Team learning behaviors, role stress and performance in project teams

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"Quibus gratias mihi minime agere licet, his maxime agam oportet."

What this short, alliterative phrase roughly means is that saying 'thank you' to someone can be as satisfactory as having someone say it to you. Bearing this in mind, the present section is not only the most difficult one to write of the entire dissertation, but also the most satisfactory one.

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Content

Chapter1:
Introduction

In the early 1980s two Dutch expeditions were organized to reach the top of the Mount Everest. The team which made the first attempt was twice the size of the second, its budget was more than twice as large, and it consisted of the best climbers of the country. Yet, this first attempt failed, mainly due to the lack of smooth teamwork. One of the factors involved was the stress within the team which was caused by a series of accidents due to extreme conditions during the climb. Another factor was the increasing competition among the ambitious top climbers; each of which wanted to have the chance to go for the top. The second team applied the lessons learned from the first team. One of these lessons was to have no more than two top climbers while the remaining six climbers were selected as competent and motivated support climbers. They made it to the top even though the conditions during this second climb were as challenging as during the first climb. Another lesson learned from the first Dutch Mount Everest expedition was to extensively practice the planning and re-planning of the climb. In all, the second team made more than fifty different climbing schedules; none of which was actually used. The team learned to adapt its plans to changing circumstances quickly, and in a harmonious and efficient manner. This prevented the occurrence of quarrels and conflicts on how to deal with unexpected problems. A third lesson, learned and applied during the second Mount Everest expedition, was to search for a team leader with a different leadership style that supported the team in learning from previous experiences and quickly adapt to changes: less task-focused and less authoritarian; more person-focused and participative (based on Vos, 2000).

The past few decades have been marked by the rapid growth of the use of teams as a means by which organizations achieve their objectives (Kozlowski & Ilgen, 2006; Meredith & Mantel, 2003). Of the many forces in contemporary society that pushed this growth, three are paramount: (1) the exponential expansion of information; (2) the growing demand for a broad range of complex, sophisticated, customized goods and services; and (3) the evolution of worldwide competitive markets for the production and consumption of goods and services (e.g., Meredith & Mantel, 2003). Individual organizations, and nations seeking to adapt and prosper under these circumstances are engaging in unprecedented levels of change (Salas, Stagl, & Burke, 2004). Increasing competition, consolidation, and innovation create pressures for skill diversity, high levels of expertise, rapid response, and adaptability, and teams enable these characteristics (Kozlowski, Gully, Nason, & Smith, 1999). Organizations have long acknowledged the value of teams in overcoming the challenges presented by chaotic context (Lewin, 1951). Teams are assumed to solve problems that are not solvable by individuals or to accomplish tasks that cannot be reasonably accomplished in a timely fashion by a single individual or by individuals working sequentially.

However, history has repeatedly illustrated that effective teamwork is not the automatic result of just bringing team members together to accomplish interdependent tasks (Steiner, 1972). The unfortunate Dutch Mount Everest expedition in the 1980s is just one example.

Other teams, led by renowned mountaineers, attempted to reach the treacherous summit and also dealt with disaster due to failures of team leadership, coordination, and communication (Krakauer, 1997). Plane crashes (Simon, 1973), and plant explosions (Cullen, 1990) could have been prevented if the team members participating in those events had been able to overcome the debilitating effects of stress to act in an adaptive fashion (Salas, Stagl, & Burke, 2004). With each of these unfortunate incidents the importance of gaining a deeper understanding of how to turn a team of experts into an expert team is underscored (Salas, Cannon-Bowers, & Johnson, 1997). The basic assumption underlying this PhD study is that a group of individual professionals brought together do not automatically constitute a team, but can develop into a team capable of fulfilling the collective ambition they strive for. Teamwork does not just happen by itself (e.g., Hackman, 1987; Salas, Sims, & Burke, 2005). In this PhD study, it is our aim to explore the learning behaviors team members show in coordinating, collaborating and communicating about their joint efforts.

Why focus on Team Learning Behaviors and why in the Context of Project Teams?

Learning at an individual, team and organizational level is increasingly seen as a central source of organizational competitiveness (e.g., Senge, 1990). In this light, it seems important to develop an understanding of team learning. This may be especially true when coupled with the proliferation of teams to achieve organizational goals (Salas et al., 2004).
Previous studies on team learning have employed a variety of terms, concepts, and methods (Edmondson, Dillon, & Roloff, 2007). Some have focused on the outcomes of team learning, others on the collective learning process in teams. We follow this latter research stream, in which the focus is on the collective learning process on the job, by action and reflection [see Kayes, Kayes, & Kolb (2005) and their theory on experiential learning in teams]. To enable team members to combine their resources to resolve team task demands, cognitive, motivational-affective, and behavioral team processes are taking place (Kozlowski & Ilgen, 2006). Within this range of team processes, Kozlowski and Ilgen (2006) described team learning as a cognitive construct, which is a representation of the process by which collective knowledge, skills and performance capabilities are acquired.

In this thesis, we are, in particular, interested in the dynamic collective behaviors of team members in order to acquire collective knowledge, skills and performance capabilities. More specifically, we are interested in 'group action processes' (Marks, Mathieu, & Zaccarro, 2001) or collective behaviors in teams, which are not directly aimed at performance outcomes of the team but at learning "how to play the game together" or so-called team learning behaviors.

Until now, scholars have discerned various team learning behaviors (Argyris & Schön, 1978; Edmondson, 1999; Gibson & Vermeulen, 2003; Kasl, Marsick, & Dechant, 1997; Van der Vegt & Bunderson, 2005). Most of them refer to an ongoing process of collective reflection and action. The body of literature on team learning behaviors is still limited, and most studies have been conducted in the laboratory (Edmondson, 1999), which limits the nature of the phenomena that can be observed. Edmondson (1999) provided a rigorous

evaluation of her model of team learning behaviors in 51 work teams, using a combination of qualitative and quantitative techniques. The resulting team learning behaviors cover the cycle of reflection and action (as defined in previous studies, cf. Kolb, 1984; Gibson & Vermeulen, 2003; Kasl, Marsick, & Dechant, 1997) such as seeking feedback, sharing information, experimenting, asking for help and discussing errors. For these reasons, in this thesis we adhere to Edmondson's broad definition of team learning behaviors, as the underpinning of a team learning process.

Previous research has provided the theoretical underpinning of the concept of team learning as a process through which a group creates knowledge for its members, for itself as a system, and for others (e.g., Kasl, Marsick, & Dechant, 1997). However, previous studies have not yet designed an integrative measurement instrument that captures the various behaviors that are related to this team process. Previous empirical studies have either focused on the assessment of a subset of the cycle of action and reflection (e.g., Schippers, Den Hartog, Koopman, & Wienk, 2003; Van den Bossche, Gijselaers, Segers, & Kirschner, 2006; Van Dyck, 2000; Van Woerkom, 2003), or the concept has been operationalized into a one-dimensional measurement instrument (Edmondson, 1999), that, although conceptually and statistically valid, did not distinguish between the various categories of behavior that underlie the process of team learning, nor addressed the complementarity (see e.g., Lichtenthaler, 2009) of these behaviors as distinctive dimensions of a higher order concept. In line with other rich behavioral concepts (see e.g., Kleysen & Street, 2001: innovative behavior), we argue that a conceptualization of team learning behaviors in the reflection-action process necessitates viewing the concept as multi-dimensional one, composed of complementary categories of behavior.

Each of the distinctive dimensions of team learning may vary in the extent of their influence on performance. By modeling these behaviors as separate behaviors with direct relationships to team performance, one might draw the conclusion that one team learning behavior is more important than another in order to increase team performance. In addition, one might infer that a team should focus on the team learning behaviors that contribute most strongly to team performance in order to maximize the latter. This may be wrong, because when a team focuses on exploring (as an example category of team learning behaviors), this may have stronger effects on team performance when the team reveals simultaneously experimenting behavior (another example category of team learning behaviors). That is to say, there might be different outcomes as a result of the co-existence of the team learning behaviors. For that reason, we aim to develop and validate a measurement instrument that enables to assess team learning behaviors as a multi-dimensional concept. This multi-dimensional concept should address the complementarity effects of these behaviors by comprising the distinctive categories of team behaviors and in addition their mutual relationships. With the development of a multi-dimensional measurement instrument to examine team learning behaviors, we aim to provide a diagnostic tool for teams to become conscious of the prevalence of specific team learning behaviors within their teams, and to develop goals to improve their under-developed team learning behaviors.

Studies on team learning behaviors are still scarce; however, the relationship between team learning behaviors and team performance appeared to be positive (see for instance Edmondson, 1999, 2002; Lutz, 1994). Hence, it seems worthwhile, from a team performance

perspective, to further explore the circumstances under which team learning behaviors are promoted or hindered. After all, when viewed as the components of a process of interaction and exchange among team members, the prevalence of team learning behaviors is contextually based and socially bound (Kozlowski & Ilgen, 2006). Moreover, we argue that, although knowledge about team behaviors that stimulate team learning is of interest for all kinds of accomplishments that need teamwork, this is especially true for project teams. We will elaborate on this point in our argumentation below.

Project teams can be defined as temporary organizations that operate relatively autonomously to attain a goal, on time, within budget, and in conformance with predetermined performance specifications to add value for the owner (i.e., the client of the project team). This generally entails the successful completion of a developmental product, and therefore the work to be done is usually non-routine (e.g., Söderlund, 2004; Turner, 2006). The interdisciplinary nature of the work in project teams, combined with their unique task and temporary membership (Turner, 1999), necessitates that professionals with more or less diverse backgrounds rapidly learn to work together to accomplish the project's goal. The non-routine type of task requires careful coordination and control in terms of timing, precedence, costs, and performance. Furthermore, in most projects there are several unknowns and uncertainties that have to be discovered and unraveled (Storm & Savelsbergh, 2005). For instance, there may be unknowns about the specific circumstances and interdependencies with other projects or the parent organization under which the project must be realized. Additionally, there may be uncertainties about the requirements of the principal or client.

Uncertainties about the outcome desires of the client in a project became apparent in the "North-South Line" project (a big infra-structural subway project in Amsterdam, the Netherlands, commissioned by the Dutch government). To be successful in these types of large infra-structural investment projects, the political environment needs to be stable and supportive. When doubts about the chances of successful completion of the project are published in the press, political alliances may fall apart. As a consequence, pressure may be put upon project management to increase control over the project. In many cases, such as the North-South Line, this has increased offensive-defensive behavior among parties within the project, instead of inquiring and reflective behavior that would have helped to clarify the client's dilemmas and requirements (Scheffrahn & Storm, 2009).

These characteristics of projects mandate the quick development from a collection of individuals into a union that is capable of dealing with unknowns and uncertainties and of careful coordination and control in order to accomplish the team's non-routine task. Therefore, in order to learn quickly to collaborate, coordinate and communicate as a team, team learning behaviors seem to be of crucial importance in project teams. In addition, project teams have to learn "on the run". In contrast to established organizations which have the opportunity and readiness to work with operational or on-going teams (such as fire brigades), and to learn between performances, for project teams there is no such time for training sessions "between matches". In sum, we argue that project teams need to learn rapidly on the job to collaborate, coordinate and communicate effectively.

In line with our argumentation that team learning behaviors are expected to be of great importance for project team performance, and that team learning behaviors are contextually based and socially bound, we aim to explore which factors stimulate or hinder team learning behaviors in the social context of a project team. In doing so, we will add to an increasing chorus resounding across the literature upon project management and learning within and between projects (e.g., Ayas & Zeniuk, 2001; Druskat & Kayes, 2000; Keegan & Turner, 2001; Lynn, Akgün, & Keskin, 2003; Winter, Smith, Morris, & Cicmil, 2006).

Moreover, we will contribute to 'situated learning theory', presuming that most learning occurs on the job, from participation and interaction of people within so-called communities of practice (Lave & Wenger, 1991). Lave and Wenger have developed an understanding of the nature of learning within communities of practice, moving away from theories of 'receiving' abstract knowledge out of context. Their theory focused on how people's activities within the world allow them access to knowledge that is fundamentally different from observing or being spoon-fed. Situated learning theory argues that learning as it normally occurs is a function of the activity, context and culture in which it occurs (i.e., it is situated). The learning is established in the relationships between people, and problem solving and learning by experience are central processes. Social interaction is a critical component of situated learning (Wenger, 1998). With our study, we aim to add to this body of knowledge by shedding light on the interpersonal behaviors within the context of project teams that may, intentionally or not, contribute to learning and improving project performance. Ideally, the results of our research would serve as an embarkation point for prompting practitioners' and researchers' debates about team learning behaviors in this dynamic workplace learning arena. Our ultimate goal is that our research outcomes build awareness among project team members and their leaders to systematically and deliberately pay attention to and to explicitly facilitate team learning behaviors.

Role Stress in Project Teams

More than operational teams, project teams operate in a world characterized by conflict (Meredith & Mantel, 2003, p. 10). By definition, project teams have to deal with non-routine assignments that have to satisfy at least four parties of interest or 'stakeholders' (the client, parent organization, project team, and the public) with often conflicting demands and with different definitions of success and failure of the project (Müller & Turner, 2007). For example, the client wants changes, and the parent organization wants profits, which may be reduced if those changes are made. Moreover, projects compete with functional departments for resources and personnel (Meredith & Mantel, 2003, p.189). Individuals working on projects are often responsible to two bosses at the same time; these bosses may have different priorities and objectives. More seriously, with the growing proliferation of projects, the project-versus-project conflict for resources within multi-project organizations is growing as well. The members of the project team are in almost constant conflict for the project's resources and for leadership roles in solving project problems (e.g., Keegan & Turner, 2002). Perceptions of overload are likely to occur. Furthermore, the uniqueness of the project task is not always helpful in gaining an unambiguous picture of the expectations at the team.

Work-related stress, or role stress, is likely to occur in project teams, operating in a turbulent and uncertain outside environment, characterized by multiple stakeholders, with sometimes ambiguous and/or conflicting requirements. The combination of a non-routine job and the multi-organizational, part-time, limited life-span type of team membership, which especially characterizes the contemporary multi-project context (e.g., Keegan & Turner, 2002; Nobeoka & Cusumano, 1997), even increases the likelihood of perceptions of role stress in project teams.

Within the project organization of the North-South Line, responsibilities have been divided rather strictly. This is necessitated by the complexity of the project. For instance, there are three so-called "deep situated" stations along the line. There is one contract with a construction company to build these three stations. Nevertheless, to monitor the progress of the construction of these three stations, three contract teams have been installed and given the responsibility to monitor the construction process. These three contract teams behave rather independently on a day-to-day basis. This might be a source of role conflict (Scheffrahn & Storm, 2009).

Role stress has been defined as the strain resulting from ambiguity, conflict, or overload in multiple task requirements or roles of employees, and it is known to impair the effectiveness of individuals executing a job (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). Until now, role stress has been investigated in organizations as a phenomenon that occurs at the individual team member level (Bacharach, Bamberger, & Conley, 1990; Rizzo, House, & Lirtzman, 1970; Kahn et al., 1964). Although interest in this phenomenon in established organizations has been extensive (e.g., Jackson & Schuler, 1985; Peterson & Smith, 1995), in particular in boundary spanning functions (e.g., Goolsby, 1992), the interest in role stress within the context of project teams is just emerging (e.g., Gällstedt, 2003). However, with the proliferation of the use of project teams in today's economy, further exploration of this phenomenon and its consequences and coping mechanisms in project teams is called for. In project teams, characterized by the turbulence of a multi-stakeholder environment, changes in the project's scope occur regularly, and with each occurrence of change the team needs to resolve the issue of the distribution of roles within the team (Gällstedt, 2003). In teams within established organizations, with individuals in more or less permanent individual roles, one might expect that role distribution is settled after some time, and that role stress diminishes. Hence, one could argue that project team members, in particular, are prone to perceptions of individual-level role stress due to the repeated issue of intra-team role distribution.

On top of the internal struggles of individual team members in terms of role distribution, the uncertainties and turbulence that shape the world of projects may not solely be related to roles and requirements faced by individual team members. Struggles with ambiguous, conflicting and overburdening requests are not unlikely to originate from the goals and requirements the project team has to meet as a whole, and are, therefore, likely to be shared by all members of the team (Akgün, Burneb, Lynn, & Keskina, 2007). If so, it is likely that these ambiguous, conflicting, and/or overburdening demands to project teams may cause

additional stress, on top of the stress about the individual role distribution among the team members.
Whether experienced at the individual or the team level, role stress is likely to impede the performance of the team and its members (e.g., Jackson & Schuler, 1985). From Weick's (1993) re-analysis of the Mann Gulch fire disaster, we know that stress may cause the collaborative abilities of a team to disintegrate. Due to role ambiguity, role conflict, or role overload, team members may spend time working on tasks that do not contribute to the project's goals, team members may experience difficulties in synchronizing or integrating tasks, or they may simply fail to finish work on time. Obviously, this may result in the team not meeting its performance standards. Based on his re-analysis, Weick (1993) suggested a frequent interaction pattern to overcome the propensity of individuals to disengage from teamwork in stressful situations.

Based upon the line of reasoning given above, we argue that it is valuable to further explore role stress in the turbulent work arena of project teams, and to investigate interaction patterns that are useful to learn to collaborate and build a shared conception of problems and demands (Van den Bossche et al., 2006), in order to better understand how to reduce role stress at both the individual and the team level.

Do Team Learning Behaviors inhibit Role Stress? Or is it just the other way around?

As stated previously, team learning behaviors are expected to be of great importance for project team performance, and role stress can play a vital and detrimental role in this relationship. Therefore, it is valuable to seek to understand better how team learning behaviors and role stress are interrelated. Previous literature has focused on the relationship between learning and stress and indicated a negative connection (e.g., Karasek & Theorell, 1990; Taris, Kompier, De Lange, Schaufeli, & Schreurs, 2003).

In Karasek and Theorell's (1990) classical job stress model, i.e., the Job Demand-Control-Support Model (JDCS Model), stress and learning are reciprocally related. On the one hand, learning allows a person to face challenges, that is to say, learning inhibits stress. On the other hand, a learning orientation decreases perceptions of stress. Moreover, there isempirical support for reciprocal causal relationships among causes of work-related stress, that is to say job demands and job control, and learning-related behavior (De Lange, Taris, Jansen, Kompier, Houtman, & Bongers, 2009).

The learning-inhibits-stress relationship is in line with Edmondson and Smith's (2006) thinking, who claimed that project team members must adapt an inquiry orientation, in which they mutually explain their positions. This claim for the necessity of an inquiry orientation puts team learning behaviors forward as important for gaining an understanding of the project as a whole, and for integrating different viewpoints and roles (Brown & Eisenhardt, 1995). Yet, the JDCS Model additionally claims that a person who experiences too much stress loses the capacity to learn, that is to say, stress inhibits learning, because stress is typically a condition that diverts attention away from learning behaviors (see for empirical studies e.g., Pearsall, Ellis, & Stein, 2009; Taris et al., 2003). Moreover, individuals and teams may have less epistemic motivation, which refers to the desire to develop a thorough under-

standing of a situation (e.g., Kruglansky, 1989; Van Kleef, Homan, Beersma, Van Knippenberg, Van Knippenberg, & Damen, 2009). This lack of desire to fully understand situations may be a hindrance for engagement in systematic and thorough information processing.

In summary, although previous empirical research at the individual level has pointed to a reciprocal relationship between stress and learning, rigorous empirical proof regarding the direction of causality in the relationships between stress and learning at the team level, as well as in individual-level and cross-level relationships, is lacking. This lack of evidence on the relationships between team learning behaviors and role stress in project teams generates questions such as: Does role stress hinder team members to engage in team learning behaviors? Are teams engaging in team learning better able to cope with role stress?

Based on the explanations given above, on the one hand, one could expect that particularly in project teams with certain levels of ambiguity, conflict and overload, there is no time or energy left for team members to engage in work processes that do not contribute immediately to the primary process of finishing the task at hand (e.g., Fried, Ben-David, Tiegs, Avital, & Yeverechyahu, 1998). On the other hand, one could expect that project teams that engage in team learning yield adaptive teams. Adaptive teams are able to learn capabilities that underlie team performance, develop collaboration and coordination skills, in order to meet unexpected challenges (Kozlowski et al., 1999). In so doing, team members engaging in team learning may be able to cope with the causes of role stress. In short, the relationship between team learning behaviors and role stress in project teams seems to be a reciprocal one. With our study, we aim to shed more light on how team learning behaviors relate to team-level and individual-level role stress in project teams.

The Impact of Team Leadership Behavior and Team Stability

Team learning behaviors are expected to influence performance within the practitioners' world of teams, and it is of much interest, especially from the practitioners' perspective, to know which factors may hinder or facilitate project teams to engage in team learning behaviors. Previous findings in other team settings pointed at the team leader's behavior explaining a considerable amount of variance in the extent of team learning (cf., Burke, Stagl, Klein, Goodwin, Salas, & Halpin, 2006; Edmondson, 2003). The use of empowerment leadership behaviors, such as coaching, monitoring, and feedback behaviors, and behaviors indicative of participative, facilitative, and consultative leadership styles, explained a significant amount of variance in team learning (see e.g., Burke et al., 2006; Edmondson, 1999; Hirst, Mann, Bain, Pirola-Merlo, & Richver, 2004; Kirkman & Rosen, 1999; Kozlowski, Watola, Nowakowski, Kim, & Botero, 2009). In our study, we intend to investigate if these outcomes may be confirmed in project teams and to gain insight into how the influence of the project manager on the extent of team learning is established.

Furthermore, previous findings indicated stable team membership as a factor to facilitate learning and intra-team coordination (Moreland, Argote, & Krishnan, 1998). Teams with a more stable composition demonstrate higher rates of improvement (Edmondson et al., 2007), and team members seem to have less difficulty in recognizing and integrating their knowledge for efficient task completion (Liang, Moreland, & Argote, 1995). Following this line of reasoning, and given the limited life-span type of team membership that charac-

terizes project teams (Keegan & Turner, 2002), knowledge about the effects of unstable team membership on the engagement in team learning behaviors seems to be of special importance for project teams. Moreover, the project manager, dealing with resource allocation issues, may have the power to keep his or her team together, and as such to indirectly facilitate team learning behaviors. For this reason, we aim to investigate to what extent the project manager's leadership behavior has not only a direct influence on the prevalence of team learning behaviors in his or her team, but also an indirect effect through team stability.

Towards a Conceptual Model Integrating Team Learning Behaviors, Team Leadership Behavior, Team Stability, Role Stress and Performance

Summarizing, the purpose of this PhD research is twofold. First, we aim to develop a better understanding of relationships between the main variables of interest in this study; that is: team learning behaviors, team leadership, team stability, individual-level and team-level role stress, and individual and team performance in general, and particularly in project teams. Second, we aim to develop sound team-level measurement instruments in order to examine these variables.

The main research question of this thesis is as follows:
How do team learning behaviors relate to: (1) individual-level and team-level role stress, (2) team leadership behavior and team stability, and (3) individual and team performance in project teams?

This main research question was divided into the following sub-questions:
1. How do stakeholders of teams judge the importance of team learning?
2. How are team learning behaviors conceptualized, and how can we measure the behaviors that constitute team learning?
3. How does the leadership behavior of the project manager affect the prevalence of team learning behaviors in his/her project team? Is this influence (partly) accounted for by team stability?
4. How does role stress occur in project teams? At the individual level solely, or also at the team level? And in addition, how does role stress relate to performance in project teams?
5. How do team learning behaviors relate to role stress and performance at both the individual level and team level?

The conceptual model that we constructed from these questions (see Figure 1) includes expected antecedents, as well as expected (mediated) effects of team learning behaviors. Furthermore, the model includes variables at multiple levels. The model states that team learning behaviors lead to higher team and individual performance. In addition, it indicates that this positive influence is (partly) shaped by decreasing perceptions of role stress at the individual level as well as the team level. Furthermore, it states that team leadership behavior positively affects the prevalence of team learning behaviors and that this relationship is (partly) shaped through team stability.

These research questions are visualized in the following conceptual model:

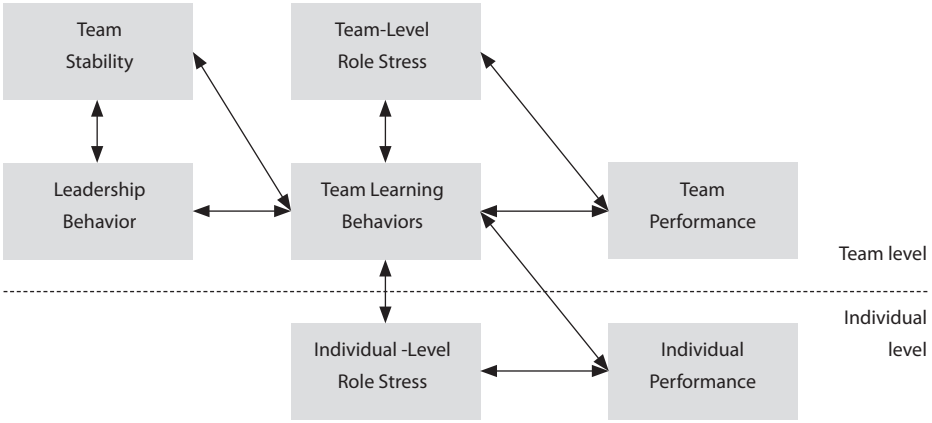

Figure 1: Conceptual Model Incorporating the Research Questions

In this dissertation four studies will be presented in Chapter 2 untill 5 which elaborate and investigate, each in their own way, aspects of these research questions. The next sections introduce and summarize the different studies in order to make clear how they relate to and build on each other.

Study 1: How do Stakeholders judge the Importance of Team Learning for Team Performance? (Chapter 2)

Study 1 explores how the most important stakeholders of a team, i.e., the team members, the team leader and the supervisor, evaluate team performance. Moreover, we aimed to justify a further exploration of team learning behaviors as a potential important antecedent of team performance. Although research on team performance rating criteria is available and a broad range of antecedents have been studied (see e.g., Kozlowski & Ilgen, 2006), it is unclear how teams evaluate the relative importance of these rating criteria and antecedents of team performance. A literature review and in-depth exploratory interviews with project-team managers in practice were conducted in order to build a survey instrument to evaluate the relative importance of the criteria and to determine factors influencing team performance. Our aim was to gain a list of team performance criteria that connect to previous findings and that are used by team leaders, team members, and supervisors in practice. Additionally, we explored team leaders, team members, and supervisors attitudes towards factors assumed to enhance team performance. In so doing, we aimed to gain justification from the practitioners' perspective to further explore team learning behaviors as an important antecedent of to team performance.

Study 2: The Development and Empirical Validation of a Multi-Dimensional Measurement Instrument for Team Learning Behaviors (Chapter 3)
Study 2 further elaborated on the concept of team learning behaviors, and how to measure these behaviors. The nature of team learning is a fairly recent topic in the literature on teams (Sessa & London, 2008). Team learning has been defined in many ways, including "a process through which a group creates knowledge for its members, for itself as a system and for others" (Dechant, Marsick, & Kasl, 1993, p. 5); and "the process of aligning and developing the capacity of a team to create the results its members truly desire" (Senge, 1990, p. 236). Edmondson (1999) offered a more concrete definition arguing that knowledge gained through the process of learning occurs by members openly testing assumptions and discussing differences. Several researchers tried to delineate the nature of the team-learning cycle (e.g., Gibson, 2001; Kasl, Marsick, & Dechant, 1997). They all refer to the cyclical act-and-reflect nature of the learning processes. Although team learning has been measured in previous empirical studies, these measurement instruments were either describing abstract processes and not perceivable behaviors or not reflecting the whole cycle of learning by experiences of a team. In this study, we, therefore, report on the development of a multi-dimensional team learning behaviors measurement instrument, using existing scales and reflecting the whole cycle of experiential team learning.

Study 3: Does Team Stability mediate the Relationship between Leadership and Team Learning? An Empirical Study among Dutch Project Teams (Chapter 4)
Study three describes an exploratory field study examining the relationship between leadership behavior and team learning behaviors among project teams in the sectors of building and utilities, engineering and construction, infrastructure, and area decontamination and development in the Netherlands. Team stability was included in this study as a potential mediator (see Figure 2), because this factor appears to be a characteristic of project teams that varies among teams and previous findings had pointed at a correlation with learning (e.g., Moreland, Argote, & Krishnan,1998). Suggestions are presented for leadership practices that stimulate project-team learning behaviors.

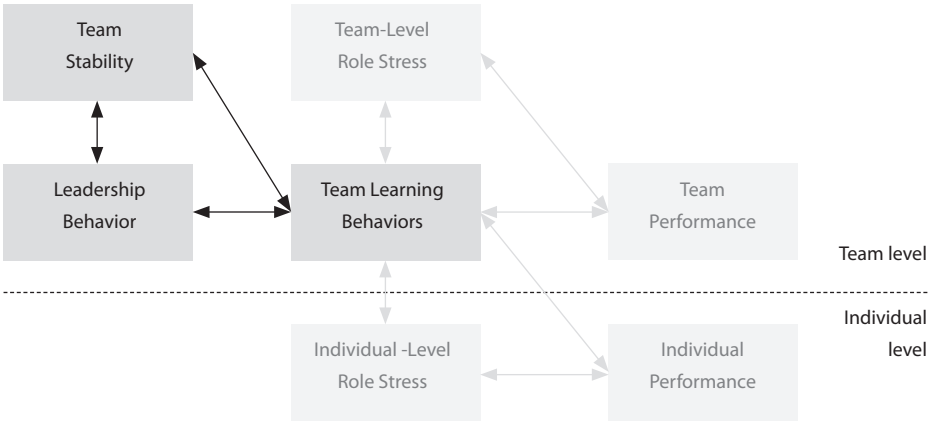

Figure 2: Conceptual Model of Study 3 (black boxes and arrows)

Study 4: Team Learning, Role Stress, and Performance: A Multi-Level Investigation among Dutch Project Teams (Chapter 5)

The final study in this dissertation investigates the existence of role stress at the team level, besides role stress at the individual level, and explores its relationships with team learning behaviors and performance. For this purpose, we connected the findings of previous studies on team learning to the findings of the role-stress literature. Although earlier research focused upon role stress as an individual-level phenomenon, we argue that role stress does not necessarily restrict itself to individuals. Especially the conditions in which project teams function emphasize the strong need to empirically investigate the causes of both individual-level and team-level role stress, and to find ways to deal with role stress within the team. Moreover, teams are multi-level systems (Nijstad, 2009), in which members are part of teams and teams are part of the environment. Therefore, researchers need to take into account relationships among characteristics at different levels (e.g., individual personality and organizational culture). In this study, on the one hand, we examined whether team learning behaviors function as a coping mechanism for project teams in dealing with role stress at both the individual level and team level, and as such improve performance. On the other hand, we examined if it is team role stress that hampers team members from engaging in team learning, and as such decreases team performance (see Figure 3).

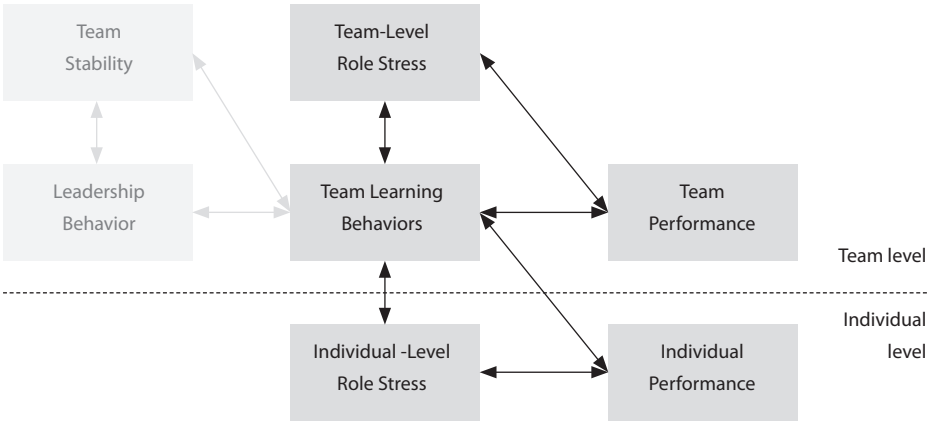

Figure 3: Conceptual Model of Study 4 (black boxes and arrows).

The final chapter of this thesis concludes with a discussion of the outcomes of this PhD research and reflects on the concepts, methodology, and theoretical and practical relevance of the thesis study. Finally, challenges for future research are discussed.

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Chapter 2:
How do stakeholders judge the importance of Team Learning for Team Performance?

Attitudes Towards Team Performance Enhancing Factors:
A Multi-Rater Approach Aimed at Establishing the Relative Importance of Team Learning Behaviours[1] .

Research has revealed a broad range of criteria for rating team performance, and of factors influencing it. However, what remains unclear is how teams evaluate the relative importance of these rating criteria and of the factors influencing team performance. In order to answer this question a survey was administered to team members (N=30), team leaders (N=19), and supervisors (N=21) of 22 teams from eight Dutch organizations. Based on a literature review and in-depth exploratory interviews, the respondents were asked to indicate which criteria they use to evaluate team performance, and which factors they assume to be the most important ones in distinguishing between greatly and poorly performing teams. Our findings showed that the most frequently applied criteria to measure team performance comprised satisfying quality requirements, reaching the target goals, and customer satisfaction. Moreover, the respondents evaluated team leadership, goal clarity, and team learning behaviours as main factors influencing team performance. Multi-rater comparisons indicated that attitudes of team members, team leaders, and supervisors differed in several aspects. This contribution may help to raise awareness of these differences among the different parties, and may increase the ability of the participants to determine the value of contributing factors in the light of team performance enhancement.

The importance of high quality teamwork for organizational success in today's economy is emphasized by many professional as well as academic publications (e.g., Banker, Field, Schroeder, & Sinha, 1996; Drucker, 2003; Glassop, 2002; Pfeffer, 1994; Kozlowski & Ilgen, 2006). Compared to what individual employees can offer, teamwork is expected to result in a greater adaptability, productivity, and creativity, and provide more innovative and comprehensive solutions to complex organizational problems (cf., Beers, 2005). Empirical research demonstrates, however, that there is a considerable variance in team performance (see, for instance, Hackman, 1987). An important question, therefore, is how this variation in team performance can be explained.

[1] *Submitted to Team Performance Management (August 2009).*

Although numerous team performance criteria have been applied in previous studies (Delarue, Van Hootegem, Procter, & Burridge, 2004), there is a lack of clarity about which performance criteria are applied most frequently in practice. Moreover, it is unclear whether different parties involved in teams, such as team members, team leaders and supervisors, use different assessment criteria when evaluating team performance. Differences in rating criteria may imply that different factors are assumed to influence team performance by the different parties, or that they use different ranking orders as regards the impact of the factors influencing team performance.

Moreover, for the appraisal of performance, there is a tendency towards the use of multi-rater (or multi-course) performance ratings (see Cheung, 1999; Waldman & Atwater, 1998). Multi-source assessment, also referred to as 360-degree appraisal or 360-degree feedback, refers to the process by which performance appraisals are collected from different sources of individuals, for instance, from team members, team leaders, and supervisors, instead of relying on appraisals from a single source (Dunnette, 1993; London & Smither, 1995; Tornow, 1993). The rationale behind this is that different evaluation perspectives offer unique and valuable information, and thus add incremental validity to the assessment of individual performance (Brett & Atwater, 2001; Woehr, Sheehan, & Bennett, 2005). The accurate interpretation of differences in assessments by different sources requires that one can assume that each set of raters uses the same metric. If, for whatever reason, one group of raters interprets the text of an item, or a set of items, differently from another group, the resulting differences may not only be the result of the observations of the raters, but also of the interpretative difference(s) elicited by the item(s) (Penny, 2001).

The fact that an item can function differently for distinguished groups of raters suggests the existence of a degree of measurement inequivalence, and raises important questions about the reliability and validity of performance ratings in general (Van der Heijden, 2005). Therefore, we will start our research with a thorough investigation into what team performance criteria are applied by different groups of raters, and examine which factors are assumed to influence team performance by the different parties involved.

The body of empirical research on variables influencing team performance is vast (Kozlowski, & Ilgen, 2006; Mathieu, Maynard, Rapp, & Gilson, 2008; Salas, Cooke, & Rosen, 2008; Salas, Stagl, & Burke, 2004; Salas, Stagl, Burke, Goodwin, 2007; Tannenbaum, Salas, & Cannon-Bowers, 1996). These variables comprise team characteristics, that is, attributes that characterize a team in comparison with other teams, for instance, diversity among team members (e.g., Schippers, Den Hartog, Koopman, & Wienk, 2003) ; team behaviours, that is, the interactions among team members that characterize the team, such as team learning behaviours (e.g., Edmondson, 1999; Edmondson, Dillon, & Roloff, 2007); and team context, that is, attributes that characterize the context in which a team has to perform, such as support from management and other organizational characteristics (Anderson & West, 1998; Edmondson, 1999). Many researchers have demonstrated that the relationship between team performance and its influencing factors is a complex one, and indicate that more empirical research is required in order to draw more reliable conclusions regarding its nature and strength. More specifically, some relationships between influencing factors and team performance appear to be moderated by other variables, such as diversity or task type (e.g., Schippers et al., 2003), or appear to have a dynamic character

(e.g., Zellmer-Bruhn & Gibson, 2006), therefore require longitudinal research.
Although these findings all increase our understanding of team performance, there is a considerable lack of systematic knowledge on the added value of the variables assumed to be important for team performance enhancement. One of the main objectives of this contribution is, therefore, to single out the most important factors influencing team performance. On the one hand, this can help teams and their stakeholders in practice to tailor their interventions and focus on the main contributing factors that are found to enhance team performance. On the other hand, our results may help to add to the literature on factors influencing team performance.

