to report more effort (Sosik, 1997) than groups with a transactional leader.

In field research, transformational leadership has been found to be positively associated with self- and manager ratings of team performance (Pearce & Sims, 2002), self-rated group effectiveness (Jung & Sosik, 2002), and—across several measurement points—self- and manager ratings of project quality and budget/schedule performance in R&D project teams (Keller, 1992). Schaubroeck, Lam, and Cha (2007) found a positive relationship between transformational leadership and performance of teams in the financial sector in the United States and in Hong Kong. This effect was mediated by team potency (i.e., the teams' confidence in their own abilities). In the military context, positive relationships have been found between transformational leadership and supervisor-rated team performance (Lim and Ployhart, 2004) and training in transformational leadership has been shown to have positive effects (Dvir, Eden, Avolio, & Shamir, 2002).

There is some evidence, however, that transformational leadership is not beneficial in all circumstances and that it can even be harmful. Although concerns about negative effects of

transformational leadership were voiced in the early literature (Bass, 1985; Howell, 1988), it has been argued that these risks are minimized by the leaders' ethical values (Bass & Steidlmeier, 1999).

A case in point is passive followership of leaders perceived as visionary and heroic (Sadler, 2001). Transformational leaders who state their positions and opinions very strongly arguably do not invite followers to think independently or to show disagreement (Detert & Burris, 2007). The more visionary and strong the leader, the less likely employees are to perceive that their voices are needed or valued (Morrison & Milliken, 2000).

Moreover, their formal power and key positions enable transformational leaders to be very influential in organizational networks (Bono & Anderson, 2005). It can be extrapolated from social impact theory (Latané, 1981) that individuals with high status have strong social influence that produces more conformist follower behaviors. As transformational leaders build social identification and collective confidence (Bass, Avolio, Jung, & Berson, 2003; Jung & Sosik, 2002) as well as collective personality (Hofmann & Jones, 2005), conformist behavior can spread through the organization. This group uniformity can hinder reflection and challenging of ideas within the group; group members become less critical and tell the leader what he or she wants to hear. Thus, there is some evidence that the concerns voiced by Sadler (2001) and Bass (1985) are warranted.

Empowering Leadership

Whereas transformational leadership can be directed towards different social entities—the individual, the group, or the whole organization—empowering leadership focuses on the team. The main objective of these leaders is to empower teams to work together as a self-managed group. Empowering leaders' main task is to facilitate team processes, thus enabling the team to manage itself. These leaders are not hierarchical supervisors in the strict sense, but more coaches or facilitators; in contrast to transformational leaders, they do not lead by communicating an inspiring vision, but by giving the team responsibility and encouraging it to find the best way of accomplishing its tasks. The theoretical framework is rather heterogeneous compared with that of transformational leadership and includes different approaches (e.g., coaching, facilitative leadership, participative leadership), subsumed by Pearce and colleagues (2003) under the term "empowering leadership." This framework has

its origins in the work of Manz and Sims (1987) on leaders of self-managing teams. The leader enables the team to act autonomously by encouraging team members to observe their performance, to be self-reinforcing and self-critical, to have high performance expectations, and to set their own goals. Nygren and Levine (1996) added that team leaders should create team-building conditions that encourage team members to interact and to find methods for dealing with disagreements within the team to facilitate and enhance team self-management.

This idea of leading others to be critical and independent was taken up by Edmondson (e.g., 1999, 2003) in her studies on team leader coaching, in which teams have access to a supportive leader who encourages team members to provide each other with information and input. The establishment of positive relationships between team members, the encouragement of productive conflict resolution, the delegation of responsibility to the team, and the creation of an atmosphere where it is safe to speak up about ideas and personal opinions have also been found to improve team autonomy (e.g., Hirst & Mann, 2004; Kirkman & Rosen, 1999). In a questionnaire construction and validation study, five dimensions of empowering leadership were identified: an empowering leader leads by example, lets the team participate in the process of decision-making, coaches the team members, informs the team about ongoing processes in the organization, and shows concern and interacts with the team (Arnold et al., 2000).

Empirical findings suggest that empowering leadership is frequently associated with enhanced team processes and more independent thinking. According to a recent meta-analysis, empowering leadership behavior explains 31% of the variance in team learning processes (Burke et al., 2006). Field studies have found empowering leadership to be associated with better team climate, reflection, team self-management, and quality of group processes (Carroll & Edmondson, 2002; Edmondson, 1999; Kirkman & Rosen, 1999; Somech, 2006). Empowering leaders also provide teams with more learning opportunities (Yun et al., 2005) and seem to foster team processes such as information sharing, open communication, and seeking and giving feedback (Nygren & Levine, 1996; Srivastava, Bartol, & Locke, 2006). These outcomes may reflect the greater opportunities that empowering leaders offer their followers to display "voice behaviors" (Morrison & Milliken, 2000). Another study demonstrated that teams with leaders who were trained to show empowering behavior in post-action reviews were more likely to display beneficial team member interaction patterns (Tannenbaum, Smith-Jentsch, & Behson, 1998). Only two

experimental studies appear to have examined the participative dimension of empowering leadership: Kahai, Sosik and Avolio (1997) found that a participative behavior led to more supportive remarks during a collective electronic brainstorming task. Larson, Foster-Fishman, & Franz (1998) found that groups with a participative leader discussed more information in a hidden profile task than did groups with a directive leader.

These enhanced team processes enable teams to perform better in changing environments (e.g., Edmondson, 2003). As groups led by an empowering leader are encouraged to exchange information and discuss diverse perspectives, more information is taken into account, with potentially beneficial effects for the teams' problem-solving ability—which should in turn lead to qualitatively better decisions. There has, however, been less research on the direct effects of empowering leadership behavior on team performance. Although empowering leadership has clearly beneficial effects on team processes, the association with outcomes is less clear. Burpitt & Bigoness (1997) found empowering leadership behavior as rated by team members to correlate with managers' ratings of team innovation (Burpitt & Bigoness, 1997). However, Pearce and Sims (2002) found no relationship between empowering leadership and manager ratings, customer ratings, or self-ratings of team performance. Larson and colleagues (1998) reported that groups with a participative leader were outperformed by groups with a directive leader on a hidden profile task. Kahai and colleagues (1997) also reported null effects of participative leadership on the frequency of proposed solutions in an electronic brainstorming task. Somech (2006) even found participative leadership to be negatively related to team in-role performance in functionally heterogeneous teams. Examination of the mechanisms of empowering leadership has revealed that it can take longer for tasks to be accomplished when the group is encouraged to participate actively and to express its opinion (Yun et al., 2005). Because these processes are so time consuming, empowering leadership may be negatively related to outcomes when time is restricted, particularly in comparison with transformational leadership.

Directive Leadership

Directive leaders derive their influence from formal hierarchical structures (i.e., position power) and focus on task-accomplishment in minimizing task-ambiguity (Burke et al., 2006). Directive leadership contains behaviors like: assigning goals, providing task-oriented

information and the necessary input to accomplish the task; in extreme cases, they can also use commands to reach their goals (Pearce et al., 2003).

Directive leaders reduce ambiguity by focusing on essential information, giving clear instructions, and establishing clear rules, and can thereby foster teams' efficient task accomplishment (Somech, 2006). At the same time, they dominate group interactions and can impede the information flow (Cruz, Henningsen, & Smith, 1999). This behavior inhibits team processes such as information exchange and "voice behaviors" and can result in poorer team outcomes, such as inferior group decisions (Peterson, 1997).

Directive leadership thus seems to be a double-edged sword, as reflected by the mixed findings reported in the literature. In an experimental study, Kahai and colleagues (1997) found that groups in the directive leadership condition proposed more solutions than did groups in the participative condition. There was no difference in the frequency of supportive or critical remarks, however. Outcome directiveness—i.e., leaders advocating their own solution—reduced group confidence and did not enhance group decision quality (Peterson, 1997). In a hidden profile decision task, groups led by a directive leader discussed less information than did groups led by a participative leader. Groups in the directive leadership condition only reached a good decision when the leader had enough useful information, as these leaders tended to repeat this information more (Larson et al., 1998). In the same vein, Cruz and colleagues (1999) found that groups adopted the decisions of directive leaders.

In the field, Pearce and Sims (2002) found that directive leadership is negatively related to managers' ratings of team effectiveness but not related to customer or self-ratings of effectiveness of change management teams. Likewise, Somech (2006) found no relationship between directive leadership and team innovation. She did find a positive association between directive leadership and teams' in-role performance, but only when the functional heterogeneity of the team was low. Yun and colleagues (2005) found that empowering leadership was generally more beneficial than directive leadership for trauma resuscitation teams. Directive leadership had positive effects only when the team was inexperienced and had to work under time constraints.

Directive leadership thus has some beneficial effects on group decisions. It can be helpful when the leader possesses valuable information and the group adopts the leaders' opinion. However, direct leaders can reinforce poor group performance if they back the wrong

decision. In terms of other conditions and other performance indicators, directive leadership seems be less advantageous for team cohesion, team processes, and team performance.

Taken together, research shows that different mechanisms relate directive, transformational, and empowering leadership to group outcomes. Directive leaders derive their influence from formal hierarchical structures. They use their position power to activate the team to reach designated outcomes. Transformational leaders, in contrast, set challenging goals and create a common vision. Their followers perceive them as persuasive and credible and thus adopt these goals, become motivated to achieve them, develop collective confidence, put in extra effort, and show enhanced performance. Empowering leaders do not communicate a vision. They simply encourage interactions between team members and assign accountability to the team, thus activating the team to set its own goals and find its own way of accomplishing the task. These processes take time, however. Time can be a major constraint for performance, especially in short-term projects (such as those involved in our experiments). We expect teams led by a transformational leader to outperform teams led by an empowering leader under these conditions. Because empowering leadership leads to better information exchange and its participative component enhances commitment and therefore performance (Pritchard, 1995), however, we expect empowering leadership to prove more beneficial than directive leadership. We thus hypothesize the following rank order of leadership effectiveness:

Hypothesis 1: Transformational leadership leads to better group performance than empowering leadership, which in turn leads to better group performance than directive leadership.

Although transformational leadership is associated with better task performance, the adoption of the leaders' vision and ideas can nevertheless have side-effects. As transformational leaders communicate very convincingly and are idealized, they do not invite disagreement. In contrast, the empowering leader fosters reflection within the team, encourages the team to discuss diverse perspectives, and assigns accountability, thus encouraging active and independent thinking and behavior within the group. Groups under directive leadership are not encouraged to exchange ideas and are prone to adopt the leader's

decision. We thus posit the following effects of type of leadership on "independent thinking" in terms of a more critical approach of followers toward the leader's position:

Hypothesis 2: Empowering leadership is more conducive to "independent thinking" than is transformational or directive leadership. There is no difference between transformational and directive leadership with regard to "independent thinking."

Task Dependency

Thus far, we have discussed main effects of leadership behavior on team performance. However, contingency theories of leadership (e.g., Fiedler, 1967) suggest that problem or task structure is an important factor in the efficacy of leadership behavior.

Researchers distinguish two types of problem or task structure: well-defined and unstructured. Problems are structured or well-defined if the starting point, the finished product, and the means of accomplishing the task are specified (Klix, 1971). This kind of task can be accomplished by following standard operating procedures. In contrast, problems are classified as unstructured if the starting point, the finished product, or the means of accomplishing the task are ambiguous or implicit (Klix, 1971). In these cases, there is no standard operating procedure, and no detailed description or objective indicator of the finished product. In structured tasks, there is less need for groups to communicate to clarify the meaning of the task. In less structured tasks, however, there is a high probability that team members' understanding and views of the task do not converge. Therefore, there is a need for more clarification, expression of opinions, and supportive and critical reflection (Kahai et al., 1997). Indeed, Mabry and Attridge (1990) demonstrated that team processes are related to better performance in unstructured tasks, but not in structured tasks.

As we have seen, the main task of empowering leaders is to foster team processes (e.g., Burke et al., 2006; Srivastava et al., 2006). Transformational leaders also promote group cooperation in order to enhance group cohesion and group confidence (Jung & Sosik, 2002; Schaubroeck et al., 2007); directive leaders do not nurture group processes (Peterson, 1997). As different tasks require different qualities of team processes, which are in turn influenced by leadership behaviors, task structure is an important moderator of the relationship between leadership and group performance. Kahai and colleagues (1997) found participative

leadership to have beneficial effects only in a moderately structured task. In a highly structured task, directive leadership proved more successful. Keller (1992) found transformational leadership to be most beneficial in less structured tasks requiring creativity and originality, such as those of development teams. Hence, tasks can make leader behavior more or less effective. The association between empowering and transformational leadership behavior and team performance outcomes might thus be speculated to be stronger in less structured tasks. More research in this area is needed, however. Because present knowledge and data do not allow any specific hypotheses to be formulated, we address the following research question:

RQ: Does the relationship between leadership behaviors and team outcomes vary with the degree to which a task is structured?

In order to investigate the distinct relationships between leadership behavior and team performance as a function of the type of task, we conducted two studies. The first examined the influence of leadership behavior in a well-defined task, namely a structured problem-solving task, in which participants received all the necessary information as well as advice on how best to approach the task. The second investigated leadership effectiveness in two less structured tasks: first, a tower construction task, in which participants were given material to build the tower but no advice on how to go about it; second, an information search and decision task on a complex problem without an objective solution or any additional advice.

Study 1

Method

We tested Hypothesis 1 in an experimental study of three-person teams that were set a structured problem-solving task. The three leadership behaviors (transformational, empowering, and directive leadership) were experimentally manipulated via video instruction.

Participants. The 90 participants in our sample were randomly assigned to 30 three-person groups. Most participants were students of psychology (41.1%), media studies (5.6%), and other fields (business studies, history, etc.; 30.0%); 23.3% already held a job. The mean age was 26.4 years ($SD = 10.5$), and more women than men participated (72.2% female).

Experimental task. The instructions for the experimental task, a structured problem-solving task called "Distress at Sea," were given by a videotaped group leader exhibiting the intended leadership behavior. The groups were asked to rank 15 items with regard to their importance for survival in the case of fire onboard a yacht. The item deemed the most important for survival was to be ranked number 1, followed by the second most important item, etc. The group had 20 minutes to discuss the importance of the items and to establish a ranking. Prior research suggests that rank order tasks can be regarded as structured tasks (Mabry & Attridge, 1990), as participants have all information they need to complete the task and there is only one objective right solution.

Design. We used a three-group between-subjects design to investigate the effectiveness of transformational, empowering, and directive leadership. Leadership was manipulated by video instruction, with a male leader following a corresponding script. The groups were randomly and equally assigned to the three experimental conditions.

Leadership manipulation. To standardize the manipulation of leadership behavior and thus ensure that all groups in a leadership condition were exposed to the same leadership behavior, we videotaped a male leader displaying the different behaviors. We chose a male leader to avoid challenging existing stereotypes (Schein et al., 1976).

For the transformational condition, we manipulated core components of transformational leadership, such as communicating a vision, accentuating the importance of the task, and a strong communication style (Kirkpatrick & Locke, 1996). We adapted scripts from a training program developed by Frese, Beimel, and Schoenborn (2003) and used modules from the transformational leadership training program by Bass and Avolio (1999). The transformational leader demonstrated moral conviction, developed a vision, and created a sense of urgency. He set high task performance goals, created confidence that these goals were achievable, and drew a positive picture of the future. He applied rhetorical questions and contrasts, used simple sentences, told stories, varied the speed and volume of his speech, and showed emotions. He used body language, facial expressions, and gestures to underline the content of the message.

The scripts for the empowering leadership condition were drawn from a training program on conducting team-fostering post-action reviews (Tannenbaum et al., 1998) and from interview data on empowering leaders obtained by Arnold and colleagues (2000). The empowering leader emphasized the importance of the task and accentuated the value of

teamwork. He encouraged team members to exchange opinions, give each other feedback, discuss problems, and solve tasks and problems together, and he pointed out that disagreements within teams are a chance to learn. He also used body language, facial expressions, and gestures, but to a lesser extent than the transformational leader.

In the directive leadership condition, the leader simply provided task-specific instructions, focusing on the content of the group task. He gave facts and provided some general advice ("pay attention to the time," "it's important to work accurately," etc.). He did not communicate a vision or confidence in the team's ability, neither did he address the issue of team work or relationships between team members. He did not use commands, but concentrated on "managing"—planning and directing subordinates' behavior and giving instructions on how to accomplish the task without offering latitude for its accomplishment.

Measure. The quality of the group ranking was taken as an indicator of group performance. Quality was derived by comparing each group's ranking with the expert ranking provided by a group of navy officers. Group discrepancy scores from 0 to 210 were obtained by taking the difference (0–14) between a group's item rank and the expert rank and summing these differences across the 15 items. The lower the score, the lower the divergence between the group and the experts; hence, the better the group's performance. This type of performance measure has been widely used (e.g., Jordan & Troth, 2003; Mabry & Attridge, 1990). Our groups' difference scores ranged from 34 to 82 ($M = 55.87$, $SD = 12.6$). One group did not manage to finish the ranking in the allotted time of 20 minutes, so we were unable to calculate a difference score. We decided to replace this missing value by the score of the poorest performing group (Winsorization, value = 82).

Manipulation check. To determine whether the participants perceived the leadership behavior in the intended way, we administered a post-experimental manipulation check questionnaire containing ten items measuring transformational leadership behavior taken from the Multifactor Leadership Questionnaire (MLQ, Bass & Avolio, 2000, German translation by Rowold, 2004; sample items: "talks about his most important values and beliefs"; "talks enthusiastically about what needs to be accomplished") and nine items measuring empowering leadership behavior taken from the Empowering Leadership Questionnaire (ELQ, Arnold et al., 2000; sample item: "encourages work group members to solve problems together"; "helps develop good relations among group members"). Items on both questionnaires were rated 0 (completely disagree) to 4 (completely agree). We conducted two

analyses of variance (ANOVA) with leadership behavior (transformational, empowering, directive) as independent variables and perceived empowering and transformational leadership as dependent variables. Both ANOVAs were significant for empowering leadership, $F(2, 87) = 79.6$, $p < .001$, and for transformational leadership $F(2, 87) = 33.5$, $p < .001$. Post-hoc tests confirmed that leadership behavior was perceived as more empowering in the empowering condition ($M = 3.16$, $SD = .60$) than in the transformational ($M = 2.02$, $SD = .71$) or the directive condition ($M = 1.13$, $SD = .55$), and as more transformational in the transformational condition ($M = 2.78$, $SD = .79$) than in the empowering ($M = 2.32$, $SD = .82$) or the directive condition ($M = 1.28$, $SD = .55$).

Data analysis. Because the groups' decision quality was measurable only on the group level, we chose the group as the unit of analysis. As our sample was quite heterogeneous in terms of to age, we first checked whether this attribute was randomly distributed across all three experimental conditions. There was no significant difference between conditions in the groups' mean age, $F(2, 27) = 1.24$, n.s., or variance in the groups' age, $F(2, 27) = 1.07$, n.s. Moreover, because none of these variables were related to the dependent variable, we decided to conduct an analysis of variance without covariates.

Results

Influence of leader behavior on decision quality. None of the groups ranked the 15 items in the same order as the experts. Our indicator of decision quality ranged from 34 to 82, with lower scores indicating better performance.

Table 1: Comparisons of Means Under Different Leadership Conditions: One-Way ANOVA for the Outcome Variable of the Problem-Solving Task

Variable	Transfor-mational	Empo-wering	Directive	df	F	η^2	p
Decision quality (difference score)	59.00	56.20	51.50	2(27)	.98	.07	.39

On average, groups in the transformational leadership condition had the highest difference score ($M = 59.0$, $SD = 13.1$), followed by groups in the empowering leadership condition ($M = 56.2$, $SD = 7.1$). Groups in the directive leadership condition achieved the lowest difference scores ($M = 51.6$, $SD = 13.8$), indicating better decision quality. However, an ANOVA revealed that the differences between the three experimental conditions were not significant (see Table 1). Thus, contrary to Hypothesis 1, leadership behavior had no significant influence on decision quality.

Discussion

Although we speculated that empowering and transformational leadership would be more beneficial in structured tasks than in unstructured tasks, we found no effects of leadership manipulation on group performance in this structured ranking task. Transformational and empowering leader behavior did not enhance the groups' decision quality, although our manipulation checks confirmed that the leadership behavior was perceived in the intended way. It seems likely that the highly structured task administered in this experiment did not offer enough scope for the potential effects of transformational and empowering leadership behavior, such as increased effort, motivation, and increased commitment. In their theoretical model, Houghton and Yoho (2005) propose that transformational and empowering leadership is more beneficial in unstructured tasks. Indeed, Kahai and colleagues (1997) reported that participative leadership was more positively related to the expression of solution proposals in a less structured brainstorming task, whereas directive leadership was more conducive to solution proposals in the structured condition. Interestingly, we also found that directive leadership was related to better decision quality, although this effect was not significant. Simply giving instructions and providing task-relevant information can help groups to work in a focused and efficient fashion in very structured tasks. We therefore decided to conduct a second study investigating the influence of leadership on distinct aspects of team performance in two less structured tasks.

Study 2

Method

We tested Hypotheses 1 and 2 in an experimental study of three-person teams that were set two unstructured tasks: a construction and an information search task. Three leadership behaviors were again experimentally manipulated via video instruction (transformational, empowering, directive leadership). We then examined whether the relationship between leadership behaviors and team outcomes vary with the degree to which a task is structured by comparing the findings of Studies 1 and 2.

Participants. A total of 72 students were randomly assigned to 24 three-person groups. The largest proportion of participants were psychology students (44%); participants had been enrolled at university for a mean of six semesters (SD = 2.9). The mean age was 23 years (*SD* = 2.4); 63% of participants were female.

Experimental tasks. The instructions for both experimental tasks were given by video by a videotaped leader exhibiting the intended leadership behavior (see "Leadership manipulation" section). In the first task—a construction task—participants had to build a tower. They were told to make the tower as high and as creative as possible, were provided with paper, scissors, and glue, and had 15 minutes to complete the task. This task can be seen as unstructured, as the participants were given no information on how to build the tower, or what the finished product should look like. Additionally, there are multiple ways to build such a tower.

The second task—an information search task—required participants to find a sustainable car for a company fleet. In all three leadership conditions, the leader suggested three possibilities—hybrid cars, green vehicles, or alternative fuels—but expressed a preference for hybrid cars. The group was instructed to look for information on the pros and cons of each possibility (or to identify others) on the internet, in brochures, and from their own knowledge. Participants had 30 minutes to compile this information and make a final decision. This task can also be considered unstructured, because there is no prescribed solution process, the problem has more than one answer, and there are multiple criteria for evaluating the solution.

To check the degree to which the instructions of the three tasks used in Studies 1 and 2 were structured, we recruited seven raters unfamiliar with the aims of the study. Three 7-point items assessed to what extent (a) the starting point was clear, (b) the target state was clear,

and (c) there were several possible solutions to the task (reverse coded). Structuredness scores ranged from 3.33 to 5.67 (M = 4.30, SD = .61), with higher scores indicating higher structuredness. We conducted an ANOVA with task type as the independent variable and perceived structuredness as the dependent variable. The differences in the ratings were significant, F(2, 18) = 5.20, p = .01. Post-hoc tests revealed that the "Distress at Sea" problem-solving task used in Study 1 was perceived as more structured (M = 4.81, SD = .63) than the construction task (M = 4.00, SD = .43) or the information search task (M = 4.10, SD = .46) administered in Study 2. In line with our intentions, there was no difference in perceived structuredness of the tasks used in Study 2 (p = .73).

Design. As in Study 1, we used a three-group between-subjects design to investigate the effectiveness of transformational, empowering, and directive leadership. The groups were randomly and equally assigned to the three experimental conditions and were administered both tasks.

Leadership manipulation. Transformational, empowering, and directive leadership behaviors were displayed by a videotaped group leader based on the same principles and theoretical frameworks as described for Study 1. Again, a male leader followed a corresponding script. Except for the specific-task relevant information, the videos were thus comparable to those used in Study 1.

Measures. To assess team performance in the construction task, we measured both the quantity and quality of outcomes. The height of the tower served as an indicator of outcome quantity (M = 94.37 cm, SD = 33.07 cm). Originality served as an indicator of quality. Nine raters (two designers and seven lay persons blind to the experimental conditions) rated creativity from 0 (not at all original) to 4 (very original). We calculated the ICC(2,1) (ICC = .44, p < .001) to gauge interrater agreement. This high level of interrater agreement (James, Demaree, & Wolf, 1984) justifies aggregation; originality ratings were thus averaged to a single score (ranging from 0.67 to 3.78).