Based upon a literature review on team performance and team learning behaviours, we expect the latter to be an example of a highly influencing factor in the light of team performance enhancement (Edmondson, 1999; Storm & Savelsbergh, 2005). Earlier research has suggested a positive relationship between team learning behaviours and team performance (e.g., Edmondson, 1999; Gibson & Vermeulen, 2003; Storm & Savelsbergh, 2005; Van der Vegt & Bunderson, 2005). What has remained unclear, however, is how teams evaluate the relative importance of team learning behaviours in the light of team performance, in comparison with other factors influencing team performance.

Summarizing, the first objective of this study is to investigate which criteria are applied for team performance ratings, and which factors are assumed to be important in the light of team performance enhancement by different groups of raters. Our second objective is to come up with a rank order approach for the contributing factors in order to determine their relative importance as perceived by team members, team leaders, and supervisors (that is, people actually involved in teamwork).

Theoretical Background

Although much research on teams has been conducted, and, similarly, on learning in organizations, relatively little empirical knowledge is available about team learning (cf. Edmondson, 1999; Kozlowski, & Ilgen, 2006; Salas, Stagl, & Burke, 2004). A team can be defined as "a distinguishable set of two or more people who are "assigned specific roles or functions to perform dynamically, interdependently, and adaptively toward a common and valued goal/object/mission, and who have a limited life span of membership" (Salas, Dickinson, Converse, & Tannenbaum, 1992, p. 126-127). Learning can be defined as the process of acquiring knowledge through experience, which leads to a relatively enduring change in behaviour (Buchanan & Huczynski, 2004). In defining the concept of team learning, some researchers have emphasized the process of learning (e.g., Edmondson, 1999, 2002; Gibson & Vermeulen, 2003; Kasl, Marsick, & Dechant, 1997), while others have stressed its outcomes (e.g., Ellis, Hollenbeck, Ilgen, Porter, West, & Moon, 2003). The present study follows the stream of research based on process definitions of team learning (Edmondson et al., 2007). For that reason we prefer to use the term team learning behaviours (Edmondson, 1999), which refers explicitly to the behavioural patterns in the team that build the process of team learning.

Definitions of team learning behaviours often capture components such as reflection and action (Edmondson, 1999; 2002; Gibson & Vermeulen, 2003; Tjosvold, Tang, & West, 2004), sharing and processing knowledge, and making improvements (Argyris & Schön, 1978;

Edmondson, 2002; Gibson, 2001). Some researchers have described concrete team learning behaviours associated with these components, such as asking questions, challenging assumptions, evaluating alternatives, seeking feedback, experimenting, reflecting on results, detecting, discussing and correcting errors, and reflective communication (Argyris & Schön, 1978; Edmondson, 1999; Gibson & Vermeulen, 2003; Kasl, Marsick, & Dechant, 1997; Van der Vegt & Bunderson, 2005; Van Dyck, Frese, Baer, & Sonnentag, 2005; Van Woerkom, 2003).

This study builds upon the definition of team learning behaviours adopted by Edmondson (1999), which can be summarized as an ongoing process of reflection and action characterized by asking questions, seeking feedback, experimenting, reflecting on results, and discussing errors and unexpected outcomes of actions. For a team to discover gaps in its plans and, accordingly, to make changes, team members should test assumptions and discuss differences of opinion openly rather than privately or outside the group, as it is through these that learning is enacted at the group level.

Team learning behaviours imply a change in understanding, knowledge, abilities/skills, processes/routines, or systemic coordination (Edmondson et al., 2007). Past research has suggested that teams can differ considerably in the extent to which they engage (either intentionally or incidentally) in team learning behaviours, and moreover, a positive relationship has been established between these learning behaviours and team performance (e.g., Edmondson, 1999; Gibson & Vermeulen, 2003; Van der Vegt & Bunderson, 2005).
It is difficult to come up with an unambiguous and conclusive definition of the concept of team performance. A wide range of performance indicators, such as operational outcomes, financial outcomes, behavioural outcomes, or attitudinal outcomes have been applied to investigate the added value of teams in organizations (Delarue, Van Hootegem, Procter, & Burridge, 2004). Since work teams always have a particular performance purpose, the present study will adhere to Hackman's (1987) concept of task performance, being the degree to which a team meets its goals, and how well its output fulfils the team's mission (cf., Bushe & Coetzer, 2007). Following other studies on team performance, we are interested in perceptions as regards general work performance of teams, implying the choice for a relatively broad measure (Edmondson, 1999; De Jong, Van der Vegt, Molleman, & Bunderson, 2007; Salas, DiazGranados, Klein, Burke, Stagl, Goodwin, & Halpin, 2008), and we are curious about the frequency with which respondents use these different criteria for team performance assessments.

While a positive empirical relationship between team learning behaviours and team performance has been established (Edmondson, 1999), it is unclear which contributing factors are evaluated to be the most important ones by team members themselves in the light of team performance. Especially, the beliefs of team members about the relative importance of team learning behaviours might be of interest, as they may predict the extent to which team members will show team learning behaviours, and to what extent they will invest in their further development. Following Ajzen and Fishbein's (1980) theory of reasoned action, beliefs about team learning behaviours are hypothesized to affect the extent to which team members actually reveal team learning behaviours. More concretely, Ajzen and Fishbein (1980) stated that beliefs produce a favourable or unfavourable attitude and subjective norm towards behaviours, which guide human action. Moreover, beliefs about the likely

consequences of behaviour and beliefs about the normative expectations of others will influence the extent to which an individual reveals the specific behaviour.

In this line of thought, the attitudes of team members towards team learning behaviours can have a substantial impact on their intended and actual behaviours within the team. In addition, other organizational groups that are involved in the team, such as team leaders (inside the team) and supervisors (above the team), may have different attitudes compared to the ones held by team members themselves (Poell & Van der Krogt, 2003). More concretely, due to their different interests in the team's performance and their different involvement in the team, attitudes of team leaders, members and supervisors towards team performance criteria and their perceptions as regards (the importance of) factors influencing team performance may vary. For instance, team leaders may be focused on short-term, instrumental leadership, arising from the relatively short duration of relations between team leaders and their subordinates (Boerlijst, 1994). This may imply that they are not too interested in stimulating further development of the capabilities, performance, and development of their team members (people management), or lack the know-how to do so. After all, it is the 'here-and-now' output of the team they supervise that counts, which may result in a serious neglect of attention to team learning behaviours aimed at future performance (Van der Heijden, De Lange, Demerouti, Van der Heijde, 2006).

In order to better understand and predict the behaviour of those different parties involved in teams, it is highly relevant to gain more insight into their attitudes towards factors influencing team performance.

Methodology

Design

Firstly, a literature review into the criteria to measure team performance was conducted. Subsequently, in order to come up with valid factors influencing team performance, both a literature review and four in-depth interviews with project managers were held. These project managers all had more than ten years of working experience in their role as manager of project teams in Information Technology, Construction or New Product Development. Based on these sources of information, a quantitative survey was constructed, which was administered to team members, team leaders, and supervisors. The aim of the survey was to investigate which team performance criteria were applied most frequently, and which factors contributing to team performance were assumed to be most important. The quantitative part of this study comprised a cross-sectional approach.

Sample

The sample consisted of, in total, 90 team members, team leaders, and team supervisors working in 15 project teams and 7 operational teams from eight Dutch organizations. A total of 37 team members, 25 team leaders, and 28 supervisors were approached ; however, only 70 respondents completed the survey, yielding response rates of 81 per cent from the team members, 76 per cent from the team leaders and 75 per cent from the supervisors (see Table 1 for more specific sampling information).

Table 1
Sample Description for the Survey (N = 70).

Respondent Group Total	
Team members	30 (43 %)
Team leaders	19 (27 %)
Team supervisors	21 (30 %)
Total	70 (100 %)

Measures

Edmondson's team performance scale (1999), itself based on Hackman's (1990) instrument, was selected to formulate criteria to assess team performance. In order to do this, we reformulated its scale items into short statements about the rating criterion applied (e.g., 'This team meets or exceeds its customers' expectations' was reworded into 'Customer satisfaction with the team's services / products'). This procedure resulted in a list of seven rating criteria. In exploratory interviews with four project managers, this list of seven criteria to assess team performance was checked for clarity and completeness. Based on the interview outcomes we extended this list with two complementary criteria, namely, 'number of reports to the team leader about problems frustrating team progress' and 'extent of competence development of the team members'. The final scale comprised nine assessment criteria (see Table 5).
In order to obtain a greater understanding of the attitudes towards factors influencing team performance in practice, exploratory in-depth interviews were held with four project managers, who were selected in view of their extensive experience (more than 10 years) as project managers of large-scale innovative projects within different kinds of organisations. They were asked to reflect on one specific team they had managed in the past, which in their opinion performed well, and on another one, which performed poorly. We asked them to carefully describe the teams, the purpose of the teams, and to come up with the criteria they applied to assess the teams' performance. Subsequently, we asked them to describe these factors that they assumed to have predictive value for team performance, resulting in a list of 26 statements that referred to criteria applied by project managers to establish team performance.
In addition, we used a survey including statements based on the various factors influencing team performance that was distilled from the literature (Cohen & Bailey, 1997; Gladstein, 1984; Guzzo & Shea, 1992; Hackman, 1987; Hackman & Wageman, 2005; Kwak, 2004; Tannenbaum, 1992; Tannenbaum et al., 1998; Salas, Stagl, & Burke, 2004). These statements comprised team composition aspects as well as team processes that lie within the sphere of influence of the team members themselves. Additionally, a number of team learning behaviours were selected (Edmondson, 1999; Kozlowski, 1998; Salas, Stagl, & Burke, 2004; Schippers et al., 2003; Tannenbaum et al., 1998; Van den Bossche, 2006; West, 1996). Table 2 contains an overview of factors influencing team performance that were selected for the survey including literature references. The influencing factors were operationalized according to 28 statements, which were included in our survey. In order to optimize the validity of our measures, we used literal excerpts of the core concepts from the literature.

Subsequently the translation-back translation method was applied (Hambleton, 1994), that is, the wording of the influencing factor statements was translated from English into Dutch and then translated back into English by an independent translator. The purpose of this double translation was to allow experts to examine both versions of the survey statements and establish conformity of meaning. In case of inconsistencies, the items were reformulated or, if necessary, eliminated.

Table 2
Factors Influencing Team Performance Selected for the Study

Team Characteristics	
A	**Team Composition Aspects:** Campion et al., 1993; Cohen & Bailey, 1997; Guzzo & Shea, 1992; Gladstein, 1984; Hackman, 1987; Hackman & Wageman, 2005; Kozlowski & Ilgen, 2006; Kwak, 2004; Tannenbaum et al., 1996.
	A1 Relative size The team is staffed to the smallest number required to accomplish work assigned (Sundstrom et al., 1990). The larger the team, the more coordination requirements.
	A2 Skills and Knowledge The degree to which skills and knowledge required to perform the task are present in the team.
	A3 Job and Organizational Tenure The level of experience with the job and the organization that guarantees a group's knowledge of standard operating procedures, and that assumes positive interaction.
	A4 Heterogeneity A good mix of people, neither too similar nor too different, with complementary knowledge and skills (Heterogeneity in knowledge, skills and experience).
	A5 Single team identity / dedication. The degree to which the team includes members that only belong to one team and belong to this team more permanently .
B	**Role clarity: Gladstein, 1984.** The degree to which the team members' behaviour is specified by routines, procedures, and prescribed roles.
C	**Goal clarity:** Gladstein, 1984. The degree in which the goal the team has to attain is clear.
D	**Interdependence:** Campion et al., 1993; Guzzo & Shea, 1992.
	D1 Task Interdependence Team members have to interact and depend on one another to accomplish the work;
	D2 Goal Interdependence The degree in which group goals and individual member goals are linked.
	D3 Outcome/Reward Interdependence The degree to which individual feedback and rewards are linked to the team's performance.

E	**Job design**: Campion et al., 1993; Hackman, 1987.
	E1 Task variety
	Each member has the chance to perform a number of group tasks. The tasks allow members to use different skills and share dull and interesting tasks.
	E2 Task significance
	The degree to which the task is significant for others.

Team Behaviours (Processes)	
F	**Leadership behaviour:** Druskat & Wheeler, 2004; Gladstein, 1984; Kwak, 2004; Kozlowski & Ilgen, 2006. The degree in which task leadership, maintenance leadership (building, strengthening and regulating group life) was realized and the extent of leadership influence on higher management (leadership influence). Furthermore, the extent to which the leader shows monitoring, feedback, coaching and influencing behaviour.

G	**Boundary management:** Campion, 1996; Gladstein, 1984; Salas, Stagl, & Burke, 2004. Managing the boundary with those groups in which interaction is required or necessary. Groups who provide inputs or absorb outputs from the group.

H	**Social interaction:** Gladstein, 1984; Campion et al., 1993; Kwak, 2004.
	H1 Workload sharing
	Every team member does a fair share of the work and contributes equally.
	H2 Team spirit (potency)
	The team believes in itself and there is much energy and a great team spirit.
	H3 Support
	Team members help each other out at work when needed.

I	**Conflict resolution:** Salas, Stagl, & Burke, 2004; Gladstein, 1984. The extent in which the team is capable of resolving interpersonal or relationship-based conflict.

J	**Participative decision making:** Campion et al., 1993; Gladstein, 1984 A decision procedure in which performance strategies are discussed and individual inputs are weighted by knowledge and skill.

K	**Team Learning Behaviours:** Van den Bossche, 2006; Campion et al., 1993; Edmondson, 1999; Gladstein, 1984 ; Kozlowski, 1998; Kozlowski & Ilgen, 2006; Salas, Stagl & Burke, 2004; Schippers et al., 2003; Tannenbaum et al., 1998; West, 1996.
	K1 Team reflexivity on process and outcomes or Meta-cognitive and Self-regulatory processing at the team level.
	The extent in which group members overtly reflect upon the group's objectives, strategies and processes, and adapt them to current or anticipated endogenous or environmental circumstances. In other words the extent to which teams use meta-cognitive skills to adapt and be self learning.
	K2 Feedback seeking.
	The extent to which the team seeks feedback on their group's objectives, strategies and processes.

	K3 (Open) Communication / information sharing and Error communication. The extent to which team members share information with each other to get the work done and communicate errors to each other, to prevent repeated errors.
	K4 Construction and co-construction of meaning and constructive conflict. Building a shared conception of a problem by a mutual process of building meaning, refining, building on or modifying the original offer, and new meanings in the collaborative work emerge that previously were not available to the group.

The four interviewees were asked to check each of these 28 statements for clarity and face validity as well as completeness in representing a list of important influencing factors of team performance. All 28 statements were accepted by all four interviewees. The two lists of statements together, consisting of a total of 54 factors (28 from literature and 26 from our interviews) (see Table 3), were used to construct our survey instrument.

Table 3
Statements about Factors Influencing Team Performance from Literature and Four Open Interviews.

Nr	*Statement*	*Influ -encing Factor *)*	*Based on litera-ture*	*Based on inter-view*
1	The supervisor shows little commitment to the team.	G		X
2	The supervisor is unclear and changeable in his assignments to the team.	C	X	
3	Decision-making by the management is slow.	G		X
4	Parties headed for by the team, such as contractors and sub-contractors, underperform.	/		X
5	The team is badly supervised.	F	X	
6	The team leader pays little attention to collaboration within the team.	F		X
7	The team leader does not warn the management enough when the team thinks it is necessary.	F		X
8	The team leader shows appreciation to the individual team members, but hardly to the team as a unit.	/		X
9	The team leader leaves little empowerment with the team. He/She him/herself decides "what and how" things have to be done.	F		X
10	The team leader insufficiently coaches the team, but instead he dictates and criticizes.	F		X
11	The team's physical circumstances are not supportive to team performance.	/	X	
12	The team has insufficient resources to perform.	A	X	
13	The pressure of deadlines is too high, which restricts the number of meetings.	K		X

14	The team has too little authority to make decisions.	J	X	
15	The team goal is unclear, with respect to for example quality requirements, deadlines and bvdget. X	C	X	
16	The team has an unclear role division.	B	X	
17	Clear procedures for decision-making are lacking in the team.	J		X
18	An unfavourable proportion of external and internal team members.	/		X
19	An improvement program is lacking.	/	X	
20	Too many conflicting personalities in the team.	A	X	
21	Many changes in the crew.	A	X	
22	The team is insufficiently focused on the team's objectives and hardly takes them into account when prioritizing their efforts.	C		X
23	The team insufficiently monitors to what extent they succeed in realizing the team goals.	K		X
24	Team members do not show commitment to collective decisions.	J		X
25	Team members do not address each other when agreements or decisions are not observed.	H		X
26	Team members do not address each other with regard to the case, but on a personal level.	H		X
27	Team members only show responsibility for their own task or thing, and only are committed to those tasks they are explicitly assigned to.	H	X	
28	Team members are not capable of thinking on the basis of disciplines as a whole. They only show respect for their own discipline.	/		X
29	Team members hardly know about each other who knows what and what they can expect of each other.	B	X	
30	The team is divided into subgroups.	I	X	
31	Team members have little interest in each other and seldom offer each other help.	H	X	
32	Personalities in the team do not match.	I	X	
33	The team members do not meet enough to properly adjust.	/		X
34	Team members hardly communicate with each other about choices they made because of their individual discipline.	/		X
35	Because the team members do not share information enough, they are not well informed about the team's situation	/	X	
.36	Team members strive to distinguish themselves from each other.	/		X
37	Team members share little knowledge and experience.	K	X	
38	The team hardly generates or implements new ideas to perform quicker, more cost efficiently or deliver more qualitative work.	K		X
39	Team members are not curious about each other ('s ideas).	/	X	
40	The team hardly ever undertakes any nice things together.	H		X
41	Team members hardly listen to each other.	K	X	
42	The team has insufficient specialist knowledge and is not capable of obtaining sufficient specialist knowledge in the team.	K	X	

43	The team shows little independence in solving problems, so problems escalated quickly. The team takes little responsibility for solving themselves.	/		X
44	The team is too slow in solving problems.	/	X	
45	Team members have or had conflicts.	/	X	
46	Team members lack trust in the sense of reciprocity for what they do and what they get from the fellow team members.	/		X
47	The team shares little interest in the (end) users. They lack commitment and care with regard to this interest.	G		X
48	The team pays little attention to the relationship with parties outside the team.	G	X	
49	The team hardly tunes in with other teams.	G	X	
50	Team members differ greatly in their level of ambition.	A	X	
51	Team members lack a shared idea about what the team can deliver.	C	X	
52	Team members lack a shared belief in the collectively chosen road.	/	X	
53	Team members do not dare to be flexible towards their colleagues when it involves their profession.	/		X
54	Collectively analyzing mistakes in the team is "not done".	K	X	

*) *For a specification of the factors influencing team performance see Table 2.*

As attitudes of team members may differ from the attitudes of team leaders and/or supervisors (Schippers et al., 2003), and in order to prevent the so-called 'common-method bias' (Doty & Glick, 1998; Podsakoff et al., 2003), different rating sources were applied in our approach. Nominally identical survey items were formulated for the distinguished categories, that is to say, team members, team leaders, and supervisors, which implies that, with the exception of their reference to one of the three rater groups, the items were the same and their aim was to measure differences in rater attitudes. Another advantage of the use of multiple sources lies in the fact that the validity of the measures is greater when respondents are instructed that their appraisals are validated against external criteria (in this case the rating by the other two parties). In our approach, instructions regarding cross-checking with the ratings of the other two parties as well as anonymity were applied to increase the validity of the results (also see Mabe & West, 1982).

Procedure

In order to identify the most frequently applied performance criteria among the three categories of raters, respondents were asked to mark each criterion they applied to assess team performance with a 'yes' or 'no'. Furthermore, we applied a six-point constant sum procedure to analyze the importance of each statement (referring to a factor influencing team performance), as is often used in customer satisfaction research (e.g., Fontenot, Henke, Carson, & Carson, 2007). The constant sum requires the respondents to distribute a fixed number of points across several items, with the most important items receiving the greatest number of points. Attributes that are not important are assigned a value of 0. The same number can be used more than once, as long as the sum of all values assigned is 6 (in our specific approach).

This straightforward method allows for easy data collection and for calculation of an importance value for each item. Moreover, it provides the researchers with assessments based on the respondents' priorities.

We agree with researchers indicating that the resultant so-called self-stated measures of importance provide validity that can only be obtained in this manner (Hanson, 1992; Hauser, 1991). Following this procedure, team members, team leaders, and supervisors were asked to assign six points to the 54 statements in the survey to indicate which factors they assumed to be the most important for influencing team performance. Our respondents were prompted to keep in mind a well-performing versus a poorly performing team that they had recently been involved in. In the instruction of the survey we carefully explained that respondents could assign all six points to just one statement, thereby indicating that they thought only one single factor was crucial in influencing team performance. On the other hand, respondents could also decide to assign one (or more) points to several statements, thereby expressing the relative importance of more than one factor.

Analysis

After the data collection was completed, eleven items that had received less than 0.5 per cent of all points were deleted. Subsequently, three researchers independently compared each of the remaining 43 statements with definitions of the factors that had been derived from the literature and categorized them accordingly. In order to ensure inter-rater reliability (Gwet, 2001), six statements that the three researchers could not agree upon in terms of whether they matched the above/mentioned definition of factors, so that they could not be categorised, were discussed in a meeting with all participating researchers. Because agreement could not be reached, the six statements were also deleted. The resultant 37 statements (constituting 69 per cent of the initial total of 54) were used for further analysis. The ratio of agreed upon classified items divided by the total number of items for each factor should be greater than .80 (see Taggar & Brown, 2001 for an insightful discussion of the minimum ratio for correct classifications, explaining the procedure applied by Latham and Wexley (1994)). However, in the study by Taggar and Brown (2001) the number of items to classify was much greater than our number of items. In our approach, a category such as 'conflict management', with two agreed items versus a total of three different items in this category, should be deleted entirely in case the .80 norm was applied. In order to warrant that categories with few items (e.g., three items) also remained if more than half the number of items (in our example two items) were agreed upon, we decided to reduce the norm to .60. Nine of the eleven factors influencing team performance complied with this inter-rater reliability norm. Table 4 shows how each of the three reviewers categorized the 37 statements as well as (in the right-hand column) the resulting final categories of factors influencing team performance.

Table 4
Categorizations of Factors Influencing Team Performance Drawn Up by Three Reviewers.

Influencing Factors from Literature (see Table 2	*Categorization Drawn Up by Researcher 1*	*Categorization Drawn Up by Researcher 2*	*Categorization Drawn Up by Researcher 3*	*Agreed upon Items*
A Team composition	12, 18, 20, 21, 50	12, 20, 21, 36, 50	12, 18, 20, 21, 50	12, 20, 21, 50
B Role clarity	16, 29	16, 29	16, 29	16, 29
C Goal clarity	2, 15, 22, 51	2, 15, 22, 51, 52	2, 15, 22, 51	2, 15, 22, 51
D Interdependence				/
E Job design				/
F Team leadership	5, 6, 7, 8, 9, 10	5, 6, 7, 8, 9, 10	5, 6, 7, 8, 9, 10	5, 6, 7, 9, 10
G Boundary management	1, 3, 47, 48, 49	1, 3, 47, 48, 49	1, 3, 43, 47, 48, 49	1, 3, 47, 48, 49
H Workload sharing / team spirit / supportiveness	25, 26, 27, 31, 36, 40	25, 26, 27, 31, 40	25, 26, 27, 28, 31, 40	25, 26, 27, 31, 40
I Conflict resolution	30, 32	30, 32, 34	30, ,36, 32	30, 32
J Participative decision making	14, 17, 24, 52	14, 17, 24, 28, 43	14, 17, 24, 34	14, 17, 24
K Team learning behaviours	13, 23, 28, 34, 37, 38, 41, 42, 43, 54	37, 38, 41, 42, 54	13, 23, 37, 38, 41, 42, 54	13, 23, 37, 38, 41, 42, 54

Note: Statements 4, 8, 11, 19, 33, 35, 39, 44, 45, 46, and 53 were deleted because they had received less than 0.5 % of all points. Statements 18, 28, 34, 36, 43, and 52 were deleted because the three researchers were unable to reach a consensus about the best-fitting category.

Results

As Table 5 shows, the most frequently applied criteria to measure team performance emerged as satisfying quality requirements, realizing the target goals, and customer satisfaction. However, the three categories of raters varied as regards the collection of criteria that are applied to measure team performance. For example, 'staying within budget' appeared to be most frequently applied by supervisors, while 'the reputation of team results' appeared to be relatively more applied by team leaders compared with the other groups of respondents. The answers of respondents on the dichotomous 'yes' or 'no' scale were analyzed conducting Chi-square goodness-of-fit tests for each performance criterion, in order to test whether the application of the criterion among the three respondent groups differed significantly. Our data showed that there was no significant difference in the application of the performance criteria between the three rater groups, except for 'extent of competence development of team members' ($\chi 2$ (df = 2, N = 70) = 9.63, $p < 0.008$). Team members appeared to be more concerned about their 'own competence development' compared with team leaders or supervisors in assessing team performance.

Table 5
Criteria to Measure Team Performance Applied Most Frequently by Team Members, Team Leaders, and Supervisors (N = 70).

Criteria to Measure Team Performance	*Based on items of Edmondson*	*Team Members*	*Team Leaders*	*Super-visors*	*All Respon-dents*
Satisfying quality requirements	Yes	27%	19%	18%	21%
Reaching the target goals	Yes	26%	22%	18%	20%
Customer satisfaction with the team's services / products	Yes	17%	18%	18%	17%
Timeliness	Yes	14%	13%	11%	13%
Extent of competence development of team members	No	6%	11%	13%	10%
Staying within budget	Yes	2%	3%	8%	6%
Complaints from external parties about team results	Yes	6%	5%	8%	6%
Reputation of team results	Yes	2%	9%	5%	6%
Number of reports to the team leader about problems frustrating team progress	No	2%	1%	1%	2%
Total		**100%**	**100%**	**100%**	**100%**

When we investigated which factors influencing team performance were perceived to be the most important ones, our respondents attributed 17 per cent of all points to the survey statements referring to 'team leadership.' As Table 6 shows, statements dealing with 'team learning behaviours' were assigned 15 per cent of all points. Similarly, 15 per cent of all points were assigned to statements dealing with 'goal clarity.' Again, each of the three groups of raters appeared to differ in their weighting of the various factors influencing team performance.

In order to further explore the variance in weighting the factors influencing team performance by the three respondent groups, a one-way analysis of variance (ANOVA) was conducted, using the respondents' ranks as assigned in the survey (also see Conover & Iman, 1981). This rank transformation approach is more robust to non-normality, and more resistant to outliers and non-constant variance compared with an approach using ANOVA without the transformation (Helsel & Hirsch, 2002, p. 177).

Our outcomes imply a difference in importance scores (based upon the six-point constant sum procedure; see more details in the procedure section) on 'goal clarity' and 'team leadership behaviour' across the rater groups at the .05 significance level ($F_{\text{goal clarity}}$ (df = 2, N = 70) = 5.043, p = .009, and $F_{\text{leadership behaviour}}$ (df = 2, N = 70) = 3.426, p = .038). Post-hoc comparisons, using the Bonferroni test on weightings of team leadership

behaviour, indicated that the mean scores on team leadership behaviour did not significantly differ among team members (M = .87, SD = .71), team leaders (M = .78, SD = .80), and supervisors (M = 1.34, SD = .78). However, post-hoc comparisons using the Bonferroni test on weightings on goal clarity, indicated that the mean score for the team members (M = 0.57, SD = .66) was significantly different from that of the supervisors (M = 1.19, SD = .92). Team leaders (M = 1.11, SD = .76) did not appear to differ significantly from either team members or supervisors in their weighting of goal clarity as a factor influencing team performance. Our analyses indicate that team members lay less emphasis on goal clarity as a factor influencing team performance, compared with their supervisors.

Table 6

Factors Influencing Team Performance Deemed the Most Important Ones by Team Members, Team Leaders, and Supervisors (N = 70).

Factors Influencing Team Performance	*Team Members*	*Team Leaders*	*Supervisors*	*All Respondents*
Team leadership	16 %	13 %	22 %	17 %
Team learning behaviours	17 %	13 %	13 %	15 %
Goal clarity	9 %	18 %	20 %	15 %
Team composition	13 %	11 %	11 %	11 %
Boundary management	11 %	8 %	7 %	9 %
Workload sharing / team spirit / supportiveness	9 %	11 %	5 %	8 %
Participative decision making	9 %	8 %	7 %	8 %
Role clarity	4 %	3 %	6 %	5 %
Conflict resolution	4 %	2 %	2 %	3 %
Total	**91 %**	**88 %**	**92 %**	**90 %**

Note: The total percentage of points is less than 100% due to the fact that statements scoring less than 0.5% of all points were deleted before the analysis.

Conclusions and Discussion

The objective of this study was to establish how team members, team leaders, and supervisors evaluate the relative importance of team performance criteria and how they perceive the relative importance of factors influencing team performance. The outcomes of our multi-rater approach support our basic proposition that those involved in teams evaluate team learning behaviours as an important influencing factor of team performance besides other factors, such as team leadership and goal clarity. In establishing the relative importance of team performance criteria, the respondents appeared to apply three criteria most frequently, that is to say: satisfying quality requirements, realizing the target goals, and customer satisfaction.

The findings of this study provide a greater insight into the attitudes of team members, team leaders, and supervisors towards rating criteria and influencing factors of team performance enhancement. According to Fishbein and Ajzen's (1980) theory of reasoned action, these attitudes can have a substantial impact on their intended and actual behaviours within the team. Although previous studies had already established correlations between team learning behaviours and team performance (e.g., Edmondson, 1999; Gibson & Vermeulen, 2003; Storm & Savelsbergh, 2005; Van der Vegt & Bunderson, 2005), to the best of our knowledge, empirical research aimed at investigating how various groups involved in teams evaluate the relative importance of team learning behaviours compared with other influencing factors on team performance has not been carried out yet.

Furthermore, attitudes towards influencing factors on team performance seem to differ among the three respondent groups, especially with regard to goal clarity. Team members perceived this factor to be less important compared with team leaders and supervisors. Our research design did not enable us to investigate the rationale behind this finding. One explanation for it may be that team leaders and supervisors are usually more involved in setting team goals than team members, possibly causing them to attach more importance to clarity of the respective goals. Moreover, poor feedback seeking behaviour of a team , which is defined as one of the team learning behaviours (Edmondson, 1999; Schippers et al., 2003) may explain why the three respondent groups showed different attitudes when they were asked for its relative importance.

When examining the differences in attitudes among the three rater groups more closely, it may be that team members attribute a relatively greater importance to factors influencing behaviour, whereas team leaders and supervisors may assume team characteristics to be of more importance (see Table 2 for detailed information on team behaviours and team characteristics). One reason for team members to focus on factors influencing behaviour in the light of team performance may be their perceived lack of direct influence of team characteristics. Team members may assume that team characteristics influence team performance more indirectly, that is, through team behaviours, for example communicating with management or external stakeholders. One reason for team leaders to focus on team characteristics may be an instrumental leadership style, aimed at short-term performance enhancement. These team leaders may assume that changing team characteristics will have a greater instant and direct effect on team performance in 'the here and now'. This may imply that they are more interested in team characteristics and neglect team learning behaviours aimed at future team performance. The different attitudes among the three rater groups reinforce our idea of using a multi-source procedure (cf., Poell, 2000; Van der Krogt & Vermulst, 2000). This is in line with previous recommendations (Edmondson & McManus, 2007; Lovelace, Shapiro, & Weingart, 2001), who advocate the use of multi-source data, internal and external to the team, to enhance the credibility of findings and for triangulation and, hence, validity purposes (Jick, 1979).

Limitations of the Study and Recommendations for Further Research

A first limitation of the present study comprises its relatively small sample size (70 team members, team leaders, and supervisors from eight organizations in the Netherlands). Research using larger samples is required to investigate the extent to which our findings can

be generalized to other occupational settings and/or other countries. Further research is also required to better understand the generalizability of the conclusions regarding the different attitudes among several respondent groups. Besides, more empirical research in this area is needed to clarify the reasons underlying the differences among raters. Future work should also focus on determining differences in subjective as well as in objective performance ratings across tasks, and across different types of teams (for instance, operational versus project teams).

A second limitation lies in the fact that all data were collected at one point in time, that is to say, the study is cross-sectional. Research using multi-wave designs can provide more specific information about the stability and change of the variables, and about cross-lagged relationships (i.e., over time) compared with our cross-sectional approach (De Lange, 2005; Taris & Kompier, 2003). In order to further address this question, a longitudinal research design will be required. Nevertheless, we think that our results are significant and provide good challenges for future research and cross-validation in different settings and countries.

Implications of the Study

Our study adds to the team learning and performance debate by investigating how various types of raters that are highly involved in teams evaluate the relative importance of team learning behaviours compared with other team performance enhancing factors. A strong point of the present approach is that we collected attitudinal data from three different types of raters (team members, team leaders, and supervisors) in order to better understand perceptual differences. Besides obtaining a greater insight into the rationale behind the fact that the three types of raters adopted different attitudes (already mentioned above), further research should focus upon the relationship between the various components comprising team learning behaviours on the one hand (predictors), and team performance (outcome variable) using validated measurement scales on the other hand.

In terms of practical implications, our study shows the different attitudes that may result in different behaviours of those involved in teams. Our findings can help stakeholders in working organizations to understand how team members, team leaders, and supervisors think about ways to enhance team performance in view of their different ideas about team performance criteria and factors influencing team performance. An increased awareness as regards these differences may help the stakeholders to tailor their efforts towards increased team learning and to improve team performance.

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Chapter 3:
The Development and Empirical Validation of a Multi-Dimensional Measurement Instrument for Team Learning Behaviors[2]

The importance of teamwork to organizational success in today's economy has been emphasized in literature for well over a decade. Effective teamwork can only be sustained, however, if it is supported by a process of team learning. Following Edmondson (1999), we regard team learning as a group process comprising several concrete learning behaviors. The aim of this paper is to report on the development of a conceptual framework and its operationalization into a measurement instrument for behaviors associated with team learning. A better understanding of these distinctive behaviors and their impact on team performance may help to tailor interventions aimed at improving team performance. Based on a survey among 19 operational teams in the Dutch banking sector, we validated a multi-dimensional instrument for team learning behaviors. To prevent common-method bias, we used a multi-rater approach with two respondent groups, namely, team members and leaders (representing the insiders of the team), on the one hand, as well as supervisors (representing the external stakeholders of the team), on the other hand. The data indicated a positive relationship between several team learning behaviors and team performance, and partly confirmed our theoretical model.

In professional as well as in academic publications (Banker, Field, Schroeder, & Sinha, 1996; Drucker, 2003; Glassop, 2002; Pfeffer, 1994), the importance of teamwork for organizational success in today's economy is emphasized continually. Teams are expected to enable increased adaptability, productivity, and creativity compared to what individual employees can offer. They are also believed to provide more innovative and comprehensive solutions to complex organizational problems (cf., Beers, 2005). However, empirical research has demonstrated considerable variance in team performance (e.g., Hackman, 1987). An important question, therefore, is how this variance in team performance can be explained.

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A vast body of empirical research on variables influencing team performance is available (Kozlowski, & Ilgen, 2006; Salas, Cooke, & Rosen, 2008; Salas, Stagl, Burke, & Goodwin, 2007). Although we do not deny the influence of the team context, such as support from the management and other organizational characteristics (e.g., Anderson & West, 1998; Edmondson, 1999), we believe that team performance mainly depends on the way teams cope with the challenges they meet given the nature of the team task. Therefore, in this paper we focus on team characteristics and processes or behaviors that can be changed by the team itself. These variables comprise team characteristics, such as diversity among team members (e.g., Schippers, Den Hartog, Koopman, & Wienk, 2003) and task interdependence (e.g., Van der Vegt, 1998), team behaviors, such as team leadership behaviors (e.g., Arnold, Arad, Rhoades, & Drasgow, 2000; Shivrastava, Bartol, & Locke, 2006), and team learning behaviors (e.g., Edmondson, 1999; Edmondson, Dillon, & Roloff, 2007).

In our approach, team learning behaviors have been singled out as one of the main influencing factors of team performance (e.g., Argote, Gruenfeld, & Naquin, 2001; Edmondson, 1999). Savelsbergh, Van der Heijden, and Poell (2007) conducted a study into the attitudes of team members and leaders towards factors deemed important to team performance and found that respondents highly agreed about the importance of team learning behaviors (besides team leadership and goal clarity). Similarly, other scholars investigated the relationship between team learning behaviors and team performance and demonstrated that they are positively associated (see for instance Edmondson, 1999, 2002; Lutz, 1994).

Although previous research has pointed out that team learning is positively related with team performance, some contradictory findings have been reported as well, concluding that team learning can also have a detrimental influence on team performance in the short run (e.g., Bunderson & Sutcliffe, 2003). These contradictory findings call for further research into the circumstances under which team learning behaviors promote or hinder team performance. It might be, for example, that team learning behaviors have either positive or negative effects on team performance depending on the development phase of the team or on the type of learning behaviors involved.

With the present study we aim to validate a newly developed instrument to measure team learning behaviors. The instrument is intended to get a better understanding of the behaviors that comprise team learning, and that may vary in their influence on team performance. Most studies on team learning behaviors used a uni-dimensional measurement instrument, or focused on only one aspect or type of team learning behavior. In this study we used previously validated instruments measuring various distinctive team learning behaviors, and operationalized team learning as a multi-dimensional construct. Furthermore, we will report the outcomes of a survey among 19 operational teams within the Dutch banking sector. The empirical part of our contribution aims to validate the newly developed measurement instrument and to examine to what extent the variance in team performance is explained by team learning behaviors.

Theoretical Background

Team Learning

A team can be defined as "a distinguishable set of two or more people who are assigned specific roles or functions to perform dynamically, interdependently, and adaptively toward a common and valued goal/object/mission, who have each been assigned specific roles or functions to perform, and who have a limited life span of membership" (Salas, Dickinson, Converse, & Tannenbaum, 1992, p. 126).