We used two measures to measure team performance in the information search task. First, as indicator of outcome quantity, we counted the total number of pieces of information found and written down by the group (M = 22.1, SD = 4.3). Second, group members' critical approach to the leader's proposal served as an indicator of "independent thinking". As mentioned in the "Experimental tasks" section, the leader in all three conditions strongly favored hybrid cars and named important organizations that already have hybrids in their

company fleet. We therefore counted the number of negative pieces of information gathered about hybrid cars as an indicator of independent thinking. This number ranged from 0 to 9 ($M = 2.7$, $SD = 1.8$).

Manipulation checks. To determine whether the participants perceived the leadership behavior in the intended way, we conducted post-experimental manipulation checks as in Study 1. The questionnaire again contained ten items measuring transformational leadership behavior taken from the MLQ (Bass & Avolio, 2000, German translation by Rowold, 2004) and nine items measuring empowering leadership behavior taken from the ELQ (Arnold et al., 2000). Items on both questionnaires were rated 0 (completely disagree) to 4 (completely agree). We conducted two ANOVAs with leader behavior (transformational, empowering, directive) as independent variables and perceived empowering and transformational leadership as dependent variables. Both ANOVAs were significant for empowering leadership, $F(2, 69) = 23.67$, $p < .001$, and for transformational leadership, $F(2, 69) = 19.86$, $p < .001$. Post-hoc tests confirmed that leadership behavior was perceived as more empowering in the empowering condition ($M = 2.64$, $SD = .67$) than in the transformational ($M = 1.96$, $SD = .94$) or the directive condition ($M = .90$, $SD = .80$). Transformational leadership was rated highest in the transformational condition, but there was a reliable difference only between the transformational ($M = 1.63$, $SD = .82$) and the directive condition ($M = .40$, $SD = .46$), not between the transformational and empowering conditions ($M = 1.42$, $SD = .71$). These results indicate that the directive leadership condition was well differentiated from the other two leadership conditions. However, empowering leadership behaviors were also rated as transformational. As a similar manipulation worked very well in Study 1, we addressed this issue by having two graduate students unfamiliar with the study rate the video instructions. ANOVAs with leadership manipulation as independent variables and leadership ratings as dependent variables were significant for transformational leadership, $F(2, 9) = 25.36$, $p < .001$, and for empowering leadership, $F(2, 9) = 128.69$, $p < .001$. As expected, post-hoc tests revealed that leadership behavior was perceived as more empowering ($M = 3.53$, $SD = .33$) in the empowering leadership condition than in the transformational ($M = 1.03$, $SD = .31$) or the directive condition ($M = .53$, $SD = .19$), and as more transformational in the transformational condition ($M = 3.09$, $SD = .80$) than in the directive ($M = .39$, $SD = .31$) or the empowering condition ($M = 1.43$, $SD = .37$). All post-hoc tests were significant.

Data analysis. As all of our hypotheses refer to the group level, we chose the group as our unit of analysis. Objective group performance on both tasks was only measurable at the group level and was thus represented by the height and creativity of the groups' towers in the construction task and by the amount of information compiled in the information search task.

Results

A multivariate analysis of variance (MANOVA) was run for each task to assess the influence of leadership behavior on the group-level outcomes. Because both MANOVAs proved to be significant (construction task: Pillai's $F(4, 42) = 3.01$, $p = .03$; information search task: Pillai's $F(4, 42) = 3.43$, $p = .02$), we ran ANOVAs with post-hoc tests for all outcome variables in both tasks. The ANOVA results are summarized in Table 2.

Table 2: Comparisons of Means Under Different Leadership Conditions: One-Way ANOVAs for the Outcome Variables in Both Study 2 Tasks

Variables	Transformational	Empowering	Directive	df	F	η^2	p
Height of tower	98.44	84.44	100.25	2(21)	.53	.05	.60
Originality of tower	3.00	2.26	1.75	2(21)	6.34	.38	.01
Amount of information gathered	25.13	21.13	20.00	2(21)	3.94	.27	.04
Independent thinking[1]	1.88	3.75	2.38	2(21)	2.54	.20	.10
Independent thinking (relative) [1]	.07	.19	.12	2(21)	4.22	.29	.03

Note. [1] Proportion of information gathered that contradicted the leader's proposition.

Influence of transformational leadership on group performance. We found support for our hypotheses regarding the influence of transformational leadership behavior on group outcomes (see Table 2). First, leadership behavior had a significant effect on the amount of information compiled in the information search task. In line with our expectations, post-hoc tests demonstrated that groups under transformational leadership found more information than did groups under directive leadership ($p = .01$). Moreover, groups with a transformational

leader outperformed groups with an empowering leader ($p = .05$). There was no difference between the empowering and directive conditions ($p = .56$). We thus found partial support for Hypothesis 1; transformational leadership led to better group performance than empowering leadership, but empowering leadership proved no more beneficial than directive leadership. Transformational leadership also had the expected effect on originality in the tower construction task. Post-hoc tests showed that groups led by the transformational leader produced more original output than did groups led by an empowering leader ($p < .05$) or a directive leader ($p < .01$). However, groups under empowering leadership did not build more original towers than groups under directive leadership. Contrary to our expectations, we found that transformational leadership behavior had no influence on the height of the tower in the construction task. Groups with a transformational leader did not build higher towers than groups in the two other experimental conditions.

To summarize, the experimental data provided support for our hypothesis that transformational leadership has a positive influence on performance; groups with a transformational leader outperformed other groups in terms of originality in the construction task and outcome quantity in the information search task. We found no support, however, for the hypothesis that empowering leadership behavior is more beneficial for group performance than directive leadership behavior.

Influence of leadership on independent thinking. We expected independent thinking to be more prevalent in the empowering leadership condition. In fact (see Table 2), we found leadership behavior to have an effect on the amount of information gathered that contradicted the leaders' proposal at a 10% significance level, $F(2, 21) = 2.55$, $p = .10$. As our N was considerably reduced when data were aggregated at the group level, we interpreted this effect as a trend, as have other researchers in the field of team leadership (Dvir et al., 2002; Lim & Ployhart, 2004). Post-hoc tests showed that groups working in the empowering condition compiled significantly more information contradicting the alternative favored by the leader than did groups working in the transformational condition ($p < .05$). Although groups in the empowering condition found more information than groups in the directive condition, this effect was not statistically significant ($p = .13$). In line with our hypothesis, there was no difference between transformational and directive leadership ($p = .57$).

As the groups differed markedly in terms of the absolute amount of information gathered, we also calculated a *relative* independent thinking score (number of pieces of information

contradicting the leaders' suggestion divided by the total number of pieces of information gathered). Using this measure (Table 2, bottom row), we found the effect of empowering leadership to be more prevalent, $F(2, 21) = 4.22$, $p < .05$. Post-hoc tests revealed that groups led by the empowering leader showed more *relative* independent thinking than did the groups led by the transformational ($p < .01$) or the directive leader ($p < .10$). In line with our proposed ranking, there was again no significant difference between the transformational and directive leadership conditions ($p = .27$).

Comparing the Findings of Studies 1 and 2

Task Structure. Another aim of our research was to show that leadership effectiveness is a function of the task structure. We expected an empowering or transformational leadership behavior to lead to better group performance on a less structured than on a well-defined task, because unstructured tasks require more clarification among group members. In Study 2, with unstructured tasks, leadership behaviors had a significant influence on various performance indicators, with transformational leadership fostering group performance. In contrast, in Study 1 with a well-defined task, leadership behavior had no influence on performance.

Table 3: Relationship Between Leadership Type and Team Performance Depending on Task Structure

	Structured	Unstructured			
	Problem-solving	Construction		Information	
	Decision	Height	Originality	Amount	Independent thinking
Transformational	0	0	+	+	-
Empowering	0	0	-	-	+
Directive	0	0	-	-	-

Note. 0 = no effect, + = positive effect, - = more negative effect than in the best leadership condition.

Table 3 presents a comparison of the results. As we expected, transformational leadership proved more beneficial to group performance in the less structured task. Contrary to our

expectations, however, groups led by empowering leaders did not show higher performance on less structured tasks. Moreover, we found no effect of leadership on performance on the structured task.

Discussion

In this experimental research, we examined the impact of leadership behavior on a range of team performance outcomes in three different tasks. Our findings suggest that the relationship between leadership and team performance varies depending on the task type and the specific group outcome measured.

Transformational Leadership

As expected, we found transformational leadership to be associated with outcome quantity in the information search task and with originality in the tower construction task. These findings are in line with previous research reporting that groups working under transformational leadership performed better (e.g., Schaubroeck et al., 2007) and generated more original ideas (Hoyt & Blascovich, 2001; Jung, 2001; Sosik, 1997).

Contrary to our expectations, however, transformational leadership was not related to decision quality in the "Distress at Sea" task or to height of the tower in the construction task. Although some researchers have found transformational leadership to influence quantitative group outcomes in terms of more ideas (Jung, 2001) or higher performance (Keller, 1992; Lim & Ployhart, 2004; Pearce & Sims, 2002; Sosik, 1997), others have not found transformational leadership to have any benefits in this respect. For example, teams with a transformational leader produced fewer quantitative outcomes in a creativity task than did those with a transactional leader (Hoyt & Blascovich, 2003). In another study, there was no difference the high and low transformational leadership conditions in the number of solutions proposed in an idea generation task (Sosik, 1997). In a field study, Bass and colleagues (2003) found that both transformational and transactional leadership were similarly effective for the unit performance of army platoons. Finally, Boerner and Streit (2006) found transformational leadership to have no direct influence on the artistic quality of an orchestra.

Our findings suggest that these inconsistent effects of transformational leadership on quantitative outcomes may, in fact, be a function of the task. Some tasks (e.g., the tower construction and information search task) may be more sensitive to transformational influence, meaning that group members can benefit more from this leadership behavior in this context than in others (e.g., the problem-solving task). As discussed below, task structure can be an important moderator of the leadership–performance relationship. Transformational leaders are thought to foster extra effort and cooperation, both of which are important for unstructured tasks, which require team members to communicate to clarify the task. Hence, transformational leadership seems to be more beneficial in less structured tasks. It remains for future studies to identify additional task characteristics that may impact the effectiveness of transformational leadership.

Empowering Leadership

In line with our expectations, empowering leadership was less beneficial than transformational leadership for most of the outcomes considered. Empowering leadership did not lead to better group rankings in the problem-solving task in Study 1, and groups in the other two conditions built higher towers than did groups led by an empowering leader, although this difference was not significant. Interestingly, groups with empowering leaders did not achieve higher outcome quantity in the information search task than groups with directive leaders. The same pattern was found for originality in the tower construction task: originality ratings in the empowering leadership condition were significantly lower than in the transformational condition, but not higher than in the directive condition. In other words, groups led by an empowering leader were outperformed by groups led by a transformational leader on most performance indicators, and they did not outperform groups with a directive leader. These findings can be explained by the theoretical contingency model proposed by Houghton and Yoho (2005), who argue that an empowering leader is less effective in situations of high urgency or crisis. In these situations, a directive leader providing task specific instructions or a transformational leader creating a vision and sense of urgency is more appropriate. Additionally, they argue that empowering leadership is more effective when the developmental potential of followers is high. In our experimental setting, followers' development was not relevant as the groups did not have to work together again.

Our results are in line with previous empirical findings that empowering leadership has no beneficial effects for the frequency of solution proposals (Kahai et al., 1997) or for the in-role performance of heterogeneous teams (Somech, 2006). This is an interesting finding, empowering leadership—through its participative component—might be expected to lead to more commitment and to better team interactions (e.g., in the form of enhanced information exchange), in turn leading to more ideas on task accomplishment and hence to higher performance than in the directive condition (Srivastava et al., 2006). However, our teams were inexperienced and the tasks were novel and therefore demanding. Directive leadership may be more beneficial than empowering leadership in such conditions, because leaders providing a direction reduce ambiguity and save time (Yun et al., 2005). Additionally, evidence suggests that the influence of empowering leadership behavior is often mediated by learning (e.g., Carroll & Edmondson, 2002; Edmondson, 1999) or team processes (Kirkman & Rosen, 1999). Thus, empowering leadership can be beneficial for team outcomes in tasks requiring positive team processes or learning—in other words, tasks characterized by ambiguity and information overload (van Offenbeek, 2001) such as those used in Study 2. It is possible that the time limit implemented in Study 2 precluded beneficial effects of group processes.

Future research should address this issue by using tasks requiring team processes, promoting skill development (e.g., repeated collaboration), and allowing enough time for these effects to materialize.

Directive Leadership

In line with our hypothesis that directive leadership is less effective than transformational leadership, we found no beneficial effect of directive leadership behavior on either the originality of tower construction or the amount of information gathered. These results are in line with previous findings that directive leadership does not affect team effectiveness ratings (Pearce & Sims, 2002) or innovation (Somech, 2006).

Contrary to our expectations, directive leadership was not inferior to empowering leadership; groups led by directive leaders built similarly original towers and found a comparable amount of information in the information search task. These findings are in contrast to previous reports that groups under a directive leader discussed less information did

than groups under the participative leader (Larson et al., 1998), and that they were less reflective and therefore less innovative (Somech, 2006). Hence, our findings do not allow us draw conclusions on the relative superiority of empowering or directive leadership. Instead, we agree with Sagie (1996) and Somech (2006) that directive and empowering leadership should not be considered as contradictory, but as complementary.

Interestingly, groups in the directive leadership condition outperformed groups in the two other conditions on the highly structured problem-solving task, although this effect failed to reach the conventional level of significance. Likewise, Sagie (1996) reported beneficial effects of a highly directive leader communication behavior on the amount of correct solutions identified and speed of the solution process. This pattern of results is in line with the contingency theory according to which directive leadership is beneficial in some conditions, e.g., in cases of high urgency (Houghton & Yoho, 2005; see "Task dependency" section).

Critical and Independent Thinking

We found support for the expected side-effects of leadership. Transformational leadership was positively related to most of the objective performance indicators, whereas empowering leadership was not. However, the beneficial effects of transformational leadership came at the expense of independent thinking (see also Sadler, 2001): Groups in the transformational condition, who performed better in terms of outcome quality, were less critical of their leaders' position. In contrast, groups in the empowering condition were more critical of their leader's ideas and more willing to find contradictory information. Note, however, that this more critical approach was at the expense of the quantitative outcome.

We therefore agree with Sadler's (2001) concerns that transformational leaders may provide too convincing a role model, making subordinates reluctant to question their ideas. In contrast, Bass and Avolio (1990) argued that transformational leadership fosters the followers' ability to think on their own, and Dvir and colleagues (2002) reported that transformational leadership training led to more self-reported critical−independent thinking among followers. This contradiction may again be resolved by looking at the context of the studies. Our studies involved an experimental setting with a video manipulation of leadership that focused on the two core components of transformational leadership: "inspirational motivation" and "idealized influence." It is very difficult for a videotaped leader to display

individual consideration or to be intellectually stimulating when a group has problems completing the task. In contrast, the leader training in Dvir's field study encompassed the whole spectrum of transformational leadership. It is possible that the "intellectual stimulation" and "individualized consideration" components buffered the risk of uncritical thinking.

Unfortunately, there has been little consideration of the "side-effects" of leadership behavior in the literature, although Conger (1990) warned that positive leadership skills can be used to reach negative outcomes. For example, a leader with good communication skills might convince a team to put a great deal of effort into a complex task. He or she might also help the team by suggesting ways of fulfilling the task. We demonstrated that a team can achieve the leader's high performance goals—e.g., in terms of information quantity in the information search task—but be so convinced of the leader's approach that it fails to look for alternative strategies or solutions. Therefore, leaders are well advised to pay attention to the kind of outcome they seek to attain. As our study is an experimental one with restricted validity, however, replication in the field—and indeed more research on the side-effects of leadership—is needed. Other side-effects worth investigating are decreased innovation, bad team climate, stress, and excessive competition (Yukl, 1999).

Task Dependency

We proposed a weaker relationship between transformational and empowering leadership and performance in structured than in unstructured tasks. The results were even stronger than expected: the leadership manipulation had no influence on group performance in our very structured problem-solving task and we found weak evidence that directive leadership was more effective than the other behaviors in this context. We propose that our problem-solving task was so structured that it did not leave enough room for transformational and empowering leaders to take effect.

In line with our expectations, transformational leadership behavior was more influential than the directive and the empowering leadership in the two unstructured tasks. In these tasks, groups could benefit much more from this type of leader. In tasks in which one or more of the problem elements are not defined (e.g., goals are vague, there are multiple or no solutions, or multiple criteria for evaluating solutions), team members have to work together and cooperate to build a shared understanding of the task. Interestingly, empowered teams did not benefit

from the degrees of freedom offered by these unstructured tasks, potentially because of the time restriction in combination with the inexperience of the team (Houghton & Yoho, 2005; Yun et al., 2005).

An interesting line of investigation would be to explore the mediating processes by which the meaning of the task is clarified in the group. Our results show that task dependency is an important, though often neglected, issue in leadership research. The pattern of effects and non-effects of leadership behavior reported in the literature may be explained by the nature of the task.

Strengths and Limitations

This research adds to the scientific understanding of team leadership and represents an important step toward determining the differential effects of leadership behavior on specific outcomes. In addition, it is the first experimental research to compare transformational and empowering leadership behavior, although these leadership concepts are currently two of the most relevant in the literature (Pearce et al., 2003). More comparative research on these two approaches is needed to identify commonalities and differences.

The experimental design allowed us to manipulate leadership behaviors and to use objective outcome measures, but several limitations must be mentioned. The foremost limitation is the number of teams in our sample (N = 30). Additionally, we used a sample consisting largely of students, who worked together for a relatively short time in an experimental setting. Thus, there is a big leap between the ad hoc groups of our experiments and the real groups in organizations and external validity remains to be demonstrated.

Conclusions

To return to our question of whether transformational, empowering, or directive leadership is more effective for group performance, we conclude that the nature of the outcome and the task both matter. Our results show that both transformational and empowering leadership have their advantages and disadvantages. We found that transformational leadership has a stronger positive relationship with measures of team effectiveness and originality, whereas empowering leadership is useful in situations requiring followers to engage in independent

and critical thinking. Hence, organizations that need an active workforce, displaying behaviors such as proactivity, personal initiative, or expressing voice (e.g. Frese et al., 2007; Parker et al., 2006; van Dyne & LePine, 1998), can purposefully utilize this kind of leadership behavior. Furthermore, directive leadership is not inferior to empowering leadership in terms of team effectiveness. We also found that task dependency is an important issue for leadership effectiveness. In general, teams benefit more from leaders' behavior in less structured tasks. As most tasks in the "real" world are complex, our findings are relevant for both practitioners and organizations: Leaders need to adapt their behavior in response to the situation and the intended team outcome and have to take into consideration possible "side effects" of their leadership behavior. When extra effort and team performance is the outcome focused, transformational leadership—like communicating a vision, addressing subordinates' emotion and drawing a positive picture of the future—is a good way of being a successful leader. In contrast, when critical and independent thinking is more important, the leader should adapt her/his behavior towards a more empowering leadership behavior that aims at team processes and assigns accountability to the team. Imagine, for example, a company that faces organizational change. In times of organizational change, the organization and its employees pass through different stages: initiation, implementation, and institutionalization. On the level of individual behavior, these stages correspond to two of the phases the "Rubicon" model distinguishes (e.g., Gollwitzer, 1996), namely the predecisional, and actional phases. At the outset of a change process, when there is not yet a clear picture what kind of actions will be necessary, broad information collection and a critical information evaluation are required and empowering leadership behavior stimulates both. But later on when goals have been set and goal pursuit takes center stage, convincing employees to follow the new vision and committing them to the goals is crucial. This is when transformational leadership behavior comes into play. As neither leader and nor followers are exchanged during the change process, the leader has to adapt her behaviors in order to instigate different mindsets in the followers and thereby facilitate successful change. Thus, the two leadership behaviors are complementary rather than mutually exclusive. Their specific benefits are maximized when they are differentially applied according to the respective context and task characteristics.

Chapter 3

The Influence of Leadership Behavior on

Affective Similarity

Theoretical Background

Group Affect

Group emotions gained more attention in the last few years within the organizational literature (e.g. George, 1990). Emotions can create or even destroy our relationships with others (DeDreu & Van Vianen, 2001); when team members' synchronize their thoughts, feelings and behavior, a smooth coordination of their actions is enabled (Bartel & Saavedra, 2000). Emotions are major causes and consequences of relationships; thus, it can be considered as the "glue that bonds" (Barsade & Gibson, 1998). Emotions fulfill several social functions at the group level, such as: coordinating social interactions, increasing cooperation, providing information about relationships, reducing aggression, creating a communal identity, enhancing group solidarity, cohesion and trust and intensifying social bonds (e.g., Keltner & Haidt, 1999). A collective group emotion plays an important role, as teams in a low team spirit or teams that do not share common affect perform worse (Totterdell, 2000). Thus, the question arises as to how common affect can be fostered and a common team spirit can be created. One person who can have an important influence on team emotions is a teams' leader (George, 1995), like a coach of a sports team who creates a common team spirit in order to foster team performance. So did, for example, the coach of the German National soccer team (J. Klinsmann). When he took up his position as coach in 2004, the best days of the German team were long gone. He started by communicating that team spirit was paramount. He praised the team even after moderate performance and never expressed anything negative in the public concerning the team. With his positive emotional communication he reached the players: he had the gift for making the players enthusiastic about soccer and their team. During the two years he coached the team Germany experienced a soccer revolution: team spirit and a feeling of belonging together developed; he succeeded to renew a sense of cohesion and enthusiasm within the team. That led to a strong performance at the 2006 World Cup and to the confirmation of Germanys' reputation as a top footballing nation.

Despite the importance of leaders in creating shared affect and a positive team spirit, there is not much research on which team leader behavior creates collective positive emotions of their followers. So, this study fills the gap and investigates the relationship between three different leadership behaviors and positive affective similarity in teams.

Mechanisms of Emotional Convergence

Emotions within groups converge over time as individuals working together will interact and observe each others' emotions; as a consequence, people working together are develop collective affect and are more emotionally similar than people who do not spend time together at work (Totterdell, Kellett, Teuchmann, & Briner, 1998). There are several explanations of how this convergence occurs: mood contagion, vicarious affect, emotional comparison, norms, and shared situations.

Mood contagion. When members of a group are exposed to other group members' emotion, they perceive this emotion via verbal and nonverbal clues. These emotions tend to be imitated automatically: mimic, facial expressions, body movements and vocalizations are synchronized. This process is primarily subconscious and leads to the feeling and experience of this emotion (Hatfield, Cacioppo, & Rapson, 1994). Additionally, on the basis of their own expressed mimics, vocalization etc., inferences on how they feel are drawn by themselves. So, due to this contagious process, group members' moods become more similar (e.g. Bartel & Saavedra, 2000).

Emotional comparison. It is assumed that the above mentioned non-conscious process of mood contagion is accompanied by a more conscious process that can lead to the experience of the others' emotions (e.g. Barsade, 2002). Team members perceive the emotions of their team colleagues (e.g. laughing) and take this as an affective cue: they conclude that these observed emotions are an appropriate and correct affective response in this situation. That is in turn followed by the production of the same, "right" emotion. Thus, the recipient takes the perception of an emotion as information on how he or she should feel (e.g. Barsade, 2002, Bartel & Saavedra, 2000). As a consequence, team members become more similar in their affective patterns by the conscious mutual "imitation" of the others' emotion.

Vicarious affect and empathy. People who spend time together tend to experience each others' moods and emotions. If one team member experiences and displays an emotion, the other team members react emotionally responsive, identifiy with this person and take his or her point of view. That in turn evokes feelings and emotions on the side of the observer (Kelly & Barsade, 2001).

Convergence in appraisal styles. When events take place they are evaluated and these evaluations are accompanied by emotions. When individuals are together for a longer time

and are getting closer, their appraisal styles become similar, that in turn can lead to similar emotional reactions (Anderson et al., 2003).

Shared emotional context. Sharing the same environment, setting or activities lead to a synchrony of emotions. Employees within a team share similar events or experiences (e.g., stressors at work, like time pressure, or joyful events, like successful accomplishment of a project) that in turn lead to a common affective climate (Pirola-Merlo et al., 2002).