Learning is a concept that is not easy to define. In this study we refer to learning as a verb instead of an outcome, which is apparent in the following definition: "learning comprises the process of acquiring knowledge through experience, which leads to a change in behavior. It is not the acquisition of knowledge, but the application of knowledge through doing things differently in the world" (Buchanan & Huczynski, 1997, p. 107).

Studies on team learning employ a variety of terms, concepts, and methods. In the review of perspectives on team learning in previous empirical research, Edmondson et al. (2007) identified three distinct areas of research that provide insight into how teams learn. The first area concentrates on team learning curves. The common theme in this tradition comprises testing and explaining differences in rates of improvement within teams. The second area focuses on the relationship between team cognitive systems and team task performance. Team learning is regarded as an outcome of communication and coordination that builds shared knowledge among team members about their team, task, resources, and context. The third area conceptualizes team learning as a group process rather than as an outcome. Studies following this tradition examine learning processes in teams, and how these are affected by managerial and contextual factors and, in turn, affect team performance. The present study follows the third research tradition, wherein team learning is measured in terms of team behaviors and activities. As such, team learning behaviors are examples of a "group action process" (Marks, Mathieu, & Zacarro, 2001) which are not directly aimed at performance outcomes of the team but at learning "how to play the game together. In previous studies, scholars have discerned various team learning behaviors (Argyris & Schön, 1978; Edmondson, 1999; Gibson & Vermeulen, 2003; Kasl, Marsick, & Dechant, 1997; Van der Vegt & Bunderson, 2005) that all appear to refer to an ongoing process of collective reflection and action.

Kasl et al.'s (1997) behavioral description of the learning process, which is a process of framing and reframing, begins with the act of framing the team's initial perception of a situation or actions, based on prior experience (Burke, Salas, & Diaz, 2008). Through interaction with other team members, by means of experimentation and boundary-crossing, team members listen to others' perspectives and use this information to examine their own perceptions in a different light. According to Kasl et al., it is through active boundary-crossing dialogue and inquiry that individuals are able to adjust and reframe their own cognitive frameworks. While the actions of experimentation and boundary-crossing provide the impetus for reframing, actual learning at the team level only occurs when reframing consists of dialogue in which team members are not "only" willing to listen to the perspectives of others, but also to integrate and share these views, thus turning learning into a collective process.

Similar learning behaviors are discerned by Kolb (1984) in his experiential learning cycle whereby knowledge is created through the transformation of experience. Behaviors in this theoretical framework are expressed as a four-stage cycle of learning in which "immediate or concrete experiences" provide a basis for "observations and reflections." The latter are assimilated and distilled into "abstract concepts" producing new implications for action which can, in turn, be "actively tested" creating new experiences. According to Kolb this process ideally represents a learning cycle or spiral where individuals or teams "touch all the bases" (Kayes, Kayes, & Kolb, 2005) (i.e., a cycle of experiencing, reflecting, thinking, and acting). More concretely, exploring immediate or concrete experiences leads to observations and reflections. These reflections are then assimilated (absorbed and translated) into abstract concepts with implications for action, which a team can actively test and experiment with, which in turn enables the creation of new experiences.

In this study, we adhere to the definition of team learning adopted by Edmondson (1999). According to Edmondson's definition, team learning is an ongoing process of collective reflection and action characterized by: (1) exploring; (2) reflecting; (3) discussing errors and unexpected outcomes of actions; (4) seeking feedback; and (5) experimenting within and as a team. This definition describes several distinct and concrete learning behaviors. Edmondson stated that through these team learning behaviors learning is enacted at a group level. For example, for a team to discover gaps in its plans and to make changes accordingly, team members ought to test assumptions, for example about their context, and discuss differences of opinion openly, rather than privately or outside the group.

We aim to develop a measurement instrument that distinguishes among these various learning behaviors in order to shed more light on their separate effects on performance outcomes (Edmondson, Bohmer, & Pisano, 2001; Gibson & Vermeulen, 2003; Kasl et al., 1997). Therefore, we categorized the team learning behaviors into five concrete learning behaviors based on Edmondson's (1999) definition as described above. Other authors "zoomed in" on one or two of these specific behaviors and came up with more specific conceptualizations that we took as a starting-point to elaborate on each team learning behavior as mentioned in Edmondon's definition. Descriptions of the team learning behaviors in this study are summarized in Table 1.

Table 1
Definitions of the Expected Distinctive Team Learning Behaviors (based upon Edmondson, 1999)

Expected Distinctive Team Learning Behaviors	
1.	Exploring and co-construction of meaning: conversational actions of team members to share knowledge, opinions, perspectives, and constructively managing differences in opinion (elaborated definition based on Van den Bossche et al., 2006).
2.	Collective Reflection: collectively look back or ahead on experiences, goals, actions, working methods, strategies, and assumptions to discuss; eventually aimed at adapting working methods, strategies, or assumptions (elaborated definition based on Schippers et al., 2003).
3.	Error management: discussing errors collectively and exploring how to prevent them (elaborated definition based on Van Dyck, 2003).
4.	Feedback behavior: seeking and analyzing feedback internally among team members and externally from outsiders to the team; in order to measure whether the team is doing the right things and doing things right; drawing conclusions that lead to further exploration or experimentation, or to adaptations in goals or assumptions (elaborated definition based on Schippers et al., 2003).
5.	Experimenting: collectively doing things differently than before and measuring differences in outcome (elaborated definition based on Van Woerkom, 2003).

Team Performance

Conventionally, team performance or team effectiveness is seen as a combination of task performance and team (or group) viability (e.g. McGrath, 1984; Sundstrom, Demeuse, & Futrell, 1990). Hackman (1987) provides an even broader definition by expanding team viability into two separate constructs: (1) maintaining the ability of team members to work together again in the future; and (2) satisfaction of group members' needs. Since each work team always has a particular performance purpose, we align our focus with Hackman's concept of task performance, as the degree to which a team meets its goals and how well its output fulfils the team's mission (cf., Bushe & Coetzer, 2007).

A second justification for our decision to focus upon task performance lies in the fact that we intend to compare team performance as perceived by two different rater groups: the first group consisting of the team members and their respective team leaders, and the second group consisting of the supervisors of the teams. The so-called multi-source performance measurement approach (Smither, London, & Reilly, 2005) requires assessment criteria that are deemed vital to both categories of respondents. Savelsbergh et al. (2007) showed that team members, team leaders, and external supervisors share a common focus on criteria that indicate task performance. Following other studies on team performance (Kozlowski & Ilgen, 2006; Mathieu, Maynard, Rapp, & Gilson, 2008; Salas et al., 2008), we intend to investigate the team's general work performance as compared to that of other teams, using a relatively broad measure (De Jong, Van der Vegt, Molleman, & Bunderson, 2007; Kozlowski & Ilgen, 2006; Salas et al., 2008).

The Relationship between Team Learning Behaviors and Team Performance

To validate our multi-dimensional conceptualization and its operationalization into the team learning behaviors' measures, the present study examined their impact upon team performance. Research has suggested that team learning behaviors relate to team performance (Argote et al., 2001; Edmondson, 2002; Lutz, 1994; Schippers et al., 2003; Van den Bossche, Gijselaers, Segers, & Kirschner, 2006; Van Dyck, 2000; Van Woerkom, 2003), we know that team learning behaviors relate to team performance. Specifically cross-functional teams, wherein team members need to adopt an inquiry orientation to ask other team members questions and to explain their own positions, have been found to help integrate the diversity of viewpoints and translate these into better products or services (Edmondson & Smith, 2006; Garvin & Roberto, 2001). A possible explanation might be that when team members work to understand and reconcile contrasting ideas and methods used, each member gains a better understanding of the whole product and process by viewing it from different perspectives (Brown & Eisenhardt, 1995). This heightened understanding may promote new solutions and methods while reducing the drawbacks of individual ideas.

A previous cross-sectional study by Bunderson and Sutcliffe (2003) suggests that team learning orientation can relate both positively and negatively to team performance. Based on their findings, they argue that team learning orientation can enhance team adaptive behaviors and overall team performance in the long run, although, in the short run an extreme focus on learning and competence development can impair performance. Another indication of the rather complex relationship between team learning behaviors and team performance can be taken from Edmondson (1999) on "real" work teams, wherein the construct of team learning behaviors was identified as a mediator between team psychological safety and team performance.

Methods

Sample

The sample that was selected to test the psychometric qualities of the measurement instrument consisted of 119 team members and leaders (92 responded resulting in a response rate of 77 per cent), and 19 supervisors (100 per cent response rate) from 19 customer service teams in a Dutch banking organization. In order to warrant the reliability of our data, teams with the response rate below 50 per cent were excluded. Complying with this constraint, none of the 19 teams dropped out of the analyses. The team size ranged from three to ten team members ($M = 6.3$; $SD = 1.7$). The 58.7 per cent of team members and leaders in the sample were male and their mean age was 42.5 years ($SD = 10.4$). Among them, 48.9 percent of participants had more than 9 years work experience. From this outcome one may assume that the participants were able to assess their team skills critically, and therefore enabling us to assess the relationship with performance accurately.

Each team interacted with clients who have business or private accounts with regard to their banking and insurance arrangements. It includes insurance and investments experts, account managers, and back office support staff. An account manager was responsible for client communication. Back-office specialists and staff supported the account manager in

their specific areas of expertise. To satisfy client expectations the account manager and back office specialists and staff are mutually interdependent. The account manager needs information from the specialists and the staff to communicate to the client, and the specialists and staff need information about the client to give useful and timely advice to the account manager. Due to this high task interdependence, learning is expected to be highly important to them, and the participants are assumed to be motivated to learn and to correct themselves as a team in order to perform well.

The teams were to some extent self-managing and team members set up their own work processes and schedules, division of labor, and methods for integrating and coordinating individual task contributions. Each team reported to a supervisor, who is responsible for several teams. Supervisors were asked to complete the survey for only one of their teams to avoid unreliable data as a result of the effects of training or fatigue from completing the survey for all the teams they were responsible for.

Data Collection

The data collection aimed at testing the convergent and discriminant validity of the instrument as well as the examination of its predictive validity took place during the winter of 2006. All team members and team leaders were asked to complete a questionnaire that measures the team's learning behaviors and its performance. At the same time, the supervisor of each team, being a relative outsider to the team, was asked to fill out a sub set of the questionnaire, measuring his or her perception of the team's performance. Nominally identical versions of the scales were used: one team member/team leader version, and one supervisor version. The supervisor version contained amended items measuring their perception of performance of the team. This multi-rater approach to measuring team performance was used in order to avoid the common-method bias that hampers self-assessments of performance by team members only (Doty & Glick, 1998; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Development of the Measurement Instrument for Team Learning Behaviors

In constructing, refining, and validating our measurement instrument for team learning behaviors we followed Van der Heijde and Van der Heijden (2006)'s steps (see table 2).

Table 2

Overview of the Development Process of the Measurement Instrument for Team Learning Behaviors

Steps in the Development Process	
1.	Relevant theoretical literature was analyzed to conceptualize and defined team learning behaviors as a multi-dimensional construct.
2.	Provisional determination of dimensions of team learning behaviors.
3.	Items were formulated for the different behaviors (if possible using existing scales), leading to an item pool for each behavioral dimension.
4.	A thorough linguistic evaluation of the different items was performed, following the translation/back-translation methodology (Hambleton, 1994), from English to Dutch.
5.	The introductory paragraph and clear instructions for the respondents were formulated.

The instrumental utility of an operationalization comprises its validity, accuracy (reliability), and efficiency. It reflects how useful or how valuable the operational definition is in its aim to represent the concept as intended in a certain research context (De Groot, 1961). In the first step of our approach, we thoroughly analyzed relevant theoretical literature and aimed for a valid and sound conceptualization. In line with Edmondson's (1999) definition of team learning behaviors (as described in the theoretical background), we defined team learning behaviors as a multi-dimensional construct consisting of five behavioral dimensions, namely: (1) exploring and co-construction of meaning; (2) reflecting; (3) discussing errors and unexpected outcomes of actions; (4) seeking feedback; and (5) experimenting within and as a team. In developing the instrument we regarded the five dimensions of the construct as a set of five instruments (De Groot, 1961). Step two (provisional determination of team learning behaviors), and step three (item formulation for the different behaviors) led to an item pool for each behavioral dimension. In the process of item formulation for each team learning dimension, our strategy consisted of elaborating upon previous research on the specific dimension. In the last part of this section we explain which previous research was used to further deepen the definition of each dimension. Additionally, we chose to use, if available, existing validated instruments to measure each of these dimensions and supplemented them where necessary. The scales used as a start in our initial instruments contained six to eleven items each. Following the translation/back-translation methodology (Hambleton, 1994), from English to Dutch, a thorough linguistic evaluation of the different items was performed (Step 4), followed by formulating the introductory paragraph and clear instructions for the respondents (Step 5). To obtain a valid, yet parsimonious, representation of the concept of team learning behaviors, we examined the different items, as regards both their content and their psychometric qualities.

In the remainder of this sub section we describe the content of each of the five initially defined dimensions of the team learning behaviors instrument based on previous research and existing instruments. The final instrument, containing all dimensions of our team learning behaviors' concept, comprises 50 items in total. The survey instructions were formulated so as to guide the participants to respond to the questions from a team perspective, using a five-point rating scale ranging from (1) "never" to (5) "always".

Exploring and co-construction of meaning

The first team learning behavior, exploring and co-construction of meaning, matches the work by Van den Bossche et al. (2006) who developed a nine-item scale on construction and co-construction of shared knowledge and opinions. Van den Bossche et al.'s concept concentrates on the interaction processes that construct and co-construct shared mental models in teams, wherein perspectives of team members are integrated, and which help the team to exploit the cognitive capabilities of the entire team (cf., Klimoski & Mohammed, 1994). An example item is: "Team members listen carefully to each other." We added three items to the original 9-item scale in order to cover the full range of our team learning behaviors dimension. Especially, different perspective taking, curiosity, and testing assumptions were, in our opinion, not fully covered by the instrument of Van den Bossche et al. (2006). First, we added a self-constructed item based on Van Offenbeek and Koopman's (1996) divergent sensemaking scale ("We encourage each other to look at our work from different perspectives"),

in order to capture different perspective taking. Second, we added an item to incorporate being curious about each other's opinions in our list. This item was taken from the Dimensions of the Learning Organization Questionnaire (DLOQ; Watkins & Marsick, 1998), namely: "If a team member gives his/her opinion he/she subsequently asks for the opinion of the others." Third, we added one item from Edmondson's (1999) team learning scale about discussing assumptions: "People in this team often speak up to test assumptions about issues under discussion."

Collective reflection

The second team learning behavior, collective reflection, was measured using the eleven-item short version of Schippers et al.'s (2003) reflexivity scale, supplemented with two items from Edmondson's (1999) team learning scale as these items express the team's attitude to reflection. Schippers et al. adhere to the definition of West (1998) on reflexivity at the team level, which is the extent to which group members overtly reflect on, and communicate about the group's objectives, strategies, and processes, and adapt these to current or anticipated circumstances. A sample item from Schippers et al.'s scale is: "In this team the results of actions are evaluated," and an example item from Edmondson's scale is: "In this team, someone always makes sure that we stop to reflect on the team's work process."

Error management

The third team learning behavior, error management, was measured using nine items from the Error Culture Questionnaire (Van Dyck, 2000; Van Dyck, Frese, Baer, & Sonnentag, 2005), which focuses on analyzing and communicating errors. This scale was developed and validated for common organizational practices. We adapted the items to refer specifically to team practices and instructed participants to rate the extent to which each statement applies to the people in their team in general. Examples of items are: "After an error has occurred, it is analyzed thoroughly within the team," and "When a team member makes a mistake, (s)he shares it with the others so that they don't make the same mistake."

Feedback behavior

The fourth team learning behavior, feedback behavior, was measured using a nine-item scale, consisting of five items from Schippers et al. (2003), supplemented with three items from Edmondson (1999), and one item from Van Offenbeek and Koopman (1996). We chose items from three existing scales because they seemed complementary, and we wanted to measure the full range of feedback seeking behavior in the team. Schippers et al.'s scale was constructed to assess the extent to which team members actively seek feedback on their method of working. A sample item is: "We seek feedback on our methods." The three items from Edmondson's scale on team learning explicitly assess the external feedback process. A sample item is: "Team members go out and get all the information they possibly can from others – such as customers, or other parts of the organization." The one additional item from Van Offenbeek and Koopman scale is: "In my team we give each other feedback."

Experimenting

The fifth learning behavior measure, experimenting, was based upon Van Woerkom's (2003) seven-item scale on individual experimentation, being a sub-scale of her critically-reflective work behavior construct. We adjusted the items pertaining to individual perceptions in order to address team behaviors. Examples of items are: "We experiment with other working methods," and "We plan to try out new working methods." Finally, survey instructions were needed because survey items had been formulated to measure individual perceptions of team-level constructs, for example: "In this team the results of actions are evaluated."

Testing the Predictive Validity of the Instrument

To demonstrate the predictive validity of the multi-dimensional team learning behaviors instrument in the light of team performance, Structural Equation Modeling (SEM) was tested using self-assessed (by the team members and the team leaders) team performance. To prevent common-method bias we examined the relationship between team performance as assessed by the team members and their leaders, and team performance as assessed by supervisors, using Pearson's product-moment correlation coefficient (PPMCC) (a PPMCC > .50 is characterized as satisfactorily strong) (Pallant, 2007). To analyze the predictive validity of our team learning instrument on team performance, team performance assessments by team members and team leaders, instead of team performance assessments by the supervisors are used.

Team Performance was measured using eight items. Our scale comprised five items from the performance scale used by Edmondson (1999) supplemented with three items based on the work by Savelsbergh et al. (2007). A sample item is: "This team meets or exceeds its customers' expectations." A five-point Likert scale was used with scale anchors ranging from "completely disagree" to "completely agree."

Furthermore, we measured *Task Interdependence* to characterize the teams in our sample using three items of Campion (1993). A sample item is: "To do my work well I need input of my team members." A five-point Likert scale was used with scale anchors ranging from "completely disagree" to "completely agree."

Analyses

In this section we report on the refinement process of the measurement instrument for team learning behaviors, and on the predictive validity testing of team learning behaviors in the light of team performance. Data analysis comprised several stages. First, data screening was conducted to identify and to establish: (a) missing data; (b) univariate normality and potential outliers; and (c) bivariate linearity, normality, and potential outliers associated with the hypothesized correlations. Linear regression plots were examined in order to test whether the assumptions were violated, which appeared not to be the case.

Second, Principal Component Analysis (PCA), using oblique rotation, was conducted on each of the initial five learning behaviors scales (ranging from seven to thirteen items) that were part of our survey. Scree plots and Eigenvalues were used to identify distinct variables or dimensions (Rummel, 1970) within each of these five learning behaviors scales. Oblique rotation (using Oblimin) was used instead of an orthogonal rotation, since we expected the variables under study to be mutually related rather than fully independent (Kline, 1994).

Subsequently, Confirmatory Factor Analyses (CFAs) using the AMOS 6.0 program (Arbuckle, 2006) were conducted aimed to test the validity of each scale separately.
Because we used scales from several authors to measure the various team learning behaviors, some overlap between these measurement instruments could be expected. Therefore, in a third step, the distinct variables (dimensions) that resulted from the CFAs were carefully reviewed to check if a possible overlap between them could be explained on the basis of face validity. For instance, some overlap between the scales for reflection and feedback behavior could occur in case items from both scales refer to reflection processes. Furthermore, overlap between the scales for Error Management and Feedback Behavior could occur in case items from both scales refer to error analyses processes. Factor analyses on both pairs of possibly overlapping scales were conducted to verify the distinctness of the underlying dimensions. Subsequently, the remaining underlying dimensions from each factor analysis were re-tested using CFAs.

Survey items with loadings of .4 or higher were used in subsequent analyses, while items with cross-loadings higher than .3 were excluded from further analyses (Field, 2000; Pallant, 2007). In order to increase scale validities, badly differentiating items were eliminated. The CFAs and elimination procedure resulted in a final measurement instrument comprising 28 items, divided across eight discernable dimensions of team learning behaviors (see Appendix A for the complete set of 28 items). The eight remaining team learning behaviors scales all consisted of three to four items (see Table 3 for specific details).

Table 3

Adapted Definitions of the Distinctive Team Learning Behaviors after Factor Analysis

New definitions of team learning behaviors	*Item example*	*Cronbach's alpha*
1. Co-construction of meaning: mutual conversational actions of team members by refining, building on, or modifying the original offered meaning in some way to come to "new" meanings in the collaborative work that were not previously available to the team (from "co-construction of meaning" of Van den Bossche et al., 2006).	Information of team members is completed with information of other team members.	.75
2. Exploring different perspectives: conversational actions of team members to explore, share knowledge, opinions and different perspectives (from "construction of meaning" of Van den Bossche et al., 2006).	If a team member gives his/her opinion he/she subsequently asks for the opinion of the others.	.79
3. Error analysis: discussing and analyzing errors collectively to prevent them (from Van Dyck, 2000).	After making a mistake, we try to analyze what caused it.	.80
4. Error communication: sharing errors collectively to prevent them (from Van Dyck, 2000).	Team members communicate their mistakes, to prevent that others make the same mistake.	.87
5. Reflection on processes: collectively discuss the team goals, assumptions, working methods and strategies, checking: Is the team doing the right things and doing things right? (from Reflexivity on processes, Schippers et al., 2003)	We often discuss our team's work methods.	.83
6. Reflection on outcomes: collectively look back or ahead on experiences and actions (for example by feedback or communicated errors) to evaluate and learn from them (from Reflexivity by evaluating/learning, Schippers et al., 2003).	In our team we check what we can learn from accomplishments.	.83
7. Feedback seeking behavior: seeking feedback internally among team members and externally from outside the team in order to reflect (from Schippers et al., 2003).	We analyze our performance in accordance with other teams.	.71
8. Experimenting: collectively doing things differently than before and measuring differences in outcome (from Van Woerkom, 2003).	We experiment collectively with other working methods.	.80 *

* EFA using the scales for (1) Exploratory questioning and co-construction of meaning, (2) Reflection, and (3) Error Management revealed that these behaviors comprised more than one factor. Elimination of badly differentiating items and CFAs of each of these behaviors as second-order models, resulted into splitting up each of these behaviors into two separate factors. For example Exploratory questioning and co-construction of meaning fell down into (1) Co-Construction Meaning and (2) Exploring different Perspectives.

Subsequently, a CFA was performed to test whether the remaining distinctive learning behaviors could be captured in a suitable model for the team learning behaviors' concept. Given its acceptable fit, the resulting single second-order factor solution (Chen, Sousa, & West, 2005) showed that the convergent and discriminant validity for the separate scales of distinctive learning behaviors (within the framework of the overall team learning behaviors concept) was satisfactory. Finally, the face validity was checked by submitting the resulting final set of 28 items (representing eight factors) to a panel of three concept experts. These experts all held a Ph. D. degree and had more than five years of research experience in the domain of organizational behavior in work and project teams. They approved our final constellation of factors in the model, and herewith supported the validity of our newly developed measurement instrument for team learning behaviors.

Fourth, the internal reliabilities measured by means of Cronbach's alpha for each of the team learning behaviors' scales and for the team performance measure were calculated using the entire sample of team members and team leaders (N = 92).

Fifth, to test whether it is allowed to assume that team performance, as perceived by team members and leaders, is highly correlated to team performance as perceived by supervisors, we examined the PPMCCs. A strong correlation ($r > .50$; Pallant, 2007) would allow us to conclude that there is no significant difference between the perceptions of team performance by team members and leaders, and team performance as perceived by supervisors. The mean score for all items filled out by the team members and the team leaders was used to compute the self-measure for team performance.

Finally, we examined the relationship between the independent variable (team learning behaviors as perceived by the team members and their leaders), and the dependent variable (team performance as perceived by the team members and their leaders) using Structural Equation Modeling (SEM, Arbuckle, 2006). SEM was chosen specifically for this investigation because of its capacity to handle complex models with measurement error, and observed and latent variables (Aragon & Gesell, 2003). By explicitly estimating and isolating the measurement error in observed variables, SEM reveals true variance and its related effects upon variables in a model. Moreover, it facilitates testing whether the hypothesized model fits, that is to say, whether it is supported by the empirical data.

Results

Descriptive Measures

Table 4 presents the means, standard deviations, and correlations among all variables under study. It also contains information on scale reliabilities and the number of items.

Table 4

Means, Standard Deviations, Reliability Coefficients, and Correlations between the Model Variables (N = 92).

	Items	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1 Co-Construction Meaning	3	4.19	.54	.75								
2 Exploring different Perspectives	4	3.95	.60	.47**	.79							
3 Error Analysis	4	3.61	.65	.22*	.30**	.80						
4 Error Communication	4	3.61	.72	.32**	.46**	.46**	.87					
5 Reflection on Process	4	3.10	.76	.10	.35**	.25*	.43	.83				
6 Reflection on Outcomes	3	3.59	.75	.28**	.36**	.28**	.36**	.16	.83			
7 Feedback Seeking	3	3.05	.76	.20	.34**	.38**	.43**	.37**	.46**	.71		
8 Experimenting	3	3.12	.74	.12	.29*	.35**	.35**	.39**	.24*	.30**	.80	
9 Performance as perceived by Team members	9	3.80	.50	.41**	.46**	.25*	.26**	.08	.23*	.21*	.12	.81

*p < .05, two-tailed. **p < .01, two-tailed.

(Crohnbach's in italics on the main diagonal)

Although many of the team learning factors are moderately correlated, with .47 being the highest correlation between two factors, multicollinearity seems not to be a problem in this study. Type II error rates tend to be quite small, when multicollinearity is between .04 and .05, except when the reliability is weak, which is not the case in our study (Grewal, Cote, & Baumgartner, 2004).

Moreover, our results indicated that task interdependence in our sample was considerably high, herewith supporting our assumption that team learning is important for the teams in our sample (M = 3.90; SD = 0.62).

As a result of the refinement process described in the analysis section, we decided to break down the initially hypothesized five learning behaviors into eight distinct team learning behaviors (for more details see Table 3). In order to test the fit between the model and the data, the traditional Chi-squared value, the goodness-of-fit index (GFI), and the sample Root Mean Square Error of Approximation (RMSEA) were calculated. As a rule of thumb, a GFI value equal or larger than .90 and the RMSEA value equal or smaller than .08 indicate a reasonable fit between the model and the data (Browne & Cudeck, 1993). Additionally, PCLOSE, which is a p-value for testing the null hypothesis that the population RMSEA is no greater than .05, was determined (Arbuckle, 2006). If the RMSEA is equal or greater than .05 the null hypothesis is rejected indicating a lack of close fit. Because the GFI and the RMSEA are dependent upon size, as recommended by Marsh, Balla, and Hau (1996), the Non-Normed Fit Index (NFI), and the Comparative Fit Index (CFI) were also examined. These indices should have values of .90 or higher (Hoyle, 1995).

The second-order Confirmatory Factor Analysis (CFA) for the remaining eight dimensions of team learning behaviors (consisting of 28 items) indicated a single second-order factor solution with an acceptable fit ($\chi 2 = 365.38$, df = 325, p = 0.06; NFI = .76, CFI = .96, RMSEA = .04. PCLOSE = 0.86). See Figure 1 for more specific information.

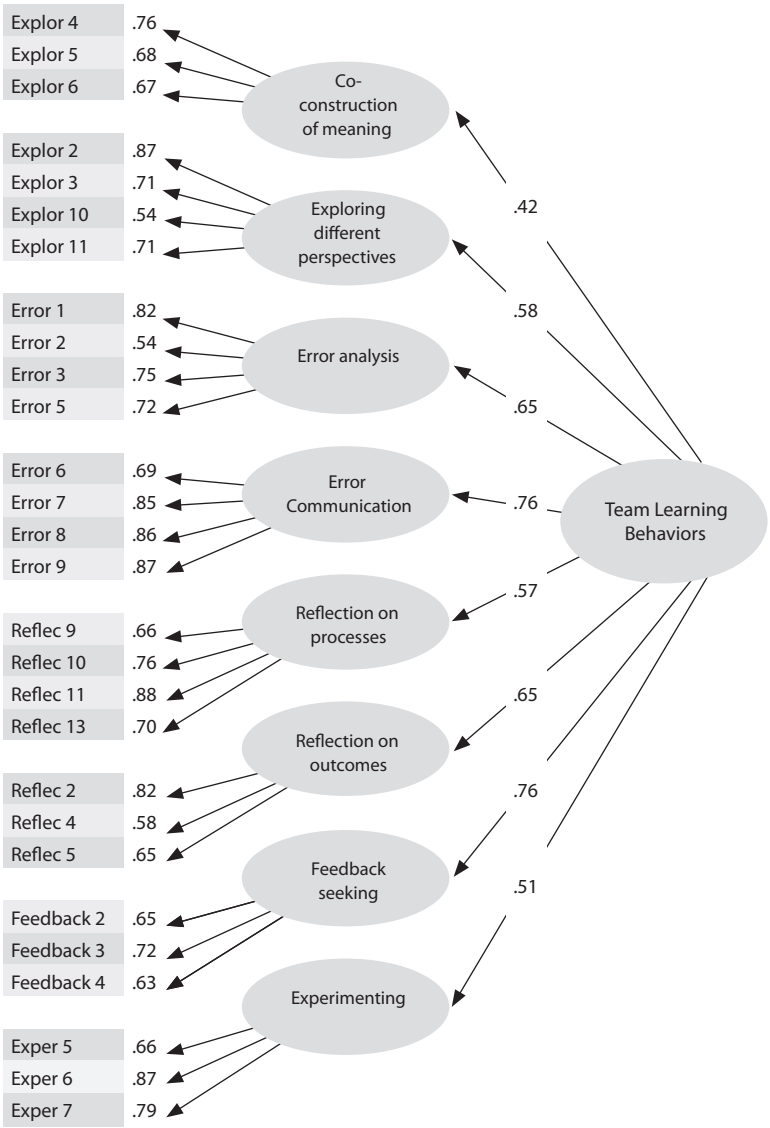

Figure 1: Second-order CFA of team learning behaviors

The analysis testing the correlation between the perceptions of team performance as assessed by the team members and leaders and the perceptions by the team supervisors, indicated that they were quite significantly correlated ($r = .50$, $N = 19$, $p < .01$) (see Table 5).

Table 5

Performance assessed by Supervisor (Outsider of the Team) and Performance assessed by Team Members and Leader (Insiders of The Team).

Descriptive Statistics

	M	*SD*	*N*
Team Performance by Supervisor	3.80	.60	19
Team Performance by Members	3.80	.50	92

Correlations

		Team Performance by Supervisor	*Team Performance by Members*
Team Performance by Supervisor	Pearson Correlation	1	.50
	Sig. (2-tailed)		.00
	N	19	92
Team Performance by Members	Pearson Correlation	.50*	1
		Sig. (2-tailed)	.00
	N	92	19

* Correlation is significant at the 0.01 level (2-tailed).

This high correlation makes it plausible to assume that team performance as perceived by team members and leaders is highly similar to the team performance as perceived by the supervisors. Because the number of supervisors that rated the teams was relatively small ($N = 19$), in order to maximize the power of our model testing, we decided to use team performance as perceived by team members and their leaders ($N = 92$) for our further analyses. The outcomes of the model that visualizes the test of the relationship between team learning behaviors and team performance is depicted in Figure 2. For sake of readability, the covariances and errors are not shown.

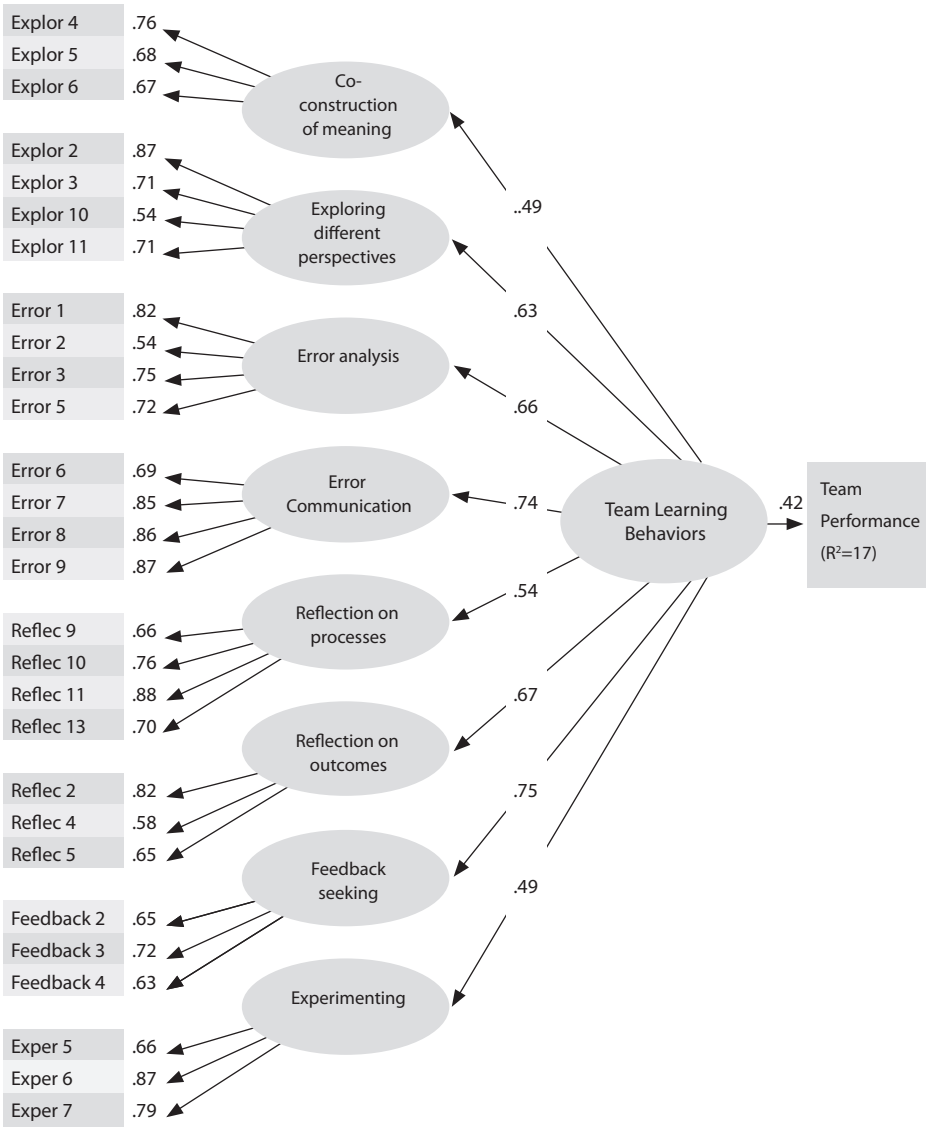

Figure 2: Relationship team learning behaviors and team performance.
(perceived by team members & team leader)

Figure 2 shows that team learning behaviors and team performance are significantly related ($\chi 2 = 392.96$, df = 351, p = 0.06; NFI = .75, CFI = .96, RMSEA = .04, PCLOSE = 0.88), and that altogether the team learning behaviors explain 17 per cent of the variance in team performance as perceived by the team members and their leaders (see Figure 2). We then decided to test the significance of the relationships of each team learning behaviors' dimension with team performance in Statistical Package for the Social Sciences using regression analysis (Pallant, 2007). Results are summarized in Table 6.

Table 6

Significance of Relationships of Separate Team Learning Behaviors on Team Performance

Team Learning Behaviors	*Standardized Beta*	*P*
Exploring different perspectives	.34	.01
Co-construction of meaning	.23	.04
Error analysis	.10	Not significant
Error communication	.01	Not significant
Reflection on Processes	-.11	Not significant
Reflection on Outcomes	.02	Not significant
Feedback Seeking Behavior	.05	Not significant
Experimenting	-.02	Not significant

$^{*}p < .05$, two-tailed. $^{**}p < .01$, two-tailed.

As Table 6 shows, only two of the team learning behaviors appear to be significantly positively related to team performance, namely, exploring different perspectives (i.e., $\beta = .34$, $p < .01$) and co-construction of meaning (i.e., $\beta = .23$, $p < .05$).

Conclusions and Discussion

Reflection upon the Outcomes

The main aim of this study was to create a psychometrically sound measurement instrument of team learning behaviors. From the CFA, we were able to identify eight dimensions of team learning behaviors comprising 28 items (see Appendix A). Based on the outcomes of our study, we may conclude that our newly developed instrument is a valid and reliable operationalization and can be used to determine team learning behaviors in further research and practice.

An advantage of the multi-dimensional measurement instrument lies in the fact that it can give a more elaborate, that is, diversified insight in team learning behaviors. It can be used to determine on a continual basis which relevant actions for performance improvement should be planned. It can also be used as a means of comparing teams in different organizational units, which may provide worthwhile learning experiences across teams. For researchers the instrument can be useful in (partly) closing the knowledge gap due to the

sometimes contradictory findings on effects of team learning behaviors. As we mentioned earlier, some studies showed that team learning behaviors are positively related to team performance (Edmondson, 1999, 2002), whereas other studies concluded that team learning can also have a detrimental influence on team performance in the short run (e.g., Bunderson & Sutcliffe, 2003). The instrument can also help us yield useful information to build new theories or models for team learning behaviors by taking into account promising sets of predictors and outcome variables.

Besides developing a new valid and reliable measurement instrument, the aim of this study was to investigate the relationship between team learning behaviors and team performance. Although we found a positive relationship between several team learning behaviors and team performance, the cross-sectional nature of our design does not allow us to make any definitive statements about causality. Although the outcome of team learning activities concerns a change in repertoire (see also Huber, 1991), team learning does not necessarily lead to an actual improvement in team performance. Huber, however, argued that teams with a more extended range of possible behaviors are expected to be more capable of acting adequately in a task environment characterized by a high information load and that is equivocal (Daft & Huber, 1987), that is, in an environment where team learning activities seem necessary to fulfill the team task.