All of these different mechanisms explain how group members' emotions converge over time due to a reciprocal influence of emotions between team members (Hareli & Rafaeli, 2008). All these mechanisms can reinforce each other and help to create a "shared affective reality" (Bartel & Saavedra, 2000, p. 203). Kelly and Barsade (2001) summarize all these processes in their input-process-output model on moods and emotions in small groups. Input factors are the individual level moods and emotions (e.g. dispositional affect, mood and emotions), that in turn lead via implicit (e.g. mood contagion) and explicit (e.g. affective influence) affect sharing processes to affective compositional effects. This affective composition forms the group emotion in combination with the affective context (e.g. emotion norms). This emotion in turn influences the affective context as well as the input factors.

Several studies on work groups could show that individual mood is linked to the groups' mood (Totterdell et al., 1998) and that there are high levels of within-group agreement across a broad range of mood categories (e.g. Bartel & Saavedra, 2000). Barsade (2002) showed in an experimental study that when a confederate within the group was in a pleasant mood, the mood of the participants changed into a more positive mood compared to the mood measured before the experiment; in contrast, group members' mood became more negative when an unpleasant confederate was present. This result was also confirmed by observational data. In line with these findings, Anderson and colleagues (2003) found that emotions converge over time, and this is true not only within close relationships like couples, but also for roommates. So, we propose the following:

Hypothesis 1: Work group members will demonstrate similarity in self-reports of mood.

Group Affective Tone vs. Affective Similarity

Group emotion as group property is a group level phenomenon and can be conceptualized in two different ways: one is the concept of "group affective tone" that is characterized by "consistent and homogeneous affective reactions within a group" (George, 1990, p. 108). The second one is the concept of "affective similarity" that is conceptualized as measure of the groups' diversity with regard to affect (e.g. Walter & Bruch, 2008).

Considering the concept of "group affective tone", it is assumed that groups are similar or homogenous with regard to their emotion. That allows to aggregate individual emotions to a group emotion, represented by the groups' mean level affect. Research that adopts this perspective is focused on relationships between the groups' mean of positive and negative emotion and different outcome measures. It was found that negative affective tone is negatively related to prosocial behavior and positively related to absence rates. Positive affective tone, however, was not related to prosocial behavior and marginally negative to absenteeism (George, 1990).

The second perspective "affective similarity" refers to the variability of individual emotions within a group. This concept is called "groups' affective diversity" (e.g. Barsade et al., 2000) or "affective similarity" (e.g. Walter & Bruch, 2008) and has its root in the diversity literature (e.g. Pfeffer, 1983). They assume that the homogeneity or heterogeneity (in terms of variation) of team members' affect has important consequences.

We saw above that mean levels of group emotions play an important role with regard to group outcomes (e.g. George, 1990). Research based on the variance and dispersion of emotions is less frequent. Kelly & Barsade (2001) assume that a groups' diversity with regard to the affective constellation provides information on "how a group is doing" and thus can serve as important indicator of team cohesion and team spirit.

Often, affective homogeneity with regard to positive emotion is considered as something positive, as it is related to feelings of liking, trust and sociability, and therefore to better group climates and states, as well as to better processes and outcomes (Barsade & Gibson, 1998). Benefits of this emotional similarity are for example coordinated responses and mutual understanding of individual emotion (Anderson, Keltner & John, 2003). In a similar vein, Barsade (2002) found that groups' affective diversity had an effect on team dynamics in such a way that positive emotional contagion led to better cooperation and task performance and

decreased conflict. Additionally, people who are emotionally similar are also more satisfied with their relationship (Anderson et al., 2003). Affectively homogeneous groups were also found to be more cooperative. This effect was explained by greater feelings of familiarity, attraction and trust that result from affective-similarity attraction processes (Barsade et al., 2000). So, emotions help to foster feelings of cohesion in relationships. In contrast, teams that were diverse with regard to trait positive affect showed lower firm financial performance (Barsade et al., 2000).

Although literature on group diversity showed that heterogeneity has beneficial effects (information/decision making perspective, van Knippenberg & Schippers, 2007), no study examined the relationship between positive affective heterogeneity and group outcomes. So, we assume that groups' affective similarity serves as an indicator for team cohesion and is a proxy for the functioning of a group (e.g. Barsade et al., 2000). Thus, it can be considered as "positive force in groups" (Barsade & Gibson, 1998, p. 92) that enables smooth team processes (Hackman, 1992). In this study, we focused on positive affective similarity rather than negative affective similarity. Although it can be semantically assumed that positive and negative affect are two sides of the same concept it was often shown that these two concepts are based on different mechanisms and are related to different antecedences and consequences (e.g. Diener & Emmons, 1985). In line with this idea, McIntyre and colleagues (1991) found that positive mood is significantly influenced by social interactions, whereas negative mood was not changed at all within the group setting. Also Barsade and colleagues (2000) could not find any effects for negative affective diversity on several outcome variables. So we concentrated on positive affective similarity; aim of our study is to shed new light on antecedences of groups' positive affective similarity in investigating the relationship between leadership behavior and affect homogeneity.

Antecedences of Positive Affective Similarity – Leadership Behavior

Rarely, the conditions that make groups prone to synchronize positive affect are considered and we know little about which context supports the development of affective similarity. Barsade and Gibson (1998) deemed this gap to be an important field of research. We assume that the most important input factor on groups' processes and performance, team leadership, has a significant influence on emotions as leaders manage affective team processes (Zaccaro et al., 2001). Leaders create behavioral regularities (Hofmann & Jones, 2005) and thus it is

assumed that they also influence affective similarity in teams. To our knowledge, there is no study on the relationship between leadership behavior and affective similarity in groups so far. Our research represents a first attempt fill this gap (Kelly & Barsade, 2001) and investigates how different leadership behaviors are associated with the teams' affective similarity or diversity, respectively.

Within the leadership process emotions play an important role. On the one hand, leaders use emotions to influence their followers, on the other hand they try to provoke positive emotions in order to facilitate task accomplishment (Glaso & Einarsen, 2008), thus, leaders can be seen as "engineers of emotions".

Within the field of emotion research, leadership is an important topic, but the research focuses mainly on how leaders' behavior is related to followers' positive and negative emotion and how mood is transferred from the leader to the follower. We know that leaders' mood expression has a strong influence on followers' mood (Bono & Ilies, 2006; van Kleef et al., 2009) and the positive and negative group affective tone (Sy, Coté, & Saavedra, 2005). Additionally, positive emotions expressed lead to the perceptions of attractiveness and effectiveness on the part of the followers (Bono & Ilies, 2006). It is assumed that leaders' positive mood also influences group outcomes, as these positive emotions convey a message of confident expectations and self-efficacy and have – in form of a role model – a facilitative effect on prosocial behavior (George, 1995). It could be shown that leaders' positive mood has a direct effect on group performance (George, 1995) and group coordination (Sy et al., 2005). In contrast, the leaders' negative mood was more beneficial for effort exertion (Sy et al., 2005).

Interestingly, the issue of leaders' behavior with regard to affective similarity in groups is often neglected. But, as we know, leaders also create shared emotional experiences and influence norms regarding emotions (Pescosolido, 2002), and thus their influence on affective similarity seems to be worth investigating. In our study, we are interested in different leadership behaviors and their relationship with affective similarity.

There are a number of rival leadership concepts (Fleishman et al., 1991). In the team context, these concepts can be assigned to four distinct leadership concepts, namely, directive leadership, transactional leadership, transformational leadership, and empowering leadership (e.g. Houghton & Yoho, 2005; Manz & Sims, 1991; Pearce et al., 2003). In our study, we will

focus on transformational, empowering, and transactional leadership, as it could be shown that these behaviors have an important influence on team outcomes (Burke et al., 2006).

As most studies on leadership and emotions study transformational leadership, we will start our theoretical reasoning by deductions on the relationship between transformational leadership and affective similarity. Later on, we will extend our reasoning towards other leadership theories, namely transactional and empowering leadership.

Transformational leadership. Transformational leadership is one of the most established leadership concepts. Transformational leaders transform self-interests of their subordinates towards collective interests (Shamir, House, & Arthur, 1993). These leaders lead by individual consideration, intellectual stimulation, inspirational motivation and idealized influence (e.g. Antonakis et al., 2003; Bass & Avolio, 2000): The leader pays attention to the needs of his/her followers (individual consideration) and encourages thinking in new ways (intellectual stimulation). On a higher transformational level, the leader aims at the transformation of the subordinates' goals by convincing them to adopt his/her or the organizational vision in communicating a compelling mission, and displaying confidence that these goals will be achieved (inspirational motivation). The leader also acts as a role model (idealized influence). This increases motivation and extra effort that in turn should lead to better performance. This kind of leadership behavior causes strong commitment on the side of the follower and thereby performance above and beyond duty (Shamir et al., 1993).

Transformational leaders are highly involved in emotional processes and their followers are emotionally attached to the leader (Shamir et al., 1993). This kind of leader uses emotions to inspire and motivate subordinates to spend extra-effort and communicates a positive picture of the future to elicit positive feelings. These leaders encourage followers' to express feelings openly (Bass, 1985) and provoke positive emotions in the followers, like pride, joy, and enthusiasm (Rowold & Rohmann, 2009). Researchers found that the effectiveness of these leaders' is linked to their expression of positive emotions, which in turn leads to followers' positive mood via emotional contagion (Bono & Ilies, 2006). McColl-Kennedy and Anderson (2002) could show that a high level of transformational leadership is related to subordinates' optimism, whereas a low level is associated with frustration. But, it should be taken into consideration that the results reported here refer to individual level emotions rather than to group level emotions.

With regard to transformational leadership of groups, it is known that transformational leaders transform the self-concept of their followers and enhance the social identification of the individual follower with the organization (Bass et al., 2003). Groups led by transformational leaders are committed to a common vision or goals (Shamir et al., 1993). This leads to a high salience of the collective identity in the individual follower's self-concept and the follower's perception of their own group as prestigious and distinct (Shamir et al., 1993). That in turn leads to a stronger feeling of involvement of the individual follower in his/her group or unit. In fact, it was shown that transformational leaders build social identification, collective confidence (Bass et al., 2003), cohesion (Bass et al., 2003; Jung & Sosik, 2002), and a collective personality (Hofmann and Jones, 2005). This emphasizing of a collective mission is predestinated to strengthen sharing of affect within work groups (Walter & Bruch, 2008). Additionally, as these leaders value emotion expression (Bass, 1985), followers' display more positive feelings (Bono & Ilies, 2006; Rowold & Rohmann, 2009). This in turn raises the probability that emotion can be observed, recognized and imitated via the mechanisms of emotional contagion, comparison and empathy within the whole group.

Hypothesis 2: Transformational leadership is positively related to positive affective similarity.

Transactional leadership. Transactional leadership is a basic leadership style that relies on mutual exchange principles. A contract or agreement about work objectives is set up between the leader and the follower; when the contract is fulfilled and the goal accomplished, the subordinate is rewarded. Followers will make an effort and accomplish the goals set by the leader with the intention to be rewarded (Bass & Avolio, 2000). Transactional leadership can be categorized as "task-focused leadership behavior". Task-focused leaders refer mainly to task accomplishment; the leader promotes task understanding in providing and explaining of all the task relevant information.

Transactional leaders use feedback on discrepancies between actual and target performance to motivate followers; they thereby concentrate mainly on task-relevant information. Thus, they do not have to use emotions in order to convince their followers or to reach task accomplishment and they do not address the followers' needs as do transformational leaders.

In fact, it was found that transactional leadership is less strongly related to followers' positive emotions than transformational (Rowold & Rohmann, 2009). In contrast, especially the passive-avoidant component of this leadership behavior is strongly associated with negative emotions (Rowold & Rohmann, 2009) as neglecting the followers' needs is often accompanied with negative emotions.

Besides, transactional leaders do not address those aspects of work that are beyond task characteristics, such as the interaction-specific characteristics of team work. Thus, they neither create a team environment, nor foster team interactions. Hofmann and Jones (2005) reported that transactional leadership is not related at all to any of five dimensions of the collective personality. It was also found that platoon leaders rated as transactional positively influenced group potency, but not group cohesion (Bass et al., 2003). The result was replicated in an experimental setting: groups in the transactional leadership condition were less cohesive than groups in the transformational leadership condition (Hoyt & Blascovich, 2003). Thus, it is less likely that transactional leaders create shared affect or a common affective environment as their behaviors do not address or foster team interactions.

Hypothesis 3: Transactional leadership is not related to positive affective similarity.

Empowering leadership. Empowering leadership has its origin in the work of Manz and Sims (e.g. 1987) on self-managing teams. This leadership style is directed towards the whole team and encourages interactions and exchanges between team members. The main goal of the supervisor is to lead the team in such a way that the team can accomplish the task on its own, from goal setting to performance review. These leaders encourage teams to have high performance expectations, to set goals participative, to be self-critical, and evaluate the teams' performance, but also to experiment with new ideas or ways of task accomplishment (e.g. Manz & Sims, 1987; Pearce et al., 2003). Taken together, these leaders empower teams to cooperate and to work self-reliant. To enable self-managed teamwork, team interactions are necessary and thus, the empowering team leader encourages team interactions. In line with this idea, it was found that empowering leadership leads to more supportive remarks (Kahai et al., 1997), to a better information exchange (Larson et al., 1998), to a trustful group climate (Edmondson, 1999), to team reflection or "speaking up" (e.g. Edmondson, 1999, 2003), and

to open communication and feedback-giving (Nygren & Levine, 1996). So, several researchers showed that empowering leadership is related to a stronger enactment of team processes.

Empowering leadership has never been investigated in the context of group affect, although it is known that it is related to group climate (e.g. Edmondson, 1999) as well as communication and exchange between team members (Nygren & Levine, 1996). But, as the mechanisms of mood convergence suggest, team interactions are an important precondition that enables sharing and imitating of affect (e.g. Pirola-Merlo et al., 2002). Frequent interactions between team members increase the probability that mood information is detected, and than it can be mimicked, and reproduced. So, members' contact frequency and intimacy should foster mood convergence. It could be shown that membership stability (operationalized by supervisor ratings of interaction continuity and frequency) was positively related to mood convergence (Bartel & Saavedra, 2000). As mood convergence depends on the quality and amount of team interactions and empowering leadership is related to team processes, we propose the following:

Hypothesis 4: Empowering leadership is positively related to positive affective similarity.

Comparison of the leadership behaviors. Research shows that different mechanisms relate transformational and empowering leadership to group affect. Transformational leaders set challenging goals and create a common vision. As a consequence, their followers develop collective confidence that in turn can lead to sharing of affect. This collective awareness leads to a strong feeling of a group identity and can also build affective similarity. Additionally, as transformational leadership is considered as a highly emotional process, this leadership behavior provokes strong positive emotions on the side of the followers. Empowering leaders, in contrast, do not communicate a common vision. They simply encourage interactions between team members and assign accountability to the team, thus enabling frequent team interactions. They also create a positive team climate (Edmondson, 1999) that values team work and enables open communication and smooth collaboration. These intensified team interactions and the creation of a team enhancing climate raises the probability of mood observation, imitation, and synchronization that in turn enables mood convergence. But, as

this leadership behavior does not apply emotions, the relationship between empowering leadership and positive affective similarity is assumed to be less strong than the relationship between transformational leadership and positive affective similarity. Transactional leaders, in contrast, do neither address team interactions nor create an affective environment. Thus, it is less likely that transactional leaders create shared positive affect.

We thus hypothesize the following rank order of the relationship between leadership behavior and positive affective similarity:

Hypothesis 5: Transformational leadership is related to stronger positive affective similarity than empowering leadership, which in turn is stronger related to positive affective similarity than transactional leadership.

Method

Participants

We collected data in teams of different Swiss organizations. Team was defined as individuals who worked for the same supervisor. We contacted 250 employees of 32 teams; 180 employees of 27 teams completed the questionnaires indicating a response rate of 72%. Team size of the participating teams ranged from 3 to 13; the average size of the team was 6.4 members. Of the respondents, 52% were female and 48% were male. The mean age of the respondents was 38.8 years ($SD = 9.8$), ranging from 17 to 63 years. Average organizational tenure was 16.6 years ($SD = 11.6$).

Measures

Transformational and transactional leadership. Each employee rated her or his supervisor with regard to his/her leadership behavior. The German version of the 36-item Multifactor Leadership Questionnaire (MLQ, Bass & Avolio, 2000) was used to assess transformational and transactional leadership. This questionnaire assesses the following dimensions of transformational leadership: individual consideration, intellectual stimulation, inspirational motivation, and idealized influence. Transactional leadership is composed of the subscales contingent reward and management-by-exception. All items are answered on a five-

point scale ranging from "not at all" to "frequently, if not always". The MLQ is an extensively validated and often used measure of transformational and transactional leadership (Judge et al., 2006). Recent research showed that the factor structure of the Multifactor Leadership Questionnaire can vary across different organizational contexts (e.g. Antonakis, Avolio, Sivasubramaniam, 2003) and the dimensions of transformational leadership are highly intercorrelated (e.g. Judge et al., 2006). Consistent with this research and with other researchers in this area (e.g. Hofmann & Jones, 2005), we decided to create two subscales measuring transformational and transactional leadership. Internal reliabilities at the individual level were .94, and .70, respectively.

Empowering leadership. The 38-item Empowering Leadership Questionnaire (ELQ, Arnold et al., 2000) was used to assess empowering leadership. This instrument assesses five different dimensions of empowering leadership: Leading by example, participation in decision-making, coaching, informing, showing concern/interacting with the team. All items are answered on a five-point scale, ranging from "not at all" to "frequently, if not always". Arnold and colleagues (2000) found support for the five factor structure of the Empowering Leadership Questionnaire (ELQ) in two studies. But, they also found that the intercorrelations between the five subscales are quite high. Consistent with these findings and in line with the decision taken for transformational and transactional leadership, we decided to create one scale measuring empowering leadership behavior. Internal consistency reliability at the individual level was .96.

Affect. In order to assess the teams' positive affective state, we measures individual positive affect with three items of the dimension "well-being state scale" of the mood state questionnaire MDBF (Steyer, Schwenkmezger, Notz, & Eid, 1997) that consisted of three positively formulated items ("Recently, I felt…well"); each of the items had to be rated on a five point Likert scale ranging from "not at all" to "in a great extent". Internal reliability of positive affect at the individual level was .73.

As we were interested in the recent past as a time frame rather than the actual moment, we decided to ask for mood in the last time ("recently"). Moreover, Watson and colleagues (1988) could show that there was no significant difference between asking mood over the last few weeks and asking for current mood.

Affective similarity was operationalized as degree of agreement within groups with regard to individual positive affect. So, we examined the coefficient of interrater agreement (rwg,

James Demaree, & Wolf, 1984) and used this coefficient as dependent variable in our analyses. Positive affective similarity ranged from .48 to .96 with a mean of .86 ($SD = .10$).

Control variables. As team members' age, tenure and also team size can be related to affective similarity (Bartel & Saavedra, 2000), their omission could bias the estimation of the regression coefficients. As a consequence, we asked the participants to indicate their age (in years), how long they are already working for the organization (organizational tenure in years and months) and in their team, respectively (team tenure in years and months). A measure for the team size was obtained by asking the supervisor about the number of her or his employees she or he has to lead in her/his team. These variables were included as control variables in the first step of our hierarchical regression analyses.

As the homogeneity of the teams' affect can be influenced by the general level of affect within the group and we were interested in the importance of leadership behavior for affective similarity regardless of whether the group shows high or low positive affect (mean level affect), we decided to control for positive mean level affect in a second step of the regression analyses (e.g. Barsade et al., 2000). Mean level affect was operationalized as the average positive mood within the group. Means and standard deviations of all variables of interest can be seen in table 1.

Aggregation of the leadership measures. In line with the theoretical background, we chose the group as unit of analysis in our analyses. As the leadership variables were measured on the individual level, we aggregated the data on the group level. The group score was represented by the group mean. To test whether there is sufficient agreement within the groups, we examined the average interrater agreement coefficient rwg (James, Demaree, & Wolf, 1984). The median rwg value for transformational leadership was .96, for transactional leadership .90, and for empowering leadership .98, indicating high agreement between the respective group members. Because all exceed the criterion of .70 (James et al., 1984), aggregation on group level is supported.

As our N shrank considerably after aggregating data on the group level we interpreted results at the 10% significance level as trend as did other researchers in the field of team research (e.g. Lim & Ployhart, 2004).

Results

We had several goals for this study. First, we wanted to explore the extent to which affective similarity occurs in work groups (Hypothesis 1). Second, we wanted to demonstrate that this affective similarity is differentially related to transformational, empowering and transactional leadership behavior (Hypothesis 2 to 5). Table 1 shows the means, standard deviations, and correlations among all independent, dependent and control variables in the study on team level.

Table 1: Group Construct Means, Standard Deviations, and Correlations among Study Variables

Variable	M	SD	1	2	3	4	5	6	7	8
1. Team mean age	39.23	4.71	-							
2. Organizational tenure	16.07	8.19	.79**	-						
3. Team mean tenure	3.36	2.07	.44*	.50*	-					
4. Team size	6.43	3.01	-.18	.13	.09	-				
5. Transformational leadership	3.87	0.39	-.34	-.42*	-.06	-.19	-			
6. Transactional leadership	3.46	0.25	-.36	-.28	.00	.31	.36	-		
7. Empowering Leadership	4.09	0.33	-.23	-.24	-.01	-.03	.88*	.32	-	
8. Mean level affect	3.80	0.31	.33†	.36†	.03	.06	.16	.15	.15	-
9. Positive affective similarity	0.86	0.10	.32	.29	.26	-.06	.22	-.10	.40*	.40*

*$p < .05$ level. **$p < .01$. $^†p < .10$

As expected, affective similarity is positively correlated with mean level affect: teams that are cohesive with regard to positive affect also reported a higher degree of positive affect. The table also shows that only empowering leadership is correlated with positive affective similarity. It can also be seen that some control variables are related to mean level positive affect; e.g. team mean age and organizational tenure, indicating that teams with a higher average age and a longer average organizational tenure report a higher amount of positive

affect. Interestingly, organizational tenure is negatively associated with transformational leadership: teams in which the members work longer within the organization rate their leaders as less transformational.

Positive Affective Similarity

To ascertain whether self-reported affect is similar within work teams, we used the measure of within-group agreement, the interrater reliability coefficient (*rwg*) that indicates the proportion of systematic variance of a specific group in relation to the expected variance taking into consideration all three items of positive affect. It reflects the degree to which team members agree in their assessments on positive affect (James et al., 1984). A coefficient of zero indicates low similarity within one group; a coefficient of .50 suggests moderate similarity, and a coefficient above .70 suggests substantial similarity.

As expected, teams converge with regard to their affect, the mean *rwg* of positive affect is .86. Table 1 shows the mean and standard deviation of the coefficient of positive affective similarity (last row). The *rwg* values ranged from .48 to .96, suggesting moderate to high levels of within-group agreement for positive affect. Although team members tended to be similar with regard to their rating on the three-item scale of affect, we did not find complete mood convergence. Nonetheless, this result provides support for the conzeptualization of affective similarity as a collective property of work teams.

Leadership and Positive Affective Similarity

Hypotheses 2 to 4 asked how leadership behavior is related to positive affective similarity. The results of the hierarchical linear regression analyses for the three leadership behaviors controlling for groups' mean age, mean organizational tenure, mean team tenure, team size in the first step and mean level affect in the second step are presented in table 2.

It should be mentioned first that in all three regression analyses, mean level affect is a powerful predictor for affective similarity and explains 12% of the variance on our dependant variable. Thus, the more positive the mood was rated on average by its team, the higher was the within-group agreement score with regard to positive affect.

Table 2: Results of the Regression Analyses for the Three Leadership Behaviors predicting Positive Affective Similarity on the Group Level

Variable	B	$SE\ B$	β	ΔR^2 of each step
Step 1: Control				
Team mean age	.00	.01	.21	
Organizational tenure	.00	.00	.05	
Team tenure	.01	.01	.18	
Team size	-.00	.01	-.04	.12
Step 2: Control				
Mean level affect	.11	.06	.38[†]	.12[†]
Step 3: Independent				
Transformational	.07	.06	.28	.05
Step 1: Control				
Team mean age	.00	.01	.22	
Organizational tenure	.00	.00	.03	
Team mean tenure	.01	.01	.18	
Team size	-.00	.01	-.07	.12
Step 2: Control				
Mean level affect	.11	.06	.38[†]	.12[†]
Step 3: Independent				
Empowering	.12	.05	.42*	.16*
Step 1: Control				
Team mean age	.00	.01	.07	
Organizational tenure	-.00	.01	-.12	
Team mean tenure	.01	.01	.30	
Team size	-.00	.01	-.05	.12
Step 2: Control				
Mean level affect	.13	.06	.43[†]	.12[†]
Step 3: Independent				
Transactional	-.06	.09	-.16	.02

*$p < .05$. [†]$p < .10$.

With regard to transformational leadership, the regression analysis revealed that, after having controlled for demographic variables and mean level affect, there is a no relationship between transformational leadership and positive affective similarity. Transformational leadership explained 5% of the variance on positive affective similarity above the

demographic variables and mean level affect. Thus, teams who perceived their leaders as more transformational did not make more similar ratings on the positive affect scale.

With regard to empowering leadership, our regression analysis shows that, controlling for demographic variables and mean level affect, there is a significant relationship between empowering leadership and positive affective similarity; empowering leadership explained 16% of the variance above the control variables and above mean level affect. Thus, the more empowering the leader was rated by its team, the higher was the within-group agreement score with regard to positive affect.

We also found support for our prediction that transactional leadership is less important in creating shared affect: we found no significant beta weight for the influence of transactional leadership on positive affective similarity. Thus, teams who perceived their leaders as more transactional did not make more similar ratings on the positive affect scale.

So, we can conclude that two of our three hypotheses on leadership and positive affective similarity are supported: there is a positive association between empowering leadership and positive affective similarity and no relationship between transactional leadership and positive affective similarity. Against our expectations, there was no association between transformational leadership and affective similarity. Thus, only empowering leaders create an environment that enables sharing of affect and stronger positive affective similarity and both, transformational and transactional leaders do not create such an environment.

In our fourth hypothesis we assumed a ranking with regard to leadership behavior and positive affective similarity. Comparing the standardized beta weights (see table 2) reveals clearly that – against our assumption – empowering leadership is more conducive in creating shared positive affect. Thus, we had to reject our hypothesis on the ranking that expected transformational leadership to be stronger related to positive affective similarity compared to empowering leadership. Our results showed that empowering leadership is more conducive to positive affective similarity compared to transformational leadership. As expected, however, transactional leadership is less important with regard to positive affective similarity compared to the other two leadership behaviors when comparing the different beta weights of our analyses.

Additional Analyses: Leadership and Mean Level Affect

As we could not find the expected relationship between transformational leadership and affective similarity, although many researchers claim that transformational leadership is a highly emotional process (e.g. Bono & Ilies, 2006; Rowold & Rohmann, 2009), we wanted to understand more deeply the mechanism between leadership behavior and affective similarity. In particular, as mean level affect was an important predictor in our regression analyses, we calculated additional analyses on the relationship between leadership behavior and mean level affect.

Additional analyses revealed that controlling for the demographic control variables, there was a positive relationship between transformational leadership and mean level positive affect ($\Delta R^2 = .16$, $\beta = .46$, $p < .05$). The more transformational the leader was rated by the group, the more positive the average mood of the group was. A similar, but weaker pattern was found for transactional leadership; transactional leadership explains significantly variance above the demographic control variables ($\Delta R^2 = .10$, $\beta = .36$, $p = .10$) what means that the more transactional the group rated the leader, the more positive the group mood was on average. Interestingly, even though empowering leadership is strongly related to affective similarity, no association between empowering leadership and mean level affect was found ($\Delta R^2 = .07$, $\beta = .28$, $p = .16$).

Discussion

The focus of this study was to investigate whether teams are homogeneous with regard to positive affect and how leadership behavior is related to this mood congruence. Different researchers were already interested in other antecedents of mood congruence, such as group membership stability, norms on mood regulation, task and social interdependence (Bartel & Saavedra, 2000), team commitment, and team climate (e.g. Totterdell et al., 1998). But, so far, there has been no systematic attempt to investigate the influence of leadership behavior on positive affective similarity. We found that group members are similar with regard to positive affect and that only empowering leadership is conducive for creating shared positive affect.

General Findings on Positive Affective Similarity

Emotions of members of one group are in fact more similar; our data showed a certain amount of agreement of positive individual affect within one group. We could find high *rwgs* of positive affect in our sample. Usually, *rwgs* above .70 are considered as meaningful (e.g. James et al., 1984), but that is mostly with regard to concepts that address the group level (team climate, team leadership etc.). In contrast, in our study individual affect was considered and thus, this result of the intra-group agreement is even more impressive. It should be mentioned, however, that the degree of affective similarity varies between groups; there are groups that display high positive affective similarity and others that do not.

Our findings on this within-group agreement of affect are in line with other findings that emotions converge over time and team members become emotionally more similar (e.g. Anderson et al., 2003; Barsade, 2002). Different authors mention different explanations for mood convergence: Barsade (2002) assumes that group members' emotions converge via subconscious primitive contagion and conscious emotional comparisons that in turn leads to emotional contagion. Anderson and colleagues (2003) additionally mention the shared emotional context that plays an important role, as well as a convergence of appraisal styles. All mechanisms reinforce each other and help to create a "shared affective reality" (Bartel & Saavedra, 2000, p. 203).

Leadership and Positive Affective Similarity

Our approach represents a rather new way of investigating the relationship between leadership behavior and followers' mood complementing existing research on the influence of leaders' mood on followers' mood (e.g. Sy et al., 2005; van Kleef et al., 2009). We found support for the assumption that leadership behaviors play an important role: As hypothesized, we found that a leadership behavior that addresses employee interactions, like an empowering leaders does, is conducive to positive affective similarity. In contrast, when only the task is addressed (transactional leadership), positive mood was less likely to converge. We could not find support, however, for our assumption that communicating a positive vision, like transformational leaders do, is beneficial for the creation of common positive affect.

Transformational leadership. Transformational leadership was shown to have no relationship with positive affective similarity; groups who rated their leaders as more transformational were not more similar with regard to their positive mood.

To our knowledge, no research on transformational leadership and affective similarity was conducted so far. There is only a theoretical framework, called "the positive group affective spiral" postulating that transformational leadership facilitates mechanisms of affective sharing and affective similarity in work groups (Walter & Bruch, 2008). In this model it is assumed that transformational leaders elicit followers' feelings of positivism and optimism and support an open expression of feelings. That in turn leads to a pronounced manner of mood expression on the side of the followers that in turn increases the probability that mood is observed, recognized and imitated and therefore mood contagion occurs. In fact, it was found that charismatic leadership positively influenced the groups' affective climate (Pirola-Merlo et al., 2002) and followers' mood expressions (Bono & Ilies, 2006; McColl-Kennedy & Anderson, 2002; Rowold & Rohmann, 2009). The process of mood contagion should be reinforced by strengthening the importance of collective goals that fosters team cohesion and creates shared affect (e.g. Bass et al., 2003; Jung & Sosik, 2002). In line with this idea it was found that transformational leadership predicts collective personality of groups (Hofmann & Jones, 2005), group potency (Schaubroeck et al., 2007) and feelings of cohesiveness (Jung & Sosik, 2002).

Our study revealed, however, that transformational leadership behaviors are only related to a positive group affective tone, but not to affective similarity. Thus, the communication of a collective mission does not necessarily lead to sharing of affect although it elicits positive feelings at the side of the followers. That means, only the first part of the proposed mechanism is supported: transformational leadership is followed by positive affect of the group members, but this positive state does not necessarily spread out throughout the entire team. A possible explanation for our finding is the effect level of transformational leadership: although transformational leadership is a person-oriented leadership style, the concept does not explicitly include the team aspect or prescribes leadership behaviors that address team processes. Transformational leadership can have (a more indirect) effect on different team outcomes via the communication of a collective mission or a common goal, that in turn stimulates team processes in order to reach these goals. It should be mentioned, however, that

transformational leadership can also be exclusively directed towards the individual follower, especially, as it includes a dimension called "individualized consideration".

In line with this reasoning it was shown by the work of Yammarino and colleagues (e.g. Yammarino & Dubinsky, 1994), that many leadership concepts are statistically only meaningful on the individual level and that the variance of leadership perception is often larger within than between groups. Analyzing multi-source data and conducting within and between analyses (WABA), they found that transformational leadership results were based solely on individual difference and do not hold at higher levels of analysis (e.g. group level).

Accordingly, also Yukl (1999) stated in his review on transformational leadership that this leadership process mainly involves a series of dyadic interactions and that therefore a transformational leader influences primarily individual followers and not processes occurring at a team level. He states that many positive effects of transformational leadership on group outcomes were found, but that it is unclear via which group processes transformational leaders obtain these results.

Interestingly, some researchers found a positive influence of transformational leadership on collective properties of a group (e.g. Hofmann & Jones, 2005; Schaubroeck et al., 2007). As mentioned above, we assume that this affect is more an indirect one, acting via the communication of a collective goal or mission. It can be assumed that this effect is the stronger the more pronounced the common group goal is communicated. As items of the MLQ questionnaire do not specifically ask for group goals, we cannot prove this assumption in our study. Additionally, transformational leaders can focus on the dimension "individual consideration" to a different extent. Thus, it can happen that transformational leaders improve individual member motivation, but there can be the negative side effect of competition between team members (Yukl, 1999) that in turn leads to a more individualistic way of transformational leadership effectiveness.

Empowering leadership. Empowering leadership was found to be related to positive affective similarity. That means that groups who rated their leader as empowering were also more homogeneous with regard to positive affect. The effect of empowering leadership on affective similarity seems to be mainly based on team interactions and not on an emotional leadership process per se, as we could not find a relationship between empowering leadership and mean level affect.

It was shown that empowering leaders encourage and also foster team processes, such as reflection, interaction frequency, team spirit and identification with the team (e.g. Edmondson, 1999; Manz & Sims, 1987; Nygren & Levine, 1996). Especially the frequent exchange between team members raises the probability that emotions can be observed, imitated, and synchronized and it can be assumed that a higher frequency of team processes is related to more mood convergence. So, for example, Totterdell (1998) found that high interdependence is related to stronger mood convergence. As we did not measure interaction frequency between team members, we can not be sure if this mechanism is the most probable explanation. Another explanation might be the mechanism proposed by Pescosolido (2002) that leaders create a safe climate in which emotion expression is valued, that in turn leads to an expression of positive emotions and as a further consequence also to contagion of positive mood. This explanation seems to be probable in the case of empowering leadership as it was shown that empowering leaders create a climate of psychological safety (e.g. Edmondson, 1999) in which it is safe to speak up with ideas and observations and so maybe also to express emotions more openly.

Transactional leadership. We found no relationship between transactional leadership and positive affective similarity. Thus, employees who rate their leaders as transactional are not more or less homogeneous with regard to individual positive affect. It is known that transactional leadership is less closely related to positive emotions compared to transformational leadership (Rowold & Rohmann, 2009). That could mean that transactional leaders do not influence followers' positive emotions and thus, no emotional contagion occurs. This explanation seems to be rather unlikely, as the feedback a transactional leader gives should be related to some kind of emotional response (e.g. pride when a positive feedback is given). Additionally, when looking closer at the study of Rowold and Rohmann (2009), there is a significant positive correlation of the transactional dimension "active management by exception" with positive emotions at the individual level. In line with their findings we also found a statistical trend between transactional leadership and a positive affective tone of the group. That seems to emphasize the reasoning that also transactional leaders provoke positive emotions at the side of the individual follower, but this individual level affect does not converge at the team level. Two explanations are possible: individual emotions are only felt, but not expressed, as transactional leaders do not create a climate that encourages emotion expression. When emotion is not expressed, it can not be observed and contagion or synchronization is less likely to occur. Another possible explanation is that

transactional leaders do not encourage team interactions and do not create shared experiences and thus, mood convergence does not occur as there is less contact direct between the team members that in turn hinders emotional contagion, as interdependence and interactions are an important antecedent of mood convergence (e.g. Totterdell et al., 1998).

So, these leaders influence individual followers' emotions, but do not enable convergence on the group level. As transactional leaders do not address work aspects that are beyond the tasks, such as interactions, team climate etc., they also do not seem to influence emotional convergence. Thus, we can conclude that transactional leadership is neither related to convergence of positive, nor convergence of negative mood.

Comparing transformational and empowering leaderhip. In contrast to our assumption, rather than transformational leadership being more strongly related to positive affective similarity compared to empowering leadership, we found the opposite rank order. As already mentioned, one explanation for this finding can be the component "individualized consideration" of the transformational leadership framework. This behavior addresses basically the individual follower and can thus lead to a feeling of "individualization" between team members and thus limits the occurrence of group-level processes. This mechanism could explain why empowering leadership behavior was more conducive to positive affective similarity compared to transformational leadership.

With regard to the distinct facilitation of positive affective convergence, the interesting question arises as to which mechanism of empowering leadership occur with regard to mood convergence. So, for example, the effect of empowering leadership on positive affective similarity could act via the creation of norms that emotion expression is valued and the fostering of interaction between team members. Thus, more research is needed on the mediating mechanisms between leadership behavior and emotional convergence.

Strength and weaknesses

We minimized the common biases by employing an indirect measure of affective similarity: we did not ask the teams how similar they rate their emotions, but measured the individual level affect and calculated a within-group agreement score. Thus, we can draw reliable inferences on affective similarity that are not influenced by common method biases (Podsakoff et al., 1984).

But, as mentioned earlier, affective similarity can be influenced by a wide variety of other factors besides leadership that were not included in our analyses. Thus, we still do not know whether leadership behavior is more influential than other, more team specific, antecedences (e.g. interdependence or conflicts) or whether leadership behavior influences behavior at the team level that in turn leads to mood convergence.

Another concern is the high correlation between transformational and empowering leadership. We do not know whether it is due to common method variance (Podsakoff et al., 1984) or due to the fact that leaders tend to display both, team-oriented empowering behavior in combination with vision-communicating transformational behavior. But, that does not influence the separate analyses between transformational leadership and positive and negative affective similarity and empowering leadership and affective similarity. As there is a significant relationship between empowering leadership behavior and positive affective similarity, but no relationship at all between transformational leadership and positive affective similarity, and reverse effects for mean level affect, the conclusion seems likely that leaders tend to display both, empowering and transformational leadership behavior, but that these behaviors have distinct consequences on group interactions and team-related concepts, such as mood homogeneity.

Another weak point is that our design does not allow us to draw causal inferences. But, it seems to be unlikely that group members' affective similarity (indirectly measured) leads to a leadership behavior. It seems more likely that leadership behavior influences the convergence of emotions in groups.

Conclusions

Emotions play an important role within the context of team work and can fulfill several functions, such as creating team cohesion, facilitating social interactions and enabling better team performance. Our study could show that individual emotions tend to be similar within teams. We also found that this similarity is related to the behavior of team leaders. So, team leaders can help to create a common team spirit and collective emotions in addressing team specific issues that go beyond the task, such as collective goals and team interactions. To enable mood convergence, leaders should be encouraged to display empowering leadership behaviors.

Chapter 4

Active vs. Reflective Team Learning –

The Role of Goal Perceptions & Team Climate

Theoretical Background

For modern organizations facing fast market changes, learning is a competitive advantage because it is related to performance, adaptation, and innovation (Carter & West, 1998; Edmondson & Moingeon, 1998). In general, learning is an individual phenomenon: It is the individual employee who has to update existing knowledge and learn new procedures and skills in an ongoing process of modifying actions through reflection (Schön, 1984). For the diffusion of the individual knowledge and the resulting changes, the interaction between colleagues within teams is important, however (Carroll, Rudolph & Hatakenaka, 2002). Therefore, as a starting point for understanding learning at the organizational level, we propose investigating the team level because subunits have to learn before the organization learns (Edmondson, 2002). When most of the work is performed in teams, it is important to researchers and practitioners alike to know more about team learning (e.g., Carter & West, 1998; Edmondson, 1999). The aim of this study is, therefore, to examine the role of psychological climate and the influence of goal sharedness in the field of learning and performance in short-term teams. Instead of relying solely on self-reports, we chose the hidden-profile paradigm to observe learning behavior of short-term teams in the lab where we can get closer to actual behaviors (Baumeister, Vohs, & Funder, 2007) and map such complex processes as learning in teams through a fine-grained analysis as suggested by Tjosvold, Tang, and West (2004).

Team Learning

Some researchers focus on outcomes such as increases in the collective level of abilities and skills (Ellis et al., 2003) or changes in the range of the team's potential behaviors as team learning (van Offenbeek, 2001). To reach these outcomes, reflective activities, communication and sharing of experiences and knowledge among team members are necessary and that is the essence of learning according to other researchers. Argyris and Schön (1978), for instance, describe a cycle of action and reflection and this cycle requires teams to reflect on past performance, analyze the causal structure for success or failure of undertaken actions, try new actions, analyze them, modify them, try again, reflect, and so forth. Particularly in teams, the reflective part is at least as important as the active one because it enables the transfer of knowledge and insights into causal connections from one team

member to another (Edmondson, 2002). Hence, in our view, the active and the reflective part of learning are equally important.

Learning as reflection. Exploring the work environment before, during or after task accomplishment in an overt and joint manner is the core of team reflection. These processes include the consideration of goals and strategies, assuring that the means of task accomplishment are appropriate and also an evaluation of task and environment after having finished the task (Schippers, Hartog, & Koopman, 2007). A closely related concept is "reflexivity" (e.g. West, 1996). Teams high in reflexivity regularly reflect upon their objectives and the way of they accomplish their tasks and discuss actively whether the goals and processes remain appropriate under changing conditions. This reflection is accompanied by an overt exchange of opinions and an expression of "voice". Reflective behaviors include reflecting on performance, team processes, progress, and strategies (Edmondson, 2002; Schippers et al., 2007), speaking up with observations, concerns and problems, seeking and giving feedback, asking questions, seeking help and information and admitting mistakes (Edmondson, 2003).

Active learning. Reflection within teams does not necessarily entail changes in knowledge, behavior, or outcomes (Schippers et al., 2007). Common knowledge or insights have to be established and transferred into concrete decisions or actions (also called "codification", Gibson & Vermeulen, 2003). According to Edmondson (2002), learning is considered as active when it produces a change or improvement within a team. That can be an achieved decision, a change made, an implemented result of an experiment, improved performance as well as the acquisition of new knowledge.

To decide upon new actions and change the teams' performance and behavior, individual knowledge, information, and resources have to be pooled effectively together; knowledge needs to be transferred to benefit from each others' knowledge (Hinsz, Tindale, & Vollrath, 1997). An important experimental paradigm in the context of information pooling and knowledge exchange is the "hidden profile paradigm" (Stasser & Titus, 1985). We chose this paradigm to investigate team learning because it is well established in the literature.

Hidden Profile Paradigm

A hidden profile is a group decision task in which groups need to decide among several alternatives based upon individual information (e.g., Stasser & Titus, 1987). Some of the information is shared, i.e., available to all team members before the group discussion, whereas other information is unshared, i.e., held only by one group member and thus represents unique knowledge. The task is created in such a way that unshared information—distributed across different group members—is necessary for the optimal decision and thus, the hidden profile can only be solved if all group members exchange and integrate their unshared information. Basing the decision exclusively on individual information before the discussion or shared information results in a suboptimal solution. Decades of research on the hidden profile show that shared information is mentioned and repeated at the expense of unshared information and groups do not find the optimal solution (e.g. Wittenbaum, Hollingshead, & Botero, 2004). As a consequence, groups often fail to find the optimal decision.

Several theoretical explanations were proposed for the biased exchange of shared information and the poor decision quality. First of all, the groups fail to discuss unshared information due to the probabilistic sampling advantage of shared information: As more "minds" possess a piece of shared information, the likelihood of mentioning shared information is increased and thus more shared information is discussed (information-sampling model, Stasser, 1992). Additionally, when shared information is mentioned, the other team members can agree with this information as they possess the same information. This positive evaluation lets this information be perceived as more accurate, valuable and important (e.g., Wittenbaum et al., 1999). Hence, shared information is repeated more frequently due to processes of social validation and mutual enhancement. Besides, it was found that the final discussion is determined by pre-discussion preferences: as the individual information is supportive of the suboptimal alternative that is also supported by the shared information, groups focus more on shared information as it is consistent with the pre-discussion preference (common knowledge effect or preference negotiation model, Gigone & Hastie, 1993).

All these factors explain why shared information is mentioned and repeated more often. Interestingly, the possession of all the shared and unshared information does not necessarily lead to a better decision. Greitemeyer and Schulz-Hardt (2003) explained this due to individual-level cognitive bias: Individuals tend to build first preferences after having read the hidden profile before entering the group discussion. During group discussion, the preference-

consistent and at the same time shared information is evaluated more positively than the preference-inconsistent, unshared information. That leads to a stronger consideration of shared information when making the decision and so, the discussion of unshared information does not lead to a better decision (e.g. Greitemeyer & Schulz-Hardt, 2003; Greitemeyer, Schulz-Hardt, Brodbeck, & Frey, 2006; Lavery, Franz, Winquist, & Larson, 1999).

Other findings are at odds with this finding that unshared information does not improve decision quality by showing a beneficial effect of the discussion of unshared information (e.g. Larson, Christensen, Franz, & Abbott, 1998; Winquist & Larson, 1998). Lavery and colleagues (1999) explained this discrepancy by differences in given discussion or judgment time. With our team-learning perspective we can contribute a new explanation of these discrepant results.

Learning in Hidden Profile Tasks

Combining the concepts of team learning and information exchange in hidden profile tasks, enables us to assume that rather than by the discussion of unshared information per se decision quality is improved by the amount of unshared information which those team members learnt who did not possess it in the first place. When group member A holds the unshared piece of information a_1 and she mentions and repeats this item, this does not contribute much to decision quality, as the repetition of own information is necessary but not sufficient for group members B and C to perceive, accept, and consider this item, i.e., acquire new knowledge (Edmondson, 2002). The amount of unshared information does not capture group members' differential attention to unshared items which is typically low according to Gigone and Hastie (1993). For this reason, Scholten and colleagues (2007) used the repetition of information during the discussion as indicator of depth of information processing. They found this to be a key factor for group-discussion quality because they did not distinguish who repeated the information no inferences on underlying learning processes can be made. In a similar vein, Brodbeck and colleagues (2002) were interested in information gain, operationalized as the number of correctly recalled items adopted from the other group members after the group discussion. They reported a positive relationship between

information gain and group decision quality. But here again, no inference with regard to learning is possible as they did not consider actual information exchange.

One aim of our paper is to close this gap by linking the team-learning (e.g. Edmondson, 2003) to the hidden-profile literature (e.g. Greitemeyer et al., 2006). This combination allowed us to distinguish three types of learning behavior: (1) reflective learning as operationalized by Edmondson (2002) and Schippers and colleagues (2007) as a reflection on groups' goals, processes and outcomes; (2) the precondition of active learning as defined by the communication of new und unique knowledge; and (3) active learning as knowledge acquisition (Edmondson, 2002) by picking up unshared information mentioned by other team members. With the aid of the hidden profile task, we examined the association of safety climate and team learning on the one hand and of team learning and team performance on the other.

Antecedences of Learning Behavior

Negative emotions can accompany learning because it often involves the detection of set-target discrepancies, the perception of problems, the confrontation with feedback, and the experience of challenges. The avoidance of negative emotions is one reason why team learning does not always occur even if it were necessary. Research by Edmondson (2002) showed that there are teams that reflect, but do not act, as well as teams that neither reflect nor change. It seems that only every other team displays learning activities and the amount of learning behavior varies across organizations of the same industry (e.g., Edmondson, 2002). Hence, it is important to know how these variations can be explained. There is evidence for a number of factors promoting or inhibiting learning behaviors in a team: goals (Tjosvold, Yu & Hui, 2004), team climate (West & Anderson, 1996), power differences and leadership behavior (Edmondson, 2003), as well as social relationships and coworkers' support at work (Tannenbaum, 1997). As we have investigated the influence of leadership elsewhere, this study will focus on goals and on team climate, more specifically, on participative safety.

Safety Climate

Perceived side effects of reflection and learning can be barriers to team learning (Edmondson, 2003): Often employees do not admit mistakes or gaps in their knowledge or

ask for help because they do not want to be perceived as incompetent. Individuals refuse to ask their colleagues or supervisors because they perceive the answer to be too obvious. Moreover, because of the risk of failure people do not want to experiment. Besides, confronting team members with novel knowledge entails the danger of being seen as annoying or being ignored as the others may not want to deal with new information and its consequences such as revising a decision. Discussions about negative performance or negative events/problems are particularly rare since people are usually afraid of being perceived as troublemakers (also known as the MUM-Effect, Rosen & Tesser, 1979). Finally, reflecting takes a lot of time and most people hesitate to steal other people's time or goodwill and are themselves under the pressure of being productive and effective. All these different side effects of learning can be reduced to two concerns: (1) the fear of being seen as incompetent or bothersome (Edmondson, 2003) and (2) the anticipation of negative reactions of other team members (Rosen & Tesser, 1970), i.e., the perceived costs of learning seem to be crucial.