A possible argument to support reverse causality, (i.e. team performance predicts team learning behaviors), is that well-performing teams may experience higher acceptance from superiors to spend time on team learning behaviors. Considering outcomes from prior research on team learning (e.g., Edmondson, 1999; Edmondson et al., 2007; Gibson, Zellmer-Bruhn, & Schwab, 2003), however, we support the notion that team learning behaviors are to be seen as predictors of team performance.

Exploring different perspectives within the team and Co-construction of a collective meaning as separate behaviors were found to relate directly to team performance. This is in line with the findings of Van den Bossche et al. (2006). In our sample, Reflection, Error Management, Feedback Behavior, and Experimenting, as separate learning behaviors, appeared not to be directly related to team performance. One explanation may be that exploring each others' viewpoints may help to clarify the team's goals and mutual task interdependence in reaching these goals. Both clear goals and task interdependence have long been established as team characteristics that relate positively to team performance (cf., Kozlowski, & Ilgen, 2006; Latham & Yukl, 1975; Salas, Stagl, & Burke, 2004; Van der Vegt, 1998). Experimenting with or reflecting on working methods aimed at a fuzzy goal, however, may have less of an influence on team performance, especially in the banking sector, where clarity and reliability are important corporate values. At the very least, our study suggests that not all team learning behaviors relate to team performance equally.

All in all, we have demonstrated empirically what previous researchers already had assumed, namely, that team learning behaviors relate to team performance. Moreover, our multi-dimensional operationalization has provided incremental insight by studying the contribution of different types of team learning behaviors to team

Limitations and Recommendations for Further Research

First, our sample was restricted to 19 operational teams in one Dutch bank. This implies that further large-scale research, adopting the newly developed instrument, is needed in order to improve the statistical validation of our instrument and to investigate the generalizability of our outcomes to other industrial sectors and other types of teams. Second, although validating the team learning behaviors measurement instrument using an individual perspective has led to some promising results, future research using a team level analysis approach is needed to provide additional insights about the psychometric characteristics of the instrument. In this study, however, the sample size was too small to use a reliable team level approach (with only 19 teams). Typically, for team research, survey samples consist of 30 to 55 teams (cf., Bunderson & Sutcliffe, 2003; Edmondson, 1999: Schippers et al., 2003), implying that, in our study, we experienced lack of statistical power to find significant results at the team level. Therefore, a larger sample of participants is needed for future research. Third, as our study was cross-sectional, future longitudinal research is necessary to shed more light on the causality in the relationship between team learning behaviors and team performance. Research using multi-wave designs can provide additional information about the stability and change of the variables, and about cross-lagged relationships (De Lange, 2005; Taris & Kompier, 2003). Fourth, all data have been collected using questionnaires, opening up the possibility of response set consistencies. This is why a triangulation approach is recommended for follow-up research.

Another possible approach to provide additional insights on team level studies lies in the choice of the statistical technique itself. When the outcome variable comprises the lowest (i.e., individual) level of analysis, and the predictors comprise both lower and higher (i.e., team or organization) levels, Hierarchical Linear Modeling (HLM) would be a more suitable analysis approach (Hoffman, Griffin, & Gavin, 2000).

Furthermore, it would be interesting to study whether and how team leaders' attitudes and additional managerial, coaching, or training interventions could influence the development of team learning behaviors. In training literature, scholars refer to various team skills that highly resemble the team learning behaviors that have been distinguished, supporting the idea that they can be learned and further developed (e.g., Cannon-Bowers, Bowers, & Sanchez, 2008; Salas et al., 2008). Moreover, it would be interesting to study whether and how the performance of teams that differ in task interdependence is affected by team learning. The task interdependence in the teams we investigated appeared to be rather high ($M = 3.90$; $SD = 0.62$). This suggests that learning from collective experiences (additional to the members' own individual experiences) is important to improve performance of the team.

Practical Implications

Finally, given that this is, to the best of our knowledge, one of the first studies empirically examining the relationship between various team learning behaviors and team performance, the findings would increase this body of knowledge and provide a useful instrument to further our insights about the learning perspective on team functioning. From a practice perspective, the findings of our study are useful to stakeholders (i.e., team leaders, team members, and supervisors of teams) responsible for team performance. Our instrument can help organizations examine which team learning behaviors should be improved in the light of future team performance. It also provides them with concrete actions (derived from the measurement items) to encourage these behaviors for better team learning and performance.

Organizations increasingly adopt team structures to cope with the complexity of the products or services to be delivered. Given technological innovation and globalization, future team performance requirements are likely to increase and teams are key to organizational success.

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Appendix A:
Final Scale of the Team Learning Behaviors' Instrument

Dimension	*Order*	*Item*
Co-construction of meaning	1	Information from team members is complemented with information from other team members.
	2	Team members collectively draw conclusions from the ideas that are discussed in the team
	3	Team members elaborate on each other's information and ideas.
Exploring different perspectives	4	Team members listen carefully to each other.
	5	If something is unclear, we ask each other questions.
	6	If a team member gives his/her opinion he/she subsequently asks for the opinion of the others.
	7	We encourage each other to look at our work from different perspectives.
Error analysis	8	After making a mistake, the team tries together to analyze what caused it.
	9	In this team we think that it is useful to analyze errors.
	10	If something has gone wrong, the team takes the time to think it through.
	11	After an error has occurred, it is analyzed thoroughly in this team.
Error communication	12	Team members communicate their mistakes, to prevent that others make the same mistake.
	13	We discuss errors within our team, because errors and their solutions can deliver important information.
	14	In our team, mistakes are discussed among each other.
	15	Errors are discussed openly.

Reflection on processes	16	We often discuss our team's work methods.
	17	As a team, we regularly discuss how effective we are in collaborating.
	18	Our team often reconsiders our working procedures.
	19	We regularly take time to reflect on how we can improve our working methods.

Reflection on outcomes	20	In our team we check what we can learn from our achievements.
	21	In our team we check if our actions have brought in what we expected before.
	22	In our team we evaluate the results of our actions.
Feedback seeking behavior	23	We seek feedback on our methods.
	24	We analyze our performance in accordance with other teams.
	25	We ask feedback from internal and external stakeholders on our results.

Experimenting	26	In our team we experiment with other working methods.
	27	Our team tests new working methods.
	28	Together we plan to test new working methods.

Chapter 4:
Does Team Stability Mediate the Relationship between Leadership and Team Learning?[3]

An exploratory field study was conducted among 30 project teams in the sectors of building and utilities, engineering and construction, infrastructure, and area decontamination and development in the Netherlands. It examined the influence of leadership on team learning behaviors and included team stability as a potential mediator, all analyzed at the team level using structural equation modeling. Results indicated that both person-focused and task-focused leadership behavior were directly and positively related to team learning. Team stability did not mediate the relationship between leadership and team learning; however, a strong direct relationship between team stability and team learning was confirmed. These findings have implications for interventions by all stakeholders of project teams (i.e., team members, project managers, and supervisors) aimed at increasing team learning. Suggestions are presented for leadership practices that stimulate project-team learning behaviors.

Organizations world-wide are pushed to restructure work around teams by a variety of global forces to enable more rapid, flexible, and adaptive responses to the unexpected (Drucker, 2003; Glassop, 2002; Kozlowski & Ilgen, 2006) and to provide more innovative and comprehensive solutions to complex organizational problems (cf. Beers, 2005). As a result of this shift in the structure of work, team effectiveness has become a salient organizational concern. Individual skills are necessary but insufficient for good team performance (Salas, Dickinson, Converse, & Tannenbaum, 1992). Empirical research, however, demonstrates considerable variance in team effectiveness (e.g., Hackman, 1987).

Team members need to have both accurate and detailed understandings of the requirements of team functioning. In other words, they need to build up shared mental models (Cannon-Bowers, Salas, & Converse, 1990), which will help them predict, adapt, and coordinate with one another, even under stressful or novel conditions. To create shared mental models, team members need to challenge each other's ideas and assumptions constructively (Senge, 1990). The latter behavior is part of the team learning behaviors defined by Edmondson (1999).

The teams we address in this study are project teams in knowledge intensive organizations (cf. Starbuck, 1992). Many knowledge-intensive work settings are characterized by overload, ambiguity, and politics. Highly specialized professionals, often drawn from different functional disciplines or departments are brought together to contribute their expertise to a unique achievement, for instance, establishing an oil refinery in a place where land is to be

[3] *Submitted to Leadership Quarterley (june 2009).*

claimed from the sea. The project teams face a multitude of problems and possible solutions. There is no single best way of knowing which problems and solutions to select; therefore, multiple stakeholders need to interact with one another continually (Alvesson, 2004). The most important performance outcome for these teams is the quality of the product they deliver to their clients.

Teamwork in these project teams consists primarily of gathering information, know-how, and feedback through interpersonal exchanges within the team and across its borders, resulting in new knowledge presented to colleagues and/or clients (cf. Starbuck, 1992; Turner, 1999). The value of the team approach lies, among others, in the cross-functionality of its members, who provide the opportunity for timely integration of critical information not only from their functional background but also from various external personal networks. To translate the diversity of viewpoints into project success, team members must adopt an inquiry orientation in which they mutually explain their positions (Edmondson & Smith, 2006). Hence they gain better understanding of the whole project by viewing it through alternative eyes (Brown & Eisenhardt, 1995). The importance of interpersonal exchanges in these project teams points to the value of team learning behaviors aimed at gaining understanding of the whole project and integration of different viewpoints. Continuous learning is a key driver of the team's ability to remain adaptive and flexible, especially for project teams working in fluid, knowledge intensive organizations.

Winter, Smith, Morris, and Cicmil (2006) stress the importance of the ability to learn and the ability to share what has been learned as one of the five major directions for future research in project management. Nevertheless, only few studies (cf. Soderlund, Vaagaasar, & Andersen, 2008) on the topic of learning in project teams are available. Especially, empirical studies in real-life project teams are lacking. With this study we intend to expand our understanding of team learning in project teams. Our focus is on those antecedents that can be influenced by the team itself and its leader.

Research has shown that team learning is related to various leadership behaviors, such as transformational leadership (Schippers et al., 2003), empowering team leadership (Srivastava, Bartol, & Locke, 2006; Burke, Stagl, Klein, Goodwin, Salas, & Halpin, 2006), and team leader coaching (Edmondson, 2003). Based on these results it can be argued that the project manager, as leader of a project team, has a prominent role in stimulating team learning behaviors, involving members in decision making, clarifying team goals, providing bridges to outside parties via the leader's status in the organization (Sarin & McDermott, 2003), and challenging and facilitating the processes of dialogue and experimentation by de-emphasizing power differences and by facilitating a psychologically safe context (see, e.g., Burke et al., 2006; Edmondson, 1999, 2003; Costanzo & Tzoumpa, 2008).

Notwithstanding the predictive value of leadership style for team learning, it is still unclear how the project manager can affect team learning. The aim of this study, therefore, is to investigate how project managers can promote team learning behaviors in their project teams. Furthermore, we will explore whether leadership behavior, besides its direct effect upon team learning, also has an indirect effect through team stability. In other words, we also aim to investigate whether the leadership behavior of the project manager influences the extent of team learning behaviors indirectly by affecting the stability of the team. Our mediation model is aimed at clarifying the promotion of team learning behaviors and at providing recommendations for effective managerial interventions.

Theory

Learning in Teams

A *team* can be defined as "a distinguishable set of two or more people who are assigned specific roles or functions to perform dynamically, interdependently, and adaptively toward a common and valued goal/object/mission, who have each been assigned specific roles or functions to perform, and who have a limited life span of membership" (Salas, Dickinson, Converse, & Tannenbaum, 1992, p. 126). In particular, project teams are characterized by a unique goal and a planned start and ending (Cohen & Bailey, 1997; Turner, 1999). Turner (1999) determines three levels of project teams: the primary, secondary, and tertiary group. The primary group or task force comprises the set of people who work face to face and know everyone else in the group. They are the immediate team. The secondary group consists of people who contribute to the work of the primary group but are not part of it. The tertiary group comprises those who are affected by the work of the project (e.g. professional bodies and clients). In this study, the concept of project team refers to the primary group. For the most part, project team tasks are non-repetitive in nature and involve considerable application of knowledge, judgment, and expertise. Members are drawn from different disciplines and functional units so that specialized expertise can be applied to the project at hand. They may work full time on the project for its duration or be seconded part time working on different projects simultaneously. When a project is completed, members either return to their functional units or move on to the next project (Cohen & Bailey, 1997). Multiple activities are done simultaneously, rather than sequentially, to save time (Brown & Eisenhardt, 1995).

In defining the concept of *team learning*, some researchers have emphasized the process of learning (e.g., Edmondson, 1999, 2002; Gibson & Vermeulen, 2003; Kasl, Marsick & Dechant, 1997), while others have stressed its outcomes (e.g., Ellis, Hollenbeck, Ilgen, Porter, West, & Moon, 2003). We follow the first stream and adhere to Edmondson (1999), who defined team learning as an ongoing process of collective reflection and action. Savelsbergh, Van der Heijden, and Poell (2009) characterized this process by eight team learning behaviors: (1) exploring; (2) co-construction of meaning, (3) reflecting on outcomes and (4) processes; (5) communicating; (6) discussing errors and unexpected outcomes of actions; (7) seeking feedback; and (8) experimenting within and as a team. For sake of clarity, elaborate descriptions of these team learning behaviors are summarized in Table 1.

Table 1

Definitions of The Dimensions of Team Learning Behaviors (Savelsbergh et al., 2009).

New defi*nitions of Team Learning Behaviors*	*Item Example*	*Cronbach alpha*
1. Exploring different perspectives: conversational actions of team members to explore, share knowledge, opinions and different perspectives (based on 'construction of meaning' of Van den Bossche, 2006).	If a team member gives his/her opinion he/she subsequently asks for the opinion of the others.	.70
2. Co-construction of meaning: mutual conversational actions of team members by refining, building on, or modifying the original offered meaning in some way to come to 'new' meanings in the collaborative work that were not previously available to the team (based on 'co-construction of meaning' of Van den Bossche, 2006).	Information of team members is completed with information of other team members.	.74
3. Error analysis: discussing and analyzing errors collectively to prevent them (based on Van Dyck, 2000).	After making a mistake, we try to analyze what caused it.	.83
4. Error communication: sharing errors collectively to prevent them (based on Van Dyck, 2000).	Team members communicate their mistakes, to prevent others making the same mistake.	.82
5. Reflection on outcomes: collectively look back or ahead on experiences and actions (for example by feedback or communicated errors) to evaluate and learn from them (based on Reflexivity by evaluating /learning, Schippers et al., 2003).	In our team we check what we can learn from accomplishments.	.81
6. Reflection on processes: collectively discuss the team goals, assumptions, working methods and strategies, checking: Is the team doing the right things and doing things right? (based on Reflexivity on processes, Schippers et al., 2003)	We often discuss our team's work methods.	.80
7. Feedback seeking behavior: seeking feedback internally among team members and externally from outside the team in order to reflect (based on Schippers et al., 2003).	We analyze our performance in accordance with other teams.	.75
8. Experimenting: collectively doing things differently than before and measuring differences in outcome (based on Van Woerkom, 2003).	We experiment collectively with other working methods.	.80

Leadership and Team Learning Behaviors

Previous research has shown a positive relationship between team learning behaviors and team performance (Gibson & Vermeulen, 2003; Van der Vegt & Bunderson, 2005). Furthermore, we know that teams differ in the extent to which they engage in learning behaviors (e.g., Edmondson, 1999). It has been established (cf. Burke et al., 2006) that the team leader's behavior explains a considerable amount of variance in the level of team learning. We were interested to find out if these findings would be confirmed in project teams in knowledge intensive organizations. For this reason, we first investigate the relationship between the project leader's behavior and team learning in project teams.

According to Fleishman, Mumford, Zaccaro, Levin, Korotkin, and Hein (1991), the dichotomy of person-focused and task-focused leadership behaviors is the most common classification of leadership in literature, one still valid today (Burke et al., 2006; Kozlowski & Ilgen, 2006). Person-focused leadership behavior facilitates team interaction and/or development. Task-focused leadership comprises behaviors that work to ensure that team members have a clear sense of direction and purpose, which guide team action towards goal attainment. Among the most robust leadership concepts are Consideration (person-focused) and Initiating Structure (task-focused) leadership behaviors (Burke et al., 2006; Judge, Piccolo, & Ilies, 2004; Stogdill, 1950), which will be elaborated below.

In this study we adhere to these traditional leadership concepts depicting the dichotomy of person- and task-focused leadership; however, we follow Stoker (1999, p. 78) in adding Coaching, Participative, and Charismatic leadership besides Consideration as aspects of contemporary person-focused leadership expected to influence the outcomes of self-managed work teams. These four aspects of person-focused leadership behavior all differ in focus and in how they influence team learning behaviors. When a leader is *considerate* (Stogdill, 1950), he or she shows concern and respect for followers, looks after their welfare, and gives support. Consideration can evoke an increased level of psychological safety in the team, which has been found to be positively related to team learning (Edmondson, 1999).
Coaching has been defined as the day-to-day encouragement of employees to improve their own performance (Popper & Lipshitz, 1992). A coaching leader is supportive and provides non-defensive responses to questions and challenges. Coaching leadership behavior may help team members conclude that the team constitutes a safe environment to engage in the interpersonal risk of certain learning behaviors, such as, discussing errors or experimenting (Edmondson, 1999).

Participative leadership refers to involving followers in decision making (House & Mitchell, 1974; Koopman & Wierdsma, 1998) and is characterized by mutual open communication between leader and follower, by which the latter can influence decision making (Mulder, De Jong, Koppelaar, & Verhage, 1986; Somech, A., 2005). Participative leadership behavior encourages a team to consider all points of view and to question their own assumptions by involving them in decision-making processes.

Charismatic leadership is demonstrated by behavior that shows a powerful personality and vision, which helps the leader be trusted and respected by his or her subordinates (Bass, 1990). According to Conger (1998), charismatic leadership behavior refers to a continual assessment of the environment and formulation of a vision, which is communicated with

motivational and persuasive arguments. Personal risk taking and self-sacrifice by the leader increase commitment and trust in him or her and in his or her goals. Role modeling, empowerment, and unconventional tactics are used to achieve the leader's vision and to increase team learning.

Findings from previous studies confirm that person-focused leadership behavior relates to team learning. Burke et al. (2006) demonstrated that person-focused leadership behavior explains nearly 30 per cent of variance in team learning outcome. Edmondson (1996, 1999) showed that team leaders giving guidance, encouragement, and support to the team members by coaching and considerate leadership influence psychological safety in teams, which in turn promotes team learning behaviors. Schippers et al. (2003) showed that inspirational, charismatic, and intellectual stimulation (all indicators of transformational leadership) (e.g., Bass, 1985) stimulate reflexivity in teams by creating a shared vision. Srivastava, Bartol, and Locke (2006) showed that empowering leadership, conceptualized in five person-focused leadership dimensions (i.e., leading by example, participative decision making, coaching, informing, and showing concern for the team), is positively related to knowledge sharing in management teams. Based on the findings of previous research (Burke et al., 2006) within other kinds of teams and on our reasoning as explained above, we deem person-focused leadership behaviors to be positively related to team learning behaviors in project teams.

Initiating structure, being the task-focused leadership behavior in this study, is the degree to which a leader defines and organizes his or her role and the roles of followers. A task-focused leader quickly takes control and determines in detail what should be done and how it should be done. He or she is oriented towards goal attainment and establishes well-defined patterns and channels of communication (Fleishman, 1973). There is lack of evidence from previous research about the relationship between task-focused leadership and team learning. Findings do, however, demonstrate a moderate influence of task-focused leadership on team performance ($r = .23$) (Judge et al., 2004). This suggests employing a research design that takes into account task-focused leadership behavior as a possible factor to explain team learning behaviors.

Task-focused leadership behavior may contribute to team learning behaviors by setting a clear and compelling team goal and by enabling a team design which gives focus and direction to the learning process. On the other hand, task-focused leadership may frustrate the self-management potential of a team (Stewart & Manz, 1995), through a prescription of what, when, and how. This structuring by the leader may even frustrate team members and hamper them from exploring, experimenting, and reflecting on processes or outcomes, if applied too strictly by the leader. If a clear direction and structure are initiated in a balanced way, however, we expect a positive relationship between this task-focused leadership and team learning behaviors. The following hypotheses are therefore investigated:

H1: Person-focused leadership behavior, subsuming Consideration, Coaching, Participative, and Charismatic leadership behaviors, is positively related to team learning behaviors.

H2: Task-focused leadership behavior is positively related to team learning behaviors.

Team Stability: Towards a Mediation Model of Leadership and Team Learning

Across the studies on team learning reviewed by Edmondson, Dillon, and Roloff (2007), team leader behavior and team stability are mentioned as essential variables for future research. If team stability is high, it implies that membership change is low. Project teams are characterized by team members who may never have worked together before, who have to come together quickly and effectively in order to achieve a task that nobody has done before within a limited life span (Turner, 1999). It takes time to become familiar with each other before team members can work together as an effective team (Goodman & Leyden, 1991); similarly, to build a team identity rather than remain a collection of random individuals takes time (Handy, 1982). Therefore, knowledge about the effects of team stability is of special importance in project teams.

Research on team stability has emphasized the disruption caused by member turnover on functioning and project performance due to knowledge depreciation. For instance, studying 211 new product development projects, Akgün and Lynn (2002) found that team stability

relates positively to team learning and project success. Moreland, Argote, and Krishnan (1998) showed that stable team membership facilitates learning and intra-team coordination. Teams characterized by a lack of group longevity experience greater difficulty recognizing and integrating their knowledge for efficient task completion (Liang, Moreland, & Argote, 1995). Nevertheless, the relationship of team stability with team learning and performance is a matter of some debate in the literature (Edmondson, Bohmer, & Pisano, 2001). On the one hand, keeping the same team members together facilitates coordination of interdependent work. Experimental research has shown that keeping team members together helps them understand one another's capabilities and coordinate their actions (Edmondson, Winslow, Bohmer, & Pisano, 2003; Moreland & Levine, 1989). As a result, the team members might become more capable of coordinating collective learning behaviors. On the other hand, over time, stable teams may become slaves to routine and fail to respond to changing conditions.

Edmondson et al. (2007) in their review on team learning state that teams with a more stable composition demonstrate higher rates of improvement. Especially when it comes to learning by doing, they claim team stability to be an influencing factor. The extent to which members have worked together is clearly an important issue for understanding how well they share their knowledge, skills, and actions to achieve collective aims.

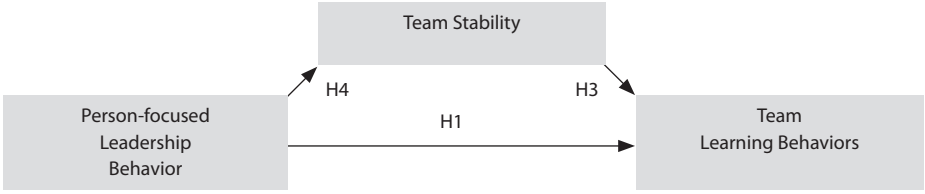
Given that project teams have a limited life span with a unique assignment, there is little chance that the same team members remain together in the same job for years. We therefore anticipate that team stability facilitates team learning behaviors in project teams. Additionally, we argue that the project manager's leadership behavior (person-focused and task-focused) has not only a direct influence on the extent of team learning in his or her team but also an indirect effect through team stability. In line with this argumentation, we assume that leadership affects team stability and that team stability, in turn, affects team learning behaviors.

We argue that person-focused leadership behavior might prevent team members from leaving the team when things are frustrating to them, with leaders being considerate, participative, supportive, and persuasive with a clear vision. Task-focused leadership might

influence team stability by enabling quick decisions and providing clear strategies that help prevent team member turnover. In other words, we expect team stability to mediate (partly) the relationship between person-focused as well as task-focused leadership, on the one hand, and team learning behaviors, on the other hand. This leads to the following hypotheses (see also Figure 1):

H3: Team stability is positively related to team learning behaviors in project teams.
H4: Person-focused leadership is positively related to team stability.
H5: Task-focused leadership is positively related to team stability.
H6: The relationship between person-focused leadership behavior and team learning behaviors is (partly) mediated by team stability.
H7: The relationship between task-focused leadership behavior and team learning behaviors is (partly) mediated by team stability.

Model of Hypothesis 6



Model of Hypothesis 7

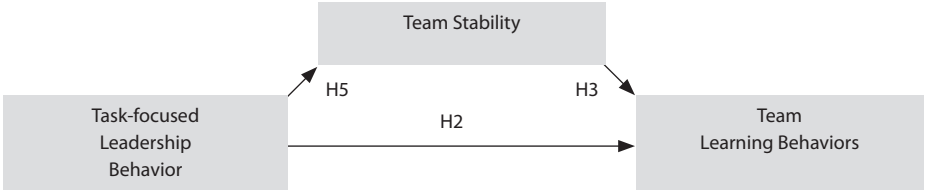


Figure 1: Team Stability (partly) mediates the relationship between Leadership and Team learning.

Method

Subjects and Procedure

Our study employed a cross-sectional approach among 40 project teams in the sectors of building and utilities (n = 10), engineering and construction (n = 12), infrastructure (n = 8), and area decontamination and development (n = 10). The main activities undertaken by the project teams concerned the design, development, and implementation of large ICT systems, utilities, or infrastructures. We approached project directors (i.e., the managers of the project managers' departments) in 12 companies with the request to participate in our research. Ten companies decided to participate with one or more project teams. Data collection took place from June through November 2008.

A survey was sent to all members of the 40 project teams selected (n = 335), and to their team leaders (i.e., project managers) (n = 40). Only teams with a response from more than half of all team members and from the project manager were included in the analyses. A total of ten teams were excluded from the analysis due to non-response by the project managers on the self-assessment leadership behavior survey items (yielding a response rate of 75 per cent of the project managers). The remaining 30 teams consisted of 272 team members of which 207 team members responded (yielding a response rate of 76 percent of the team members within the remaining 30 teams). The final sample thus consisted of 207 team members and their team leaders (n = 30), yielding an overall individual response rate of 79 per cent. The mean age was 41.5 years (SD = 10.1) for the team members and 44.7 years (SD = 7.8) for the project managers. The percentages of male team members and project managers were 82.1 and 93.5, respectively. The number of members per team ranged from 2 to 22 (M = 10.1; SD = 5.8).

The mean team tenures of the team members and the project managers were 14.9 months *(SD = 14.9)* and 20.3 months (SD = 22.2), respectively. The mean levels of work experience of the team members and the project managers were 18.2 years (SD = 10.9) and 20.4 years (SD = 7.9), respectively. Not all team members spent all their working time in the team; some were seconded part time to the team. We therefore characterized each project team by a so-called part-time factor, that is, the proportion of time that team members and project manager spend on the project team relative to their total working time (M = 68.5 per cent; SD = 34.5). The mean meeting frequency of the team was 3 times a month (SD = 1.6). Furthermore, 63.3 per cent of the project teams were working in the realization phase, 13.3 per cent were preparing for realization, 16.7 per cent were in the design phase, and 3.3 per cent were in the idea and definition phase.

Measures

A questionnaire was designed to measure leadership behaviors, team stability, and team learning behaviors. The survey was pretested in face-to-face interviews using think-aloud protocols with three individuals (two team members and one project manager) in order in order to examine the clarity of the questions. In addition, the survey was completed by four others (two team members and two project managers) in order to test the user-friendliness of the survey, and to test the time needed to answer all questions. The average time needed to fill out the total survey was 35 minutes, ranging from 29 minutes to 40 minutes. For

Dutch-speaking respondents, the English survey items were translated into Dutch. For this, the translation-back-translation method has been used (Hambleton, 1994). The purpose of the double translation was to allow experts to examine both versions of each questionnaire item to establish conformity of meaning. Where inconsistencies were, the items have been reformulated or, if necessary, eliminated.

All scales covering leadership and team learning behaviors were derived from previously developed and validated instruments. Unless otherwise noted, five-point Likert-type scales ranging from 1 (*completely disagree*) to 5 (*completely agree*) were used in this study.

Task-focused leadership behavior was measured using three items (based on the Ohio-State leadership questionnaire of Stogdill, 1974; Mulder, Ritsema van Eck, De Jong, 1971). Before testing our hypotheses, the reliability of the task-focused leadership scale was optimized by eliminating one item that loaded ambiguously on the intended factor. This was the item 'As a project manager I determine in detail what should be done and how it should be done'. The remaining items were: 'As a project manager I quickly take control', 'As a project manager I take care that everybody does his/her utmost' and 'As a project manager I insist that everything happens according to fixed rules'. The alpha of the remaining three-item scale was .62

Person-focused leadership behavior, consisting of four factors, was measured using the 20 items of the instrument developed by Stoker (1999). In this scale *Consideration* was measured using four items (based on the Ohio-State leadership questionnaire of Stogdill, 1950; Mulder et al., 1971). An example item is: 'I feel appreciated by my project manager.' *Coaching* was measured using five items (based on De Jong and Carpay (1991). An example item is: 'My project manager gives me advice when I need it.' *Participative behavior* was measured using three items (based on Mulder, De Jong, Koppelaar, & Verhage, 1986; Le Blanc, 1994). An example item is: 'My project manager confers mutually with my team – also about important issues'. *Charismatic behavior* was measured using five items (based on Bass, 1985; Den Hartog et al., 1994). An example item is: 'My project manager serves as an example to me.' Before testing our hypotheses, the reliability of the person-focused leadership scale was optimized by eliminating three items that loaded ambiguously on the intended factor. These were 'As a project manager I give my team members the feeling that they can also reach the goals without me', 'I am a striking personality in all respects', and 'As a project manager I act without consulting my people' (reversed). The alpha of the remaining 17-item scale was .77.

Team stability was measured using two self-constructed items asking how often the team composition had changed over the last year. The items are: 'How many persons newly joined the project team in the last 12 months' and 'How many persons left the project team in the last 12 months.' The responses on these two items were added up and the resulting number was then divided by the team size, thus representing the membership change rate of the team in relation to the number of team members (team *instability*). A team stability coefficient was calculated by subtracting this outcome from 1 (M = 0.51; SD = 0.31).

Team learning behavior was measured using 28 items developed by Savelsbergh et al. (2009) (based on Edmondson, 1999; Van den Bossche, 2006; Van Dyck, 2000; Van Dyck, Frese, Baer, & Sonnentag, 2005; Schippers et al., 2003; Van Woerkom, 2003). The measurement instrument was broken down into eight dimensions. An example item is: 'Team members elaborate on each other's information and ideas.' The alpha of the 28-item scale was .94 (see Table 1 for more information on each of the eight team learning behaviors).

Analysis

All variables in this study were conceptualized and analyzed at the group level. For that purpose, we aggregated data collected from individual team members to constitute a team level construct for team learning behaviors. Leadership behavior data were self-assessed by the project managers, and as such referring to a team level construct. Team stability also was operationalized as a team level variable. We assessed both the level of between-group difference and within-team agreement in the team-learning behaviors' measure prior to aggregating them to the team level. To do so, first, we conducted a one-way ANOVA showing a statistically significant between-group difference in the average team learning behaviors' score ($F(30, 237) = 1.54$, $p < .05$). Additionally, we used the Intra Class Correlation coefficients (Klein & Kozlowski, 2000) and the multiple-item estimator $R_{wg(j)}$ (James, Demaree, & Wolf, 1984). This analysis for the team learning behaviors' scale resulted in an ICC(1) of 0.002, an ICC(2) of 0.32, and a mean $R_{wg(j)}$ of .97 (the mean $R_{wg(j)}$ of the sub-scales of team learning behaviors ranged between .71 and .89). The most often used cut-off for aggregating responses to a group-level is that ICC(1) should be .20 or higher, ICC(2) should be .70 or higher, and the mean $R_{wg(j)}$ should be higher than .70 (Klein & Kozlowski, 2000). Although the ICC(1) and ICC(2) were rather low compared to the usual cut-off for aggregation, the mean $R_{wg(j)}$ values of the teams on team learning behaviors supported our decision to aggregate the individual responses to create a team-level variable for team learning behaviors (Dixon & Cunningham, 2006).

Further analysis on the team level constructs comprised several stages.

First, data screening was conducted to identify and to establish: (a) missing data; (b) univariate normality and potential outliers; and (c) bivariate linearity, normality, and potential outliers associated with the hypothesized correlations. Linear regression plots were examined in order to test whether the assumptions were violated, which appeared not to be the case.

Second, a Confirmatory Factor Analysis (CFA) (Arbuckle, 2006) was performed to test whether the measurement instrument for team learning behaviors showed satisfactory psychometric characteristics. CFA and further analyses aimed at testing our study hypotheses were performed using AMOS 16.0, a Structural Equation Modeling (SEM) program (Arbuckle, 2006). SEM was chosen because of its capacity to handle complex models with measurement error and to include observed and latent variables. By explicitly estimating and isolating the measurement error in observed variables, SEM reveals 'true' variance and its related effects upon variables in a model (Aragon & Gesell, 2003). Moreover, it facilitates testing whether the hypothesized model fits, that is, whether it is supported by the empirical data.

Third, we examined the pattern of relationships between the independent variables (1) person-focused leadership, (2) task-focused leadership, (3) the expected mediator (team stability), and (4) the dependent variable (team learning behaviors), using SEM (Arbuckle, 2006). Three single indicators operationalized 'team stability', 'person-focused leadership', and 'task-focused leadership' behavior. We corrected for random measurement error by making the random error variances of the two leadership measures equal to the product of its variances and the quantity one minus its internal consistencies (Jöreskog & Sörbom, 1993). To test a mediation model, we followed the four steps described by Baron and Kenny (1986). This resulted in testing two separate structural equation models (see also Figure 1).

Results

Descriptive Measures

First, data screening was conducted. Table 2 presents the means, standard deviations, and correlations among all variables under study. It also contains information on scale reliabilities and numbers of items per scale. As Table 2 shows, all constructs demonstrated good internal consistencies (Cronbach's alpha > .62). Person-focused leadership as well as task-focused leadership correlate significantly with team learning behaviors. Furthermore, team stability correlates significantly with team learning behaviors.

Table 2

Means, Standard Deviation, Reliability Coefficients (Cronbach's alpha; in bold on the main diagonal), And correlations between the model variables.

Variable	*N*	*M*	*sd*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1 Person-focused Leadership	30	4,16	0,37	**.77**											
2 Task-focused Leadership	30	3,22	0,72	.42*	**.62**										
3 Team Stability	30	0,51	0,31	.11	.17	-									
4 Team Learning Behaviors	237	3,50	0,62	.34*	.59**	.18**	**.94**								
4a Exploring different perspectives	237	3,86	0,61	.02	.15	.09	.70**	**.70**							
4b Co-construction of meaning	237	3,98	0,67	.20	.35*	.21**	.65**	.71**	**.74**						
4c Error analysis	237	3,66	0,80	.19	.45**	.14*	.81**	.60**	.54**	**.83**					
4d Error communication	237	3,72	0,77	.24	.28	.12*	.80**	.64**	.56**	.77**	**.82**				
4e Reflection on outcomes	237	3,47	0,84	.43**	.73**	.14*	.84**	.47**	.45**	.61**	.61**	**.81**			
4f Reflection on processes	237	3,07	0,84	.24	.56**	.12*	.83**	.41**	.39**	.57**	.51**	.70**	**.80**		
4g Feedback seeking behavior	237	2,90	0,87	.43**	.61**	.06	.81**	.43**	.35**	.54**	.52**	.67**	.74**	**.75**	
4h Experimenting	237	3,29	0,94	.29	.48**	.21**	.74**	.33**	.25**	.46**	.43**	.60**	.67**	.64**	**.80**

Note. ** $p < .01$, * $p < .05$.

Testing the Team Learning Behaviors Instrument at the Team Level

A second-order confirmatory factor analysis (CFA) was conducted for the eight dimensions of team learning behaviors, aggregated at the team level using SEM. In order to test the fit between the hypothesized model and the data, the traditional Chi-square value, the goodness-of-fit index (GFI), and the sample root mean square error of approximation (RMSEA) were calculated. As a rule of thumb, a GFI ≥ .90 and a RMSEA ≤ .08 indicate a reasonable fit between the model and the data (Browne & Cudeck, 1993). Additionally, PCLOSE, which is a p-value for testing the null hypothesis that the population RMSEA is no greater than .05, was determined (Arbuckle, 2006). In case of an RMSEA ≥ .05, the null hypothesis is rejected indicating a lack of close fit. Because of the fact that the GFI and the RMSEA are dependent upon size, as recommended by Marsh, Balla, and Hau (1996), the Non-Normed Fit index (NFI), and the Comparative Fit index (CFI) were also examined. These indices should have values of .90 or higher (Hoyle, 1995). To conduct the CFA of the team learning behaviors instrument, we used our original sample data consisting of 40 teams (instead of the 30 teams remaining due to missing data on the leadership scales). The second-order CFA indicated a single second-order factor solution with an acceptable fit (Chi-square = 20.1, df = 17, p = 0.269; NFI = .902, CFI = .982, RMSEA = .068, PCLOSE = 0.369). See Appendix 1 for more specific outcomes.

Testing the Team Learning Behaviors Enhancement Models

First, the direct relationships between each independent variable (person-focused and task-focused leadership behavior) and the dependent variable (team learning behaviors) were examined. Second, the relationships between each independent variable and the mediator (team stability) were tested. Third, the relationship between the mediator (team stability) and the dependent variable (team learning behaviors) was examined using Structural Equation Modeling (SEM) (Baron & Kenny, 1986). Table 3 presents the outcomes of these analyses.

Table 3

Significance of Relationship Between Each Single Independent Variable (Task-focused Leadership, Person-focused Leadership), The Expected Mediator (Team Stability) And The Independent Variable (Team Learning Behaviors).