Therefore, organizations have an interest to influence the perception of these costs. And this is where psychological climate comes into play that is conceptualized as the individuals' perception, interpretation, and evaluation of object attributes within the work environment (Parker et al., 2003). Psychological climate is measured on the individual level, and can be aggregated to a higher level, such as the team or the organization as "shared psychological climate" (James et al., 2007, p. 16). One concept within the psychological climate literature is that of team climate (e.g. Anderson & West, 1996). As we argued above, a climate that minimizes the fear of being punished for sticking out one's head should be conducive to learning activities.

Various researchers contributed to our current knowledge about this phenomenon. Schein (1985) introduced the term "psychological safety". Later on, Kahn (1990) used this term to characterize a feeling of being able to behave without the threat of negative consequences to self and found that it is positively related to personal engagement in groups. In the field of team learning, Edmondson (1999) adopted the term to describe a team climate in which it is perceived as safe to take the interpersonal risks inherent in learning behavior (see left side of Figure 1). It has much in common with the concept of trust, but it acts in a short-term and immediate range of time, focuses on the anticipated consequences, and is supposed to be homogeneous within the team. Edmondson (1999) assumes that, in a climate of safety,

employees will feel secure enough to ask for help, information, or feedback or to reflect critically on performance because they are not afraid of being laughed at or punished. And in fact, a team climate of safety is positively associated with reflective learning behaviors (Edmondson, 1999; Carter & West, 1998) and even with innovative behaviors in work teams (West & Anderson, 1996). It also promotes productive discussions and fosters the detection and correction of medical errors (Edmondson, 2003). A parallel exists in the literature on knowledge transfer in hidden profile tasks with the assumption that norms or the fear of conflicts influence the exchange of information (Wittenbaum et al., 2004). Whereas in a competitive climate, people tend to withhold information and exchange less unshared, unique information (Toma & Butera, 2009), a safe climate can serve as debiasing factor within hidden profile discussions.

So, we propose the following:

Hypothesis 1: The more pronounced the safety climate in a team, the more learning behaviors will be performed.

Hypothesis 1a: The more pronounced the safety climate in a team, the more reflective learning behaviors defined as reflection on groups' goals, processes and outcomes, will be performed.

Hypothesis 1b: The more pronounced the safety climate in a team, the more new and unique information will be communicated which serves as precondition of active learning behavior.

Hypothesis 1c: The more pronounced the safety climate in a team, the more active learning behaviors, defined as knowledge acquisition, will be performed.

Goal Sharedness

Members within a team may have a variety of goals and these goals on the individual and group level can influence the way in which information is processed within a team (Hinsz et al., 1997). Edmondson (2003) emphasizes the important role of goals in the process of team learning. She proposes that goals have to be understood and shared by all team members in order to enable the cycle of action and reflection. When team members do not know and

understand the goals or team members have divergent goals, they do not comply, negative emotions arise, and the willingness to reflect and to initiate changes is reduced (Edmondson, 2003). In contrast, when goals are shared, feelings of cohesiveness and cooperative attitudes are promoted (Johnson, Maruyama, Johnson, Nelson, & Skon, 1981) and learning is enabled (Tjosvold et al., 2004). In their meta-analysis, Gully and colleagues (1995) pointed out that group goals should be considered as important, but often neglected moderator; they argued, for example, that highly cohesive groups are only good performers when their goals are congruent with organizational goals.

There is evidence for the moderating role of goal properties. Group cohesion, for instance, was only positively related to group performance when goal acceptance was high (Greene, 1989; Podsakoff, MacKenzie, & Ahearne, 1997) or demographically diverse teams benefit from reflexivity when they have common goals (Schippers et al., 2003).

It can be assumed that safety climate is important for teams' learning behaviors, but when team members pursue diverging goals, people will not take the risk of reflecting and experimenting when they risk to be outperformed by the other team members. Thus, goal sharedness can reinforce the positive effects of participative safety, but the positive effect of psychological safety can be undermined when goals are not perceived to converge.

On these grounds, we expect shared goals to be a moderator of the influence of safety climate on learning behaviors.

Hypothesis 2: The perception of goal sharedness moderates the relationship between safety climate and learning behaviors in such a way that only when goals are shared, safety climate is related to learning behaviors.

Learning Outcomes

After presenting factors that influence learning behaviors in teams, it is important to show the outcomes of these processes. Edmondson showed in various studies that teams are more effective when they engage in learning (e.g. Edmondson, 1999). In his model of group effectiveness, West (1996) also stresses the importance of reflexivity with its positive influence on group performance. A team develops collective insight by sharing information,

seeking feedback about performance, discussing errors or problems, and experimenting in these reflective phases (Edmondson, 2002; Hirst et al., 2004). In this fashion, one team member can benefit from experiences of other team members and problems can be identified early. There is evidence that a higher frequency of team learning activities leads to better team performance (van Offenbeek, 2001), to higher innovation ratings by managers (Tjosvold et al., 2004), and to better self-rated team effectiveness, especially in teams with high outcome interdependence (de Dreu, 2007). Teams have to reflect after acting to enable double-loop learning and, as a consequence, better performance (Argyris & Schön, 1978).

Vice versa, the implementation of new technologies takes longer when teams do not enact learning processes, such as speaking up, boundary spanning, and reflection (Edmondson, 2003). One explanation of this effect may be the lack of variance in informational input, critical analysis, and internal feedback that results from not discussing information, processes, and alternatives. As a consequence, the basis for decision making is weak, problems are not detected and solved, and a worse decision quality may be the result (Morrison & Milliken, 2000). At the same time, when employees do not discuss and process information, they do not feel valued and needed and may show lower commitment, trust and, even motivation and job satisfaction (Morrison & Milliken, 2000).

Hypothesis 3a: Reflective learning behaviors, defined as reflection on groups' goals, processes and outcomes, are related to different facets of group performance.

As common knowledge is a precondition for effective group cooperation, learning in the form of sharing ideas and gaining new knowledge within teams affects individual and team-level outcomes (Hinsz et al., 1997). Studies using the hidden profile paradigm, however, could not consistently demonstrate a beneficial effect of discussing unshared information (e.g. Greitemeyer & Schulz-Hardt, 2003; Greitemeyer, Schulz-Hardt, Brodbeck, & Frey, 2006; Lavery et al., 1999). As already reasoned above, the unshared information mentioned can be of different quality: mentioning information owned by oneself is assumed to be less influential for decision quality than when another group member picks up this information and repeats it during the group discussion (knowledge acquisition). In this fashion, the danger

of preference-consistent evaluation of information (Greitemeyer & Schulz-Hardt, 2003; Greitemeyer, Schulz-Hardt, Brodbeck, & Frey, 2006) is reduced.

Hypothesis 3b: The precondition of active learning behaviors, defined as the communication of unique information, is not related to group performance.

Hypothesis 3c: Active learning behaviors, defined as knowledge acquisition, are related to facets of group performance.

Considering the positive influence of reflective and active learning behaviors on performance and the positive influence of safety climate mentioned earlier we conclude that reflective and active learning behaviors mediate the relationship between safety and performance, i.e., a team climate of safety influences performance in an indirect way (see also Carter & West, 1998).

Hypothesis 5a: Reflective learning behaviors, defined as reflection on groups' goals, processes and outcomes, mediate the effect of safety climate on objective and subjective group performance.

Hypothesis 5b: Active learning behaviors, defined as knowledge acquisition, mediate the effect of safety climate on objective and subjective group performance.

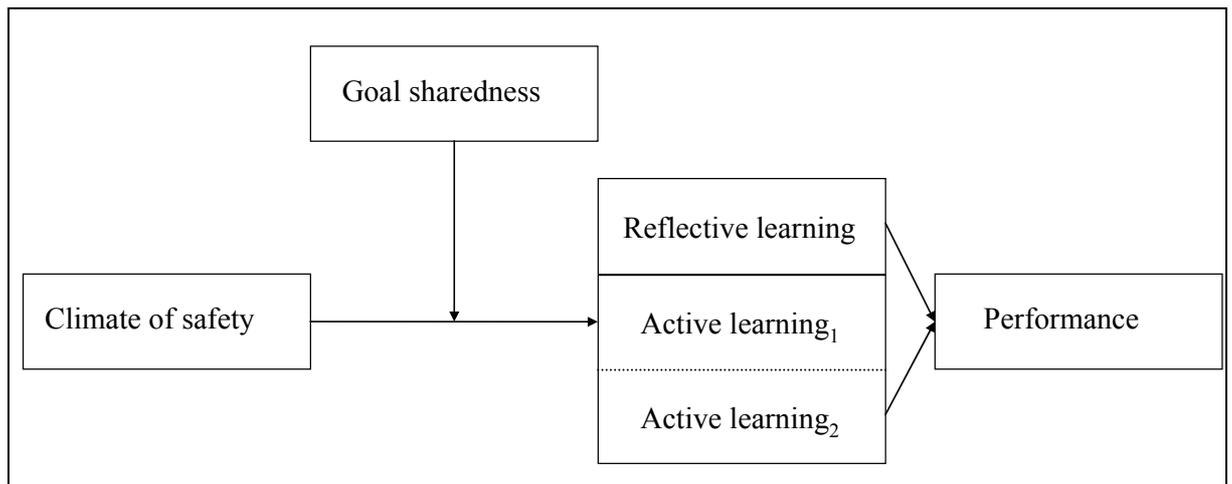All proposed relationships are summarized in Figure 1.

Figure 1: Model on team learning behavior

Method

Participants

Our sample consisted of 72 students who participated for credit. The vast majority were psychology students (69.4%), 11.1% were media and communication students, and 19.5% were enrolled in other domains of study (business studies, history, etc.). They had an average age of 23.8 years ($SD = 3.9$), have been studying for 5.8 semesters ($SD = 2.8$), and the gender ratio was slightly unbalanced (61.1% female, 38.9 % male). We recruited them via advertisements in the university buildings and also through presentations in courses. 24 groups resulted from assigning three persons randomly to groups.

Decision Task

We adopted the hidden profile task from the literature (e.g. Greitemeyer et al., 2006; Scholten et al., 2007). The groups were asked to imagine that they were part of an application committee that had to decide which of three candidates applying for a job as a head nurse is the most suitable. Each candidates' profile included positive, neutral, and negative characteristics; participants also got a fictitious job description. An independent sample of seven persons, drawn from the same population as our participants, rated the pieces of information as "positive", "negative" or "irrelevant" for the job of a head nurse. We

constructed the final profiles on the basis of these ratings and only used unambiguous pieces of information that all rated consensually as positive, negative or neutral.

Every team member got 15 items of shared information. The group had additionally 27 items of unshared information distributed equally among team members with each member having 9 unique items. The final task included in total 42 pieces of information regarding the three candidates which could be positive, negative, or neutral. The task was designed in such a way that the best alternative could not be chosen based on individual information, but only through the exchange of unshared information. Whereas individual information suggested candidate A to be the best match for the job, considering the total information enabled the conclusion that it is candidate C. As a result, participants had to share unique information between team members in order to find the best applicant.

Procedure

After their arrival in the laboratory, the experimenter welcomed the three participants and introduced them to the experiment with a cover story placing it in the context of assessment center tasks and their effects on applicants. The participants were seated separately from each other and the experimenter handed over the instructions to the participants informing them that their task was a group discussion in which they had to choose one of three applicants for a job as a head nurse. They were instructed that there was positive, negative, and neutral information about each of the three applicants. The candidate ranked number one should have more positive and less negative characteristics than the others, and the second more positive and less negative than the third.

They received the job description as well as the respective information regarding the applicants A, B, and C. They were instructed that they had 10 minutes to memorize this information before the experimenter led them into the second room for the group discussion where the participants were seated together as a group. They were instructed to discuss the information and to make a ranking of the three applicants. We informed them that they had maximum 20 minutes time. They were also asked to note their ranking on a sheet of paper. Group discussions were videotaped.

After discussion participants were asked to fill out the post-discussion questionnaire, in which we measured climate of safety, goals sharedness, and self-rated group effectiveness.

Discussion Coding

To avoid problems of relying solely on self-reports (Podsakoff et al., 2003) the group discussion were videotaped and coded with regard to the three forms of team learning: reflective learning, communication of unique information as precondition of active learning and active learning. To capture the concept of reflective learning, the frequency of reflective behaviors based on a coding scheme adopted from the work by Edmondson (2002, 2003) and Schippers and colleagues (2007) was coded (see measurements section). The coder was blind to the ideas of this study and was trained until consensus with the authors was reached for all coded behaviors. Information dissemination—important for the operationalization of the precondition of active learning behavior and active learning itself—was scored by two coders blind to the aim of this study. They independently watched the videotapes and coded every comment made with regard to the three candidates. They coded the items mentioned within the group discussion with a list of the items in hand. Every time one of the 42 items was mentioned, coders stopped the video and compared the item with their list. In order to be coded, a statement had to be understood to refer to a single piece of information and applicant. Comments that were ambiguous and could not clearly be matched to one single candidate were not coded. Repetitions were coded when mentioned separably and when they were not an immediate "echo". The interrater reliability measured as intraclass correlation for unshared information was $ICC = .59$. We also recorded discussion time.

Measurements

Goal sharedness. To capture the teams members' goal perceptions we used items of the subscale "goal sharedness" of the team climate inventory's dimension "vision" (TCI, Anderson & West, 1998, German translation by Brodbeck, Anderson, & West, 2000, $\alpha = .78$ in our sample). Participants were asked to indicate on a 5-point scale in which intensity (ranging from "not at all" to "completely") each question with regard to team objectives reflected the team members' perception. A sample item is "To what extent do you think your team's objectives are clearly understood by other members of the team?".

Climate of safety. Eight items of the team climate inventory's dimension "participative safety" (Anderson & West, 1998, German translation by Brodbeck et al., 2000, $\alpha = .77$ in our sample) were used to obtain a measure of the perceived consequences of taking interpersonal

risks in the group. Participants were asked to indicate on a 5-point scale how accurately each statement reflected the group climate during the discussion. A sample item is: "People feel understood and accepted by each other".

Learning behaviors. The frequencies of the following behaviors as indicator for reflective learning were measured: Consideration of (prospective) strategies (Schippers et al., 2007), review of (past) strategies (Schippers et al., 2007), consideration of goals (Schippers et al., 2007), review of objectives (Schippers et al., 2007), reflect on past performance or progress (Edmondson, 2002, 2003), speaking up with observations, concerns or problems (Edmondson, 2003), giving each other feedback (Edmondson, 2003), seeking feedback (Edmondson, 2002, 2003), asking questions for help or additional information (Edmondson, 2003), and admitting mistakes and problems (Edmondson, 2003).

As precondition of active learning, we followed the work by Edmondson (2002) who proposed transferring new information to others as an important part of team learning. So, we coded the frequency with which unshared information was mentioned by the owner of a piece of information. As every participant had 9 items of unshared information the other group members did not know, he or she could mention up to 9 different pieces of information that were unknown to the others. As we were interested in the depth of information sampling (Scholten et al., 2007), repetitions of this information was included.

In order to capture the active nature of team learning, we measured the acquisition of new knowledge in form of picking up new information as active learning behavior. Thus, we measured how frequent the group members repeated information that was new to them (i.e., unshared information they did not know before entering the group discussion). Here again, as we were interested in the depth of learning, we included repetitions.

Objective group performance. Participants were asked to rank the candidates described in the task with regard to their qualification. The quality of the group decision was derived through comparing the group ranking to the optimal ranking (i.e., when considering all information) and calculating the summed difference score (Jordan & Troth, 2003). The lower the difference, the better a teams' decision quality or group performance.

Self-rated group effectiveness. This variable was measured with four items from Hackman's model of team effectiveness (1983) to assess "the other side of team performance", i.e. the satisfaction with the group and its performance. The participants had to

indicate on 5-point scales (ranging from "not at all" to completely"): (a) the extent to which group members believed that the result of the group decision was valid, (b) how satisfied they were with their experience as a group member, (c) whether they felt positive about this experience, and (d) whether they were willing to work again with the same group in the future ($\alpha = .82$).

Data Analysis/Adequacy of Measures

As objective group performance and observer-rated learning behaviors are only measurable at the group level and our sample size on group level is smaller than 25, we chose the group as unit of analysis in our hierarchical regression analyses (Kenny, Kashy, & Cook, 2006). Variables measured on the individual level, as self-rated group performance, goal sharedness and safety climate, were represented by the group mean. To test whether there is sufficient agreement within the groups, we examined the average interrater agreement coefficient rwg (James, Demaree, & Wolf, 1984). The rwg value for safety climate was .94, for goal sharedness .95, and for self-rated group effectiveness .89, indicating high agreement between the respective group members. Thus, aggregation on group level is supported.

As our N shrank considerably after aggregating data on the group level we interpreted results at the 10% significance level as trend as did other researchers in the field of team research (e.g. Lim & Ployhart, 2004). Because of the reduced power of analyses of interaction effects, we set the significance level for our moderator analyses to 10% (e.g. Aguinis, 1995).

As groups differed with regard to discussion time (ranging from 8 min 30 sec to 20 min maximum) and some hidden profile studies found effects of discussion time (e.g. Brodbeck et al., 2002), we decided to include discussion time as control variable in all our regression analyses.

Results

Descriptive statistics (aggregated level) of the variables are shown in Table 1.

Table 1: Means, standard deviations, inter-correlations of the variables

Variable	Number of Items	*M*	*SD*	1	2	3	4	5	6	7
1. climate of safety	8	3.34	.23							
2. goal sharedness	5	3.40	.27	.56**						
3. reflective learning	Coding of 15 behaviors	70.68	25.14	.45*	.18					
4. precondition of active learning	Coding of unshared information (own property)	17.64	7.80	.35	.23	.32				
5. active learning (knowledge acquisition)	Coding of unshared information (learnt)	3.64	2.65	.11	.08	.17	.37			
6. self-rated group effectivn.	4	3.35	.36	.41*	.32	.33	.46*	.01		
7. objective group perform.	3 (Ranking)	2.58	1.38	-.34	-.15	-.31	-.22	-.38	-.26	
8. discussion time	minutes	17.68	3.15	-.17	-.29	.24	.14	.06	-.16	-.06

p < .05 level. **p* < .01

A climate of safety is significantly associated with the perception of teams' goal sharedness, with self-rated group effectiveness and with the observer rating of reflective learning behaviors. Apart from safety climate, goal sharedness and reflective learning behaviors are not related to any of the other constructs. Interestingly, the three different operationalizations of learning behavior do not correlate to a great extent: for the

communication of new and unique knowledge as precondition of active learning behavior and active learning behavior measured as knowledge acquisition we found an association of $r = .40$ ($p = .09$). That means that there is a qualitative difference between mentioning own unshared information and knowledge acquisition in terms of picking up and repeating unfamiliar information. Reflective learning behavior does not correlate with the two forms of active learning behavior. Communication of new and unique information as precondition of active learning in turn is related to self-rated group effectiveness, whereas active earning behavior is related to none of the other variables. Apart from safety climate and the precondition of active learning, self-rated group effectiveness is not associated with any other variable. Objective group performance is neither related to self-rated group effectiveness, nor to any of the other variables.

Safety Climate and Learning Behavior

Hypothesis 1 assumed that a climate of safety is related to all three forms of learning behavior: reflective learning, communication of unique information as precondition of active learning and active learning in form of knowledge acquisition. To test the relationship between the teams' safety perceptions and learning, we conducted a hierarchical linear regression analysis, with discussion time entered as control variable in the first step and the groups' mean of safety climate in the second step (see table 2). As hypothesized, participative safety turned out to be a significant predictor of the observer coded reflective learning behavior and explained 25% of the variance in reflective learning. In other words, groups that reported a higher degree of participative safety also showed more reflective learning behaviors during the group discussion. A similar trend was found with regard to the precondition of active learning behavior: participative safety predicted the communication of new and unique information and explained 14% of the variance above discussion time. That means that in groups perceiving their average level of safety climate to be higher, individual team members mentioned more of their own, unique information during the group discussion. Against our hypothesis, we could not find this relationship for active learning behavior itself; participative safety did not turn out as significant predictor of active learning. In groups that perceived their climate as safe individual team members did not mention more newly learnt information. So, summarizing our results with regard to hypothesis 1 we found partial support: participative safety was significantly related to reflective learning and the

communication of new, unique unshared information as precondition of active learning, but not to active learning itself.

Table 2: Summary of hierarchical regression analysis for safety climate predicting the three forms of learning behaviors

Variable	B	$SE\ B$	β	ΔR^2
teams' reflective learning				
Step 1				
discussion time	1.94	1.73	.24	.06
Step 2				
discussion time	2.61	1.55	.33	
participative safety	59.28	22.62	.51*	.25*
teams' communication of new and unique information as precondition of active learning				
Step 1				
discussion time	.35	.55	.143	.02
Step 2				
discussion time	.51	.53	.21	
participative safety	13.98	7.71	.39†	.14†
teams' active learning				
Step 1				
discussion time	.05	.19	.06	.00
Step 2				
discussion time	.07	.19	.08	
participative safety	1.56	2.84	.13	.02

$*p < .05.\ ^\dagger p < .10.$

Interaction Between Safety Climate and Goal Sharedness and Learning Behavior

Hypothesis 2 postulated that safety climate was only beneficial for all three forms of team learning when goals were perceived as shared. To test this hypothesis, we conducted three hierarchical linear regressions and regressed reflective learning, the precondition of active learning and active learning itself on discussion time in the first step, followed by entering the variables safety climate and goal sharedness, followed by their interaction term. To avoid

multicollinearity, all variables (except the control variable discussion time) were centered before entered in the regression analysis (Aiken & West, 1996). With regard to our hypothesis, only partial support was found: we found a trend of the interaction term as predictor for teams' reflective learning activities, $\Delta R^2 = .13$, $\beta = .38$, $p = .06$, but not for the precondition of active learning and active learning itself ($\Delta R^2 = .01$, $\beta = -.09$, $p = .70$, $\Delta R^2 = .02$, $\beta = -.15$, $p = .57$, respectively). This interaction is plotted in figure 2. In line with our reasoning we found that participative safety is beneficial for reflective learning when goals are perceived as shared. On the other hand, when goals are not perceived as shared, the beneficial effect of participative safety disappears and there is no longer a relationship between safety climate and reflection.
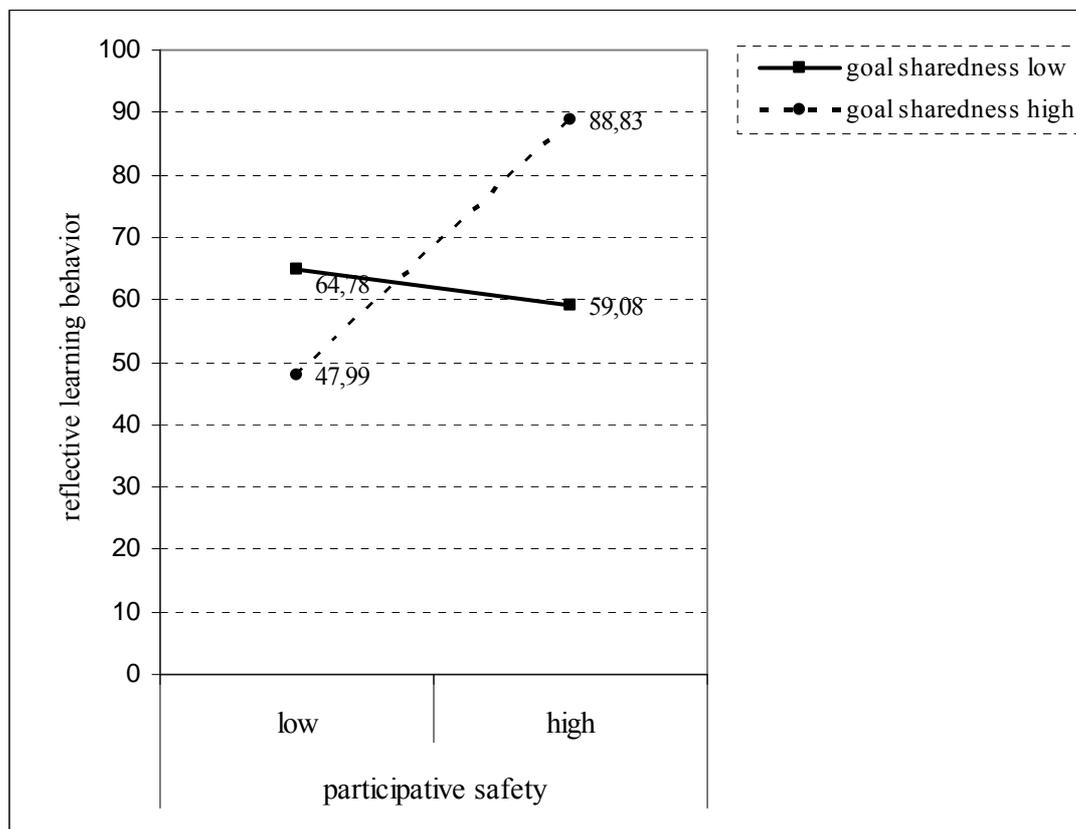

Figure 2: The interaction between safety climate and goals on learning behavior

Learning and Performance

We hypothesized that reflective and active learning are related to group performance, the precondition of active learning per se should not have a positive effect, however. To answer

hypothesis 3, we calculated six hierarchical linear regression analyses and regressed self-rated group performance, and objective group performance, respectively, on the groups' reflective learning, or the precondition of active learning or active learning itself, respectively (see table 3).

Reflective learning. With regard to self-rated group effectiveness, our hypothesis regarding reflective learning and performance was supported. We found a trend of reflective learning predicting self-rated group performance. In other words, groups that showed more reflection during group discussion also rated their result of the group discussion as better. With regard to objective group performance, however, more reflection did not lead to an objective better group decision. So, we only found partial support for our hypothesis on reflective learning and group performance: reflection proved to be beneficial for a feeling of satisfaction with the group result, but did not enhance objective decision quality.

Communication of unique information. When considering the communication of new and unique information as precondition of active learning behavior, we found that it is—unexpectedly—related to self-rated group effectiveness. Groups, in which individual team members communicated more new information owned uniquely, also assessed the groups' performance as better. With regard to objective group performance, a different pattern was found: the precondition of active learning was not related to objective group performance; when group members mentioned more of their own, unique information during group discussion this was not beneficial for the decision quality. So, we found again partial support for our hypothesis: in line with our ideas, the mentioning of own, unshared information does not improve decision quality. It should be noted, however, that this mentioning is accompanied by better perceived group performance.

Active learning. For the last part of our hypothesis 3 on active learning and group performance we again found mixed support: in line with our hypothesis we found that more active learning is related to a smaller deviance from the optimal ranking and therefore to a better objective group decision quality. Groups in which individuals learnt more new, unshared information that their team colleagues communicated also came to objectively better decisions. Interestingly, that did not lead to a better self-rating of the groups' performance.

To summarize our findings on hypothesis 3: reflective learning and the precondition of active learning led to a better self-rating of group performance, but are in fact not beneficial for the objective group decision quality. Active learning however, does lead to a better

ranking of the alternatives and is therefore beneficial for the objective group performance, but without being perceived in this way by the group itself (self-rated group effectiveness).

Table 3: Summary of hierarchical regression analysis for the different forms of learning behavior predicting self-rated and objective group performance

Variable	B	$SE\ B$	β	ΔR^2	B	$SE\ B$	β	ΔR^2
	self-rated group effectiveness				objective group performance			
Step 1								
discussion time	-.02	.02	-.16	.03	-.03	.10	-.06	.00
Step 2								
discussion time	-.02	.02	-.25		.01	.10	.02	
reflective learning	.01	.00	.39†	.15†	-.02	.01	-.31	.09
Step 1								
discussion time	-.02	.02	-.16	.03	-.03	.10	-.06	.00
Step 2								
discussion time	-.02	.02	-.23		-.01	.10	-.02	
unique information	.02	.00	.50*	.24*	-.04	.04	-.22	.05
Step 1								
discussion time	-.02	.02	-.16	.03	-.03	.10	-.06	.00
Step 2								
discussion time	-.02	.02	-.16		-.02	.10	-.03	
active learning	.00	.03	.02	.00	-.20	.11	-.38†	.14†

$*p < .05.$ $^{\dagger}p < .10.$

Mediation: Safety Climate, Learning and Group Performance

In the last part of our analyses, we investigated whether reflective learning, and active learning mediates the influence of participative safety climate on group performance. We followed the mediation test procedure suggested by Baron and Kenny (1986) and used regression analyses for the three equations.

Self-rated group effectiveness. As we demonstrated in the previous section, only reflective learning was related to self-rated group effectiveness. Hence, calculations were only feasible for the test of the mediation effect of reflective learning behavior. As we showed in

the first part of our results section, participative safety climate significantly predicted reflection ($\Delta R^2 = .25$, $\beta = .51$, $p < .05$). Additionally, safety climate significantly predicted the criterion variable self-rated group effectiveness ($\Delta R^2 = .43$, $\beta = .67$, $p < .01$). If both, safety climate and reflective learning behavior are entered into the multiple regression equation to predict self-rated group effectiveness, reflective learning is not a significant predictor in this equation ($\beta = .06$, $p = .78$), whereas safety climate stayed a significant predictor ($\beta = .64$, $p = .01$). Thus, it is unlikely that reflective learning does mediate the effect of safety climate on self-rated group performance.

Objective group performance. As only active learning was related to objective group performance that in turn was not influenced by safety climate, the first conditions for mediation following Baron and Kenny (1986) were not supported. Thus, calculations of the other conditions were not feasible and the hypothesis on the mediation via learning on objective performance is not supported.

To summarize, both reflective and active learning can be ruled out as mediators for the effect of safety climate on group performance.

Additional Analyses: Repetition Rate Reconsidered

In the intro we mentioned the inconsistent results with regard to the relationship between the communication of unshared information and decision quality. Some researchers found that the discussion of unshared information leads to better group decision quality (e.g. Larson et al., 1998; Winquist & Larson, 1998). Other results contradicted these findings as no beneficial effect of knowing more or even all unshared information was found (e.g. Greitemeyer & Schulz-Hardt, 2003; Greitemeyer et al., 2006, Lavery et al., 1999). So, other authors already stated that sharing of unshared information is not the most suitable indicator of information processing and searched for possible explanations in taking other operationalizations of the communication of unshared information. Scholten et al. (2007) proposed repetition rate as indicator of the depth of information processing. Repetition rate of unshared information is defined as the number of times unshared information was repeated after having been mentioned for the first time divided by the amount of unshared information mentioned (e.g. Larson et al., 1998; Scholten et al., 2007). In integrating results of the team learning literature we hypothesized that it is not the repetition rate per se, but repeating unknown, unshared

information that had been mentioned by its holder (active learning in form of knowledge acquisition). So, we would like to complement our findings on active learning with results based on repetition rate as variable of our analyses.

Safety climate and repetition. In a hierarchical linear regression analysis, we regressed the repetition rate on discussion time entered in the first step and participative safety entered in the second step. We found that safety climate significantly predicted the repetition rate ($\Delta R^2 = .33$, $\beta = .58$, $p < .01$). When disentangling the measure of repetition rate into repetition of own, unshared information or newly learnt, unshared information we found that a climate of safety is related to mentioning own, unshared information ($\Delta R^2 = .25$, $\beta = .51$, $p < .05$), but not to active learning in form of repeating new learnt information (see first section, $\Delta R^2 = .02$, $\beta = .13$, n.s.).

Repetition and decision quality. When regressing decision quality on repetition rate with discussion time as control variable, repetition rate proved to be a significant predictor of decision quality ($\Delta R^2 = .19$, $\beta = -.44$, $p < .05$). But again, when disentangling the measure of repetition we found that mentioning own, unshared information does not lead to a better group decision quality ($\Delta R^2 = .05$, $\beta = -.21$, n.s.), only repeating newly learnt unshared information is a significant predictor ($\Delta R^2 = .14$, $\beta = .51$, $p < .10$).

Discussion

In this study, we examined the role safety climate and goal sharedness on three different forms of team learning and the association between team learning and group performance. To test our hypotheses, we used the hidden profile paradigm and combined the literature on team learning (e.g. Edmondson, 1999; Schippers et al., 2007) with that on hidden profiles (for an overview, see Wittenbaum et al., 2004).

The Influence of Safety Climate

To test the importance of safety climate, we examined its relationship with team learning and team performance. Our findings indicate that groups with a higher safety climate, i.e., groups that perceive the consequences of taking interpersonal risks as benign, displayed more reflective learning behaviors than groups with lower safety climate. This is in line with

evidence from field studies that safety climate is related to more reflection on goals, team processes, and outcomes (e.g., Edmondson, 1999).

We also found that in groups with higher safety climate team members also communicated more of their own, unshared information (precondition of active learning). That is in line with the reasoning within Wittenbaum and colleagues' (2004) review that in hidden profile tasks norms are influential on information exchange. Already Zand (1972) showed that trust, a concept related to safety climate, influenced the information flow of experimental groups. With our findings, we showed that the team psychological climate plays an important role within hidden profile group decision tasks; shared perceptions of safety were related to a better pooling of unique knowledge. That is particularly important as more knowledge on factors that promote effective information pooling is needed (Wittenbaum et al., 2004). But, as it is the first study investigating the role of climate within the hidden profile paradigm, the effect remains to be established.

Interestingly, we did not find a relationship between safety climate and active learning behavior. So, members of groups that rated their climate as safer, did not pick up and repeat more unshared information from the other two members. This is not in line with findings that psychological safety is related to better active learning (e.g. implementation of a new technology in hospitals, Edmondson, Bohmer, & Pisano, 2001). An important difference between the studies was their context: whereas the study of Edmondson and colleagues (2001) was situated in a highly complex field environment where active learning was necessary to succeed, our study took place in an experimental setting in which actions do not have severe consequences. It can be concluded that safety climate is important for reflective learning and information exchange, but not for knowledge acquisition. Safety climate may have differential effects, depending on the operationalization of team learning; the degree of safety diminishes the fear of being seen as bothersome and new information are brought into the discussion, but it does not influence if the information is picked up and repeated by the other team members—for this process, individual characteristics (e.g. motivation) may be of greater importance.

With regard to the measures of the hidden profile literature, we could demonstrate that safety climate significantly predicts repetition rate, but when differentiating between the repetition of own, unique information and that of newly learnt information we only found a significant relationship between safety climate and repeating own information. This indicates

that group members feels safe enough not to fear they may bother others with their information. But acquiring new information may have different predictors.

There also was an unexpected finding. Safety climate not only had a positive influence on two forms of learning behaviors, but also on group performance. Groups that perceived their climate as secure came to a better and more appropriate group decision and reported higher satisfaction with the result of the group discussion and their experience as group member. This finding is in line with a study by Baer and Frese (2003) who found a positive association between psychological safety and performance on the organizational level. Carter and West (1998), however, could not confirm that climate variables predict team effectiveness. But, in this study, there was not much variance to be explained by climate factors because most of the variance had already been accounted for by reflexivity.

There also was an interesting interaction between safety climate and goal sharedness. Whereas we did not find a main effect of goal sharedness, a safe climate was positively associated to reflective learning behaviors in those groups that perceived goals as shared. At the group level, goal sharedness may hence be a precondition of the beneficial effect of safety climate on reflective learning behavior. We could not find this effect, however, for the two other forms of team learning behavior. So, further research has to demonstrate whether this effect can be replicated.

Regarding the importance of safety climate for reflective learning, the precondition of active learning, self-rated group effectiveness, and group performance it is important to know how it develops and how it can be affected. Especially in organizational life it would be helpful to identify organizational or group characteristics that are beneficial for the development of a safe climate.

Team Learning and Performance

The evidence for our hypothesis that learning promotes performance depended on the form of learning behavior as well as the operationalization of group performance.

Groups that showed more reflective learning reported that they were performing better, but considering the objective group decision quality they did not. The same relationship was found for communication of unshared information as precondition of active learning. In contrast, acquiring new information as indicator of active learning leads to a better decision

quality, but does not improve self-rated performance. Whereas the reflective part of learning is more beneficial for a feeling of good group performance, active learning seems to foster objective group performance.

Reflection and performance. Our finding, that reflection is more related to a feeling of satisfaction, but not to a hard outcome, is in line with a recent meta-analysis (Mesmer-Magnus & DeChurch, 2009) in which the authors concluded that information-sharing openness, i.e. communication in a broader sense, like on goals, progress, and coordination, is more strongly related to cohesion than to team performance. Several explanations for the similar result in our study are possible: The null-effect of reflective learning on objective performance may be a result of our lab-setting in which groups worked together for a short time. Taking a look at reflective learning behaviors it can be imagined that reflection takes time and time is a crucial factor for the achievement in short-term teams. We found groups that displayed more reflective learning behaviors to have more problems with the 20-minutes deadline. So, reflection may be irrelevant or even reduce team effectiveness when teams have to meet a deadline (e.g. Bunderson & Sutcliffe, 2003; DeDreu, 2002; Druskat & Kayes, 2000).

Another explanation for the non-existing relationship between reflection and objective performance might be the nature of the task. West (1996) considered reflection to be more beneficial in complex tasks within an uncertain environment in which reflection pays off at a later point in time when the environment changes. In our simple decision making task group reflexivity may not be as beneficial and also future benefits could not show up.

As already mentioned, reflection is related to self-rated group effectiveness; groups seemed to be more satisfied with their experience when more reflective learning behaviors were performed. Also Carter and West (1998) mentioned that reflexivity is related to affective well-being and Mesmer-Magnus and DeChurch (2009) found that these activities foster relationship quality. Interestingly, these findings contradict the idea that reflection has to be perceived as something troublesome and unpleasant (e.g. Edmondson, 2003). Our data indicate that the adverse impact of reflective activities is not as we deduced in the introduction.

Communication of unshared information and performance. The communication of own, unique information as precondition of active learning leads to a better self-rating of performance. This non-hypothesized relationship can be explained due to our measure of self-

rated performance that is more an indicator of satisfaction. A meta-analysis found that there is a sample-size-weighted mean observed correlation of $r = .43$ between information sharing uniqueness (i.e., sharing of information that is not held by all group members) and subjective measures of group performance (Mesmer-Magnus & DeChurch, 2009).

The precondition of active learning, however, is not related to a better group decision. Groups in which team members mentioned more of their unique unshared information did not come to better group decisions. Although this result is in line with our reasoning, it contradicts other findings that information sharing is related to team performance (Mesmer-Magnus & DeChurch, 2009; van Offenbeek, 2001). The hidden profile literature provides evidence that sharing unshared information sometimes predicted decision quality (e.g. Larson et al., 1998) and sometimes did not (e.g. Greitemeyer et al., 2006). It could be shown, however, that depth of information processing (i.e., repetition rate of unshared information) or information gain (i.e., number of correctly recalled unshared items) were beneficial for group decision quality (Brodbeck et al., 2002; Scholten et al., 2007). So, all these findings can be interpreted in such a way that whether this kind of learning activity is related to objective performance depends on the form or depth of information processing. In fact, we found that rather than mentioning of own unique information (precondition of active learning) the unique information learnt and repeated by other team members (active learning, see next section) is important for decision quality.

Active learning and performance. Our finding that learning new information from team colleagues (knowledge acquisition) predicts decision quality is in line with our idea that the concept of "learning" should be considered in the paradigm of hidden profile tasks. This is in line with similar ideas that it is the depth of information exchange (Scholten et al., 2007), or the learning of information (Brodbeck et al., 2002) that influences groups' decision performance and not the general amount of unshared information. We also showed that repetition rate as indicator of depth of processing is in fact related to a better decision quality. But when disentangling the repetition measure into the repetition of own, unique information and the repetition of newly learnt information we found that only the latter is a significant predictor of decision quality. So, the concept of team learning as acquiring new knowledge from team colleagues is valuable and useful to explain findings of the information processing literature. It should be noted, however, that learning new knowledge does not lead to a higher feeling of satisfaction with the result and the group process. One reason for this finding may

be that learning new information from team colleagues is a process which occurs rather unknowingly and the groups base their performance rating on more salient processes like reflective activities or the general amount of exchanged information.

To summarize, our findings on the learning-performance relationship suggest that there are differential relationships between learning and performance that depend on the operationalization of the concepts (reflective vs. active, objective vs. self-rated) – reflective learning enhances the subjective feeling of performance, whereas active learning improves objective decision quality.

Mediation: Safety Climate, Learning and Performance

We could not find evidence, however, for a mediation of the relationship between safety climate and group performance via learning behaviors. That is contrary to the findings reported by Edmondson (1999) and may result from the differential relationships between safety climate and learning, depending on the operationalization of learning implemented as well as the differential relationships between learning and performance, depending again on the operationalization of learning as well as of performance. Additionally, in contrast to the study by Edmondson (1999), our study was conducted with student groups working together for a short time horizon and without any tangible consequences except course credit.

A meta-analysis on relationships between psychological climate factors and work-related outcomes showed that the relationship between psychological climate and performance is mediated via work related attitudes (Parker et al., 2003). So, other mediators besides team learning such as the attitude towards team learning should be taken into account.

Different Forms of Team Learning

Within all our analyses, we discovered that the three forms of learning behavior are not highly correlated. With regard to the relationship between the communication of unique unshared information as precondition of active learning and active learning itself, we can conclude that an intense communication of unique information does not necessarily entail that team members actually pick up this information. This could explain why some hidden profile studies could find a beneficial effect of the communication of unshared information (e.g.

Larson et al., 1998), whereas others could not (e.g. Greitemeyer et al., 2006). Simply counting the amount of unshared information does not reflect the difference between mentioning own unshared information and learning new information from other team members. The relationship between reflective learning and active learning was even weaker. That is in line with findings that there is not necessarily a relationship between action and reflection (Edmondson, 2002). There are teams that do reflect, but do not transform their reflection on goals, processes and progress into new knowledge or behaviors. These findings and the differential effects on safety climate on reflective vs. active learning led us to conclude that different forms of learning follow different underlying mechanisms. Further research should address this issue in determining the underlying conditions and the fashion in which reflective learning is transformed into active learning behavior.

Strengths and Limitations

This study represents an important step in investigating climate in the context of team learning and how team learning is related to team outcomes. Additionally, we explored the findings on hidden profile tasks from the "learning" point of view. Our approach allowed us to make a fine-grained analysis of learning behaviors and information exchange taking place in groups and avoiding common method variance in using observer-ratings of learning behaviors and an objective performance indicator.

Several limitations considering our results have to be mentioned. The foremost limitation is the number of teams in our sample (N=24) and the resulting power limitation. Additionally, it was a student sample working together for a relatively short time (restricted external validity). In organization there are also individuals working together in short-term teams, like project teams, task forces or committees. For this purpose, our findings can be of value to organizations.

Conclusion

As information exchange and knowledge acquisition are important concepts in the hidden profile literature as well as in the team learning context, the combination of the two approaches seems to be fruitful. The hidden profile task provides a valuable framework, and the team learning literature enables new insights and explanation within the realm of hidden

profile tasks. Taken together our study showed that team learning can be operationalized in different ways and that each of these is associated differentially with psychological climate and outcomes.

We also demonstrated that reflective learning is related to self-rated group performance, and active learning is related to objective group performance. Safety climate was found not only to be beneficial for reflective learning and communication of unique knowledge within teams but also for objective team performance. Considering these findings, we think that further studies should investigate which factors are associated to safety climate and how practitioners can establish a climate of safety within their teams.

Chapter 5

Integration, Discussion and Concluding Remarks

Research Questions

Aim of this work was to investigate how two factors of the Input-Process-Output Model of teamwork (e.g. Cohen & Bailey, 1997; Gladstein, 1984; Hackman, 1987; McGrath, 1964), team leadership and team learning processes, influence different team outcomes. More specified, the following questions should be answered:

I. What kind of leadership behavior (transformational and empowering) is more beneficial with respect to team outcomes?

II. Does the influence of team leader behavior vary depending upon the measured outcome variable (group performance, originality, critical thinking, and group emotion) and on the situation (e.g. degree of task structuredness)?

III. What kind of learning behaviors can be observed in ad-hoc groups and are they conducive to team outcomes, such as performance?

IV. Does the influence of learning behavior on group performance depend on the operationalization of group performance: self-rated group effectiveness (satisfaction with the cooperation) versus objective group performance?

V. What are the antecedences of team learning?

This chapter is structured as follows: first, method and results of the presented studies are summarized. Later on, the five research questions are answered and discussed. The chapter is finished by presenting further research questions and by drawing practical conclusions.

Summary of the Studies

In this work, different empirical studies on team work are presented and discussed. Chapter one gave an overview of the Input-Process-Output Model of team performance. This model provides a good framework on how different input- and process factors lead to different team outcomes. Later on in this chapter, more information with regard to one important input factor—team leadership—and one important process—team learning—are presented. With regard to team leadership, the theory on empowering leadership and on transformational

leadership was described in detail with its theoretical background, measurement and consequences for team outcomes. With regard to team learning, different kinds of team learning and the consequences of team learning for team performance were presented.

For a better overview, the variables of interest (team leadership, team learning and team outcomes) are integrated in the framework of Gladstein (1984) (see figure 1); the variables that are not part of this work are displayed in grey letters and the concepts of this work are displayed in black.
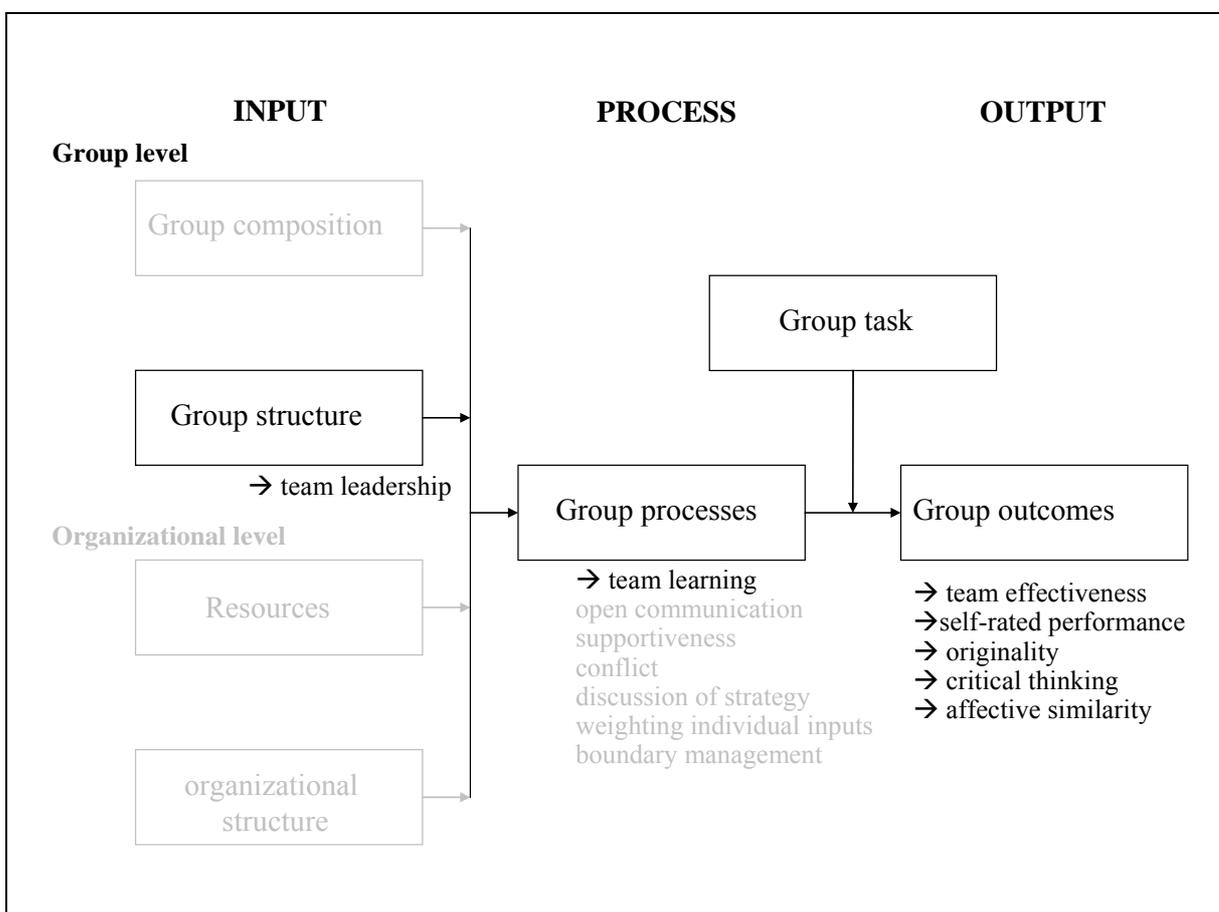

Figure 1: Variables considered in this work, integrated in the IPO framework

In Chapter two, three, and four, four different empirical studies on team work were presented. A summary of the four presented studies can be found in table 1.