	Standardized Beta	*P*	*Explained Variance of Team Learning*
Person Focused Leadership – Team Learning Behaviors	.49	.007	24%
Task-focused Leadership – Team Learning Behaviors	.46	.011	21%
Person Focused Leadership – Team Stability	Not significant		
Task Focused Leadership – Team Stability	Not significant		
Team Stability– Team Learning Behaviors	.40	.028	16%

Person-focused and Task-focused leadership appeared to be significantly related to team learning behaviors, thus confirming hypothesis 1 and step 1 of the mediation assumption by Baron and Kenny (1986). We continued with our second step, by testing the relationships between the independent variables, person-focused and task-focused leadership respectively, and the expected mediator, team stability. These relationships appeared to be non-significant (see Table 3), implying that mediation of the relationships between person-focused leadership and team learning, or task-focused leadership and team learning, through team stability, being the mediator, could not be tested due to violation of the assumption (step 2) according to Baron and Kenny (1986).

Although our hypotheses about team stability being a mediator between both leadership behaviors and team learning behaviors could not be demonstrated, person-focused leadership, task-focused leadership and team stability appeared to be strongly related to team learning behaviors. Therefore we decided to examine their impact upon team learning by including both team stability and one of the leadership behaviors as independent variables in a combined model. By testing them simultaneously chance capitalization can be prevented. The first row in Table 4 shows that the combined model of person-focused leadership, task-focused leadership, and team stability fits well to the data. We compared the fit of this combined model with the results of the test of the alternative models with only one or two of the independent variables (person-focused leadership, task-focused leadership and team stability respectively) related to team learning behaviors. The results (see in Table 4, the second, third and fourth rows for two combined independent variables and rows five, six and seven for each independent variable separately) showed that the combined model (M1) did not significantly differ from the models with two of the independent variable models (M2, M3, and M4), Delta $\chi 2$ (M2) = 3.55, p = .06, Delta $\chi 2$ (M3) = 2.44, p = .012, and Delta $\chi 2$ (M4) = 3.67, p = .06, although the $\chi 2$ of the combined model shows the lowest value. Furthermore, the data demonstrated a significant better fit of the combined model to the data in comparison with each of the single independent variable models (M5, M6, and M7), Delta $\chi 2$ (M5) = 6.62, p = .036, Delta $\chi 2$ (M6) = 7.29, p = .026, and Delta $\chi 2$ (M7) = 9.00, p = .011. Taken together, these findings indicate the combined model of person-focused leadership, task-focused leadership and team stability as independent variables explains a significantly larger amount of variance in team learning behaviors (37 per cent) than each of a single or two combination models of independent variables do (see Table 4 last column, M2, to M7 ranging from 32 to 16 per cent explained variance). Although the significance of the relationship between task-focused leadership and team learning in the combined model with person-focused
leadership and team stability disappears (see also Figure 2), a larger amount of variance in team learning behaviors is explained than without task-focused leadership.

Table 4

Results of SEM-analyses: Fit Indices of the Combined Model "Person-focused Leadership, Task-focused Leadership and Team Stability being the Independent Variables, related to Team Learning, being the Dependent" and the Alternative Models with a single or two Independent Variables (Standardized Maximum Likelihood Estimates), N = 30.

Model	*χ2*	*df*	*χ2/ df*	*Delta χ2*	*GFI*	*RMSEA*	*NNFI*	*CFI*	R^2
M1. Combined Model Person-focused Leadership & Task-focused Leadership & Team Stability related to Team Learning	48.72	40	1.22	-	.79	.09	.79	.95	.37
M2. Person-focused Leadership & Task-focused Leadership related to Team Learning	52.26	41	1.28	3.55	.76	.10	.78	.94	.32
M3. Person-focused & Team stability related to Team Learning	51.15	41	1.25	2.44	.78	.09	.78	.94	.32
M4. Task-focused Leadership & Team Stability related to Team Learning	52.38	41	1.28	3,67	.78	.10	.78	.94	.28
M5. Person-focused Leadership related to Team Learning	55.33	42	1.32	6.62*	.76	.11	.76	.93	.24
M6. Task-focused Leadership related to Team Learning	56.00	42	1.33	7.29*	.76	.11	.76	.92	.21
M7. Team stability related to Team Learning	57.70	42	1.37	8.99*	.76	.11	.75	.91	.16

* $p < .05$

Note. χ2 = chi-square; df = degrees of freedom; GFI = goodness-of-fit index; RMSEA = root mean square error of approximation; NNFI = non-normed fit index; CFI = comparative fit index.

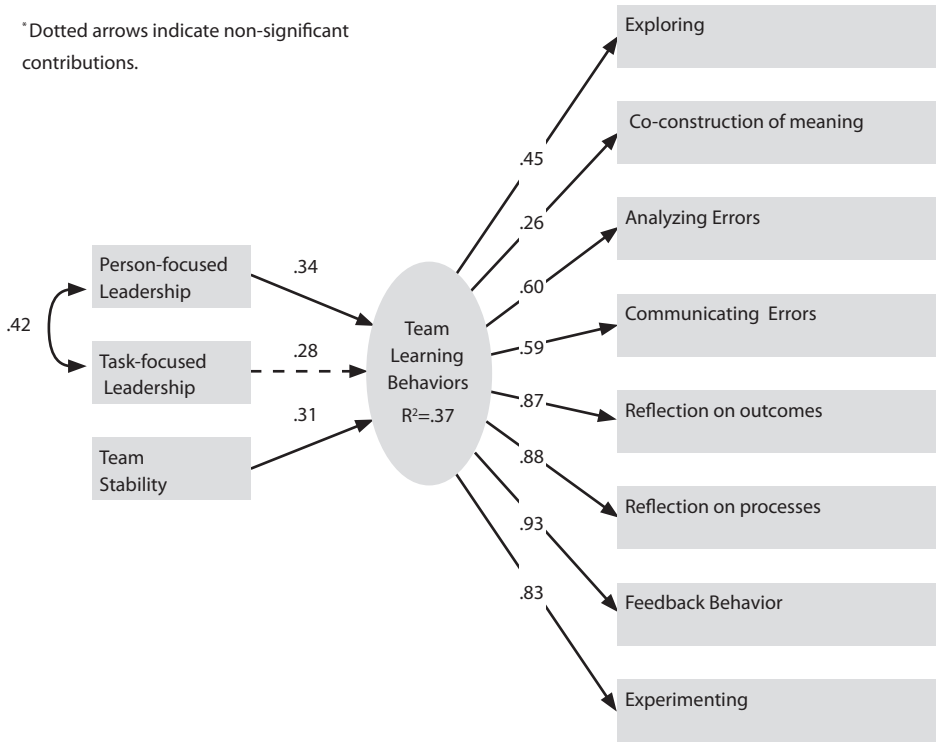


Figure 2: Combined effect of Team Stability and Person-focused and Task-focused Leadership as Independent Variables on Team Learning Behaviors based on SEM (Standardized Estimates) ($\chi 2 = 48.7$; df = 40; $\chi 2$ / df = 1.238 ; p = .162; NFI= .791; CFI = .951.; RMSEA = .087; PCLOSE = .256)

Conclusions and Discussion

Reflection upon the Outcomes

The aim of this study was to shed more light on antecedents of team learning behaviors in project teams that can be influenced by the team itself. It thus contributes to one of the five major directions for future research in project management as stated by Winter et al. (2006), namely "the ability to learn and the ability to share what has been learned in projects". The main conclusions from the study are as follows.

First, both person-focused and task-focused leadership were found to be positively related to team learning behaviors in project teams. For person-focused leadership this relationship is consistent with findings from earlier research (Burke et al., 2006; Fleishman et al., 1991, Judge et al., 2004, Kozlowski & Ilgen, 2006, Stogdill, 1950). Previous research was less clear, however, about the relationship between task-focused leadership and team learning. In our study task-focused leadership (i.e., facilitating team members, giving them clear

directions, challenging them to give their utmost) was also related to team learning behaviors.

Second, neither person-focused nor task-focused leadership behavior were found to be related to team stability, which was not in line with our expectations. Perhaps it is not the leader's behavior that matters here; changes in project requirements throughout several phases might also determine team members entering and leaving. Our study could not identify the reason(s) why team members entered or left the project team. This information might have suggested additional ways to influence team stability and should be collected in further research

Third, team stability being unrelated to leadership implies it cannot mediate the relationships between either person- or task-focused leadership behavior and team learning. Apparently, there are other factors that explain these strong positive relationships. One such factor could be team members' perceptions of role stress, which might inhibit learning (Beauchamp & Bray, 2001; Rizzo, House, & Lirtzman, 1970). The demand-control-support model (Johnson & Hall, 1988) predicts a negative effect of role stress on learning at the individual level. Task-focused leadership might help overcome team members' perceptions of role stress. For instance, by clarifying ambiguity about the team's tasks and about conflicting demands from external stakeholders. It might solve quantitative or qualitative task overload by taking charge and giving clear directions. Person-focused leadership might help diminish team members' perceptions of role stress by consideration, by coaching them, and by stimulating their participation in defining the team's role. Another factor already known as an antecedent of team learning from previous work by Edmondson (1999) is the concept of psychological safety. Her study indicates that coaching leadership promotes a climate of safety needed to take interpersonal risks required for team learning behaviors to occur.

Fourth, team stability was found to be directly related to team learning behaviors, although it explained less variance in team learning than each of the leadership behaviors did. One explanation for this direct relationship might be that if people stick together for a longer period they have more time to build a team learning routine. A laboratory study by Argote, Insko, Yovetich, and Romero (1995) suggests that the removal or replacement of team members has a detrimental effect on knowledge building and retention in groups. Another explanation could be that team longevity promotes team members becoming familiar with each other, which helps them transcend the norms prevalent in their respective professions and understand the views of other team members.

Fifth, the relationships between task-focused leadership and team learning became non-significant in combination with person-focused leadership and team stability. This combined set of leadership behaviors and team stability, however, explained more variance in team learning than each of the independent variables separately did or person-focused leadership combined with team stability did. There seems to be merit, therefore, to include both types of leadership as well as team stability in studies of team learning.

Strengths and Limitations of the Study

A strength of our approach is that the research was performed amongst real project teams, instead of projects in a laboratory setting, and amongst projects in different kinds of organizations, which makes it likely that the findings can be generalized across several work settings.

The present study has some limitations. First, all data have been collected using questionnaires opening up the possibility of response set consistencies. Second, because of the self-report nature of the data, and the correlation analyses that have been employed, any attempt at a causal explanation of the results must remain tentative. A longitudinal study might reduce these limitations, although this design has also limitations, such as the problem of selecting appropriate time intervals (Frese & Zapf, 1988; Kessler & Greenberg, 1981). Research using multi-wave designs can provide more specific information about the stability and change of the variables, and about cross-lagged (i.e. over time) relationships than our cross-sectional approach (De Lange, 2005; Taris & Kompier, 2003).

Third, the internal consistency of the task-focused leadership scale was rather low (.62). The widely-accepted social science cut-off is that alpha should be .70 or higher for a set of items to be considered a scale, but some use .75 or .80 while others are as lenient as .60 (Miller, 1995). The formula for alpha takes into account the number of items on the theory that the more items, the more reliable a scale will be. This means that the alpha will rise when the number of items will be higher, even when the estimated average correlations are equal. In future studies, the three-item task-focused leadership scale should be supplemented with some additional items to represent the concept more completely and to increase the internal consistency of the measurement instrument.

Fourth, this study explores only a limited set of factors that project managers and their teams can influence to promote team learning. Other possible mediators of the relationship between team leadership and team learning include the role stress perceptions of team members and the meeting frequency of the project team. Practical reasons (e.g., the length of our questionnaire and the number of teams that could be included in our final analysis) limited the number of factors that could be explored. Future research should assess the relationships with other antecedents.

Fifth, team leadership behavior was measured by a self-assessment survey filled out by the project manager. The leadership behavior as perceived by the project team members might differ. Multi-source ratings could be used to compare the different perceptions and might shed more light on opportunities for improvement as well.
Finally, although 237 respondents participated in the study, all variables were measured and analyzed at the team level. The number of teams was 30, which is rather small. Further research using larger samples is needed to examine the robustness of our findings and to include multiple mediation models.

Future studies should also examine whether the leadership behaviors that promote team learning vary over time depending on the project phase. This would help project managers tailor their behavior to the situation at hand. Hackman and Wageman (2005) proposed a model of team coaching consistent with this line of thinking, defining team coaching as *".. direct interaction with a team intended to help members make coordinated and task-appropriate use of their collective resources in accomplishing the team's work"* (p.269). They suggest tailoring the leader's coaching behavior to the team's task cycle, by getting team members acquainted to each other and to the task at an early stage, by fostering team task strategies throughout the project, and by promoting reflection at the end of meaningful task cycles.

Practical Implications

From a practitioner's perspective, project organizations can benefit from the results of this study by helping their project managers increase the learning ability of their teams. Outcomes may help project managers develop the most helpful mix of leadership behaviors to foster team learning behaviors in their project teams. Furthermore, this study suggests that project managers face a tradeoff in using temporary team membership. On the one hand, it helps apply the highest level of expertise in each project phase. On the other hand, temporary team membership means that familiarity and understanding among team members resulting from team longevity are missing. This may hinder team learning routines through perceptions of a team climate that is less psychologically safe (Edmondson, 1999).

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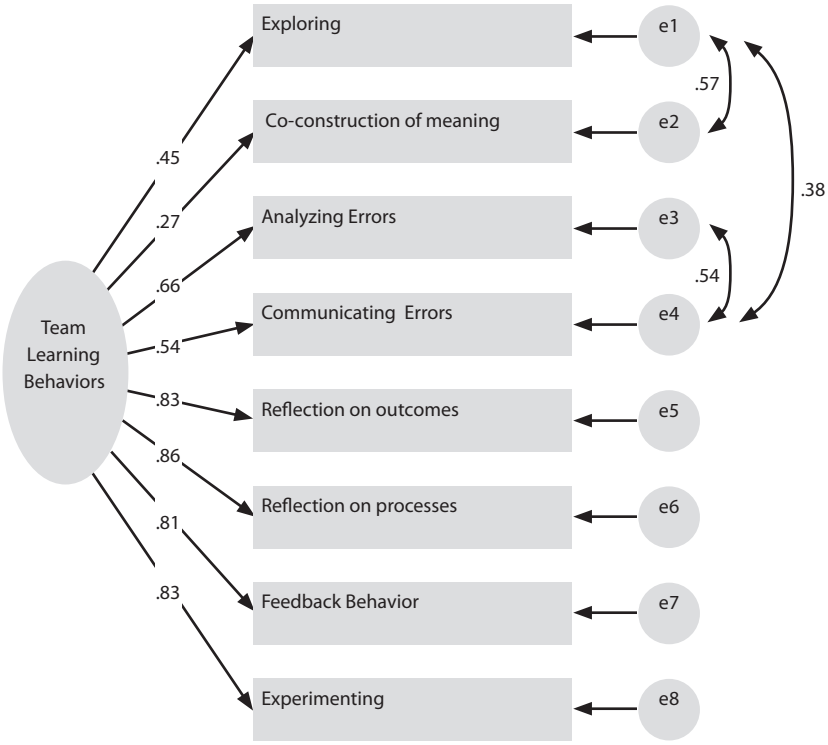
Appendix 1:
Second-order SEM model of Team Learning Behaviors (at the team level, N = 40)



($\chi 2 = 20.1$; df = 17; $\chi 2$ / df = 1.182; p = .269; NFI= .902; CFI = .982.; RMSEA = .068; PCLOSE = .369)

Chapter 5:
Team Learning, Role Stress, and Performance: A Multi-Level Investigation among Dutch Project Teams[4]

Employee role stress has been investigated extensively. However, much less is known about role stress at the team level. Many teams, project teams in particular, are confronted with ambiguous or conflicting goals, and/or an overload in quantitative or qualitative task requirements. Whether experienced at the individual or team level, role stress may seriously hamper the performance of project teams, partly because it may reduce the amount of effort invested in team learning. For this study, we tested a multi-level mediation model describing the relationships among role stress, team learning behaviors, and performance using a sample of 38 Dutch project teams (N = 283). Our findings indicate that team role stress, in particular quantitative overload, impedes team performance by inhibiting team learning behaviors. Individual performance appears to be hindered by team role stress as well. These findings imply that team leaders should explicitly take time to encourage team learning. By doing so, they not only support their team's performance, but also reduce feelings of individual role stress, supporting individual performance.

This study addresses the relationships among role stress, team learning behaviors, and performance in project teams at both the individual and the team level. Role stress has been defined as the strain resulting from ambiguity, conflict, or overload in multiple task requirements or roles of employees (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). Although it comprises a natural and often unavoidable phenomenon in organizational settings, it is known to impair the effectiveness of individuals executing a job (Kahn et al., 1964). Moreover, previous research consistently revealed negative relationships with job performance and job satisfaction (e.g., Beauchamps & Bray, 2001; Erera-Weatherley, 1996; Jackson & Schuler, 1985; Zika-Viktorsson, Sundström, & Engwall, 2006). However, to the best of our knowledge, earlier research has merely focused upon role stress as an individual-level phenomenon. We argue that role stress does not necessarily restrict itself to individuals; it may

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just as well concern a whole team.

Salas, Dickinson, Converse, and Tannenbaum (1992, p. 126) defined a team as "a distinguishable set of two or more people who are assigned specific roles or functions to perform dynamically, interdependently, and adaptively toward a common and valued goal". More specifically, project teams can be defined as temporary organizations that operate relatively autonomously towards the attainment of a goal, on time, within budget, and in conformance with predetermined performance specifications to add value for the owner (i.e., the client of the project team). This generally entails the successful completion of a developmental product, and therefore the work to be done is usually non-routine (Gaddis, 1959; Söderlund, 2004; Turner, 2006)

Teams, project teams in particular, are likely to experience role stress. They often have to deal with multiple stakeholders (e.g., the owner, users, and external parties involved, like local or national authorities). These stakeholders may confront teams with ambiguous and/or conflicting requirements, and/or simply overload them with too many quantitative or qualitative task requirements given the available resources. This may be especially true in a multi-project context (e.g., Keegan & Turner, 2002; Nobeoka & Cusumano, 1997), where teams are struggling with issues of resource allocation and priorities as well as coordination among projects (e.g., Söderlund, 2004). Moreover, the non-routine nature of the job typically requires a constant adaptation to an often turbulent and uncertain outside environment, which may dictate interim membership changes on top of the already commonly seen part-time, multi-functional, limited life-span type of membership (Turner, 2006), possibly leading to internal struggles in terms of goal and role clarity. Given these conditions, perceptions of role stress in the team environment may not just be related to roles and requirements faced by individual team members, they may also originate from the goals and requirements the project team has to meet as a whole, and are, therefore, likely to be shared by all members of the team (Akgün, Byrneb, Lynn, & Keskina, 2007).

Whether experienced at the individual or the team level, role stress is likely to impede the effectiveness of the team and its members. Due to role ambiguity, -conflict, or –overload, team members may spend time working on tasks that do not contribute to the project goals, they may experience difficulties in synchronizing or integrating tasks, or they may simply fail to finish work on time. Obviously, this may result in the team not meeting its performance standards. Hence, it is valuable to carry out empirical research aimed at finding ways to reduce role stress, both at the individual and at the team level. Previously, different ways of reducing role stress have been suggested (Wetzels, Ruyter, & Bloemer, 2000), such as, restructuring of the role distribution, (de)formalization of roles, and empowerment of individual employees. However, these means to reduce role stress tend to require the involvement of others, notably higher management. The fact that project teams are, by definition, relatively autonomous, reduces the ability of others, outside the team, to take measures to reduce role stress. Consequently, it is important to better understand how the team itself deals with role stress.

According to Edmondson and Smith (2006), project team members must adapt an inquiry orientation, in which they mutually explain their positions in order to translate the diversity of their cross-functional viewpoints and personal networks into project success. These interpersonal exchanges put forward team learning behaviors (e.g., Edmondson, 1999; Savelsbergh, Van der Heijden, & Poell, 2009 in press) as important for gaining an

understanding of the project as a whole and for integrating different viewpoints and roles (Brown & Eisenhardt, 1995). Research has indeed shown extensively a positive association between team learning behaviors and team performance (e.g., Edmondson, 1999; Savelsbergh, Van der Heijden, & Poell, 2009). Team learning behaviors may represent an effective means to explore roles collectively, to reflect collectively on ambiguous, conflicting, or overburdening demands, or to experiment together in finding solutions to cope with these role-stress evoking situations. As such, team learning may decrease perceptions of role stress and may counter its negative effects.

Interestingly, traditional job stress theory (Karasek & Theorell, 1990; Taris, Kompier, De Lange, Schaufeli, & Schreurs, 2003) pointed out that the experience of stress is typically a condition that diverts attention and effort away from learning behaviors. This happens because there is no time or energy left for important, yet 'secondary', work processes that do not contribute immediately to the primary process of finishing the task at hand (e.g. Fried, Ben-David, Tiegs, Avital, & Yeverechyahu, 1998). Time pressure may cause a lowered epistemic motivation of individuals (Kruglansky, 1989; Mayseless & Kruglansky, 1987) and teams (Van Kleef, Homan, Beersma, Knippenberg, Knippenberg, & Damen, 2009), and as such, hinder engagement in systematic and thorough information processing. Hence, there seems to be a reciprocal relationship between stress and learning, which has indeed been addressed in earlier, individual-level research, but not in team-level research. The aim of the present study, therefore, is to study the team-level, individual-level and cross-level relationships of role stress and performance, thereby also considering the role of team learning behaviors in these relationships.

Theoretical Background

Individual-Level and Team-Level Role Stress Defined

Roles refer to a set of expectations about behaviors given a certain position in a social structure, and are a defining characteristic of teams (Beauchamp & Bray, 2001). Considerable research has focused on role-related perceptions of stress. Following Kahn et al. (1964), we define role stress as a composite construct consisting of role ambiguity and role conflict and, in line with later studies (Bacharach, Bamberger, & Conley, 1990; Ivancevich & Matteson, 1980; Peterson & Smith, 1995), of role overload. Stress does neither reside solely in the environment nor solely in the individual, yet, is established when the interactions between the two are appraised as demanding enough to threaten well-being (Dewe, 1992). *Role ambiguity* occurs when a person does not have access to sufficient information to perform his or her role adequately (Rizzo, House, & Lirtzman, 1970). *Role conflict* refers to "the simultaneous occurrence of two (or more) sets of pressures such that compliance with one would make more difficult compliance with the other" (Kahn et al., 1964, p. 19). *Role overload* occurs when a person perceives an inconsistency between task demands and time or other resources available for completing tasks (quantitative role overload) (Bacharach et al., 1990; Ivancevich & Matteson, 1980). It also occurs when a person perceives a lack of knowledge, abilities, or skills to comply with expectations (qualitative role overload) (Ivancevich & Matteson, 1980). As such, role overload can even occur in case there is no role conflict or ambiguity.
Research on role stress has consistently linked role ambiguity, conflict, and overload with

higher levels of job-related tension, reduced organizational commitment, greater job dissatisfaction, and impaired performance (e.g., Jackson & Schuler, 1985; Zika-Viktorsson et al., 2006). Negative relationships between the distinguished three dimensions of role stress and job performance are explained by cognitive and motivational processes (Tubre & Collins, 2000); cognitive, because of the lack of information to solve conflicting demands; motivational, because role stress tends to weaken 'effort-to-performance' and 'performance-to-reward' expectancies. Moreover, psychological implications of role stress (e.g., decreased efficacy beliefs and job satisfaction), and behavioral implications (e.g., performance) have been reported (Beauchamps & Bray, 2001). The findings by Zika-Viktorsson and colleagues (2006) indicated positive associations between levels of project overload and (a) levels of psychological stress reactions, (b) deviations from time schedules, and a negative association with competence development.

Over 400 empirical investigations into the causes and effects of role stress have been carried out in the past 40 years, and have focused on the individual role incumbent. There is no doubt that stress is an important individual-level phenomenon and that its effect depends on how individuals evaluate and receive it (Fleming, Baum, & Singer, 1984). However, stress is also identified as a collective reality in team settings. Based on the writings on cross-functional team integration (Kahn, 1996; Millson & Wilemon, 2006), and upon the ideas from structuration theory (Giddens, 1984), Akgün et al. (2007) stated that "stress is socially distributed in teams and denotes the collective awareness of individuals of stressors as a result of perceived conditions or happenings in the project's processes". In addition, Akgün, Lynn, and Byrne (2006) suggested that "team members can experience fear, pressure and uncertainty, and feel confused in a collective manner".

Following this line of reasoning, we assume that, besides an individual experience of role stress related to the requirements associated with one's specific role within a team, team members may also come to experience collective feelings of stress resulting from ambiguity, conflict, or overload related to the roles and requirements of the team as a whole. The important difference between the concepts of individual role stress and team role stress concerns the source causing the feelings of stress. While individual role stress stems from ambiguous, conflicting, or overloaded demands in terms of one's individual task, team role stress is experienced because of ambiguous, conflicting, or overburdening demands at the project or team-level. Evidently, role stress factors related to the project level may also cause feelings of ambiguity, conflict, or overload about one's own role in the scheme of things, and the experience of individual role stress may become shared among team members through processes of social contagion, but team role stress, as we define it, purely relates to the collective experience of strain resulting from ambiguity, conflict, or overload in the task requirements and roles at the project level.

In line with common definitions of individual role stress (Bacharach et al., 1990; Ivancevich & Matteson, 1980; Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; Peterson & Smith, 1995), we define team role stress as a composite construct consisting of role ambiguity, role conflict, and role overload. *Team role ambiguity* occurs when a team does not have access to sufficient information to perform its role adequately. *Team role conflict* refers to the simultaneous occurrence of two (or more) sets of pressures on the team as a whole, such that compliance with one would make compliance more difficult with the other. *Team role overload* occurs when a team does not have sufficient time or resources to comply with expectations.

Individual-Level and Team-Level Role Stress and Their Relationships with Performance

Considering the increasing attention paid to research into all types of team configurations, such as autonomous or self-directed teams and project teams, it is remarkable that the effects of role stress factors at the team-level have received so little attention. Not in the least because available studies (e.g., Forsyth, 1999) suggest that psychological and behavioral implications of role stress for the whole team are equal to the ones found for individual role incumbents. Before elaborating on the role stress - performance relationships, we will deal with a conceptualization of individual and team performance in the project team context. Focusing on the performance purpose of project teams (rather than viability or personal growth), we adopt Hackman's (1987) concept of task performance who defined the concept as the degree to which a team meets its goals and how well its output fulfils the team's mission (cf., Bushe & Coetzer, 2007) as explicated in aspects such as the quality of the work, the timeliness of the work, the handling of financial resources, and the maintenance of good client relationships. In line with this focus, we define individual performance in our study as the degree to which an individual team member meets his or her assignments and his or her accomplishments in contributing to the team's mission (Tesluk, Zaccaro, Marks, & Mathieu, 1997).

We anticipate that negative effects of individual role stress are most likely to become manifest at the individual level rather than the team level. Prior research within variegated contexts (e.g., Beauchamps, Bray, Eys, & Carron, 2005; Peterson & Smith, 1995; Veloutsou & Panigyrakis, 2004) has provided ample proof of negative associations with individual performance, job satisfaction, and intention to leave. Role stress in a single team member will not directly become visible in team outcomes, unless that person fulfils a very prominent role. Nevertheless, even in this case the team can function as a safety net, and may compensate for the malfunctioning of one of its members. Team role stress, due to ambiguous, conflicting, or overburdening roles and/or requirements at the team-level, may negatively affect both individual-level and team-level performance. When there are many of these team-level stress factors, this makes it extremely difficult for team members to perform towards a "common and valued goal" in a coordinated manner (Salas, Dickinson, Converse, & Tannenbaum, 1992). Hence, we anticipate that team role stress will impair the performance of the team as a whole. Negative effects of team role stress may, however, also become manifest at the individual level of performance. After all, it may be rather difficult for individual members to be effective, in case there is ambiguity or controversy about the team's goals and roles, or when the team is understaffed quantitatively or qualitatively. Based on this line of thinking, our first three hypotheses read as follows:

H1. Individual role stress is negatively related to individual performance.
H2. Team role stress is negatively related to individual performance.
H3. Team role stress is negatively related to team performance

Team Learning and Its Relationship with Role Stress and Performance

In previous research, the concept of team learning has been addressed from different perspectives. Some researchers have emphasized the process of learning (e.g., Edmondson, 1999, 2002; Gibson & Vermeulen, 2003; Kasl, Marsick, & Dechant, 1997), while others have mainly stressed its outcomes (e.g., Ellis, Hollenbeck, Ilgen, Porter, West, & Moon, 2003). *Outcome* definitions of team learning are often described in terms of changes in knowledge, skills, and attitudes resulting from interactions among the team members (e.g., Argote, Insko, Yovetich, & Romero, 1995; Ellis et al., 2003). So-called *process* definitions of team learning capture components such as reflection and action (Edmondson, 1999; 2002; Gibson & Vermeulen, 2003; Tjosvold, Tang, & West, 2004), sharing and processing knowledge, and making improvements (Argyris & Schön, 1978; Edmondson, 2002; Gibson, 2001). Several researchers have described concrete team learning behaviors associated with these components, such as asking questions, challenging assumptions, evaluating alternatives, seeking feedback, experimenting, reflecting on results, detecting, discussing and correcting errors, and reflective communication (Argyris & Schön, 1978; Edmondson, 1999; Gibson & Vermeulen, 2003; Kasl, Marsick, & Dechant, 1997; Savelsbergh et al., 2009; Van der Vegt & Bunderson, 2005). Here we apply a process definition of team learning (Edmondson, Dillon, & Roloff, 2007), that is to say, we adhere more specifically to Edmondson's (1999) definition of team learning behaviors as an ongoing process of collective reflection and action, which was elaborated by Savelsbergh and colleagues (2009) into eight distinct and concrete learning behaviors, including (1) exploring different perspectives, (2) co-construction of meaning, (3) reflection on outcomes, and (4) reflection on processes, (5) communicating errors and (6) analyzing errors, (7) feedback behavior, and (8) experimentation.

Although the attention paid to intra and inter-project learning is increasing in the project management literature (e.g., Winter, Smith, Morris, & Cicmil, 2006), only few studies on learning in project teams are available (cf., Söderlund, Vaagaasar, & Andersen, 2008). Earlier theoretical work highlighted some of the dilemmas and opportunities associated with learning within and among projects (Ayas & Zeniuk, 2001; Keegan & Turner, 2001; Raelin, 2001), however empirical evidence from real-life project teams is largely lacking. The scarce available findings (e.g., Gibson & Vermeulen, 2003; Van der Vegt & Bunderson, 2005; Savelsbergh et al., 2009), however, indicate a positive relationship between team learning behaviors and the performance of the project team.

Karasek and Theorell's (1990) classical job stress model, i.e., the Job Demand-Control-Support Model (JDCS Model), offers a useful psychological perspective to study the relationships between team learning behaviors, role stress, and performance. Their mdel postulates that some level of stress or demands in the form of challenge, interest, and importance is necessary for effective performance, but that a too high level of stress or too many demands can seriously impair performance. The optimal level of demands, according to this model, depends on the amount of resources an employee has available to learn to cope with high demands. That is, when a person has enough resources to develop new skills and strategies to respond to a taxing situation, these new behaviors will be added to that person's repertoire of coping strategies, thereby raising his or her action potential for the future. In fact, such learning experiences may help to reduce perceptions of events as stressful, since they

stimulate feelings of mastery or confidence, and thereby increase success in coping (Taris & Kompier, 2005). However, the JDCS model (Karasek & Theorell, 1990) also claims that the experience of stress itself may jeopardize a person's engagement in learning behaviors. If a person's resources are totally absorbed in an attempt to deal with demanding and stressful conditions, few resources for learning will be left and no learning will take place. The more recent 'broaden-and-build theory' (Frederickson, 2001) touches on to the role of emotion in broadening the thought-action repertoires of people, and in building their personal resources. Frederickson (2001) stated that positive emotion fosters the desire to explore, assimilate new information, and experience and growth. Role stress perceptions, being associated with negative emotion, may block this desire to learn. Hence, the relationship between stress and learning is believed to be a reciprocal one: learning allows a person to face challenges, that is to say, *learning inhibits stress*, but a person who experiences too much stress loses the capacity to learn, that is to say, *stress inhibits learning*.

Although the JDCS model was developed in the context of individual performance, we deem its principles to be applicable in the context of team performance. That is, team learning behaviors may well help team members, individually or collectively, to deal with particular demands placed on them in the context of a team project. For example, at the individual level, team learning behaviors may help team members to gain a greater clarity concerning their specific role in the team. Exploration of the team's tasks and roles from different perspectives may help reduce role conflicts among team members by building a co-constructed meaning about which role should be fulfilled by whom, or it may help overcome individual role overload by reflecting on processes or experiments with new strategies developed together. As a result, individual performance is expected to benefit as well. Analogously, these team learning behaviors may help the team to gain clarity concerning its role within its context (e.g., relations to other subcontractors), on how to cope with conflicting demands made by stakeholders, and/or on how to overcome perceptions of overload. Consequently, the performance of the team as a whole will benefit as well.

It is, however, conceivable that stressful conditions associated with team-level role ambiguity, role conflict, and particularly role overload, leave a team with little resources to fully engage in team learning behaviors. Some studies on stress and learning in teams indeed reported such a negative effect. Pearsall, Ellis, and Stein (2009) found that stressors perceived as a hindrance (i.e., exceeding the team's competencies) show negative effects on a team's capacity for learning, remembering, and communicating relevant team knowledge (e.g., Wegner, 1987). Zika-Viktorsson and associates (2006) also suggested that high levels of project overload lead to a reduced focus on competence development. These findings corroborate the assumption that the strains associated with ambiguous, conflicting, or simply too high demands will have a negative effect on team learning behaviors.

Summarizing, rigor empirical proof regarding the relationships between team role stress, team learning, and team performance is lacking. We will therefore test *two alternative mediation models* for the team-level stress-learning-performance relationship, in which, respectively, a) team learning behaviors inhibit team role stress (i.e., team role stress (partially) mediates the positive effect of team learning behaviors on team performance), and b) team role stress inhibits team learning (i.e., team learning behaviors (partially) mediate the

negative effect of team role stress on team performance:

H4a. Team learning behaviors are positively related to team performance. This relationship is mediated by team role stress.

H4b. Team role stress is negatively related to team performance. This relationship is mediated by team learning behaviors.

The fact that some individuals experience role stress does not necessarily imply that the whole team will do so, and subsequently, will refrain from engaging in team learning behaviors. That is to say, the other team members may still give rise to team learning behaviors. With regard to potential cross-level effects of team learning, we are inclined to believe that team learning behaviors may help to evaluate the team's role, and hence reduce perceptions of ambiguity and overload or role conflicts regarding the specific individual roles. Stated otherwise, team members that have a clear focus of the team's role and how it deals with conflicting demands or role overload, may feel less stressed about their own specific role as well.

This line of reasoning is in line with findings of DeSchon, Kozlowski, Achmidt, Milder, and Wiechmann (2003), who indicated that team members, confronted with multiple-goals in the multi-level context of teams (individual and team-level goals), are more capable to self-regulate their own resource allocation. These resource allocation processes take place by means of individual and team feedback processes, being one of the team learning behaviors. Moreover, next to the negative association between team learning behaviors and individual role stress, we hypothesize a positive impact of team learning behaviors upon individual performance. Hence, individual role stress is expected to (partially) mediate the positive effect of team learning behaviors on individual performance. We have formulated this hypothesis as follows:

H5. Team learning behaviors are positively related to individual performance. This relationship is mediated by individual role stress.

The hypothesized relationships in the multi-level mediation model used in this study are summarized in Figure 1.

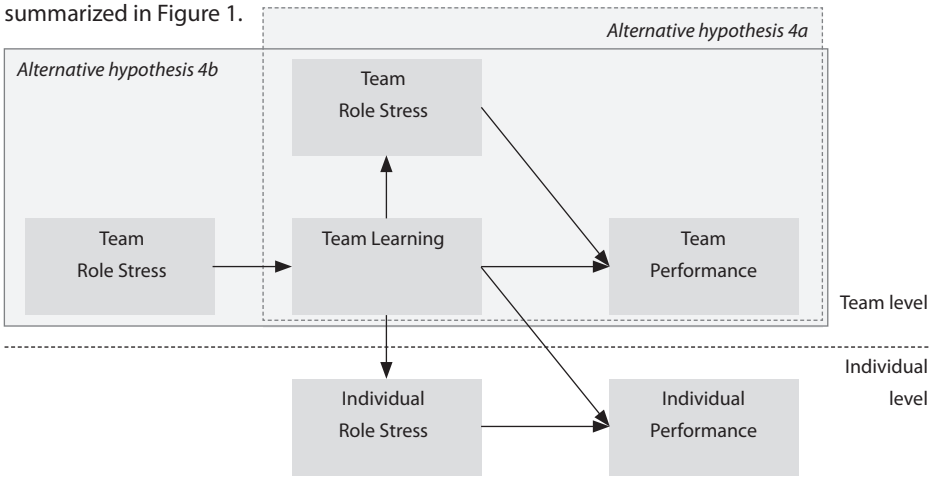

 Figure 1: Conceptual Model

Methods

Procedure and Sample

The challenge in data collection aimed at investigating relationships among constructs using a multi-level approach lies in obtaining a sample with sufficient between-unit variability to assess the effects of unit (in our case team) differences. However, at the same time, sufficient within-unit homogeneity should exist to justify aggregation of lower-level data when testing the effects of shared unit properties. In order to comply with these sample requirements, we asked the principal managers of projects (the so-called project directors) of ten companies, who were willing to participate, to select two or more project teams which in their opinion differed significantly in terms of role stress, team learning behaviors and performance. We explained how we conceptualized a project team by referring to Turner's (1999) so-called primary group or core team, comprising 'a set of people who work face to face and who know everyone else in the group' (p. 426). The sample suggested by the project directors comprised 40 project teams from ten companies involved in building and utilities (N = 10), engineering and construction (N = 12), infrastructure (N = 8), and area decontamination and development (N = 10).

Our survey was pre-tested in a pilot study among two team members and one project manager, using think-aloud protocols, in order to examine the face validity and clarity of the questions. In addition, the survey was completed by four other participants (two team members and two project managers) in order to test its user friendliness and time needed to answer all questions. The average time required to complete the total survey was 35 minutes, ranging from 29 minutes to 40 minutes. The survey items that were originally in English were translated into Dutch using the 'translation-back-translation method' (Hambleton, 1994).

The data collection for the main study took place during the second half of 2008. 335 team members and their 40 project managers were asked by the principal researcher to complete an e-questionnaire measuring the amount of individual - and team-level role stress, the team's learning behaviors, and the amount of individual - and team-level performance in their specific projects. At the same time, the external owners of each project team (i.e., the client) (N = 40), being relative outsiders, were asked to fill out a sub-set of questions measuring their perception of the project team's performance. Nominally identical versions of the measurement scales were used for the three categories of respondents, i.e. team members, project managers, and project owners. This so-called 'multi-rater approach' for measuring team performance was used in order to enable us to control for common-method in our analyses (Doty & Glick, 1998; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Responses were received from 245 team members (71.3 percent response rate), 38 project managers (95.0 percent response rate), and 38 owners (95.0 percent response rate). We decided to exclude teams for which the response rate among its members was below 50 percent, in order to warrant reliability of the data in case the project manager did not respond. Due to these constraints, two of the total number of approached teams (N = 40) dropped out, implying that 38 teams were included in our analyses. The team size (including

the project manager) of the remaining 38 project teams ranged from two to twenty-two members (M = 9.74; SD = 5.39). The mean age of the team members was 42.2 years (SD = 10.2), and 45.86 years (SD = 7.6) for their project managers. Respectively 82.9 percent of the team members and 94.7 percent of the project managers were male. The total amount of work experience of the team members (M = 18.9 years; SD = 11.0) and their project managers (M = 21.6 years; SD = 7.9) was rather high; 77.0 percent had more than 9 years of total work experience

Measures

Individual-Level and Team-Level Role Stress. We used a sub-set of items from Ivancevich and Matteson's (1980) scales of employee tension due to: a) role ambiguity, b) role conflict, c) quantitative, and d) qualitative role overload to measure the multi-dimensional concept of role stress at the individual as well as the team level. The original individual-level items were slightly reworded for the team-level scales, asking the project team members to evaluate the role of their project team as a whole. An example item is: 'The team is responsible for an almost unmanageable number of assignments at the same time' (instead of: 'I am responsible for an almost unmanageable number of assignments at the same time').

Role ambiguity was assessed using a five-item scale reflecting the four forms of role ambiguity identified by Kahn and associates (1964): 'scope of responsibilities', 'role behaviors necessary to fulfill one's responsibilities', 'criteria according to which one is evaluated', and ' ambiguity about whose expectations team members are required to meet'. An example item is: 'My job duties and work objectives are unclear to me'. For the team level this item was reworded into: 'The work duties and objectives of the team are unclear to the team members'.

Role conflict was assessed using two items of the Ivancevich and Matteson (1980) role conflict scale. An example item is: 'I receive conflicting requests from two or more people'. At the team level this item was reworded into: 'The team receives conflicting requests from two or more people'. One item from House, Schuler, and Levanoni (1983) was added as we wanted to reflect a more complete set of role conflict causes than those covered by the Ivancevich and Matteson (1980) role conflict scale. This item was: 'I receive an assignment without adequate resources and materials to execute it'. At the team level this item was reworded into: 'The team receives an assignment without adequate resources and materials to execute it'.

Quantitative role overload (i.e., lack of sufficient resources to fulfill the project team's mission) was assessed using four items from Ivancevich and Matteson's (1980) quantitative role overload scale. An example item is: 'I simply have more work to do than can be done in an ordinary day'. At the team level this item was reworded into: 'The team simply has more work to do than can be done in an ordinary day'.

Qualitative role overload (i.e., lack of competencies to fulfill the project team's mission) was assessed using a three-item scale from Ivancevich and Matteson (1980). An example item is: 'The tasks assigned to me are too difficult and / or complex'. At the team level this item was reworded into: 'The tasks assigned to the team are too difficult and / or complex'.
For all individual-level and team-level role stress scales, a five-point rating scale was used with scale anchors ranging from 1 (completely disagree) to 5 (completely agree). Internal

consistencies using Cronbach's alpha were acceptable to good for the four individual role stress scales (respectively, alpha $_{\text{role ambiguity}}$ = .79, alpha $_{\text{role conflict}}$ = .70, alpha $_{\text{role quantitative overload}}$ = .78, alpha $_{\text{role qualitative overload}}$ = .67) as well as for the four team-level role stress scales (respectively, alpha $_{\text{team role ambiguity}}$ = .77, alpha $_{\text{team role conflict}}$ = .81, alpha $_{\text{team role quantitative overload}}$ = .82, alpha $_{\text{team role qualitative overload}}$ = .80).

Team Learning Behaviors. Team learning behaviors were measured using 28 items developed by Savelsbergh and colleagues (2009) (based on Edmondson, 1999; Van den Bossche, Gijselaers, Segers, & Kirschner, 2006; Van Dyck, 2000; Van Dyck, Frese, Baer, & Sonnentag, 2005; Schippers, Den Hartog, Koopman, & Wienk., 2003; Van Woerkom, 2003) covering eight dimensions of team learning behaviors, including (1) exploring different perspectives, (2) co-construction of meaning, (3) reflection on outcomes, and (4) reflection on processes, (5) communicating errors and (6) analyzing errors, (7) feedback behavior, and (8) experimentation. An example item was: 'Team members elaborate on each other's information and ideas'. A five-point rating scale was used with scale anchors ranging from 1 (completely disagree) to 5 (completely agree). The internal consistency of the 28 items was high (alpha = .94).

Individual Performance. As a team's task performance is achieved by the individual members of a team (McGrath, 1964; Tesluk et al., 1997), we formulated six items examining the self-perceived contributions of each individual team member to the project, thereby obtaining a measure for individual performance (see also Bandura, 1986). Item formulation was based on the same dimensions that Hackman and Oldham (1980) used to examine team task performance (as followed by many others such as Cohen & Bailey, 1997; Katzenbach & Smith, 1993; Sundstrom, DeMeuse, & Futrell, 1990). We used a 'relative rating procedure' asking respondents to indicate their relative feelings of satisfaction about their individual performance in this project compared to that in other projects they had recently worked on (Henderson & Lee, 1992). An example item was: 'In comparison with other project teams I recently worked for, my own accomplishments in this team in general make me feel …'. A five-point rating scale was used with scale anchors ranging from 1 (much less satisfied) to 5 (much more satisfied). The internal consistency of the six items was high (alpha = .86).

Team Performance. This study examined the team performance dimension of team effectiveness as defined by Hackman (1989). Our previously explained multi-rater performance measurement approach (Smither, London, & Reilly, 2005) requires assessment criteria that are deemed vital by all the distinguished categories of respondents. We used a self-reported subjective measure of team performance, a method commonly used in the study of work teams (Cohen & Bailey, 1997; Van den Bossche et al., 2006), in combination with a more objective measure of team performance as perceived by the project owner, following Hackman (1989). The subjective measure of team performance consisted of eleven items of which nine were formulated on the basis of the team performance criteria identified by Savelsbergh, Van der Heijden, and Poell (2007). An example item was: 'In comparison with other project teams I recently worked for, the way that good client relationships are taken care of in this team makes me feel…'. Two additional items were based on Müller and Turner's (2007) project success criteria to cover specific performance aspects that are in particular important to project teams. An example item was: 'In comparison with other project teams I recently worked for, the number of improvement initiatives of this team makes me feel…'. The internal consistency of the scale was high (alpha = .80 for the external clients, and alpha = .90, both for the internal team members and for project managers).

Data Preparation

In this sub-section we report on the preparation of the data prior to the actual testing of hypotheses. First, data screening was conducted to identify and establish: a) missing data, b) univariate normality and potential outliers, and c) bivariate linearity, normality, and potential outliers associated with the hypothesized correlations. Linear regression plots were examined in order to test whether the assumptions were violated, which appeared not to be the case.

In order to test the validity of the team-level constructs, the team-level measures were tested as regards their dimensionality, discriminant validity (Anderson & Gerbing, 1988), and aggregate reliability (Bliese, 2000; Klein & Kozlowski, 2000). Dimensionality and discriminant validity were tested by means of Confirmatory Factor Analyses (CFAs) using the AMOS 16.0 program (Arbuckle, 2006). Model fit was evaluated with a set of indices including the Chi-square test statistic ($\chi 2$), the Goodness of Fit Index (GFI), the Comparative Fit Index (CFI), the Parsimony Normed Fit Index (PNFI), and the Root Mean Square Error of Approximation (RMSEA), each of which reflect somewhat different facets of model fit (Kline, 1998). Values of CFI and GFI ≥ 0.90 and RMSEA < 0.10 are considered acceptable, while values of CFI and GFI ≥ 0.95 and RMSEA < 0.08 may be interpreted as a good fit (Hu & Bentler, 1999). Parsimony fit indices, such as the PNFI, take the complexity of a model into account and typically have lower values. Parsimony fit indices in the range of .50 are not unexpected (Byrne, 1998). Concerning the role stress measures, CFAs confirmed the validity of the multi-dimensionality of the individual role stress construct ($\chi 2 = 172.09$; df = 86; $\chi 2$ / df = 2.001; p = .000; GFI= .92; CFI = .93; PNFI = .71; RMSEA = .060) as well as of the team role stress construct ($\chi 2 = 211.919$; df = 86; $\chi 2$ / df = 2.464; p = .000; GFI = .91; CFI = .92; PNFI = .72; RMSEA = .072). Both constructs appeared to comprehend the four dimensions corresponding to role ambiguity, role conflict, quantitative role overload, and qualitative role overload. Subsequently, in order to assess the discriminant validity between individual - and team-level role stress, a series of four two-factor models (individual versus team factor) were estimated, one for each dimension of role stress, as recommended by Bagozzi, Yi, and Philips (1991). The CFAs of the two-factor models produced a good fit for role ambiguity ($\chi 2 = 68.765$; df = 34; $\chi 2$ / df = 2.02; p = .000; GFI= .96; CFI = .96; PNFI = .69; RMSEA = .060), for role conflict ($\chi 2 = 14.803$; df = 7; $\chi 2$ / df = 2.12; p = .039; GFI= .98; CFI = .986; PNFI = .454; RMSEA = .063), for quantitative role overload ($\chi 2 = 31.024$; df = 18; $\chi 2$ / df = 1.72; p = .029; GFI= .98.; PNFI = .622; CFI = .986; RMSEA = .051), and for qualitative role overload ($\chi 2 = 12.085$; df = 86; $\chi 2$ / df = 1.73; p = .098; GFI= .46; CFI = .991; PNFI = .457; RMSEA = .051). Moreover, when the two-factor models were compared with single-factor models with regard to each of these dimensions, the discriminant validity of the individual-level and team-level constructs was confirmed. The Chi-square difference was significant ($p < .05$) for all comparisons.

Finally, CFAs were conducted to assess the validity of the other measurement instruments used in our study. As regards the multi-dimensional team learning behaviors' instrument from Savelsbergh and colleagues (2009), the validity of the use of the measure within the project team context was tested by examining the fit of a second-order model of team learning behaviors, consisting of eight latent learning behaviors, each measured by three to six observed variables ($\chi 2 = 491.03$; df = 259; $\chi 2$ / df = 1.66; p = .00; GFI= .88; CFI = .95; PNFI= .69; RMSEA = .049). The internal consistency of the measure was .94.

As regards individual performance, the CFA showed that all six items have a shared construct ($\chi 2 = 93.92$; df = 39; $\chi 2$ / df = 2.15; p = .000; GFI = .95; CFI = .97; PNFI= .67; RMSEA = .064), and high factor loadings (minimum: .72). As regards team performance, the CFA showed that all eleven items tap into a shared construct ($\chi 2 = 15.12$; df = 6; $\chi 2$ / df = 2.52; p = .019; GFI = .98; CFI = .99; PNFI= .39; RMSEA = .073), and appear to have high factor loadings (minimum: .57).

Before aggregating the data collected from individual team members to the team level, we assessed the validity of aggregation by calculating the average intra-group agreement index $R_{wg(j)}$ (James, Demarée, & Wolf, 1984). $R_{wg(j)}$ reflects the degree to which raters provide essentially the same rating and ranges from 0 (indicating complete disagreement) to 1 (complete agreement) among group members. Values of .70 or above are considered adequate (George, 1990; George & Bettenhausen, 1990). For our sample all mean $R_{wg(j)}$ values appeared to be met or approached this criterion: mean $R_{wg(j)}$ = .90 for team role ambiguity, .69 for team role conflict, .78 for quantitative team role overload, .74 for qualitative team role overload, .97 for team learning behaviors, and .97 for team performance.

Finally, we conducted one-way ANOVAs on the aggregated data set to examine whether a statistically significant between-group difference existed, which appeared to be the case for all group level variables, except for team role ambiguity ($F(38, 283) = 1.16$, n.s.) and for qualitative team role overload ($F(38, 283) = 1.29$, n.s.). We concluded that the between-group difference for team role ambiguity and qualitative team role overload did not possess enough variability in our sample, and therefore, excluded these measures from all further analyses.

Analyses

The hypothesized individual-level and cross-level relationships among team learning behaviors, individual role stress, and individual performance were examined by means of Hierarchical Linear Modeling (HLM) (Hox, 2002; Snijders & Bosker, 1999), using MLWin 2.1 (Rasbash, Browne, Goldstein, Yang, Plewis, Healy, Woodhouse, Draper, Langford, & Lewis, 2002). Our analysis followed Mathieu and Taylor's (2007) guidelines for testing meso-mediational relationships. First, a null-model was specified for the individual-level outcome measure (i.e., individual performance) to check whether there was sufficient variability for modeling cross-level influences. The ICC(1)-coefficient was computed as an indication of how much variance in the lower-level variable was explained by team membership. We proceeded to test individual-level relationships while controlling for team membership by entering all three indicators of individual role stress into the model, separately and simultaneously. Next, before testing the proposed meso-mediational relationships among team learning behaviors, individual role stress, and individual performance, we specified null models for potential individual-level mediators to check for cross-level mediation potential. The actual test of the meso-mediational relationship consisted of: a) modeling the presumed predictor (team learning behaviors) and mediators (individual role stress) on the dependent variable (individual performance), and b) testing the influence of the predictor on the potential mediators. Mediation (or partial mediation) is established if the relationships between the predictor and the dependent diminishes or disappears completely (in case of full mediation), after including the mediator, provided that the predictor is significantly related to the

mediator, and that the mediator significantly predicts the dependent (Baron & Kenny, 1986; Kenny, Kashy, & Bolger, 1998; Mathieu & Taylor, 2007).

The team-level relationships were tested by means of Structural Equation Modeling (SEM) analyses (Jöreskog & Sörbom 1993), using the AMOS 16.0 program (Arbuckle, 2006). The analysis involved a comparison of four models specifying the relationships among team learning behaviors, team role stress, and team performance according to the alternative hypotheses 4a (with team role stress as the mediator) and 4b (with team learning behaviors as the mediator), implying either full or partial mediation. The distinguished models' fit to the data was evaluated with the same set of indices that we used for the CFAs, with one additional measure, i.e. the AIC. The AIC is generally used to compare competing non-nested models estimated using the same data set. More specifically, the model with the smallest AIC is considered to be best (Kline, 2004). The mediation tests followed similar steps to the ones described above. First, the significance of all applicable univariate relations was evaluated with zero-order correlations. Then, evaluation of full and partial mediation effects involved testing models that either constrained or allowed for direct effects between the predictor and the criterion variables. Since the direction of all effects was predicted in the hypotheses, tests were performed using a one-tailed significance level of .05 (α).

Results

Table 1 provides descriptive statistics and correlations of all variables under study at both the individual and the team levels. Considering the response scale (1-5), employees reported relatively low levels of individual role stress (individual role ambiguity: M = 1.54, SD = 0.68; individual role conflict: M = 2.18, SD = 0.99; individual quantitative role overload: M = 2.48, SD = 0.98; individual qualitative role overload: M = 1.86, SD = 0.81), and team role stress (team role conflict: M = 2.42, SD = 0.95; team quantitative role overload: M = 2.49, SD = 0.94). Team learning behaviors, on the other hand, were scored relatively high (M = 3.48, SD = 0.61). Moreover, employees were quite positive about their individual and team performance (M = 3.41, SD = 0.58, and M = 3.34, SD = 0.52, respectively). Client ratings of team performance were equally positive (M = 3.38, SD = 0.42) in comparison to the self-rated team performance by the team members and their leader ($t(37) = -.69$; $p = .50$).

Table 1

Means, Standard Deviations, and Correlations[a].

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	42.72	9.98		-.41**	.40	-.13	-.08	.03	.14	-.21	.05	-.10	.05	-.16	-.03
2. Gender	1.16	0.36	-.31***		-.02	.08	-.08	-.03	.05	.26	.24	-.06	.12	.27†	.11
3. Team Size	12.64	5.55	.13*	-.04		.18	-.31	.15	.37*	-.02	.30	-.39*	-.09	-.19	-.03
4. Ind. Role Ambiguity	1.54	0.68	-.11†	.06	.05		.20	.31	.37*	.21	.06	-.37*	-.28†	-.43**	-.21
5. Ind. Role Conflict	2.18	0.99	-.09	.04	-.11†	.40***		.26	.02	.47**	.04	.12	.15	-.18	-.21
6. Individual Quantitative Role Overload	2.48	0.98	.05	-.05	.07	.21***	.41***		.54**	.35*	.58**	-.44**	-.30†	-.42**	-.36*
7. Individual Qualitative Role Overload	1.86	0.81	.11†	.01	.14*	.23***	.25***	.36***		.31†	.36*	-.62***	-.15	-.52***	-.32*
8. Team Role Conflict	2.42	0.95	-.12*	.06	-.01	.24***	.57***	.34***	.17**		.46**	-.07	.11	-.30†	-.18
9. Team Quantitative Role Overload	2.49	0.94	.02	.14*	.21***	.16**	.21***	.50***	.27***	.35***		-.45**	-.13	-.34*	-.24†
10. Team Learning Behaviors	3.48	0.61	.03	-.04	-.17**	-.27***	-.17**	-.17**	-.26***	-.14*	-.20***		.39*	.57***	.36*
11. Individual Performance (self)	3.41	0.58	-.04	.12	-.06	-.19***	-.17**	-.26***	-.15**	-.15**	-.12*	.27***		.60***	.15
12. Team Performance (self)	3.34	0.52	-.03	.02	-.15**	-.23***	-.24***	-.26***	-.16**	-.27***	-.18**	.41***	.62***		.23†
13. Team Performance (client)	3.38	0.42	-.11	.07	-.06	-.01	-.10†	-.09	-.09	-.10†	-.11†	.07	.01	.08	

[a] Values below the diagonal result from individual-level analyses (N = 283); those above the diagonal result from the team-level analyses (N = 38).

* p ≤ .05; ** p ≤ .01;*** p ≤ .001; † p ≤ .10 (two tailed)

Concerning the correlations at the individual level, Table 1 shows that all four indicators of individual-level role stress; individual role ambiguity (r = -.19, p < .001), individual role conflict (r = -.17, p < .01), individual quantitative role overload (r = -.26, p < .001), and individual qualitative role overload (r = -.15, p < .01), are negatively associated with individual performance. These preliminary findings are in line with Hypothesis 1. With regard to the

team level, it appeared that self-rated team performance shows negative correlations with individual role stress (individual role ambiguity: r = -.43, p < .01; individual quantitative role overload: r = -.42, p < .01; individual qualitative role overload: r = -.52, p < .001) as well as team role stress (team role conflict: r = -.30, p < .10; team quantitative role overload: r = -.34, p < .05). These outcomes imply support for Hypothesis 2 as well.

The client-rated team performance measure, however, appeared to merely show a negative correlation with individual role overload (quantitative: r = -.36, p < .05; qualitative: r = -.32, p < .05), and a marginally significant negative relationship with team quantitative role overload (r = -.24, p < .10). The self-rated and client-rated team performance measures show a relatively strong positive relationship with team learning behaviors (r = .57, p < .01, and r = .34, p < .05, respectively). The outcomes corroborate the positive association between team learning behaviors and performance implied in Hypotheses 4a, 4b, and 5.

HLM Analyses of the Relationships Between Team Learning Behaviors, Individual Role Stress, and Individual Performance

The first step in the HLM analyses consisted of the calculation of a so-called baseline or 'null' model for the dependent variable to determine how much variance resides within teams, and how much resides between teams. The proportion of total variance that resided between teams was small, yet significant (9.0 percent, $\chi 2$ (1) = 6.51; p < .05), meaning that a significant proportion of the variance in individual performance can be explained by team membership, and that multi-level testing is justified. As indicated previously, we followed the steps prescribed by Mathieu and Taylor (2007) to elaborately test individual-level and cross-level relationships (see Table 2 for all specific outcomes).

Table 2

HLM Analysis for the Relationships Among Team Learning Behaviors, Individual Role Stress, and Individual Performance.

	Dependent Variable									
	IP	*IP*	*IP*	*IP*	*IP*	*IP*	*IP*	*IP*	*IP*	*IQO*
Model	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Individual Role Ambiguity	-.18**				-.11†					
Individual Role Conflict		-.20***			-.05					
Individual Quantitative Overload			-.25***		-.20**				-.22***	
Individual Qualitative Overload				-.15**	-.04					
Team Role conflict						-.08				
Team Quantitative Overload							-.06			
Team Learning Behaviors	.							26***	.22***	-.18*

Notes: N = 283 individual, 38 teams. * p ≤ .05; ** p ≤ .01;*** p ≤ .001; † p ≤ .10 (two tailed)

IP= Individual Performance, IQO = Individual Quantitative Overload

Standardized Bs are presented.

We tested the individual-level relationships by regressing individual performance on the four individual role stress indicators, separately (Models 1 through 4) and simultaneously (Model 5). The results of these tests showed that, conforming to our expectations, all four indicators of individual-level role stress were negatively associated with individual performance. More specifically, for individual role ambiguity, $\beta = -.18$; $p < .01$; individual role conflict, $\beta = -.20$; $p < .001$; individual quantitative role overload, $\beta = -.25$; $p < .001$; individual qualitative role overload, $\beta = -.15$; $p < .01$. Model 5, however, points out that individual quantitative role overload ($\beta = -.20$; $p < .01$) is the only significant predictor of individual performance when the others are controlled for. Individual role ambiguity ($\beta = -.11$; $p < .10$) only adds marginally to its prediction. Hence, we conclude that there is strong support for Hypothesis 1, which stated that individual role stress, in particular quantitative role overload, is negatively related to individual performance.

The cross-level relationship between team-level role stress and individual performance was tested by regressing individual performance on the two team role stress indicators (Models 6 and 7). Because neither construct was related significantly to individual performance (for team role conflict: $\beta = -.08$; n.s.; and for team quantitative role overload: $\beta = -.06$; n.s.), we refrained from testing them simultaneously, and concluded that our second hypothesis was not supported with our data.

The next step in the HLM analyses was to test meso-mediational relationships among team learning behaviors, individual role stress, and individual performance as proposed in Hypothesis 5. Model 8 demonstrated a significant overall cross-level relationship between team learning behaviors and individual performance ($\beta = .26$; $p < .001$). Moreover, adding the individual-level predictor of quantitative role overload (Model 9)[5] resulted in a significant reduction, albeit not a complete mitigation, of the team learning cross-level effect ($\beta = -.22$; $p < .001$; Sobel = 2.27, $p < .05$), suggesting partial mediation. Finally, for the sake of completeness, Model 10 is presented and demonstrates a significant relationship between team learning and individual quantitative overload ($\beta = -.18$; $p < .01$), which confirms the assumption as regards a mediation effect. Hence, Hypothesis 5 was supported, in the sense that the HLM analyses confirmed a positive relationship between team learning and individual performance, partially mediated by individual role stress, particularly individual quantitative role overload.

[5]Although a test of the null model showed that the proportion of total variance in individual quantitative role overload that could be attributed to the team level was not significant (5.0 percent, $\chi 2\ (1) = 2.13$, n.s.), we followed Mathieu and Taylor's (2007) advice to continue meso-mediational testing.

SEM Analyses of the Relationships Between Team Learning Behaviors, Team Role Stress, and Team Performance

Hypotheses 4a and 4b presented two competing assumptions for the team-level relationships among team learning behaviors, team role stress, and team performance. The correlations in Table 1 already indicated that team learning behaviors were positively related to team performance ($r = .57$, $p < .001$, and $r = .36$, $p < .05$, for self and client rating, respectively), and that team-level quantitative role overload was negatively related to team learning behaviors ($r = -.45$; $p < 0.01$), and to self-rated team performance ($r = -.34$; $p < .05$), while team role conflict showed no substantial relationship with team learning behaviors ($r = -.07$; n.s.), and an only marginally significant relationship with team performance ($r = -.30$; $p < 0.10$).

Table 3

Goodness-of-Fit Indices of Structural Models of the Relationships Among Team Learning Behaviors, Team Role Stress, and Team Performance.

Model	χ^2	*df*	*p*	*GFI*	*CFI*	*PNFI*	*RMSEA*	*AIC*
1. Hypothesis 4a – full	26.68	4	.001	.79	.32	.15	.39	48.68
2. Hypothesis 4a – partial	10.01	2	.007	.91	.76	.15	.33	36.01
3. Hypothesis 4b – full	5.16	5	.40	.95	1.00	.44	.03	25.16
4. Hypothesis 4b – partial	1.38	4	.85	.99	1.00	.39	.01	23.38

Notes: N = 38 teams.
$\chi 2$ = Chi-square value
df = degrees of freedom
p = probability
GFI = goodness-of-fit index
CFI = Comparative Fit Index
PNFI = Parsimony Normed Fit Index
RMSEA = Root Mean Square Error of Approximation
AIC = Akaike information criterion

Hypothesis 4a refers to the 'team learning – stress – performance' mediation model.
Hypothesis 4b refers to the 'stress - team learning – performance' mediation model.

Table 3 shows the results of the SEM analyses that were conducted to test Hypotheses 4a and 4b. Hypothesis 4a, which proposed that team role stress mediates a positive relationship between team learning behaviors and team performance, was tested in Models 1 and 2, where team learning behaviors is the predictor variable, team quantitative role overload and team role conflict are mediators, and self and client ratings of team performance are the criterion variables. Model 1 contained indirect effects only, representing full mediation, while Model 2 contained direct effects of team learning behaviors on the criterion variables as well, implying partial mediation. The results of the SEM analyses presented in Table 3

show that Model 1 did not fit the data ($\chi 2 = 26.68$, df = 4, p = .001, GFI = .79; CFI = .32; PNFI = .15; RMSEA = .39; AIC = 48.68). In Model 2, we allowed for direct relationships between team learning behaviors and both indicators of team performance. This model, however, did not fit the data either ($\chi 2 = 10.01$, df = 2, p = .007, GFI = .91; CFI = .76; PNFI = .15; RMSEA = .33; AIC = 36.01). Hence, we did not found any support for a mediating effect of team role stress in the positive relationship between team learning behaviors and team performance.
In the alternative hypothesis (4b), we modeled team learning behaviors to be the mediator variable in the negative relationship between team role stress and team performance. This hypothesis was tested in Models 3 and 4, again representing, respectively, full and partial mediation. Model 3 showed a close fit to the data ($\chi 2 = 5.16$, df = 5, p = .40, GFI = .95; CFI = 1.00; PNFI = .44; RMSEA = .03; AIC = 25.16); however, the modification indices indicated that the model could be improved by including the direct effect of team role conflict on self-rated team performance. Model 4, including this direct effect, showed a superior fit ($\chi 2 = 1.38$, df = 4, p =.85, GFI = .99; CFI = 1.00; PNFI = .39; RMSEA = .01; AIC = 23.38). Model 4, visualized in the upper (team-level) part in Figure 2, showed that team-level quantitative role overload ($\beta = -.53$; $p < .001$) inhibits team learning behaviors, which are in turn positively related to self-rated performance ($\beta = .57$; $p < .001$) as well as to client-rated performance ($\beta = .36$; $p < .05$). Team role conflict did not appear to be significantly related to team learning behaviors ($\beta = .17$; n.s.); it does, however, have a direct negative relationship with self-rated team performance ($\beta = -.26$; $p < .05$). The model explained 23 percent of the variance in team learning behaviors ($R2 = .23$), 39 percent of the variance in self-rated team performance ($R2 = .39$), and 13 percent of the variance in client ratings of team performance ($R2 = .13$). Hence, these findings provide support for hypothesis 4b, implying that team role stress has a negative effect on team performance, which can be partly attributed to the reduction in team learning behaviors.
Figure 2 provides a full overview of all findings from the HLM analyses as well as from the SEM analyses that have been presented above.

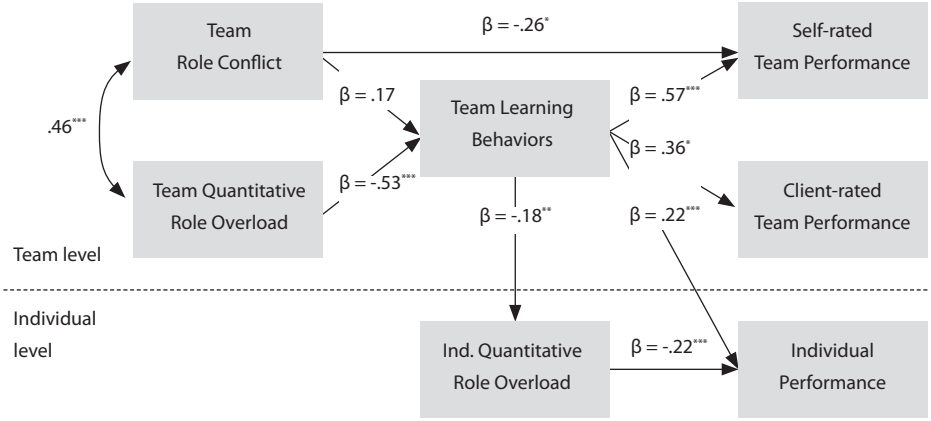

Figure 2: Overview of Findings from the HLM and SEM Analyses.

Conclusions and Discussion

Reflection upon the Outcomes

The aim of the present study was to test a multi-level mediation model describing the relationships among role stress, team learning behaviors, and the performance of project teams and their members. We distinguished between role stress experienced at the individual level, and role stress experienced at the team level.

Based on our findings, we found ample support for the assumption that role stress, whether experienced at the individual or at the team level, impairs team performance. These outcomes are in line with previously found detrimental effects of individual-level role stress on individual performance (e.g., Erera-Weatherley, 1996; Zohar, 1997), and add proof to the idea of an equally detrimental effect of team-level role stress on team performance. Moreover, our findings also indicate that team role stress affects individual performance. To be precise, rather than operating directly, this effect was found to work indirectly, in that team role stress inhibits team learning behaviors, which subsequently increase individual-level quantitative overload, thereby negatively affecting individual performance.

Besides the empirical verification of role stress as a team-level construct, this study contributes to the discussion concerning the 'learning - stress - performance relationship'. On the one hand, we expected team learning behaviors to form a buffer that levels off the experience of role stress. On the other hand, we acknowledged the inhibiting effect that stress may have on team learning behaviors. Concerning the two competing hypotheses 4a and 4b (learning inhibits role stress versus role stress inhibits learning), we have actually found support for both.

To be specific, team learning behaviors appeared not so much to prevent team-level role stress. Instead, our findings indicated that team role stress, in terms of both quantitative role overload and role conflict, impairs team performance. In the case of team-level quantitative role overload, the effect was fully explained by a reduction in team learning behaviors. Possibly, quantitative role overload at the team level takes up too many resources spent on primary team task processes, and limits the capacity of the team to engage actively in secondary processes such as team learning, thereby impeding the team's performance. In any case, our findings corroborate prior research outcomes, in that we found team learning behaviors to be strongly and positively related to both individual - and team-level performance (e.g., Edmondson, 1999; Savelsbergh et al., 2009).

Through its negative effect on team learning, team role stress also indirectly hinders individual performance. The cross-level relationships that we tested supported the hypothesized stress-inhibition effect of team learning, in that the positive effect of team learning behaviors on individual performance was partially mediated by a reduction in individual quantitative role overload. A likely explanation could be that sharing experiences, collective reflection, and feedback processes may help optimize the work division among the members of a team. Similar effects of team learning on workload division were found in the work by DeSchon and colleagues (2003), whose findings indicate that individual as well as team feedback processes help individual team members to regulate the allocation of their resources more adequately.

All in all, this study demonstrates that both individual - and team-level role stress are important factors in determining the effectiveness of a project team and its members. Moreover, the tests of the 'stress - learning - performance relationship' from a multi-level perspective allowed us to offer support for both the hypothesized 'stress-inhibiting effect' and the 'stress-inhibited effect' of team learning behaviors. Herewith, this study delivers an enlargement of the existing role stress literature, and above all supports the assumptions regarding the association between role stress and team learning in a project context. The outcomes provide empirical support for existing theoretical interest in the ability to learn and the ability to share what has been learned within project teams (Winter et al., 2006).

Limitations of the Study and Recommendations for Further Research

In interpreting the results of our study, one should take into account the single method of data collection, the limited sample size, and the cross-sectional design. As regards the first limitation, all data was collected using questionnaires and based upon self-measures only, opening up the possibility of response set consistencies (Podsakoff & Organ, 1986). A triangulation approach is recommended for follow-up research. Moreover, research on the quality of self-measures indicated that self-report measures may not limit internal validity as much as is often expected (Spector, 2006; 1992). Besides, we are of the opinion that the own perspectives of team members on the project are most relevant, because that is what group activities are based upon (Amabile, Conti, Coon, Lazenby, & Herron, 1996). Furthermore, outsiders may not be in a position to know exactly what is going on inside a group, for example with regard to team learning behaviors.

The number of teams involved in our study was rather small, which restricted us in terms of the number of relations that could be examined in one and the same model simultaneously, and some of the participating teams only just passed the criteria for inclusion (i.e., the amount of respondents per team). Future research using larger samples should aim to examine the robustness of our findings by simultaneously testing both uni-level and cross-level mediational relationships in a multi-level model. Moreover, including samples from a more diverse organizational context could enhance our understanding of the impact of team role ambiguity and qualitative team role overload constructs, which we were forced to exclude from the analyses in this specific study, due to insufficient variability between the teams in the present sample. Analysis of the team-level role stress construct, in this empirical study, had to be restricted to team-level role conflict and quantitative role overload.

Because of the cross-sectional design that was employed, any attempt to make causal explanations of the results must remain tentative. However, our comparison of alternative mediation models clearly indicated a better fit of the role stress - team learning behaviors - performance mediation model (Hypothesis 4b) than of the learning behaviors - role stress - team performance model (Hypothesis 4a). Nevertheless, research using a longitudinal design can provide more specific information about the stability and change of the variables, and about cross-lagged (i.e., over time) relationships than our cross-sectional approach can do (De Lange, 2005; Taris & Kompier, 2003), although a multi-wave design will give rise to other issues, such as, the problem of selecting appropriate time intervals for effects of role stress and team learning to become apparent (Frese & Zapf, 1988; Kessler & Greenberg, 1981). Future longitudinal approaches could examine whether relationships of role stress,

team learning behaviors, and performance vary over time depending on the project phase. This could help project managers to identify those phases that are most critical in countering role-stress effects, and to increase awareness when to invest in team learning behaviors.

Practical Implications

The findings of the present study provide project managers and team members with a better understanding of the different levels of role stress with which they are likely to be confronted in any project. The increased insight into the stress - learning - performance relationships using a multi-level perspective may help team members and their managers to counter negative role stress effects at the individual as well as the team level, to safeguard the performance of individual team members, and of the team as a whole. Our findings underscore the importance of engaging in team learning behaviors. Team learning behaviors should be stimulated particularly under stressful conditions, as, otherwise, team members might 'forget' to take time to sit back and collectively try to make sense of the problems at hand. Project managers perceiving signals of individual role stress among one or more members of the team should stimulate to collectively explore and reflect on the role division in their team, opening up the opportunity to experiment with a different role division. As such, they not only help to reduce individual perceptions of role stress, which appears to be detrimental to individual performance, but also strengthen the performance of the team as a whole.

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Appendix A
Team Role Stress Scale Items

Response scale: 1) completely disagree, 2) disagree to some extent, 3) neither disagree nor agree, 4) agree to some extent, 5) completely agree.

Instruction: The following statements all refer to the task and role of the project team as a whole. Please could you indicate for each statement to what extent it applies to your project team and give your answer as if you were the spokesman for the team.	*Dimension of Role Stress*
The work duties and objectives of the team are unclear to the team members.	Ambiguity
It is unclear to the team who it should report to and/or who reports to the team.	Ambiguity
The team lacks the authority to carry out its work responsibilities.	Ambiguity
The team does not fully understand what is expected of.	Ambiguity
The team does not completely understand the part its assignment plays in meeting overall organizational objectives.	Ambiguity
The team does things that are accepted by one person and not by other.	Conflict
The team receives conflicting requests from two or more people.	Conflict
The team receives an assignment without adequate recourses and materials to execute.	Conflict
The team puts in extra hours to keep on top of the work.	Quantitative Role Overload
The team is responsible for an almost unmanageable number of assignments at the same time.	Quantitative Role Overload
The team simply has more work to do than can be done in an ordinary day.	Quantitative Role Overload
Team members feel they don't have time to take occasional breaks.	Quantitative Role Overload
The tasks assigned to the team are too difficult and / or complex.	Qualitative Role Overload
Team tasks seem to be getting more and more complex.	Qualitative Role Overload
The organization expects more of the team than is achievable with the skills and / or abilities in the team.	Qualitative Role Overload

Chapter 6:
Conclusions and Discussion

The main purpose of this PhD thesis was to develop a better understanding of the relationships among team learning behaviors, role stress and performance in general, and in project teams in particular. We aimed to develop an instrument to measure team learning behaviors in such a way that the instrument would offer opportunities for project teams to improve their team learning. Moreover, we aimed to develop an instrument to measure team-level role stress offering the opportunity for project teams to build awareness of role stress caused by ambiguity, conflicting or overburdening tasks at the team level.