Table 1: Overview of the presented studies

Study	Chapter	Type of study	Sample	Variables of interest
Study 1	2	Experimental study One structured task	30 ad-hoc teams	Team leadership: transformational, empowering, directive Objective team performance: decision quality
Study 2	2	Experimental study Two unstructured tasks	24 ad-hoc teams	Team leadership: transformational, empowering, directive Team performance: originality, objective measures of effectiveness, critical thinking
Study 3	3	Field study Teams of Swiss organizations	27 real organizational teams	Team leadership: transformational, empowering, and transactional leadership Affective similarity & Mean level affect
Study 4	4	Laboratory study Hidden Profile group decision task	26 ad-hoc teams	Team learning: reflective & active Team performance: self-rated group effectiveness, objective group performance

Chapter two contained two experimental studies. In these studies, effects of transformational, empowering, and directive leadership on different aspects of team performance were tested. In both studies, the instructions were administered by a videotaped group leader displaying transformational, empowering, or directive leadership behavior. In study 1, 30 ad-hoc teams (three persons per team) had to accomplish a highly structured problem-solving task and the objective decision quality (comparison with the optimal solution) was measured as outcome variable. In study 2, 24 ad-hoc teams (three persons per team) had to accomplish two unstructured tasks: the first one was a construction task in which the groups had to build a tower of paper, with the help of scissors and glue within the time limit of 20 minutes. In this task, the originality of the tower as well as the height of the tower was measured as outcome variables. The second task was an information search task in which the groups had to search for information with regard to ecological alternatives for a car company fleet within a time limit of 45 minutes. In this task, the total amount of gathered

information as well as the amount of gathered information against the alternative proposed by the leader as indicator of critical thinking were measured. So, we used three different tasks; it enabled us to draw conclusions about the task dependency of leadership effectiveness. Results revealed transformational leadership to be most beneficial for group productivity (amount of gathered information) and originality of the tower, and empowering leadership to be most conducive to critical and independent thinking of the group members (gathered information against the proposition of the leader). Results suggest that leadership effectiveness depends on the task structure, with teams benefiting more from the leader's transformational behavior in unstructured tasks.

Chapter three also dealt with the relationship between leadership behavior and a rarely measured team outcome, namely affective similarity. In contrast to chapter 2, this study is a field study. 27 teams of Swiss Organizations were investigated via an online-questionnaire. Three different leadership behaviors were measured: transformational, transactional, and empowering leadership. Transformational and transactional leadership behavior was measured with the Multifactor Leadership Questionnaire MLQ, empowering leadership behavior was measured with the Empowering Leadership Questionnaire ELQ and positive affect was measured with the mood state questionnaire MDBF. As indicator of affective similarity, the within group inter-rater reliability coefficient *rwg* of the individual mood score was calculated for positive affect. Theses indices provide information on how similar members of a team rated their individual positive affect. Results revealed that groups converge towards positive affect and that affective similarity can be considered as group property. We also found that transformational and transactional leadership are both related to mean level affect, but not to affective similarity. In contrast, empowering leadership is positively associated with positive affective similarity, although it is not related to mean level affect.

Chapter four concentrated on another factor of the Input-Process-Output Model, namely team learning behavior. Aim of this study was to investigate the influence of team learning behavior on group performance. Linking the team learning and hidden profile literatures, we differentiated three forms of team learning and examined their association with safety climate and goal sharedness and that between team learning and group performance. 24 ad-hoc groups (three persons per group) were videotaped while completing a hidden profile task that represents a specific case of a group decision task. Coding the videos allowed us to analyze

three forms of team learning: reflective learning, communication of new information as precondition of active learning, and active learning in the form of knowledge acquisition. The decision quality in form of a difference score (difference between the groups' ranking and the optimal ranking) was used as indicator of objective group performance. Subjective group performance was measured with items of the Hackman-Scales (self-rated group effectiveness). Results revealed that a climate of safety is essential for the display of reflective team learning behaviors, in particular in combination with shared goals. Safety climate is also related to the precondition of active learning, and to better group performance but not to active learning behavior. Active learning, however, is the sole form of learning that leads to a better decision quality, whereas reflective learning and the precondition of active learning are only beneficial for self-rated group performance. So, it can be concluded that reflective team learning leads to a better feeling of the group with regard to their performance and collaboration, but in fact only active learning is conducive to the objective group decision quality.

Discussion of the Research Questions

Question I: Team Leadership, Team Outcomes, and Task Structure

Question one asked which kind of leadership behavior is conducive to different team outcomes. This question can be answered by means of the studies presented in chapter two and three. The two experimental studies of chapter two investigated the influence of transformational, empowering, and directive leadership on different indicators of team performance in one structured and two unstructured tasks; whereas the field study in chapter three analyzed the influence of transformational, transactional, and empowering leadership on teams' affective similarity. As our main interest was to compare empowering and transformational leadership with regard to different team outcomes, I will mainly concentrate on these results and only briefly review our results on directive and transactional leadership.

Transformational leadership. The theory on transformational leadership assumes that the subordinates' needs are transformed into higher order needs of the organization through the leaders' instilling of his or her goals. The transformational leader motivates his/her subordinates to spend extra effort, to perform beyond expectations and to accomplish the

organizational goals via the convincing communication of a common vision. So, the subordinates adopt the mission, goals and strategies of the leader and the organization, respectively (e.g. Bass & Avolio, 1990; Bass, 1999). In fact, other researchers found that transformational leadership leads to better group outcomes, like budget and schedule performance, supervisor rated performance, self-rated group performance, creativity, amount of solutions and ideas, perceived extra effort, cohesion, positive emotions and collective confidence (e.g. Dvir et al., 2002; Hoyt & Blascovich, 2001; Jung, 2001; Keller (1992; Lim & Ployhart, 2004; Pearce & Sims, 2002; Rowold & Rohmann, 2009; Sosik, 1997; Sivasubramaniam, 2002).

In line with the theory by Bass and Avolio (e.g. 1990) and empirical studies of other researchers (see above), this work could confirm that transformational leadership is related to better performance, to superior originality and to positive affective similarity of groups. In the two experimental studies, groups in the transformational leadership condition outperformed groups of the empowering and directive condition in the tower construction task (originality of the tower) as well as in the information search task (amount of gathered information). That means that the communication of a compelling goal in combination with the confidence that goals will be achieved and also the expression of a common mission motivate followers to spend extra effort, to work hard and to be better than the other groups. It should be mentioned however, that transformational leadership did not lead to higher outcome quantity in the tower construction task (height of the tower) and not to a better decision in the problem-solving task. Thus, task structure seems to be an important moderating factor.

In our field study, we investigated the relationship between transformational leadership and affective similarity. We assumed that transformational leadership is associated with the development of affective similarity, as transformational leaders foster the development of group cohesion and collective confidence through the communication of a common vision. That in turn should lead to a convergence of the individual team members' mood. So far, only research on the influence of transformational leadership on positive and negative emotions (e.g. Rowold & Rohmann, 2009) was conducted although it was already suggested that transformational leadership could lead to affective similarity (Walter & Bruch, 2008). Against our hypotheses, we found that transformational leadership is only related to mean level affect, but not to affective similarity. This means that the more transformational groups rated their

leaders to be, the more positive the ratings of their members' emotional state were. Ratings of their members' emotional state were not more similar, however.

So, it can be concluded that transformational leadership is only positively related to performance and positive affect, but not to affective similarity and critical and independent thinking; thus, the communication of a mission and the inspirational motivation of transformational leaders influence objective performance measures, but do not necessarily address interactions at the group level.

Empowering leadership. The theory of empowering leadership assumes that the leader takes a coaching role that is less hierarchical, more collaborative and helps subordinates to develop their own competences (Tannenbaum et al., 1996). The main aim of empowering leaders is to empower teams to work together and to encourage the team to work self-reliant. Empowering leaders encourage opportunity thinking, self-rewards, self-leadership, participation in goal-setting, teamwork, team interactions as well as process and performance evaluation (Manz & Sims, 1987; Pearce et al., 2003) that in turn leadss to better team interactions, a deep information exchange, an exchange of expertise and knowledge as well as to a feeling that group work is valued. In fact, it could be found by other researchers that empowering leadership is related to better group processes, like communication of supportive remarks, constructive discussions, ease of speaking up, reflection, and learning (e.g. Edmondson, 1999, 2003; Kahai et al., 1997; Kirkman & Rosen, 1999; Larson et al., 1998; Nygren & Levine, 1996).

In line with the theory and the results reported by other researchers we found in our experimental study that empowering leadership is related to more critical and independent thinking; groups led by the empowering leader collected more information against the proposition of the leader compared to groups led by the transformational or directive leader. That means that empowering leadership is in fact less hierarchical than transformational and directive leadership; the leader is not seen as someone that is flawless and as the leader encourages independent thinking, the team feels safe enough to discuss also other alternatives than the one proposed by the leader. It should be mentioned, however, that these processes are at the expense of effectiveness measures: groups led by the empowering leader found less information. They were also outperformed with regard to originality by the groups led by the transformational leader.

In our field study, we investigated the relationship between empowering leadership behavior and affective similarity. This relationship has never been discussed in the literature and so far, no research on this issue was conducted. We assumed that empowering leadership should be conducive to affective similarity as empowering leaders build a climate of cooperation and trust and also encourage team interactions that raise the probability of mood observation, imitation, and synchronization. In fact, we found that empowering leadership is related to positive affective similarity. The more empowering groups rated their leaders to be the more homogeneous groups were with regard to their ratings on positive affect. Interestingly, empowering leadership is not accompanied by more positive emotions at the side of the followers. It was also found that empowering leadership had a stronger influence on positive affective similarity than transformational leadership. So, it can be concluded that empowering leadership is positively related to affective similarity; thus, the encouragement of team interactions and the communication of the value of team work seems to foster the frequency of team interactions that in turn enable mood convergence.

Directive leadership. The influence of directive leaders is build upon formal hierarchical structures, i.e., these leaders have power as they hold a certain hierarchical position. Directive leaders assign goals, provide task-oriented information and the necessary resources to accomplish the task; in an extreme case they can also use commands to reach their goals (Pearce et al., 2000). Directive leadership in the team context seems to be a double-edged sword: on the one hand, these leaders focus on the essential information, give clear instructions and establish clear rules. That reduces ambiguity and can thereby foster teams' efficient task accomplishment (Somech, 2006). On the other hand, these leaders dominate group interactions and can impede the communication flow (Cruz, Henningsen, & Smith, 1999). This inhibits team processes such as information exchange and reflective activities and can result in worse team outcomes, such as inferior group decisions (Peterson, 1997). Thus, the literature on directive leadership is rather inconsistent: some studies did not find a relationship between directive leadership and team outcomes (e.g. Somech, 2006), many reported that this leadership behavior leads to worse group performance (e.g. Pearce & Sims, 2002; Peterson, 1997) and few found a beneficial effect of directive leadership, but often only under certain circumstances (like inexperience of the team members, low functional heterogeneity) (e.g. Somech, 2006; Yun et al., 2005). Thus, it can be expected that directive leadership is not conducive to team outcomes.

In this work, directive leadership was manipulated in the two experimental studies. In line with many empirical studies, directive leadership was not beneficial for team outcomes; teams in the directive leadership condition did not build higher or more original towers, did not find more information, and did not show more critical thinking. There was a weak effect that failed to reach the conventional level of significance in the problem-solving task: groups led by directive leaders reached a slightly better decision quality than groups of the other two leadership conditions. A surprising finding in these experimental studies was that directive leadership is not inferior to empowering leadership as we assumed that a leader encouraging group interactions and creating a good team climate would be more beneficial with regard to team outcomes than a leader who does not address team-related issues at all and just gives task-relevant information without emotions, encouragement, etc. As we did not investigate directive leadership in our field study, conclusions on how directive leadership influences affective similarity can not be drawn.

Transactional leadership. Transactional leadership relies on mutual exchange principles. An agreement about work objectives is set up between the leader and the follower; when the goal is accomplished, the subordinate is rewarded and vice versa, when the goal is not reached, the follower will not be rewarded or even punished (Avolio & Bass, 2000). Transactional leaders use feedback on the state of goal accomplishment to motivate followers; they thereby concentrate mainly on task-relevant information and not on team related issues, like cooperation or climate. Transactional leadership is seen as a basic leadership style that leads to the expected effort and expected performance at the side of the followers; the follower will accomplish the goals set by the leader with the intention to get the announced reward (Avolio & Bass, 2000). With regard to team effectiveness, it can be expected that transactional leadership leads to a good (but not excellent) team performance. In line with this idea, some researchers found a beneficial effect of transactional leadership on team outcomes (e.g. Bass et al., 2003, with regard to group potency) or no beneficial effect of transactional leadership (e.g. Bass et al., 2003; Hoyt & Blascowich, 2003, with regard to group cohesion). As we did not manipulate transactional leadership in our experimental studies on leadership and team outcomes, conclusions on the influence of transactional leadership on measures of team effectiveness can not be drawn in this work.

In our field study, however, we investigated the relationship between transactional leadership and affective similarity. It can be assumed, that with regard to affect, it is unlikely

that transactional leaders foster affective similarity, as they neither address team related issues (e.g. climate, interactions, and value of team work) nor communicate a collective goal. As hypothesized, we found that transactional leadership was not associated with affective similarity. Thus, directive leadership does neither have a direct nor an indirect effect on affective similarity of groups; groups led by exclusively transactional leaders are not prone to develop a shared affective climate. Different explanations for this finding are possible: transactional leaders do not provoke strong or visible emotions and thus, individual emotions do not converge. That seems to be rather unlikely as it is known that the feedback given by transactional leaders is also related to emotions on the side of the follower (Rowold & Rohmann, 2009). In line with this idea we found a positive trend for the relationship between transactional leadership and mean level positive affect. So, it seems to be more likely that transactional leaders provoke individual emotions, but as neither team climate, nor a feeling of togetherness is encouraged by a transactional leadership style, emotions are not shared and collective affect does not develop.

Question II: Differential Effects of Team Leadership on Outcomes

Question two asked if the influence of leadership behavior (empowering vs. transformational) depends on the kind of outcome that is measured. This question can be answered by looking at the studies presented in chapter two and three. As already presented in the section above, transformational leadership behavior is conducive to effectiveness, like output quantity and to originality and also to positive affect. Empowering leadership did not show up as beneficial for quantity or originality, even when comparing with directive leadership. But, this leadership behavior has a positive influence on affective similarity and on critical and independent thinking.

Thus, the theoretical reasoning as well as our empirical findings suggests that there are differential effects of the two leadership behaviors. In a similar vein, Houghton and Yoho (2005) developed a contingency model on leadership efficiency that was not tested empirically as a whole so far. This work, however, provides empirical evidence for parts of the model. An overview of the contingency model can be found in figure 2.
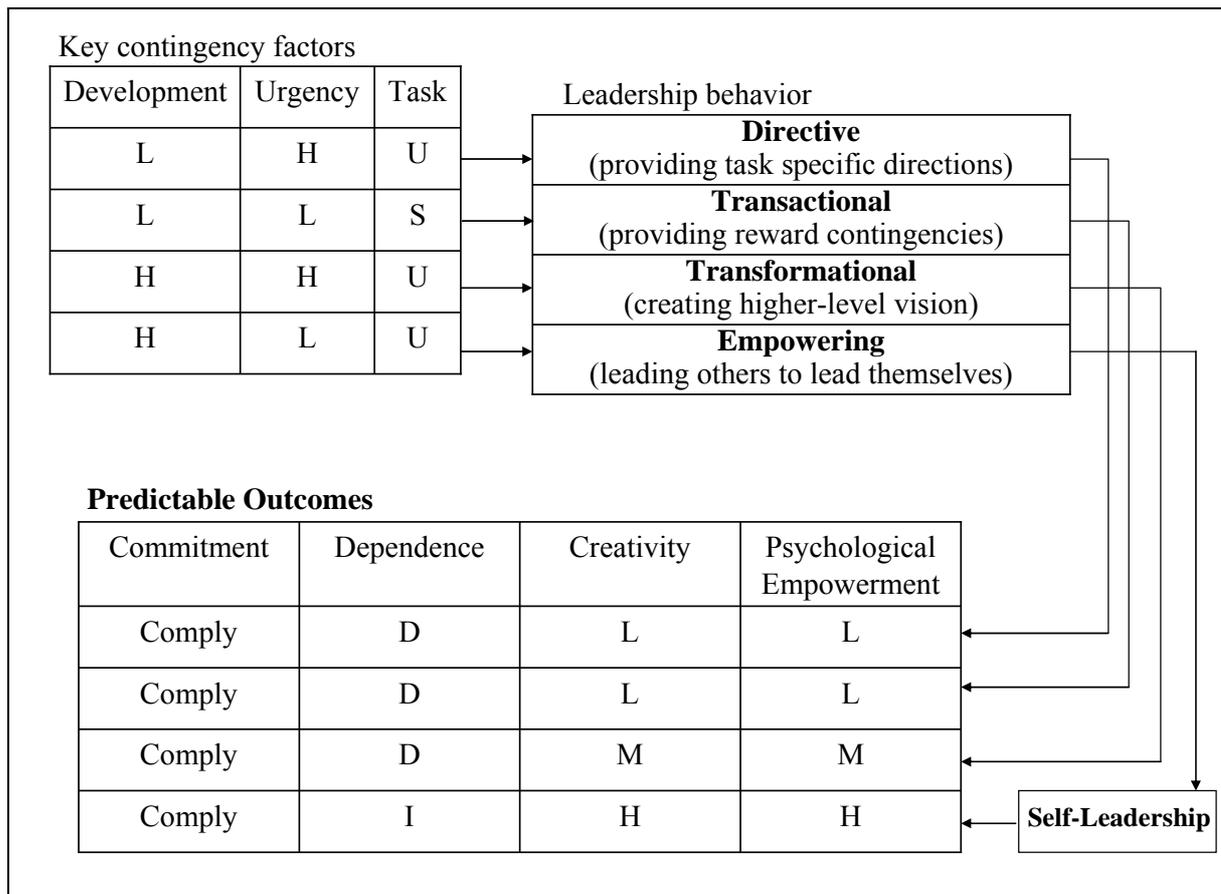
Key contingency factors			
Development	Urgency	Task	**Leadership behavior**
L	H	U	**Directive** (providing task specific directions)
L	L	S	**Transactional** (providing reward contingencies)
H	H	U	**Transformational** (creating higher-level vision)
H	L	U	**Empowering** (leading others to lead themselves)

Predictable Outcomes

Commitment	Dependence	Creativity	Psychological Empowerment
Comply	D	L	L
Comply	D	L	L
Comply	D	M	M
Comply	I	H	H

Self-Leadership

Figure 2: A contingency model of leadership (Houghton & Yoho, 2005)

Note. L = Low, H = High, U = Unstructured, S = Structured, D = Dependence, I = Independence, M = Mixed or Moderate

They make—similar to the work by Pearce et al. (2003)—a distinction between four different leadership behaviors: directive, transactional, transformational, and empowering leadership and they assume that their efficiency with regard to outcomes depends on the one hand on how desirable an enhancement of the followers' capability is (left side, first key contingency factor "development"), on how urgent the situation is (left side, second contingency factor "urgency"), and on how the task can be characterized (unstructured vs. structured, left side, third key contingency factor "task"). On the other hand, they also differentiate between four predictable outcomes (see lower part of figure two): follower commitment, follower dependence, follower creativity/innovation, and follower self-development/empowerment. Commitment is characterized by the amount of identification with the organization and ranges from compliance (follower obeys the directives of the leader) to deeper affective commitment (self-abandonment for the interest of the

organization). Follower dependence indicates how reliant the follower is on the leaders' task instructions, reward, or inspiration. Follower creativity is the level of the followers' capability to develop novel and useful ideas. The last predictable outcome in this model is psychological empowerment; empowered followers perceive congruence between his/her personal values and his/her work role, are confident that they possess the capability to perform well, experience the feeling of control and influence with regard to work outcomes. Houghton and Yoho (2005) assume that each leadership behavior is more or less appropriate with regard to the different outcomes and that the advantage of each leadership behavior also depends on the level of the three contingency factors (development, urgency, and task). More specific with regard to the four leadership behaviors, this model suggests the following (p. 72-74):

Transformational leadership is more appropriate when:

- the followers' developmental potential is high, as the followers' commitment is addressed,

- there is a situation of high urgency or crisis as the self-esteem of the followers is raised,

- and the task environment is unstructured, as these leaders provide a vision that can be followed by the subordinate even in ambiguous and complex situations.

→ Transformational leadership behavior results in high follower commitment, moderate creativity and moderate empowerment of the followers, but also in high dependency on the leaders' inspiration.

Empowering leadership is more appropriate when:

- the followers' developmental potential is high, as these leaders encourage the development of the followers' self-management skills,

- there is a situation of low urgency or crisis as the development of such self-management skills takes time,

- and the task environment is unstructured as the development of self-management skills is facilitated in flexible situations.

→ Empowering leadership behavior results in high commitment, creativity and psychological empowerment. As these leaders foster self-leadership skill, the employee is

capable of leading his- or herself and is thus independent from the leaders' goals and task instructions.

Transactional leadership is more appropriate when:

▪ the followers' developmental needs are low, as this leadership behavior aims at the followers in-role performance,

▪ there is a situation of low urgency or crisis, as the creation of reward contingencies takes time,

▪ and when the task is structured, as reward contingencies are most appropriate in routine situations in which tasks are clearly specified.

→ Transactional leadership behavior results in followers that comply with their organization but without spending extra effort or accomplish tasks beyond duty. As their task accomplishment depends on the reward of the leader, these followers are highly dependent on their leaders. Additionally, this leadership behavior results in low creativity and low psychological empowerment.

Directive leadership is more appropriate when:

▪ the followers' developmental needs are low, as the use of commands does not enable personal development,

▪ there is a situation of high urgency or crisis, as directive and specific task instructions enable a quick behavioral reaction on the side of the follower,

▪ and the task is unstructured as this kind of leadership behavior reduces ambiguity.

→ According to the model by Houghton and Yoho (2005), directive leadership entails the same consequences like transactional leadership (see above).

In line with this theoretical model (Houghton & Yoho, 2005), we also found that the influence of leadership behavior depends on the groups' outcome as well as on the situation, although we could not find all hypothesized effects. Transformational leaders create a higher level vision that influenced positively the groups' performance. Unfortunately, performance is

not included as predictable follower outcome in this model. In the model, only commitment is mentioned as performance-related outcome. So it could be inferred that the positive influence of transformational leadership on performance can be due to higher commitment. As we did not measure commitment in our studies and as we did not find the same effect for empowering leadership, however, we can not be sure about this conclusion. We could not find a beneficial effect of empowering leadership on group performance, however, even not when comparing it to directive leadership.

In line with the assumption of the model with regard to followers' dependency, groups in the empowering leadership condition made more propositions against the alternative favored by the leader compared to transformational leadership. This finding supports the idea that empowering leadership is more conducive to independent thinking and psychological empowerment. Interestingly, we found a positive influence of transformational leadership on creativity/originality, but we could not detect this relationship for empowering leadership. This difference is not in line with the model that assumes an only moderate relationship between transformational leadership and creativity, whereas empowering leadership is supposed to be more beneficial for creativity.

These discrepancies—empowering and transformational leadership should be both related to commitment what in turn could lead to a better performance and also to better creativity—can be resolved when looking at the key contingency factors of the model (see figure 2): Transformational leadership is assumed to be most appropriate in situations of high urgency, whereas empowering leadership is more useful in situations without time constraints. As our findings on performance and originality were generated in an experimental setting in which people worked together only for a short time horizon, the beneficial effect of empowering leadership probably could not unfold. In contrast, in the field study on leadership and affective similarity, we were able to find the positive influence of empowering leadership. Thus, the influence of "urgency" seems to be in fact a very influential factor. We can also emphasize the importance of the key contingency "task structure"; we only detected the positive influence of transformational leadership in the two unstructured tasks, whereas in the structured task directive leadership was more powerful. That is in line with the assumption in the contingency model.