This chapter first deals with the conclusions in relation to the research questions of the study, and will link these to previous findings regarding the variables and relationships that were under study in this thesis. Subsequently, we will reflect on the decisions that we made during the research process and their implications for this study on the conceptual and methodological levels. The chapter concludes with a discussion of the theoretical and practical relevance of our findings, highlighting some challenges for future research.

Summary of Conclusions

The main research question of this thesis was as follows:
How do team learning behaviors relate to (1) individual-level and team-level role stress, (2) team leadership behavior and team stability, and (3) individual and team performance in project teams.

This main research question was divided into the following sub-questions:

1. How do stakeholders of teams judge the importance of team learning?
2. How are team learning behaviors conceptualized, and how can we measure the behaviors that constitute team learning?
3. How does the leadership behavior of the project manager affect the prevalence of team learning behaviors in his/her project team? Is this influence (partly) accounted for by team stability?
4. How does role stress occur in project teams? At the individual level solely, or also at the team level? And in addition, how does role stress relate to performance in project teams?
5. How do team learning behaviors relate to role stress and performance at both the individual level and team level?

The first research question was addressed in our first study (Chapter 2). Our findings showed that the most frequently applied criteria to measure team performance comprised satisfying quality requirements, reaching the target goals, and enhancing customer satisfaction. Moreover, the respondents identified the top three factors influencing team performance as team leadership, goal clarity, and team learning behaviors. These findings indicate that, when

teams in real-life situations are asked how they consistently manage to be adaptive in both their performance and outcomes, a consistent theme emerges – namely, they indicate that they engage in continuous learning at both an individual and team level. This is important because attitudes towards team learning may have a substantial impact on intended and actual behaviors (Ajzen & Fishbein, 1980). Multi-rater comparisons indicated that attitudes of team members, team leaders, and supervisors differed in several aspects, which is in line with other previous findings (e.g., Cohen, Ledford, & Spreitzer, 1996; Gibson, Zellmer-Bruhn, & Schwab, 2003; Jehn, 1995).

The second research question was addressed in our second study (Chapter 3), and concerned the development of a conceptual framework and its operationalization into a measurement instrument for behaviors associated with team learning. A better understanding of the distinctive behaviors and their complementary impact on team performance may help to raise awareness among team members and leaders about their team learning. This awareness may offer them opportunities for the improvement of their team's performance by tailoring interventions aimed at team learning. In this study, we were able to construct a valid and reliable operationalization of team learning, identifying eight complementary team learning behaviors measured by an instrument comprising 28 items. The eight behaviors were labelled as follows: (1) exploring; (2) co-construction of meaning, (3) reflecting on outcomes and (4) processes; (5) communicating; (6) discussing errors and unexpected outcomes of actions; (7) seeking feedback; and (8) experimenting within and as a team.

The third research question was addressed in study 3 (Chapter 4), concerning the influence of leadership behaviors on team learning behaviors and including team stability as a potential mediator. In line with previous findings on person-focused leadership behavior, our research outcomes indicated a direct and positive relationship with team learning behaviors. Our findings indicated that task-focused leadership was directly and positively related to team learning behaviors; however, when controlling for person-focused leadership behavior the influence of task-focused leadership on team learning behaviors became nonsignificant. In addition, the hypothesized (partly) mediating role of team stability, as a possible explanation for the influence of the leader on the prevalence of team learning behaviors, was not confirmed in our data. Instead, team stability appeared to be positively and directly related to team learning behaviors.

The fourth research question was addressed in study 4 (Chapter 5), and concerned role stress in project teams. From previous research, the relationship between stress and learning has been established (Karasek and Theorell, 1990). However, previous research was restricted to individual-level role stress. Moreover, findings on the causality of relationships between learning and stress remained inconclusive. In this third research step we addressed the occurrence of multi-level sources of role stress. Findings from our third study indicated that both individual-level and team-level role stress were important factors influencing the performance of a project team and its members, confirming our hypothesis that role stress in teams may not solely be restricted to the individual level. Although we were not able to examine the relationships among all team-level role stress dimensions and team performance, due to weak between-group differences as regards ambiguity and qualitative overload, it was clear from our findings that role conflict and role quantitative overload impeded team

performance and that individual performance was hindered by team role stress as well.

The fifth research question (also addressed in study 4, and elaborated on in Chapter 5), addressed the stress-learning-performance relationships in project teams. Findings of our third study using a multi-level perspective offered support for both the stress-inhibits-learning effect and the learning-inhibits-stress effect of team learning behaviors. The stress-inhibits-learning effect appeared to occur at the team level, whereas the learning-inhibits-stress effect was observed in the cross-level relationships between team learning behaviors and individual role stress. More particularly, overburdened teams seemed to take less time for behaviors associated with learning, and thus role stress appeared to hinder learning and performance at the team level. Team learning, though, seemed to help team members to gain a better intra-team role division, and thereby decreased perceptions of individual role overload and increased individual performance. In sum, the major results of our study can be presented in an 'overall model' (see Figure 1):

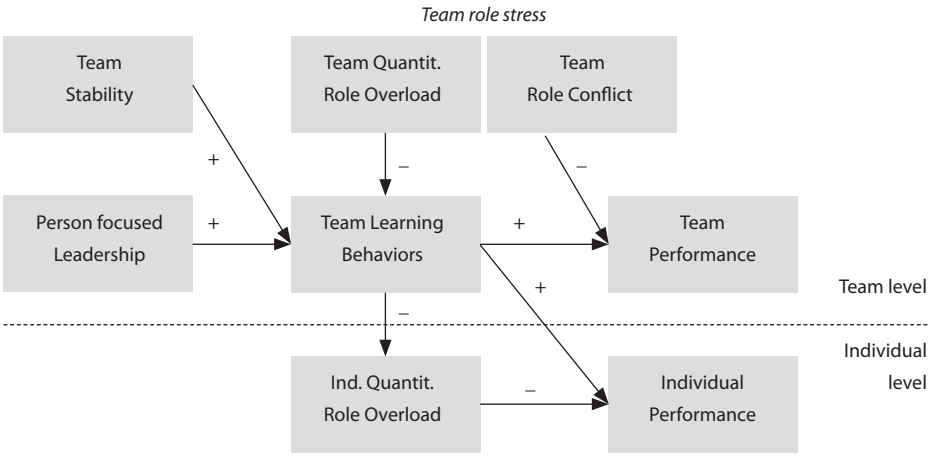

Figure 1: Overview of Findings from our Studies (for the β's see Studies three and four in Chapters 4 and 5)

Reflection on Concepts

In this section we will reflect on the main concepts, and the relationships between them, that we have studied in this thesis in terms of how powerful they are as analytic tools and as communicative tools. First, we reflect on the concept of team learning behaviors, which was further elaborated and examined in all four studies. Second, we reflect on the concept of role stress as perceived at both the team and individual level. Finally, we reflect on the chosen operationalization of the concepts of team leadership behaviors and team stability.

Team Learning Behaviors and the Relationship to Performance

The first two research questions mainly deal with the concept of team learning behaviors. In literature, team learning is presented in different ways. Some scholars discuss learning as an outcome using terms such as shared mental models (e.g., Cannon-Bowers, Salas, Converse, & Castellan, 1993), others focus on a process they define as learning (Argyris & Schön, 1978; Van den Bossche, Gijselaers, Segers, & Kirschner, 2006). In our study we explicitly chose to use the latter definition, and we focused on the behaviors through which learning outcomes can be achieved. The focus on learning as a process encompasses the possibility to operationalize the behaviors that constitute the process, and as such to raise awareness among project participants and their teams about team learning activities, in order to offer them opportunities for improvement.

The conceptualization of learning as a process goes back to John Dewey and his work on inquiry and reflection (e.g., Dewey, 1938/1991) and has had considerable influence on subsequent learning theories (Argyris & Schön, 1978; Edmondson, 1999; Kolb, 1984). In our study, we joined this tradition of conceptualizing team learning as a process. Key to our conceptualization was Edmondson's approach of defining team learning behaviors as a process of reflection and action, and Van den Bossche et al.'s (2006) conceptualization of team learning behaviors as the behaviors that constitute the social process building a shared cognition. To avoid confusion with the notion of learning outcomes, we followed Edmondson in using the term team learning *behaviors*, instead of the mere term of team *learning*. Edmondson's conception of team learning behaviors was based on an empirical study within 51 work teams and covered the full range of learning behaviors identified in these teams. These team behaviors all referred to interactions of team members associated with learning through which a team obtains and processes data, and allows itself to adapt and improve by learning new collective action repertoires.

With regard to the measurement of the concept of team learning behaviors, we argued that existing instruments were not sufficiently covering the full concept. More specifically, Edmondson's seven-item measurement instrument, did not offer the opportunity for teams to assess the various defined learning behaviors as distinctive interactions of a covering conception. Van den Bossche et al. (2006) defined the conception of team learning behaviors into three concrete conversational actions, i.e., construction and co-construction of meaning, and constructive conflict, which are all focused on the construction of a shared cognition in teams. In sum, the measurement instrument of Van den Bossche and colleagues does not grasp all team behaviors needed to learn new collective action repertoires. Particularly, behaviors that concern reflection on collective experiences, sharing and analyzing errors, actively seeking and collectively analyzing feedback and active collective experimentation to test collective assumptions are not fully covered.

However, they are all examples of behaviors that in previous management literature were associated with team learning, see e.g., experimentation (e.g., Henderson & Clark, 1990; Van Woerkom, 2003), reflexivity (Schippers, Den Hartog, Koopman, & Wienk, 2003), error management (Leonard-Barton, 1995; Van Dyck, 2000). In order to develop an integrative measurement instrument that covered the full range of team learning behaviors as already identified by Edmondson (1999), we decided to use previously developed measurement instruments. In addition, we aimed to offer a measurement instrument that assesses the interactions that underlie team learning as distinct behaviors, though complementary to

each other in their relationship to a higher-order team learning behaviors concept. This methodological decision was fed by our motivation to align as much as possible with existing literature on team learning as a process, and to construct a measurement instrument that would be indicative for the complementarity of the distinct behaviors that underlie the team learning process.

Complementarity of learning behaviors would imply that the magnitude of the effect of all team learning behaviors together is larger than the sum of the marginal effects from pursuing each process individually. When analyzed together, the individual effects should be exhausted by the overall effect (Whittington, Pettigrew, Peck, Fenton, & Conyon, 1999). Therefore, in our study, we relied on modeling team learning behaviors as a concept of a higher order, composed of eight distinctive and complementary learning behaviors. This higher-order factor modeling (Hair, Anderson, Tatham, & Black, 2006) is a procedure consistent with recent examinations of complementarity (Lichtenthaler, 2009; Tanriverdi & Venkatraman, 2005). In a higher-order factor model it is explained why the lower-order factors co-exist and covary with one another (Hair et al., 2006). By shaping a model wherein the various learning behaviors are distinctive, though part of a higher order concept, we prevented a situation where multilateral interactions between the distinctive learning behaviors would not have been addressed (Whittington et al., 1999).

We found that the higher-order factor model had an acceptable fit, whereas the model including the eight learning behaviors and their pair-wise covariances (indicating correlations between all possible pairs of two of the eight learning behaviors) did not have a satisfactory fit. Moreover, this latter model, wherein each of the separate learning behaviors was modeled as a separate concept, indicated that only exploring different perspectives and co-construction of meaning had significant direct effects on team performance. Although these findings indicated complementarity of our eight team learning behaviors, and underlined the need to model this complementarity, future research is needed to better understand the impact of the learning behaviors distinguished on team performance. Extended research analyses and experimental studies may reveal the effect of complementarity of the team learning behaviors, in comparison with teams that restrict themselves to, for example, experimenting (without reflecting).

By building on existing descriptions of behaviors associated with team learning in the literature, we may have overlooked possible interaction patterns that have not been revealed in previous approaches. However, by using Edmondson's (1999) empirical study on team learning behaviors within 51 work teams as a starting point for covering the full range of team behaviors associated with learning, we tried to overcome this possibility as much as possible. Moreover, Edmondson's identified team learning behaviors match with conceptualizations by other scholars, grasping the full range of team learning behaviors [see for example Kolb's theory on the learning spiral, where teams "touch all the bases", i.e., a spiral of experiencing, reflecting, thinking, and acting (Kayes, Kayes, & Kolb, 2005)]. Future research, using observation techniques within teams, should further validate our conceptualization and measurement instrument of team learning behaviors, by identifying interactions in teams that could be associated with learning because of changes in team interaction patterns. The use of this observational approach in addition to our deduction from literature was not realizable within the time frame of this PhD project and within the

participating project teams, because of the restricted direct surplus value for their teams, and thus the lack of willingness to devote additional efforts over and above their already high willingness to participate in the study.

From previous findings we know that team learning behaviors relate to team performance (e.g., Argote, Gruenfeld, & Naquin, 2001; Edmondson, 2002; Lutz, 1994). Moreover, we know that particularly cross-functional teams, in which team members need to adopt an inquiry orientation to ask other team members questions, and to explain their own positions, have been found to help integrate the diversity of viewpoints and translate these into better products or services (Edmondson & Smith, 2006; Garvin & Roberto, 2001). These findings were reconfirmed in our study among a sample of 40 project teams. Previous findings suggesting both positive and negative relationships between team learning orientation and performance (Bunderson & Sutcliffe, 2003) could not be reconfirmed due to the one-shot cross-sectional design of our study. These outcomes leave open some questions for future research, such as: In which project phase is the prevalence of team learning behaviors of particular interest for team performance?

From talking to project directors of several large Dutch project-oriented organizations in the infrastructure and ICT branches, we learned that they indicated to observe a decreasing number of projects characterized by the label "starting when everything is clear what has to be achieved", and a growing number of projects characterized by the label "starting with a sometimes vague, idea or dream". According to this development, the 'idea' or 'initiation' phase is becoming an important stage of many projects. Especially, this idea or initiation phase may reveal characteristics that resemble projects focusing on new product development endeavors (Edmondson & Nembhard, 2009), juggling with multiple objectives, cross-functionality, temporary membership, fluid team boundaries, where outcomes are uncertain at the outset, and therefore must be discovered iteratively. In such projects, a learning orientation is needed alongside a performance orientation.
Future research is needed to gain more insights into how the influence of team learning behaviors on team performance evolves over the life-time of a project from 'dream to accomplishment'. Moreover, complexity, novelty, pace and level of technology are qualities of projects characterized by more or less uncertainty (Sauser, Reilley, & Shenhar, 2009).

Future research using multi-wave designs can provide additional information about the stability and change of these variables during the different project stages, and about cross-lagged relationships (De Lange, 2005; Taris, Kompier, De Lange, Schaufeli, & Schreurs, 2003). These research attempts can provide answers on questions such as: In which project stage do team learning behaviors matter most? Do variables like, complexity, novelty, pace or level of technology moderate the relationship between team learning behaviors and performance? Recent work of De Lange, Taris, Jansen, Kompier, Houtman, and Bongers (2009), for example, confirm the importance of taking a dynamic view on the relationships between work and learning-related behaviors, indicating the existence of reciprocal causal relationships among job demands and learning-related behavior, where age accounted for significant moderating effects.

Team Leadership and Team Stability and Their Relationship with Team Learning Behaviors

The third research question dealt with the influence of leadership behavior and team stability on the prevalence of team learning behaviors. Functional leadership theory (Fleishman, Mumford, Zaccaro, Levin, Korotkin, & Hein, 1991; McGrath, 1962) has centered on the level of the team and the individuals embedded in teams. This theory claims that it is the leader's responsibility to ensure that all necessary functions for team task accomplishment and maintenance of members' interpersonal and social relationships are accomplished. More recent work in this tradition has centered on leader functions that underlie team learning and development. Edmondson (1999), for example, viewed the primary role of the leader in promoting team learning by establishing a psychologically safe team climate, wherein members can experiment and learn from errors. Hackman and Wageman (2005) posited that leaders can positively influence team learning by providing motivational functions (getting familiar) early in the team's work cycle, consultative functions (task strategies) at the midpoint of the team's work, and educational functions (reflection) at the end of a meaningful task episode of the team. And even more recently, although not empirically tested yet, Kozlowski and Bell (2008) posited a theory that states two primary leader functions. The first function is task-based and instructional (e.g., setting learning goals, monitoring progress, intervening as needed, diagnosing performance and guiding feedback), and the second is developmental. The bottom line from these functional-leadership theories is that team leaders are viewed as key agents for creating learning experiences, for prompting, guiding and shaping team learning, and for developing adaptive teams.

According to a review by Burke, Stagl, Klein, Goodwin, Salas, and Halpin, (2006), it has been empirically established that the team leader's behavior explains a considerable amount of variance in the level of team learning. In our study, we aimed to add to this knowledge in two directions. First, previous empirical findings on person-focused leadership (i.e., behaviors focused on developing team members or maintaining socio-emotional aspects of the team) characterized this type of leadership behavior as supportive, coaching-oriented, participative and non-defensive to questions, and as one that prompts team members to engage in team learning behaviors. The influence on team learning of the second leadership behavioral style most commonly classified in the literature, that is task-focused leadership (i.e., behaviors dealing with task accomplishment), however, has not yet been established. With our study, we partly filled in this gap. As we knew from previous findings that this leadership behavior has a positive relationship with team performance (Judge, Piccolo, & Ilies, 2004), we argued that this leadership behavior could not be neglected when examining the leader's impact on team-learning, Though one could reason that task-focused leadership may frustrate the self-management potential of a team (Stewart & Manz, 1995), through a prescription of what, when, and how, we argued that task-focused leadership behavior may contribute to team learning behaviors by setting a clear and compelling team goal, and by enabling a team design, which gives focus and direction to the learning process. Our findings confirmed our argumentation; however, the positive effect of the task-focused leadership behavior became non-significant, when examining both person-focused and task-focused leadership behaviors and their relationship with team learning behaviors in one model. Apparently, a task-focus is not frustrating team learning, and should be viewed as a boundary condition, where a person-focus appears to promote team learning behavior in teams. Further research should shed light on the optimal balance between task-focused

and person-focused leadership behavior in promoting team learning behaviors. Moreover, future research attempts should indicate when to favor which leadership behavioral style in order to maximize team learning behaviors in teams.

The second addition to existing knowledge on the relationship between leadership behavior and team learning behaviors was aimed at examining the mediating effect of team stability. Team stability, in addition to team leadership, has been previously mentioned as essential for future research on team learning (Edmondson, Dillon, & Roloff, 2007). With our study, we aimed to clarify if leadership behavior influences team learning behaviors through team stability. Although our findings confirmed previous findings on the positive relationship between team stability and team learning behaviors (Akgün & Lynn, 2002; Moreland, Argote, & Krishnan 1998), the influence of both person-focused and task-focused leadership behavior on team stability appeared to be non-significant. One explanation may lie in the fact that our method of measuring team stability was based on the number of occurrences that a team member left or entered the team. We did not ask why they left or entered the team. A very common reason why team members leave or enter project teams is the end or beginning of a new project phase or task, implying a change in required capabilities. Under these kinds of circumstances, it is neither the team leader nor the team member, but the team task that indicates a change in team composition. This may be an explanation for the fact that we did not find any significant relationship between team leadership behavior and team stability. Future research, using measurement instruments for team stability that identify which team members enter or leave a team, may be useful in clarifying in which cases the leader may be capable of keeping the team together, and in so doing which cases favor team learning, and which kind of leadership behavior is needed to accomplish that.

The results of our study shed light on team learning behaviors and their relationship to the classical approach of leadership behavior, i.e., task-focused and person-focused leadership behavior. However, one could argue why we did not build further on more recent leadership concepts, findings and multi-dimensional measurement instruments, which already indicated a positive relationship with knowledge sharing (see e.g., Srivastava, Bartol, & Locke, 2006: empowering leadership). In the next paragraphs, we will justify why we did not join these more recent theoretical leadership approaches.

First, various recent reviews on team effectiveness research (e.g., Kozlowski & Ilgen, 2006) and leadership (Judge et al., 2004) showed that findings on this traditional classification of leadership into task-focused and person-focused demonstrate the potential as a viable approach to leadership. Second, this classification was recognized by the project organizations we approached to participate in our study, which could imply that our findings might be better comprehensible for practitioners. Third, the empirical findings on the more recent leadership concepts considered to enhance team development, such as transformational (Bass, 1985), and empowering leadership (Srivastava et al., 2006), left questions unanswered about the impact of task-focused leadership behavior on the engagement in team learning behaviors. In our study, we aimed particularly to fill this gap as task-focused leadership behavior has empirically been proven to be of importance for team performance (Judge et al., 2004).

Very recently, Zaccaro, Heinen, and Schuffler (2009) proposed a model of team leadership that summarizes several of the previous theoretical functional leadership contributions into

an integrative model. This model reflects the basic assumption that the fundamental role of team leadership is to promote team interconnectivity and synergy, and that the effects of leadership on team outcomes are mediated entirely by its influence on team interaction dynamics (and thus, among others, on team learning behaviors). Their integrative model covers direction setting, managing operations, as well as developmental leadership functions. Future research, using such an integrative leadership model, could advance our knowledge on balancing appropriate leadership behaviors in order to enhance engagement in team learning behaviors across the different stages project teams are going through. One can think, for instance, of examining the optimal mix of leadership behaviors that prompt team learning behaviors within various types of projects or various project stages that differ in uncertainty due to complexity, novelty, pace and level of technology (Sauser et al., 2009). This mix of leadership behaviors may be different in different project types or project stages. Edmondson and Nembhard (2009) posited that in order to learn and discover as a team, frequent, rich communication among team members mutually and with their leader is required to make progress. They propose that, when leaders do not actively communicate a 'learning' frame [i.e., "learn as much as possible as to produce novel possibilities interdependently" (p. 22)], people tend to automatically impose a 'performance' frame (i.e., "framing the project as not that different, new or complex, and focusing on getting the job done while everyone contributes based on his or her expertise" (p. 22)], that may inhibit teamwork and team performance, especially under conditions of uncertainty (Edmondson, 2003). Therefore, we argue that it is of interest to know in which types of projects, and when in particular, leaders should reveal certain specific leadership behaviors, in order to actively communicate a learning frame.

Role Stress and its Relationships with Learning and Performance

The fourth and fifth research questions dealt with the concept of role stress at both i ndividual and team level and how these perceptions of role stress related to team learning behaviors and performance. Employee role stress, perceived by individual employees and caused by ambiguous, conflicting or overburdening demands on an individual employee, has been investigated extensively (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). In this PhD thesis, we introduced the construct of team-level role stress - a shared perception held by members of a team that the *team demands* are ambiguous, conflicting or overburdening for the team as a whole - and modeled the relationships between team-level role stress and team learning and performance. The newness of the concept of team-level role stress lies in the fact that the source of stress as perceived by team members is not coming from their own individual role demands in the team but from the demands that are posed at the team as a whole. Findings within our sample confirmed that all individual-level role stress dimensions, i.e., role ambiguity, role conflict and quantitative and qualitative role overload, were also perceivable at the team level.

Furthermore, previous research on individual-level role stress consistently revealed negative relationships with job performance and job satisfaction (e.g., Beauchamps & Bray, 2001; Erera-Weatherley, 1996; Jackson & Schuler, 1985; Zika-Viktorsson, Sundström, & Engwall, 2006). This negative effect of individual-level role stress on performance appeared to be confirmed for team-level role stress. We did not succeed in examining the relationships for

all team-level role stress dimensions, because the variability of team-level role ambiguity and qualitative overload were insufficient in the sample to be examined. However, findings of team-level quantitative role overload and team-level role conflict indicated negative relationships with team performance.

Our team-level concept of role stress adds to the theoretical body of knowledge upon employee role stress, by adding supplementary causes of role stress in organizations. Although individual role stress is associated with the individual team member and his or her role, and may be experienced only by one member of a team, team-level role stress is associated with the team and its role and perceived more or less by all members of a team. We will explain this with some examples. From an individual-level perception of role stress, an individual team member may perceive his or her role as ambiguous, conflicting or overburdening, whereas another team member may have a clear perception of his or her own role and may not sense any stress due to conflicting or overburdening demands. Although team members from one team may differ in their perceptions of individual role stress, it may also be the case that all individual team members of a team feel overburdened by their own role. An explanation for this collective experience of individual role stress may be due to an organizational culture of cultivating pressure. "How are you doing? Busy, busy…". From a team-level role stress perception, role stress does not refer to the individual team member's role but to the team's role, and how it is perceived by its members collectively. When team-level role stress is high, all team members, to some extent, perceive that the team demands are unclear or asking too much of the team as a whole. Individual team members, though, may not feel any ambiguity about their own role demands.

Although the focus in our study lay on investigating the relationships of team-level role stress with team learning and team performance, we agree with many scholars (e.g., Kozlowski & Bell, 2003; Kozlowski, Brown, Weissbein, Cannon-Bowers, & Salas, 2000; Salas, Stagl, & Burke, 2004) that teams are nested and intertwined within multi-level open systems. For example, effective team performance can be enabled via both the actions of team members operating individually and as a collective. Therefore, in our study, we have taken into account the relationships of individual-level role stress and cross-level relationships of team role stress on individual role stress and performance. From our findings negative effects of both individual and team-level role stress on performance were confirmed. However, we were not able to test the effect of perceived individual-level role stress on the prevalence of team learning behaviors and team performance. This is due to the statistical restrictions of multi-level analysis using Hierarchical Linear Modeling (HLM). Examining our data with HLM enabled us to account for potential non-independence of the data within a team. However, to the best of our knowledge, HLM does not allow predictors at a lower level to be tested, in our case the individual team member perceiving role stress about his individual role, predicting higher level variables, in our case the prevalence of team learning behaviors. Although we were not able to examine these relationships, we do expect that team members perceiving high levels of individual role stress are less willing to spend time on collective reflection or experimentation. Moreover, their negligence of engagement in team learning behaviors may cause a drop in team performance. Future research should clarify this cross-level relationship. Furthermore, because of the negative effect of team-level role stress on team learning and performance, future research on team-level role stress should shed light

on how team-level role stress can be prevented.

Reflection on Methodology

In this section we reflect on the decisions we took as regards the methodology during the research process. We first consider the research approach, and then continue by reflecting upon the objectivity of the data obtained through interviews and cross-sectional survey data instruments. The chapter ends with some ideas on the generalizability of the findings.

Research Approach

Since Senge (1990) suggested that collaboration is needed to learn, and that teams are the fundamental learning blocks in organizations, an increasing focus on team learning 'capabilities' has been evoked within team effectiveness and organizational learning literatures. Theoretical papers on groups as information-processing systems, and empirical studies examining information exchange in laboratory groups are numerous. However, literature on learning processes of real work teams, in particular project teams, is rarely available (cf. Argote et al., 2001). Group learning has primarily been investigated in the laboratory, and little research has been done to understand the factors that clarify why some ongoing project teams in real organizations engage in team learning behaviors, and others do not.
Without neglecting the value of laboratory studies, it may not be capturing the full set of complex processes engaged by teams in real-life situations. In natural settings, teams often perform a multitude of processes and tasks simultaneously in response to the competing demands placed on them. The latter creates a host of complex operations within the team, which is hard to incorporate in laboratory settings. Real-work teams are influenced by myriad factors in their natural context (Salas & Wildman, 2009), and, therefore, investigating them in their natural settings has the potential to draw a more complete picture of team dynamics.

In this PhD study, we aimed to gain some answers on the dynamics of project teams in real-work settings focusing on team learning, stress, and performance. Furthermore, a main aim of this thesis was to build a bridge between the rich knowledge on teams as produced in the academic world and issues in the practitioners' world of teams that may profit from it. For that reason, we first aimed to justify from a practitioners' perspective our interest in team learning behaviors, indicated by academics as one of the main influencing factors of team performance (e.g., Argote et al., 2001; Edmondson, 1999). We started questioning project managers, team members, and supervisors about their attitude towards factors influencing team performance, in order to gain insight into the extent to which team learning behaviors are believed to be one of them (study 1). Moreover, with this research step, we aimed to develop valid research questions that will contribute to both the academic and practitioners' interest, which may help to gain commitment from organizations to participate in our study. From a preliminary research step in 2005, we concluded that little from what has been learned from research in teams was used or even known among practitioners (Savelsbergh, 2006). For this reason, we decided to involve practitioners right from the moment that we started to develop our research questions, because we did not want to restrict ourselves by

filling in gaps in theory, but we also wanted to get answers to questions that cover the needs of team practice. An additional advantage of this approach was that many teams were willing to participate in our research. From that preliminary research step among human resource managers, we learned that teams and their functioning were evaluated as very important for companies' profits, but it remained vague what they expected from team functioning, and how they strived to improve it in their companies, or how they could make use of research findings. Their attempts to improve team performance were almost solely restricted to a focus on team composition and contextual conditions, like putting the team members close together.

In order to identify valid criteria and influencing factors of team performance, agreed upon by practice, and to build better bridges between theory and practice, we decided to conduct a four-step approach. We first started with reviewing the literature on criteria and factors of influence on team performance, team learning, team leadership and role stress. Second, we held several in-depth interviews with stakeholders of teams in practice, to derive issues that needed answers when working with teams, and to check clarity, relevance and completeness of our research plans and, in addition, to elicit willingness to participate in the execution of our research. Third, cross-sectional surveys were conducted among a broader sample of team practitioners (team leaders, team members, and supervisors), in order to find answers on our research questions. And last, but not least important, we disseminated our findings and practical implications to practice by a conference for all participants in our research. Furthermore, as recommended by Moreland and Levine (2009), we published our results in journals and reports that are accessible and comprehensible to practitioners, as well as in scientific journals in order to disseminate our findings to our academic colleagues. Moreover, during and after the data gathering phase of our studies, we kept continuously in close contact with project managers and their teams. In line with Moreland and Levine's (2009) suggestions, we, as academics, regularly spent time in professional settings where project teams meet. In doing so, we met a substantial number of project practitioners and became more familiar with their problems and insights. To summarize, through this interaction between research activities and ongoing project practice, we started building a bridge between academics and practitioners.

In our approach, we were aware of several limitations too. We restricted ourselves to cross-sectional survey research, because we did not succeed in getting access to teams over a longer time period. Moreover, within the time frame we had, we were not able to conduct observational studies. To really understand the way teams learn in organizations, how this behavior influences performance, and what factors influence the learning behaviors in teams, there is a need to gather more direct observational data of teams performing in real-life settings over a considerable period of time. This is exactly what we intend to do in our further research plans.

Furthermore, we were aware of the additional restrictions of our cross-sectional approach of team functioning. Kozlowski, Watola, Jensen, Kim, and Botero (2009) conceptualized team development as a process that proceeds across levels and time. An empirical examination of the theorized influences of time on team processes in addition to performance is still rare, and much is unclear or disjointed in this area (Salas & Wildman, 2009). In sum, the results of our study open up avenues for future research that may lead to the acquisition of a more

coherent, integrated, and robust understanding of how team learning, role stress and performance change over time. More thorough longitudinal research is necessary to uncover the patterns of team dynamics, such as team learning and team role stress. Moreover, testing our hypotheses more rigorously, in order to uncover causal directions, would require measuring team learning behaviors, role stress, and performance at multiple (at least two) points in time, and analyzing, for example, the effect of team learning behaviors on role stress at Time t, while controlling for learning behaviors at Time *t*-1. In doing so, this kind of multi-wave research may lead to a deeper understanding of the causal links among team learning, role stress, and performance in teams.

Objectivity

In order to gain statistically sound insights in the relationships among leadership behavior, team learning behaviors, role stress, and performance, we conducted a cross-sectional survey study among a large sample of project teams. In order to optimize objectivity, we used triangulation of data sources in our studies. This means that researchers, observing a particular object of research, use as many different data sources as possible to get a more integral insight into the phenomenon studied. As regards the evaluation of team performance in our study, we used a multi-rater approach (Mabe & West, 1982) asking supervisors, as relative outsiders of the teams, to give their perception of the team's performance, in addition to team members themselves.

Advantages of multi-rater performance measurement (Zingheim & Schuster, 1995) are various. A first advantage of such procedures is that they provide input from a wider range of sources that may interact with the team under different circumstances, and as such multiple inputs may offer a wider and deeper understanding of how the team is doing. This variety of perspectives might reveal possible problems related to subjectivity in ratings. A second advantage is that multiple inputs expand learning opportunities for the team. A third advantage is that feedback from a wider range of reviewers may lead to the team's increased flexibility to change, because clarity about the perspectives of various reviewers can give insight into the need for change.

Moreover, we used different research methods to gather empirical data on team learning behaviors and team performance, namely interviews and questionnaires, in order to increase the richness of information. In the interviews, we dealt with all criteria for evaluation of team performance and factors influencing team performance, including team learning. By means of the questionnaires we attempted to assess the prevalence of team learning behaviors, role stress, and performance in the teams. In both cases our goal was to investigate the relationship between team learning behaviors and performance. More specifically, for the concepts of role stress and team leadership behavior, we used self-report measures only. Therefore, the variance might be somewhat restricted, for these variables, because individuals strive to achieve consistency in their response pattern (Spector, 1987), possibly leading to inflation in the relationships between the model variables.

For the purpose of increasing the amount of objectivity in the data, we recommend method-triangulation using observation and additional interviewing in future research attempts, approaching different types of raters, for instance, individual team members, their leaders, and other related parties. When using different observation methods, special

attention should be given to reactivity of individuals (Heppner, Wampold, & Kivlighan, 2008, p. 331), being the phenomenon that individuals alter their behavior or performance due to awareness of being observed or the expectations of the observer.

Analysis

To analyze our data, we used Structural Equation Modeling (SEM) and Hierarchical Linear Modeling (HLM). SEM, as defined by Ullman (1996), "allows examination of a set of relationships between one or more independent variables, either continuous or discrete, and one or more dependent variables, either continuous or discrete." SEM deals with measured and latent variables. A *measured variable* is a variable that can be observed directly and is measurable. Measured variables are also known as observed variables, indicators or manifest variables. A *latent variable* is a variable that cannot be observed directly and that should be inferred from measured variables. Latent variables are implied by the covariances among two or more measured variables. They are also known as factors (i.e., factor analysis), constructs or unobserved variables. SEM is a combination of multiple regression and factor analysis. Its goal is to validate a model that fits the data well enough to serve as a useful representation of reality and a parsimonious explanation of the data.

One huge advantage of SEM is that it provides the opportunity to test relationships among several variables simultaneously in one model, and to examine concurring models, based on the various existing theories on the domain. That is to say, SEM provides the opportunity to control for chance capitalization and to gain an indication of causality through the comparison of concurring models (Byrne, 2001; Hoijtink & De Jonge, 2007). This was particularly of interest in our fourth study, testing the rivalling hypotheses of stress-inhibits-learning and learning-inhibits-stress, SEM was valuable in gaining an indication of which model would fit best to our data, without the need to have data from multiple points in time. To more safely conclude causality in the relationships between the model variables, however, we recommend multi-wave designs (Taris & Kompier, 2003) in further future research. Another advantage of SEM in our study was that SEM provided the abilities to distinguish between indirect and direct relationships between variables and to analyze relationships between latent variables without random error differentiates SEM from other simpler, relational modeling processes.

Multi-level analysis is viewed as essential to the study of teams (e.g., Salas, Stagl , & Burke, 2004), because individuals and teams are nested and intertwined within multi-level open systems. Thus, in our view, examining effects of team learning behaviors, role stress, and performance could not be restricted to the team level. HLM deals with the issue that people residing within equal levels of hierarchies tend to be more similar to each other than people randomly sampled from the entire population, and thus observations based on these individuals are not fully independent (Bryk & Raudenbush, 1992).

For example, team members of a particular project team are more similar to each other than to individuals randomly sampled from the organization as a whole. This is because team members are not randomly assigned to project teams from the population, but rather are assigned to projects based on specified characteristics. Further, team members within a project share the experience of being in the same context, e.g., the same project manager, and similar experiences, which may lead to increased homogeneity over time. However,

most analytic techniques require independence of observations as a primary assumption for the analysis. HLM incorporates these so-called design effects into the analyses, because it provides the opportunity to control for potential non-independence of the data within a team, and to test variables of multiple levels. Our study examined the influence of team learning behaviors, being a team-level construct, on individual-level role stress and performance, controlling for this potential non-independence.

Generalizability

The issue of generalizability raises questions such as: Are the concepts and relationships we found in our study relevant for other types of teams? And within other types of organizational settings? In other words, generalizability of findings can be anticipated upon during the design stage of a study, as well as in the analysis of results (Drummond, Manca, & Sculpher, 2005). For the sake of generalizability of our findings among project teams, we addressed project teams from several organizational settings in the Netherlands. The interviews and survey studies in our first and second study were conducted with project managers, and team members, team leaders and supervisors of operational as well as project teams. Findings from these studies may be generalizable to operational as well as project teams. In our third and fourth study, however, we restricted our sample to project teams in the sectors of building and utilities, engineering and construction, infrastructure, and area decontamination and development. These sectors may have specific characteristics that color their project teams, and as such the findings of our study may not be confirmed in other project organizations. For this reason, it is wise to be cautious about generalizing our findings, without further investigation, to other types of teams like management teams or operational teams. Future research among projects from other sectors may increase the generalizability of our findings to project teams from other settings.