Question III: Team Learning Behaviors and Performance

Question three asked which kind of learning behaviors can be observed in teams and if team learning is conducive to team performance. This question can be answered with the aid of the study presented in chapter four. This study investigated the influence of three different learning behaviors on group performance in a hidden profile group decision task of ad-hoc teams in the laboratory.

Learning is a very heterogeneous concept in the literature and it can take place on different levels (individual, team, organization, see Crossan et al., 1999). As a lot of tasks in organizations are assigned to teams these days, the focus of this work was on team learning. Many researchers investigate the concept of team learning, but the definitions lack consistency. To make it even more complex, there is also a lot of research done on information processing in groups ("groups as information processors", Hinsz et al., 1997) that has a lot of features in common with team learning.

In chapter one the different operationalizations of team learning were presented and it was elaborated that—in general—team learning can be divided in two different forms, namely reflective learning behavior and active learning behavior. Reflective learning is characterized by sharing information and knowledge, giving and seeking feedback on performance, discussing errors, problems, or divergent opinions, and reflect on goals, strategies, past, and future performance (e.g. Edmondson, 2002, 2003; Hirst et al., 2004; Schippers et al., 2007; West, 1996), whereas active learning includes behaviors such as making a change, achieving closure on a decision, implementing results of an experiment, finalizing a plan, improving performance or transferring new knowledge to others (Edmondson, 2002). Thus, learning is a cycle of action and reflection: the team reflects on past performance, changes its behavior, tries new actions, analyzes them, modifies them, tries again, reflects, and so forth. Sharing and exchanging information plays an important role within the context of team learning as it enables transferring learning on the individual level to the team level. Often, the so called "hidden profile paradigm" (subgroup of group decision tasks) is used in order to investigate information exchange in teams. Following up this idea, this work combines concepts of the literature on team learning (e.g. Edmondson, 1999; 2002; 2003; Schippers et al., 2007) with findings on groups as information processors (Greitemeyer et al., 2006; Hinsz et al., 1997; Scholten et al., 2007) and deduced three different forms of learning behaviors that can be observed in group decision tasks (hidden profile tasks):

- Learning as reflection, operationalized as consideration of (prospective) strategies (Schippers et al., 2007), review of (past) strategies (Schippers et al., 2007), consideration of goals (Schippers et al., 2007), review of objectives (Schippers et al., 2007), reflecting on past performance or progress (Edmondson, 2002, 2003), speaking up with observations, concerns or problems (Edmondson, 2003), giving each other feedback (Edmondson, 2003), seeking feedback (Edmondson, 2002, 2003), asking questions for help or additional information (Edmondson, 2003), and admitting mistakes and problems (Edmondson, 2003),

- Precondition of active learning, operationalized as transferring new information to others (frequency of mentioned unique information), and

- Active learning behavior, operationalized as the acquisition of new knowledge in form of picking up new information (frequency of picking up the information that was new to the team members).

In the laboratory study presented in chapter four it was reported that the three forms of learning behavior do not intercorrelate to a great extent. Reflective learning behavior did not correlate with the precondition of active learning and active learning itself. The precondition of active learning in form of the communication of unique knowledge was weakly associated with active learning (measured as knowledge acquisition), however: $r = .40$ ($p = .09$). That means that there is a qualitative difference between reflecting on team processes, goals, performance etc. and giving and picking up unique knowledge, but also between mentioning own, unique information and picking up this information by the other team members.

We also found that not all these learning behaviors are conducive to team performance: reflective learning and the precondition of active learning led to a feeling of satisfaction with the task accomplishment and cooperation of the team members. But, considering the objective group decision quality, groups showing a lot of reflection did not perform better. In contrast, active learning in form of knowledge acquisition led to a better decision quality (objective group performance), but does not improve the team members' satisfaction with the task accomplishment and the cooperation.

To interpret the relationships between the different forms of learning behavior and the objective group performance, the factor "urgency" can serve as explanation, like already in

the last section on the influence of leadership on team performance. In this group decision task, the teams had to meet a 20 minutes deadline. The time constraints may explain why reflection did not lead to a better group decision: reflective behaviors take time; we found that teams that displayed a lot of reflection had problems to meet the 20 minutes deadline. But, time was a crucial factor in this task. Thus, teams that did a lot of reflection spent too much time on reflecting, giving and seeking feedback, talking about strategies, and discussing divergent opinions and were not able to reach an optimal decision within the deadline as they did not spent enough time on the task accomplishment. Maybe, if they had had more discussion time, the beneficial effects of reflection would have unfolded or if they had done this task a second time, the reflection would have helped them to have better strategies that in turn would have led to a better objective group decision.

The relationship between the different forms of learning behavior and self-rated group performance (feeling of satisfaction with the task accomplishment and the cooperation) is more difficult to interpret: groups that reflected on team performance and communicated more unique knowledge had the impression that they did perform better (although they did not). But, picking up new and unique information did not lead to a better feeling with regard to the teams' performance. One explanation might be that reflecting and communicating a lot of information is a very conscious process that provides a feeling of productivity, whereas picking up new information of other team members is less conscious and therefore provides no information on how the group is doing.

The findings on the relationship on reflection and self-rated group effectiveness are in so far surprising as many researchers assume that reflection is seen as something unpleasant groups do not like to do. But, this work showed that reflection can even be used as indicator of the groups' productivity. The form of active learning we measured in this study does not seem to provide this information. That might be different when looking at actual active learning in real organizational teams: it is entirely conceivable that making a change, achieving closure on a decision, implementing results of an experiment, finalizing a plan, or improving performance of real teams is a more conscious process groups can use as indicator of their performance than transferring new knowledge to others in our experimental setting.

Question IV: Differential Effects of Team Learning on Performance

Question four asked if there are differential effects of learning on performance, depending on the measured learning and measured outcome. In the laboratory study described in chapter four, three kinds of learning behavior and two kinds of different outcomes were investigated. As already discussed in the question above, differential effects were found: reflection and the communication of unique knowledge is solely beneficial for self-rated group effectiveness, active learning is only conducive to objective group performance. Thus, we found evidence for the differential effects. Unfortunately, only two outcomes were measured in this study: self-rated group performance vs. objective group performance. So, no conclusions on other differential effects on different outcomes, such as affect, well-being or self-efficacy can be drawn.

Question V: Antecedences of Team Learning

Question five asked which factors foster learning behaviors in teams. This question can be answered with the means of the study presented in chapter four on learning in ad-hoc teams. In a rather new model, Edmondson and colleagues (2007) describe key constructs that are related to team learning behavior (see figure 3).

This model summarizes different factors proposed by Edmondson (2006) that influence team learning. The model uses dashed lines to indicate that the proposed relationships are empirically untested so far, whereas solid lines show previously tested relationships.

Edmondson (2006) proposes the following factors to be relevant in the context of team learning: team climate (e.g. perceptions of interpersonal risks created by within-team power differences, climate of openness, team psychological safety), shared learning goals (e.g. integration and learning perspective, team learning orientation, cooperative goals), team identification (e.g. collective team identification), team composition (e.g. diversity, subgroup strength, demographic faultlines), context (e.g. exposure to other teams, centralization of organizations), and team leader behavior (e.g. downplaying hierarchical differences) (for more details see Edmondson et al., 2007).
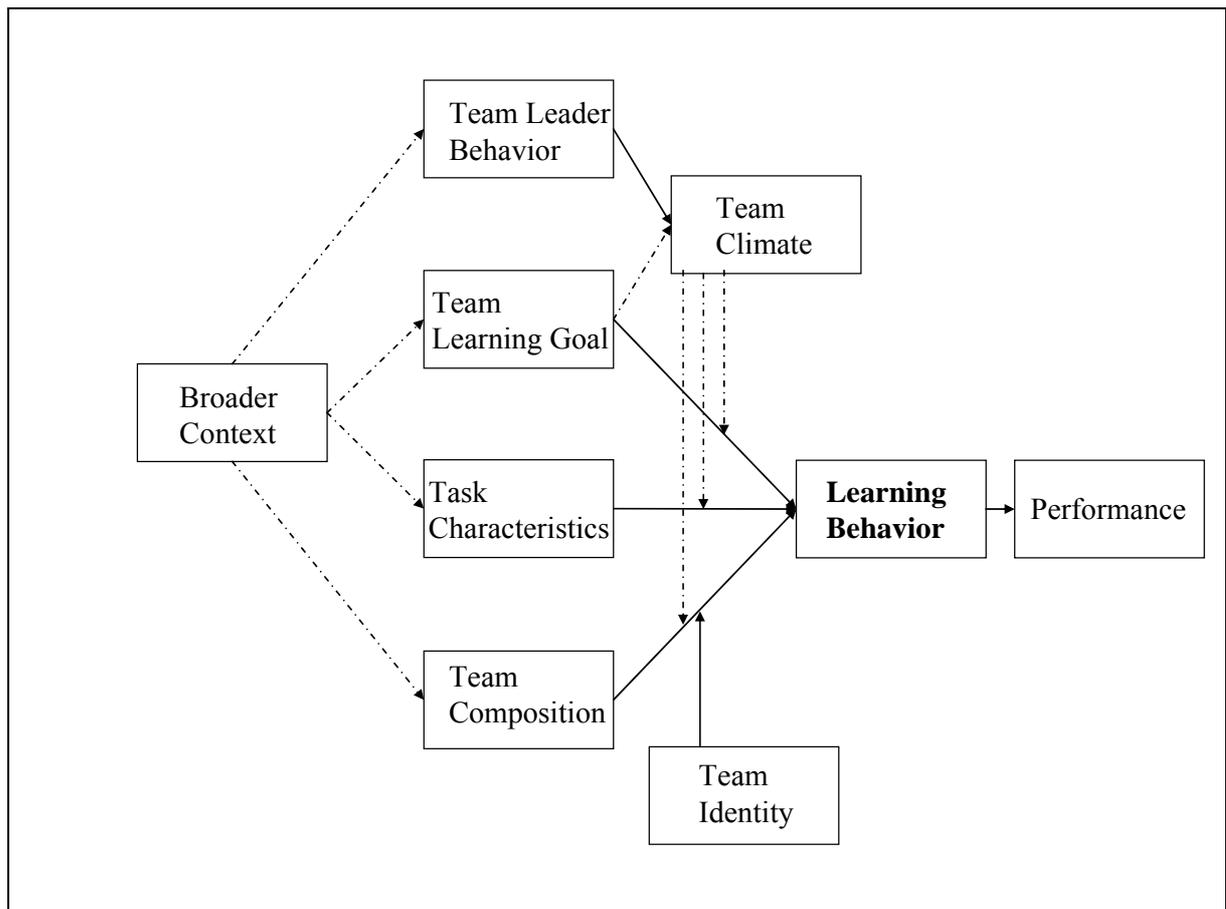
Figure 3: Key constructs in the area of team learning (Edmondson et al., 2007)

Note. Solid lines: previously tested relationships; dashed lines: untested relationships

This work enables some conclusions with regard to the factors mentioned in the model by Edmondson et al. (2007). We found that a climate of safety (i.e. a climate in which it is safe to speak about problems, errors etc.) is positively related with reflective learning and the precondition of active learning, but not with active learning itself. In contrast to the model, we found evidence for a main effect of safety climate, and not for a moderating effect. Other research on climate and learning shows that both mechanisms (main effect vs. moderating effect) are possible (Edmondson, 1999 for main effect; Edmondson, 2003 for moderating effect). In line with this model also the importance of shared goals could be shown, although this work argues that goal sharedness is more a moderator that interacts with safety climate. As task characteristics and team composition are not measured in the study presented in chapter four, no inferences on the relationship between these factors and team learning can be drawn in this work. With regard to team leadership, it would be of special interest in this work

how the different leadership behaviors of chapter two and three, namely transformational, empowering, and directive leadership, are related to team learning behaviors. In the studies presented in chapter two, we also measured different forms of team learning with questionnaires (these results are not presented in the chapter). In the first study with the structured problem-solving task, we found an influence of leadership behavior on reflective learning (measured with items based on our coding scheme of reflective team learning): teams in the empowering and in the transformational leadership condition indicated that they reflected more on ways of task accomplishment, on goals, strategies, and problems during task accomplishment compared to groups in the directive leadership condition. There was no difference between empowering and transformational leadership with regard to reflection. We also measured the teams' reflexivity with the items by Carter and West (1998). With regard to this measure, no influence of leadership behavior could be found.

In the second study with the two unstructured tasks, namely the tower construction and information research task, we found no influence of leadership behavior on the perceived reflection of the groups (measured with the scale by Carter & West, 1998). We also tried to capture the active nature of learning by asking the participants how much they have learnt during the experiment. With regard to this learning measure, we found a beneficial effect of transformational leadership on reflection: groups in the transformational leadership condition indicated that they had learned more. There was no difference between the empowering and directive leadership condition. Unfortunately, both measures of team learning in the two experimental studies are only measures of self-report and no observational measure like in chapter four. Additionally, the influence of leadership behavior depends to a large amount on the measure used and thus, the effect of leadership behavior on team learning cannot be interpreted as stable and consistent effect.

This work provides evidence that team climate and goal sharedness are important for team learning. With regard to team leadership, the relationship remains unclear.

Summary, Conclusions, and New Research Fields

Team work is an important topic within the field of industrial and organizational psychology literature and it is of interest for researchers and practitioners to know more on how team work can be promoted. Aim of this work was to shed light on two factors that

influence team outcomes: team leadership and team learning. To answer the question how team leadership and team learning can help to enable effective team work, four different studies were conducted and presented: two experimental studies, described in chapter two, examined the influence of leadership on different team outcomes, one field study, described in chapter three, looked at the influence of team leader behavior on affective similarity as indicator of team cohesion, and at last, one laboratory study presented in chapter four pointed out the differential effects of three team learning behaviors on team performance.

Team Leadership and Team Outcomes

One important conclusion can be drawn on leadership effectiveness: there is not the "one" leadership behavior that is beneficial for all kind of outcomes. We found differential effects of leadership behavior on team outcomes, depending on the measured outcome (performance, critical thinking, affective similarity, etc.). It should be mentioned, however, that in the field, leaders often display a "mix" of different leadership behaviors. Thus, the distinction into empowering and transformational leadership helps to investigate differential effects of leadership behavior, but it does not present a true image of the reality. Leaders can display transformational, as well as empowering, and directive behavior towards their team at the same time or at least in quick succession.

In line with the contingency model of leadership (Houghton & Yoho, 2005), the "magic bullet" that works every time, everywhere, and under all circumstances does not exist (yet). This work supports the idea that the influence of leadership behavior depends on the intended outcome and on the situation or context. Whereas transformational leadership fosters team performance and originality, empowering leadership advances critical and independent thinking and affective similarity. When looking closer at the results of this work, the contingency model can even be expanded: so, for example, performance in form as measures of effectiveness or quantitative output should be included or, in line with rather new research areas, group affective tone or affective similarity (Kelly & Barsade, 2001).

Interestingly, transformational leadership is a leadership behavior that—at its beginning— did not develop in the team context. Transformational leadership mainly addresses the individual follower, but the influence can cascade to other organizational units, like the team, the whole organization or even a whole nation (when considering political leaders). In

contrast, empowering leadership (as it is defined in this work) works exclusively in the team context. Encouraging team interactions, and helping the team to become a self-managing one, is only useful in team based environments. But, even if transformational leadership was originally not developed in the team context, it has a very important influence on team based outcomes, such as cohesion, group performance and group affective tone. It is even more interesting that the influence of transformational leadership on team performance outcomes is even stronger than the influence of empowering leadership.

Chapter one already mentioned that the mechanisms of transformational compared to empowering leadership are quite different. First, the influence can take place at different levels: whereas transformational leaders also address the individual follower, empowering leaders mainly deal with the whole group in fostering team interactions and valuing team work. The influence of transformational leadership on the individual, however, can cascade to other organizational levels, as these leaders create also a collective mission. So, both leadership behaviors can result in a feeling of team cohesion and a common team spirit, either via the communication of the collective vision or the encouragement of team interactions. That is in line with the framework proposed by Burke et al. (2006) who mentioned that different leadership behaviors fulfill different tasks in the context of team work (see figure 4 in chapter one). And also Zaccaro et al. (2001) emphasized that different kinds of team processes (cognitive, motivational, affective, and coordination) have to be managed by the team leader to promote team effectiveness (see figure 3 in chapter one) and there might be differences in the extent transformational and empowering leaders address these processes.

Thus, the effect of transformational leadership via creating collective confidence and a common goal is quite strong and; especially in cases of high urgency teams with a transformational leader outperform teams with an empowering leader. Although the different mechanisms are already elaborated theoretically above, the exact mechanism would be worthwhile to investigate in the future: is it really the collective vision that leads to cohesion and better group performance? Or does a transformational leader influence each individual of the group in such a way that each group member is highly motivated and spends extra effort and this motivation and effort spreads out across the other team members who reinforce each other? Future research should address the question which processes mediate the influence of transformational and empowering leadership on team outcomes: do empowering leaders really foster the frequency of team interactions that in turn lead to more reflection, affective

similarity and so forth? And does a transformational leader really create a collective vision and confidence that in turn lead to better group performance, innovation, and so forth?

Additionally, it should also be mentioned that the distinction in different leadership styles is an artificial one that enables research on the distinct mechanisms of leadership behavior: leaders within organizations, however, do not display only one leadership behavior: a leader can also encourage team work and team interactions (empowering) in a transformational way. Vice versa, an empowering leader (i.e. a leader that encourages self-reliant team work) can also use emotions, metaphors etc. to underline the importance of his or her message. So, also research on the optimal combinations of leadership behavior would be worth investigating.

Team Leadership and Contingency Factors

With regard to leadership effectiveness, it should be added that it is not only the intended outcome that is crucial, but also so called "key contingency factors" (Houghton & Yoho, 2005) that influence the effectiveness of leadership behavior. In their framework, especially time urgency, task structure and developmental potential of the followers are mentioned. Results of this work emphasize that both factors, time (urgency) and task structure, matter. With regard to the developmental potential, no conclusions could be drawn. Also at this part of the model extensions are possible: newer research streams indicate that it is not only the situation that matters, but also followers' attributes that make leadership behavior more or less effective. Thus, the question arises, which follower attributes influence the sensitivity of the individual follower or the group towards leadership behavior. There is already some research on followers' attributes: it could be shown that followers' personality characteristics influence how they perceive their transformational leaders; followers high in extraversion perceive more transformational leadership and also tend to evaluate this leadership style as more positive (Felfe & Schyns, 2006). But not only personality characteristics (like the Big Five) may play an important role, also attributes like "need for leadership" (e.g. de Vries, Roe, & Taillieu, 2002), "need for autonomy" (Yun, Cox, & Sims, 2006), "self-concept clarity" (Howell & Shamir, 2005), or "openness to influence" (Eckloff & van Quaquebeke, 2008) influence how susceptible followers are with regard to transformational or empowering leadership behavior. Thus, future models or future research should also concentrate on the follower or the following group and how individual or group attributes moderate the relationship between leadership behavior and team outcomes.

Taken together, leaders should adapt their behavior to the situation or to characteristics of their followers or the group and emphasize more or less the transformational or the empowering aspect of leadership.

Team Learning

Team learning can be seen as important team process, especially in fast changing environments (e.g. Edmondson & Moingeon, 1998). Unfortunately, the theory on learning is rather inconsistent. In a review (Edmondson et al., 2007), three different approaches towards team learning are identified: the first approach is called "learning curve research at the group-level" and means learning in the sense of developing routines and gained experience. The second approach called "task mastery" captures the outcome perspective and explains how teams master new tasks and how they develop collective knowledge. The third approach is the approach chosen in this work, is called "learning as group process" and is interested in looking at specific learning behaviors and their antecedences (see also figure 3). This work concentrated on two or three forms of learning, respectively: reflective learning and active learning and also the communication of unique knowledge as precondition of active learning was included. Interestingly, we found that the correlations between these learning behaviors are not very high. Thus, there are in fact several distinct learning processes that can be observed during team work and task accomplishment. Edmondson (2002) already stated that there are teams that neither reflect, nor act, and there are also teams that reflect, but do not act. The interesting question that arises now is if reflection is always the precondition of active learning and if there is a special temporal sequence with regard to the distinct forms of learning behavior. If reflection always has to take place before action, the second interesting question arises: what factors raise the probability that reflection is transformed into action? Do individual level attributes, like attitudes towards learning, play a role? Or group level attributes, like group potency, or member stability? Or even organizational factors, like stress, or time constraints? That is especially important as only action was shown to be conducive to objective group performance (decision quality). Further research should address these issues.

According to the review of Edmondson and colleagues (2006), the most influential factors in the context of team learning (independent of the operationalization of team learning behavior) are "team stability"; "leader" behavior", and "psychological safety" or other aspects of interpersonal climate. Results presented in this work underline the importance of safety

climate: teams that perceive their climate as safe showed more reflective learning activities as well as communicated more unique information. In an indirect way, also the importance of the factor "team stability" is supported as it could be seen that time plays an important role: teams that showed a lot of reflective activities also had problems to meet the deadline and it can be assumed that the beneficial effect of reflective learning on performance could not unfold within this short time horizon of teams working together for the first time. Unfortunately, the conclusions that can be drawn on leadership and learning remain vague. We found evidence that transformational and empowering leaders influence at least some reflective activities. But, further research should be conducted in comparing transformational and empowering leadership with regard to team learning.

Edmondson and colleagues (2006) also assume that learning has a positive effect on team outcomes, like task performance or rate of improved efficacy. But, results of this work showed that only active learning has a positive influence on objective group performance. Reflective activities seem to consume too much time and therefore are not conducive to team performance within this short time horizon. So, not only in the field of leadership effectiveness, but also in the field of learning, time plays an important role: some leadership behaviors might only unfold in situations without time pressure, as do some learning activities.

Conclusion

Taken together, leadership behavior is conducive to team outcomes, as is learning behavior. It should be noted, however, that many findings of this work support the idea of contingency models or moderator variables: Team leadership effectiveness depends on time, task structure, and the intended outcome, whereas the influence of learning on performance depends on the kind of learning as well as the kind of outcomes measures, and maybe also on time restrictions. On the one hand, such contingency models are more realistic than the sole assumption of main effects. But, on the other hand, these models make research even more complex and especially for practitioners it is very complicated to make use of this knowledge in the practical field.

Implications for Practitioners

It is also of importance to practitioners to know more about how team effectiveness can be promoted. The following practical conclusions can be drawn out of this work:

First of all, team leadership is a very important input factor that can have an influence on several team outcomes. In the organizational field, leaders often display a mixture of different leadership behaviors. Transformational leadership is very useful to achieve superior team effectiveness and a positive mood of the followers, whereas empowering leadership is appropriate to foster critical and independent thinking and to create shared affect within groups. Thus, both leadership concepts can be helpful to lead teams in an effective way. Additionally, also the situational context plays an important role: in situations of urgency, transformational leadership should be chosen at it reduces ambiguity and enables quick behavioral responses at the side of the follower. In contrast, in a situation in which the team should adapt to changing circumstances or affective cohesion is needed and enough time is given, empowering leadership is the method of choice. That also implies that leaders should be able to adopt their behavior and thus, leadership development should also include the issue of "sensitivity towards situations".

With regard to learning activities in teams, it can be concluded that active learning is more beneficial with regard to objective performance; thus, group, task, and organizational structures should encourage active learning behaviors, such as: making a change, achieving closure on a decision, implementing results of an experiment, finalizing a plan, improving performance or transferring new knowledge to others. In contrast, we cannot be sure how useful fostering of reflection is as it was not directly associated with objective performance measures. But, two points with regard to reflective activities should be noted: first, reflective activities can be important as it leads to a feeling of satisfaction with the groups' cooperation and maybe that could—in form of a self-fulfilling prophecy—in turn lead to better objective performance. Second, we do not know yet whether reflection is a (temporal) precondition of action. If reflection is necessary to enable action, reflective activities should be fostered in order to enable action that in turn leads to better performance. Reflection can be encouraged in form of post-action reviews (e.g. Tannenbaum et al., 1998) or team meetings in which the team is directly asked to reflect on their goals, strategies and ways of task accomplishment.

So both, team leadership and team learning are important starting points to influence team outcomes, but the situational context (e.g. characteristics of the followers, time urgency, intended outcome etc.) should always be taken into consideration.

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