By using multi-level modeling, we anticipated generalizability in the analysis of results. The advantage of multi-level modeling is that, if individual-level data are clustered per team, they provide a more appropriate estimate by controlling for the team-membership effect (Drummond et al., 2005).

Reflection on Relevance

Chapter 1 presented the relevance of this PhD study for theory building and practice. This section reflects on the contribution of this thesis, and reports ideas on an agenda for future research.

Scientific Relevance

Our study aimed to contribute to existing theory by a better understanding of the team learning process and role stress in project teams, and how these concepts interrelate with the team's performance. This was done by measuring the perceptions of the concepts from team members, their project manager and client or supervisor.

First, the studies included in this research project resulted in two multi-dimensional measurement instruments, which can be used in future research attempts to study team lea-

rning and team-level role stress. One instrument aimed at examining the extent of perceived team learning behaviors, while the other aimed at examining the extent of perceived team-level role stress in teams, a concept that until now almost exclusively has been investigated at the individual level. The scales that were incorporated in the questionnaires appeared to have adequate internal consistency, and a clear factor structure. However, more research is needed to assess whether use of the questionnaire would be valid in other settings. Second, the present study has extended previous research on team learning by incorporating the complementarity of the various behaviors associated with team learning, and by relating the concept to several other variables of importance to team performance. The model that resulted from our research offers new insights into the multi-level mediational relationships among team learning behaviors, role stress, and performance.

Finally, our findings offer additional insights into the relationships among team learning behaviors, role stress, performance and leadership behavior. For example, a negative relationship was found between quantitative role overload at the team level, and team learning behaviors, indicating that overburdened teams take less time for collective learning behaviors. A positive relationship was found between team learning behaviors and performance at both the individual and team level. The relationship between team learning and individual performance appeared to be partly mediated by individual role overload, indicating that team learning behaviors may help individual members to cope with perceptions of role overload. For both person-focused and task-focused leadership behaviors, a positive relationship was found with the prevalence of team learning behaviors. However, when simultaneously examining both leadership behaviors and their relationship with team learning behaviors in one model, the positive effect of the task-focused leadership behavior became nonsignificant.

Practical Relevance

Interviewing project managers and project directors about their perspectives on their projects, and their role as facilitators of project teams, we observed that they all agreed that learning as a team is of vital importance for performance. Furthermore, we discovered that project managers and directors were unaware of the knowledge, tools and strategies that research on teams has provided, and that could help them facilitate team learning behaviors. We learned from our interactions with project teams in practice that attention for learning was almost completely restricted to the completion phase of a project, during its so-called project review phase (see e.g., Von Zedtwitz, 2002). Although this may be a valuable means of learning from a project's processes and results, for the project team itself, it comes a bit late to improve their team process and outcomes. During project execution, team members were mostly driven by a performance attitude, neglecting the learning perspective within their teams. Moreover, they were often unaware of their tacit assumptions, and they were not used to exploring issues, to questioning assumptions, or to experimenting with new approaches collectively. Deliberately taking time for learning as a team appeared to be highly neglected in this dynamic world. For that reason, we think that the results of our studies may be useful for practitioners in several ways in order to increase the learning capacity of their teams.

First, the elaboration of the concept of team learning behaviors into eight concrete and

complementary behaviors was operationalized by means of our validated measurement instrument. This instrument may help practitioners to diagnose their teams as regards team learning behaviors, and to make them aware about which behaviors they could increase in order to improve the team learning capacity as a team. As the team learning behaviors are operationalized into observable interactions, instead of abstract team processes, team members are able to reflect upon the occurrence of each of the behaviors within a certain time frame, and to set goals for the future. In addition, the findings about a positive relationship between these team learning behaviors and performance, at both the team and individual level, may promote and justify team members to engage in team learning behaviors.

Second, the conceptualization of team-level role stress may help project managers and their teams to become aware of and to diagnose the level of perceived role stress from team-level demands. In addition, the negative relationships found in our study between team-level role stress and team performance, necessitates team stakeholders to explore how to eliminate possible sources of team-level role stress. For instance, they could explore possible causes of role stress with their team, collectively construct possible solutions, and plan for action. They could explicitly give consideration to existence of ambiguous team tasks or conflicting team demands, and as such make perceptions of role stress shared perceptions that could be solved or coped with together.

Third, project managers confronted with one or more team members, perceiving high levels of individual role stress, may take some extra time with the whole team to collectively explore and experiment with alternative role divisions. Our findings show that team learning behaviors help individual team members to cope with perceptions of role stress, and as such prevent the negative effect of individual role stress on individual performance.

Fourth, project managers may learn from our findings that team-level role stress, and in particular quantitative team role overload, may hinder team members from engaging in team learning behaviors. This awareness, in addition to the awareness that team learning behaviors positively effect performance, may encourage project managers to intentionally take time for team learning especially when project teams are exposed to a very demanding context with limited resources, causing high perceptions of team-level role stress.

Fifth, our findings on team leadership behaviors may help project managers to tailor their own behavior in order to promote their team's learning behaviors. In projects with strong deadlines and few resources in an uncertain and complex environment, project managers will have the tendency to focus on the tasks at hand in order to gain some control. However, our findings may prompt them to deliberately demonstrate more person-focused leadership behavior. Particularly in ambiguous and overburdening situations, exploring, experimenting, and bringing up team routines for discussion may be uncomfortable for many people. Systems, which teams are, tend to rely on the familiar and known, because it is functional in giving a sense of certainty and trust (Homan, 2001). Project managers showing concern for team members may take away these feelings of discomfort. In addition, project managers who stress the performance as well as the learning goals of a project (Druskat & Kayes, 2000) invite their team members to broaden their focus from a pure performance focus to a combined "what did we achieve", and "what can we learn from this" perspective. Moreover, exemplifying team learning behavior of project managers themselves may help team members engage in team learning too. For example, project managers that ask team

members to explicitly communicate their perspective on situations, and to talk freely about mistakes and how to prevent them, may prompt team members to act in the same manner. In addition, project managers that invite team members to look back together and express their perspective on the team's approach, and to explicitly try out what the effect is of little changes in this approach, may trigger team members to copy this engagement for collective learning. Moreover, project managers can stimulate team members to explore and co-construct their meaning as a team by asking them to participate in decision-making.

Finally, many project managers and their teams became highly involved in the course of the research project. Frequently reporting our findings to all participants has contributed to dissemination of the results to the broad range of practitioners that participated in interviews and surveys that served as exploration and validation of our research concepts in practice. In total, four project managers were interviewed and 70 team members, team leaders and supervisors were surveyed to gain preliminary insights and justification of our research intentions in practice. A total of 92 team members, team leaders and supervisors participated in the validation of our team learning instrument. Nine project directors of project-oriented organizations were convinced to allow their organizations to participate in diagnosing a total of 40 project teams with 245 team members on the prevalence of team learning behaviors, role stress, and performance. In addition, at the end of our research project, a small conference was held to discuss research findings with the project directors and project managers who participated to the study, and to discuss additional avenues for future research. By means of a research report for Project Management Institute America, we aimed to disseminate the research findings and practical implications internationally among a large population of project management practitioners.

Agenda for Future Research

The implications and challenges for future research, derived from this study, have partly been discussed in the previous sections. For the convenience of the reader they are summarized below, and some additional challenges will be presented.

First, future research should pay attention to the limitations of the quantitative cross-sectional design of our study. This approach prevented a conclusive demonstration of causality of these relationships. Moreover, the cross-sectional design of our study limited the ability to explore dynamic issues. Multi-wave designs, using multiple assessments over time of the various model variables, should overcome this limitation. In addition, we agree with Edmondson (1999) that to understand learning in teams, team structures such as team leadership, and shared beliefs on issues such as team-level role stress, must be investigated jointly, using both quantitative and qualitative methods. One could think of the use of case studies for an in-depth investigation of the development of team learning behaviors, stress, and performance in teams. Alternative methods, such as questionnaires (for pre- and post examination), observations, interviews and diaries could be implemented in this perspective.

Second, careful sample selection with teams that significantly differ on the prevalence of

team-level role stress could shed more light on the relationship between team role ambiguity, conflict and overload, and performance and learning. The sample of project teams in our study all faced considerable uncertainties, caused by multiple key customers from industry, public and/or government, and requiring extensive integration of milestone products (e.g., the development and construction of an oil refinery on newly reclaimed land, and the decontamination of polluted ground surface in the middle of Amsterdam while simultaneously property was developed).

From Sauser and colleagues' (2009) review on project types, it is clear that all projects are not the same, nor should project teams be managed in the same way. Pich, Loch and De Meyer (2002) suggested that as projects increase in the amount of uncertainty due to lacking (or changing) information, project teams must "actively incorporate" new information, which requires the team to be flexible and to look for different approaches. Using their words, they need a learning strategy, indicating that team learning behaviors may be vital. In projects where adequate information is available and simple problems do not need a learning orientation to allow for optimized solutions, team learning behaviors may be less vital to performance or may even lead to it deteriorating (e.g., Bunderson & Sutcliffe, 2003). Future research, focusing on certain project characteristics, such as project phase, complexity, novelty, pace or level of technology, may contribute to a contingency approach of project teams in using team learning behaviors, and may help project teams to find a balance between learning and planning and "fire-fighting" to keep on target.

Third, a correlation analysis at the team-level revealed several relationships between project characteristics, team role stress (more precisely team role conflict and team role quantitative overload) and team performance. Almost none of the team characteristics appeared to be significantly related to team performance. The exceptions were that team performance was significantly related to team size (number of team members) and duration of the project. As team size, in turn, was significantly related to team member age, work experience and the degree to which team members had a part-time involvement with the project (part-time factor), and as project duration was also related to these variables, this might raise the hypothesis that the more experienced teams with a higher degree of full-time involvement perform better.

Furthermore, the correlation analysis showed that age was the only team characteristic included in the study that correlated negatively with team role conflict, suggesting that the more senior the team members are, the less they perceive conflicting demands on the team. Team role overload, however, appeared to correlate positively with part-time factor, team size, project duration, meeting frequency, and negatively with team stability. Moreover, part-time dedication and number of team members, in turn, appeared to be negatively related to team stability. Based on these preliminary outcomes, we suggest to other scholars to thoroughly investigate the impact of these factors in elaborate future model testing. Given the limitation of the amount of data points in our study, we could not safely conclude on this ourselves.

For now, our outcomes might provide ground for a possible explanation in the sense that larger project teams, with a lesser degree of full-time involvement, have higher turnover rates, and feel more overburdened as a team. Moreover, the outcomes suggest that team

members of projects having a long scheduled duration time are more prone to perceptions of team role overload than members of projects with a shorter scheduled duration time. All these correlations and hypothesized explanations suggest further exploration in future research.

Fourth, in this study we gained insight into the relationships between the classical categories of leadership behavior, i.e., person-focused and task-focused leadership behavior, and team learning behaviors. Our findings, however, do not shed light on the optimal balance between task-focused and person-focused leadership behavior in order to maximize team learning in project teams, nor how this optimal balance varies over time. Future research might shed more light on this issue of balance over time.

Fifth, due to the lack of insight into why people were leaving or joining a team, we were not able to identify different types of team changes. We assume that in future research it is of interest to discern why team member changes take place, which of these changes can be influenced by the leader, and if so, which leadership behavior is needed to keep the team together.

Sixth, from our interactions with practice, we learned that teams by themselves are not used to taking time for the mere sake of reflection without a strong sense of urgency. Especially not, when no-one appreciates that they do so. But would they be more willing to engage in team learning behaviors if they were rewarded or appreciated for it? Which appreciation should help? And what can be done in this respect by the project manager? In this light it is interesting to further explore the effect of team leader interventions on team-level role stress and team learning behaviors, e.g., by diagnosing the team on the various dimensions of team-level role stress and team learning, and then to reflect with the team on the results and plan for action. Do these interventions differ among teams, and what are the factors that influence the success of the interventions? What interventions are to be used by the team leader, and when? In order to gain some answers on some of these questions, our next research steps are focused on examining intervention strategies for project managers that may help to facilitate team learning behaviors in their teams. We will briefly explain our research intentions in the next paragraph.

Concrete Approach

During our feedback session with participating project directors, managers and team members, which we organized after the data collection and analysis phase, we explored with them the question "How can we help the project team and its leader to apply the results of this study in order to improve performance through team learning?" On the basis of this exploration we developed a framework to apply the results of this study (see Figure 2).

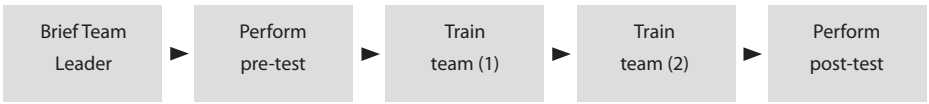

Figure 2: Framework for Increasing Levels of Team Learning Behaviors

Within the intervention program we intend to use a five-step framework (see Figure 2) based

on the following assumptions:

1. Commitment and understanding on the part of the team leader (project manager) is essential to create initial conditions that stimulate learning behaviors and to maintain the behavioral patterns implemented during the training.
2. Learning is an abstract concept. People may easily agree that joint learning is important for them to perform their collective task without agreeing on the "what" and "how" of joint learning. Hence, we apply a specific description of learning behaviors which can easily be related to the concrete experiences of the team.
3. Feedback is an essential ingredient to support learning. Hence we perform both a pre-test and a post-test and feed the results back to the team. The way in which this test is administered can easily be adopted by the team for future use.
4. Team learning behaviors encompass quite a few different behaviors. It is rather difficult for an individual to pick up several behaviors simultaneously. Probably this is even more difficult for a group of people. Hence, we select those learning behaviors which are lacking most within the team to be trained at first.
5. Concrete and work-related learning is more stimulating to most people than classroom training. Hence, we will only use concrete cases and experiences of the team itself. These cases and experiences will be brought in by the team leader mostly.
6. Role overload (too much work) is a common phenomenon within project teams. Project managers and project teams can be expected to be hesitant about going into a training to "learn to learn". Hence the framework is aimed at a very short throughput time requiring a minimum of time to be invested by the team.
7. To further adapt the framework to the real conditions of the team we will design and apply minor variations. For instance, coaching the project manager in addition to training the team could be a necessary variation in certain circumstances.

Again, we intend to use a field setting to execute our investigation program, and intend to measure team learning behaviors, role stress, and performance at multiple (at least two) points in time and to analyze the effect of interventions (executed by the leader and by a facilitator) on team performance and role stress at Time *t* (after the intervention program), and Time *t*-1 (before the intervention program). The intervention exercises will be aimed at increasing the prevalence of team learning behaviors in teams. As an example of such an exercise, one could think of giving the team the assignment to decide which team process they want to improve, and then to ask them to describe each step they currently take in this process. With such an exercise several learning behaviors are addressed and trained, e.g., exploring, co-construction of meaning, and reflection on processes. By indicating the subject of reflection within their own working environment, and looking at their own working process, we aim to use an action research approach in which the empirical research is not separated from team functioning in practice, but where research is done as part of the team functioning. With a pre- and post program measurement of team learning behaviors, role stress, performance and leadership behavior using surveys, we intend to gain insights into the effects of the interventions, and in the dynamics of the variables under study. In order to optimize objectivity we will apply method-triangulation, by using not only quantitative, but also qualitative approaches. Case descriptions of the contexts of the teams, interviews with

several stakeholders within the participating organizations, logs of the project managers about their own interventions and effects, and observations during the sessions will be used to gain more complementary qualitative data, giving answers on factors that may have influenced the success of the interventions used. For the sake of generalizability, we will broaden our sample selection to other types of organizations.

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Samenvatting (Summary in Dutch)

Na bijna anderhalf decennium ervaring met teams in de praktijk, zowel in de rol van projectleider als in de rol van teamlid, kreeg ik bij de Open Universiteit Nederland en de Universiteit van Tilburg de kans om me samen met mijn promotoren te verdiepen in teams en hun functioneren. Een team wordt gedefinieerd als een herkenbare groep mensen die in onderlinge afhankelijkheid, dynamiek en aanpassingsvermogen streven naar een gezamenlijk doel. Het werken in teams, met name in projectteams, is de afgelopen decennia sterk toegenomen. Krachten die deze groei hebben gestimuleerd liggen onder andere in de toename van complexe problemen of vraagstukken die voortkomen uit de exponentiële groei van informatie, de globalisering van de markt en de (daarmee samenhangende) behoefte aan versnelde innovatie, en dientengevolge de noodzaak om een breed en vernieuwd productenscala op maat aan te bieden. De meerwaarde van teams bij de oplossing van deze complexe vraagstukken wordt onder andere toegeschreven aan de diversiteit van de teamleden in vaardigheden, waarden en expertise. Teams worden daardoor geacht zaken voor elkaar te krijgen die niet tijdig door één individu of door meerdere individuen achtereenvolgens voor elkaar kunnen worden gebracht. De teamleden moeten dan niet naast maar met elkaar samenwerken aan een vraagstuk.

Uit eigen ervaring als projectleider en de ervaringsverhalen van vele collega-projectleiders, weet ik inmiddels dat het kweken van een 'soepel' functionerend team, dat voortdurend in onderlinge samenwerking streeft naar gezamenlijk succes niet gemakkelijk is. Ook de geschiedenis en het systematisch volgen hiervan door middel van empirisch onderzoek hebben herhaaldelijk geïllustreerd dat effectief samenwerken in teams niet automatisch volgt uit het bijeenbrengen van een groepje mensen met relevante kennis en ervaring, die verantwoordelijk worden gemaakt voor een gezamenlijk vraagstuk. Effectief samenwerken is kennelijk iets wat ontwikkeld, ofwel geleerd moet worden, hetgeen alleen kan in onderlinge interactie. Vooral in projectteams, gekenmerkt door tijdelijkheid en niet-routinematige opdrachten, is het van belang dat teamleden snel leren om samen te werken, onderlinge acties te coördineren en effectief met elkaar te communiceren. De term 'leren' verwijst in deze context naar een combinatie van ervaringsleren (oftewel leren van ervaringen tijdens het samenwerken in het projectteam) en zelfgestuurd leren (waarbij de teamleden bewust bepalen wat ze willen leren en hoe) door een voordurende afwisseling van actie en reflectie. Leren definiëren we daarom als een (impliciet én expliciet) proces van kennisverwerving door ervaring, dat leidt tot een relatief blijvende verandering in gedrag. Vaak wordt van ervaringen vooral impliciet geleerd, zonder dat mensen zich hiervan bewust zijn, bijvoorbeeld door te observeren, te imiteren of te herhalen. Het nadeel van impliciet leren is dat het leidt tot kennis, vaardigheden en gedrag waar we ons niet bewust van zijn en waar men daarom moeilijk over kan communiceren. Dit laatste impliceert ook weer dat mensen voor wat betreft hun impliciete kennis minder ontvankelijk zijn voor feedback van anderen. "Zo doen wij dat hier!" in plaats van "Doen wij dat hier wel zo handig?" Dit nadeel wordt ondervangen door naast het impliciete leren ook bewust en expliciet te leren van ervaringen. Bijvoorbeeld wanneer een team bewust concludeert dat de communicatie met de omgeving van het team hapert en ideeën gaat uitwerken om die communicatie te verbeteren.

De onderzoeksliteratuur in het domein van 'leren als team' is de laatste jaren fors gegroeid. Toch bleek dat het gedrag dat ten grondslag ligt aan 'het leren gezamenlijk te opereren' nog onvoldoende meetbaar en concreet gemaakt Is. Vele gesprekken met projectleiders uit de praktijk moedigden ons aan om dit gedrag verder te concretiseren, zodat er actief invloed op uitgeoefend kan worden. Hier lag de aanleiding voor de eerste doelstelling van dit promotietraject, namelijk het gezamenlijk leergedrag in teams (dat niet direct gericht is op het leveren van resultaten, maar op "Hoe spelen we het spel samen?") te identificeren en te operationaliseren, en te bepalen in hoeverre dit gedrag samenhangt met teamprestaties. Gedurende ons gehele onderzoek is het een belangrijk uitgangspunt geweest om antwoorden te vinden op vragen die leven zowel in de beroepspraktijk als in dat deel van de academische wereld dat zich bezighoudt met teams. Wat vinden experts uit de beroepspraktijk plausibele verklaringen voor het verschil in presteren tussen het ene en het andere projectteam? En wat is er uit onderzoek over deze factoren al bekend? Hoe hangen die factoren met elkaar samen? Welke vragen zijn nog open gebleven? Door deze wisselwerking tussen in de literatuur gevonden inzichten en interviews met praktijkexperts werd de doelstelling van het onderzoek verder uitgebouwd naar het verkrijgen van inzicht in de relaties van teamleergedrag met teamleiderschap en rolstress.

Teamleiderschap wordt zowel in onderzoek als in de praktijk gezien als een belangrijke invloedsfactor op het presteren van teams, zo bleek uit de eerste studie waarover in deze dissertatie is gerapporteerd. Dit bracht ons op de tweede doelstelling van dit promotieonderzoek, namelijk inzicht te krijgen in de relatie tussen het gedrag van de teamleider en de mate van teamleergedrag in zijn[6] team. Bovendien wilden we onderzoeken in hoeverre de teamleider invloed kan uitoefenen op de mate van teamleergedrag door te werken aan stabiliteit in de teamsamenstelling Eerder onderzoek heeft immers al aangetoond dat in stabielere teams meer leergedrag voorkomt. Wisselingen in teamsamenstelling komen met name in projectteams relatief veel voor, waardoor zij steeds weer opnieuw een teamleerroutine moet opbouwen om in de nieuwe samenstelling leren om adequaat samen te werken.

Rolstress is een construct dat we later in onze studie hebben opgenomen, toen op basis van de literatuur en gesprekken met praktijkexperts een mogelijk verband met teamleergedrag werd verondersteld. Rolstress heeft betrekking op stress die voortkomt uit percepties van onduidelijkheid over het werk en de eigen rol, de conflicterende belangen die men moet dienen, en tijdsdruk. Dit concept is tot nu alleen als individueel ervaren perceptie over het eigen werk gedefinieerd. Uit de literatuur en uit gesprekken met projectmanagers en directeuren in de praktijk bleek dat juist op het niveau van projectteams onduidelijkheid over projectdoelstellingen vooral in startende projecten veel voorkomt. Ook geworstel met conflicterende belangen tussen partijen waar het projectteam mee te maken heeft, en een hoge

[6] Waar we met 'hij', 'hem' of 'zijn' verwijzen naar de (projectteam)leider, bedoelen we ook 'zij' of 'haar'.

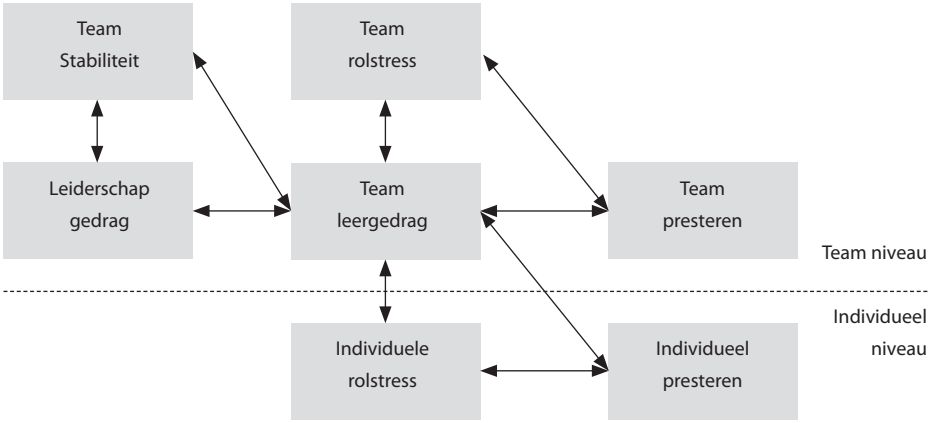
tijdsdruk werden gemeld als kenmerkend voor vele projectteams. Projectteams hebben immers te maken met een niet-routinematige opdracht die binnen vooraf gestelde tijd voor vaak verschillende opdrachtgevers vervuld moet worden. De veelvuldig in de interviews genoemde onduidelijkheid over doelen, conflicterende vraagstellingen en hoge tijdsdruk op teamniveau, deed ons veronderstellen, dat rolstress ook wel eens voort zou kunnen komen uit teamgerelateerde werkpakketten, en daardoor bij alle teamleden rolstress zou kunnen veroorzaken bovenop de rolstress voortkomend uit de individuele rol. Dit brengt ons tot de derde doelstelling van dit promotieonderzoek, namelijk te onderzoeken of rolstress ook gezamenlijk als team kan worden ervaren, voortkomend uit onduidelijke teamdoelen, conflicterende teamopdrachten en overbelasting van het team in kwalitatieve of kwantitatieve zin.

Uit eerder onderzoek naar stress op individueel niveau blijkt dat leren en stress negatief met elkaar samenhangen, maar nog onduidelijk is of stress leren hindert, of andersom, dat leren stress kan verlichten. Aan de ene kant hebben mensen de neiging om onder stressvolle condities hun blikveld af te schermen, terwijl leren juist de tegenovergestelde houding vraagt. De gesprekken met de praktijkexperts bevestigden ons vermoeden, en meer specifiek dat vooral tijdens hoge tijdsdruk (roloverbelasting) in teams er niet de tijd wordt genomen voor teamleergedrag. Aan de andere kant kan 'een lerende instelling' iemand helpen om stressvolle situaties als uitdaging te zien, en hem helpen om constructief om te gaan met de situatie. Zo zou ook geredeneerd kunnen worden op teamniveau. Immers, het gezamenlijk onderzoeken van een onduidelijke of conflicterende situatie en samen oplossingen bedenken en uitproberen (een aantal van de teamleergedragingen) zouden kunnen helpen om de doelen van het team te verduidelijken en een aanpak voor conflicterende vraagstellingen uit te proberen, om zo de op teamniveau ervaren rolstress te verminderen. Dit brengt ons tot de vierde doelstelling van dit onderzoek, namelijk te onderzoeken of 'team-rolstress' samenhangt met teamleergedrag, en hoe deze samenhang eruit ziet: vormt team-rolstress een hindernis voor teamleergedrag of helpt teamleergedrag juist om team-rolstress te verminderen? Tenslotte, en als vijfde doelstelling, wilden we onderzoeken of en hoe teamleergedrag samenhangt met individueel gepercipieerde rolstress en teamleergedrag. Het zou immers zo kunnen zijn dat ook de stress die voorkomt uit onduidelijkheid, rolconflict of overbelasting in de eigen rol, wordt beïnvloedt door teamleergedrag, door bijvoorbeeld met het hele team de onderlinge rolverdeling te exploreren en te experimenteren met een andere.

Gebaseerd op de hiervoor genoemde onderzoeksdoelstellingen hebben we in dit onderzoek ernaar gestreefd antwoorden te krijgen op de volgende vragen:

1. Hoe belangrijk is teamleren voor het teampresteren volgens belanghebbenden van (project)teams in de praktijk?
2. Welk geheel van collectieve gedragspatronen liggen ten grondslag aan teamleren, hoe kunnen we dit 'teamleergedrag' meten, en welke samenhang kan worden gevonden tussen dit gedrag en de teamprestaties?
3. In welke mate en met welk leiderschapsgedrag kan de projectleider invloed uitoefenen op de mate van teamleergedrag in zijn team? In hoeverre wordt deze invloed van de projectleider bewerkstelligd door het zo stabiel mogelijk houden van de teamsamenstelling?
4. In hoeverre komt rolstress voor in projectteams? Wordt rolstress alleen op individueel niveau, of ook op teamniveau, ervaren?
5. In hoeverre hangen teamleergedrag, rolstress en presteren op zowel individueel als teamniveau met elkaar samen in projectteams?

Samengevat is de ene hoofddoelstelling van dit promotieonderzoek erop gericht meer inzicht te verkrijgen in teamleergedrag en de relaties met rolstress en presteren in teams, meer in het bijzonder projectteams. De andere hoofddoelstelling is erop gericht inzicht te verkrijgen in teamleergedrag en de relatie tot het gedrag van de teamleider en de stabiliteit van het team.
Deze onderzoeksvragen worden gevisualiseerd in het volgende conceptueel model:



Figuur 1: Conceptueel model.

Theoretische bijdragen vanuit de leertheorie en teamtheorie zijn gebruikt voor de conceptualisatie van teamleergedrag. Bovendien zijn bijdragen vanuit de leiderschapstheorie en de organisatiepsychologie gebruikt om factoren op teamniveau te identificeren die sterk samen lijken te hangen met teamleergedrag: het gedrag van de projectteamleider, teamstabiliteit, en team-rolstress.
Vier studies vormden de basis voor de beantwoording van de bovengenoemde onderzoeksvragen. Van deze studies wordt verslag gedaan in de hoofdstukken twee tot en met vijf. In het hoofdstuk zes, Conclusions & Discussion, worden de conclusies uit het onderzoek systematisch weergegeven en wordt kritisch teruggeblikt op de gemaakte keuzes. Tevens wordt de relevantie van de resultaten voor theorie en praktijk verder toegelicht. Het zesde hoofdstuk eindigt met aanbevelingen voor verder onderzoek. In het navolgende vatten we de belangrijkste conclusies van de deelstudies samen, inclusief enige kritische noten en aanbevelingen voor verder onderzoek.

Belangrijkste conclusies van de deelstudies

De eerste onderzoeksvraag wordt beantwoord in *Study 1(hoofdstuk 2)*, waarin verslag wordt gedaan van een vooronderzoek naar factoren die volgens belanghebbenden uit de praktijk het presteren van teams beïnvloeden. Het eerste doel van dit onderzoek was het achterhalen van beoordelingscriteria van teampresteren die door betrokkenen bij teams (opdrachtgevers, teamleiders en teamleden) zelf gebruikt worden. Uit de onderzoeksresultaten bleek dat de meest gebruikte beoordelingscriteria betrekking hadden op 'het voldoen aan de gewenste kwaliteit', 'het bereiken van de gestelde doelen' en 'het verbeteren van de klanttevredenheid'. Het tweede doel van deze eerste studie richtte zich op het verkennen van verklaringen die betrokkenen bij teams zelf aanvoeren voor een verschil in presteren tussen (project)teams. Enerzijds hebben we hiertoe diepte-interviews gehouden met vier zeer ervaren projectmanagers van grote innovatieve projecten die werkzaam waren in verschillende organisaties. Anderzijds is een uitgebreide literatuurstudie uitgevoerd om uit de theorie bekende verklaringen voor verschil in teampresteren te verzamelen. Vervolgens heeft een drietal teamexperts de theoretische en empirische verklaringen ingedeeld tot in totaal 11 factoren, die vervolgens zijn geoperationaliseerd in 54 statements. Tenslotte is aan een grotere groep betrokkenen uit de teampraktijk (N = 70) gevraagd om het relatieve belang van de verklaringen aan te duiden door middel van een scoringsprocedure, waarbij elke respondent zes punten kon verdelen over de 54 statements. De uitkomsten resulteerden in een zogenaamde top drie van belangrijkste verklaringen voor verschil in teampresteren volgens de ondervraagden uit de praktijk. Deze top drie van verklaringen kan samengevat worden als: (1) het gedrag van de teamleider, (2) teamleergedrag, en (3) helderheid van doelen. Deze resultaten stimuleerden ons tot verdere verdieping in de vragen hoe teamleden leren samen te werken, en in hoeverre de leider daarin een rol speelt.

De tweede onderzoeksvraag wordt beantwoord in *Study 2 (hoofdstuk 3)*, waarin we met behulp van de literatuur het concept teamleergedrag verder hebben uitgewerkt en verfijnd in een aantal gedragsdimensies, en waarin we een meetinstrument hebben ontwikkeld om teamleergedrag en de onderliggende gedragsdimensies te kunnen meten. Het doel van deze studie was een beter begrip te krijgen van het concept teamleergedrag door het concept te vertalen in concrete te onderscheiden gedragingen, en door de invloed van deze gedragingen op het presteren van teams te bepalen. Teamleren wordt in de literatuur op verschillende wijzen gedefinieerd, soms verwijzend naar de uitkomsten van teamleren, bijvoorbeeld in de vorm van gedeelde mentale modellen, soms verwijzend naar het proces van teamleren. Met onze studie sluiten wij aan bij de procesdefinitie, omdat wij ons verder wilden verdiepen in de collectieve gedragspatronen die nodig zijn om gezamenlijke leeruitkomsten te bereiken. Om deze keuze te onderstrepen kozen we voor de term teamleergedrag in plaats van teamleren.

In onze uitwerking van het concept teamleergedrag bouwen wij voort op de teamleergedragingen die we kunnen onderscheiden, en meten de invloed die deze gedragingen hebben op het presteren van teams. Ons doel was een meetinstrument te ontwikkelen dat de teamleergedragingen als separate, maar complementaire, gedragingen onderscheidt als onderdeel van het samenvattend concept teamleergedrag. Met complementariteit van de leergedragingen bedoelen we dat de leergedragingen in onderlinge samenhang meer

effect hebben op bijvoorbeeld teamprestaties, dan de separate invloed van de leerge-dragingen.
Bij de constructie van het meetinstrument is zoveel mogelijk uitgegaan van bestaande en gevalideerde meetschalen voor de onderkende gedragsdimensies. Door middel van een pilotstudie zijn de psychometrische kwaliteiten van de uiteindelijk door ons samengestelde vijf meetschalen onderzocht. De uitkomsten van de pilot-studie wezen uit dat teamleergedrag uiteenvalt in een achttal te onderscheiden gedragsdimensies:

- gezamenlijk exploreren;
- co-construeren van een gezamenlijke mening;
- reflecteren op de teamuitkomsten;
- reflecteren op de teamprocessen;
- onderling communiceren van fouten;
- gezamenlijk analyseren van fouten;
- feedback op het team managen;
- en tenslotte gezamenlijk experimenteren (bijvoorbeeld met een nieuwe werkwijze).

Hoewel deze onderscheiden gedragsdimensies overlap vertonen, gegeven de hoge inter-schaal correlaties, blijkt het onderscheidend vermogen bevredigend te zijn, gegeven de hoge intra-schaal correlaties, en de uitkomsten van de kwantitatieve valideringsstudies, onder andere uitgevoerd met behulp van AMOS (software pakket voor het toetsen van structurele vergelijkingsmodellen), aangaande de convergente en discriminant validiteit. We vonden bovendien een sterk positief verband tussen teamleergedrag en teampresteren. Tevens werd het verwachte complementaire karakter van de verschillende gedragingen bevestigd, omdat de resultaten lieten zien dat de teamleergedragingen samen meer variantie in de teamprestaties verklaarden dan de optelsom van de verklaarde variantie door elk separaat teamleergedrag. Hoewel meer experimenteel en longitudinaal onderzoek nodig is om het complementaire effect van de acht teamleergedragingen op teampresteren aan te tonen, kan op grond van onze bevindingen de veronderstelling worden geformuleerd dat teams waarin alle acht gedragsdimensies zichtbaar zijn, beter presteren dan vergelijkbare teams die zich beperken tot bijvoorbeeld reflecteren op de teamprocessen, maar die nooit een nieuwe werkwijze uitproberen.

De derde onderzoeksvraag wordt beantwoord in *Study 3 (hoofdstuk 4)*, waarin het verband tussen het gedrag van de projectleider en de mate van teamleergedrag wordt uitgediept. Gebaseerd op diverse functionele leiderschapstheorieën wordt de teamleider gezien als de sleutelfiguur in het creëren van gezamenlijke leerervaringen, het stimuleren, faciliteren en vormgeven van teamleren, en het ontwikkelen van adaptieve teams. Bovendien tonen voorgaande empirische onderzoeksresultaten al een positief verband aan tussen coachend en participatief leiderschapsgedrag en teamleren. Met deze studie beoogden wij de bestaande kennis te vergroten in twee richtingen. We wilden meer inzicht krijgen in de vraag welk leiderschapsgedrag positief bijdraagt aan de mate van teamleergedrag, en we wilden onderzoeken of de invloed van de leider (deels) verklaard kon worden vanuit de argumentatie dat deze met zijn gedrag in staat is zijn team meer stabiel te houden en daarmee de teamleergedragsroutine kan versterken.

Als theoretisch uitgangspunt zijn we aangesloten bij de meest traditionele indeling van leiderschapsgedrag, te weten persoonsgericht en taakgericht leiderschapsgedrag. Persoonsgericht leiderschapsgedrag wordt gekarakteriseerd door het ondersteunen, coachen en betrekken van teamleden, aangevuld met het hebben van visie en het uitdragen daarvan in voorbeeldgedrag. Taakgericht leiderschapsgedrag komt tot uiting in gedrag dat gefocusseerd is op het resultaat en de taken die daarvoor uitgevoerd moeten worden. Hoewel voorgaand onderzoek heeft aangetoond dat beide leiderschapsgedragingen positief samenhangen met het presteren van een team, en dat met name persoonsgericht leiderschapsgedrag teams uitnodigt tot teamleergedrag, was nog onbekend of taakgericht leiderschapsgedrag teamleren door een heldere taakstelling faciliteert of juist frustreert. Het zou immers zo kunnen zijn dat het taakgerichte gedrag van de teamleider, tot uiting komend in het voorschrijven van wat, wanneer en hoe taken uitgevoerd moeten worden, het team frustreert om te leren zelf 'hun zaakjes op te knappen'. Onze onderzoeksresultaten toonden echter aan dat ook taakgericht leiderschap positief samenhangt met teamleergedrag, hoewel dit verband in het niet valt naast de invloed van persoonsgericht leiderschapsgedrag. Meer onderzoek is nodig om inzicht te krijgen in de optimale balans tussen taak- en persoonsgericht leiderschapsgedrag om teamleergedrag te promoten.

Voortbordurend op bestaande onderzoeksresultaten over een positief verband tussen teamstabiliteit en teamleergedrag, veronderstelden we dat het wellicht zo zou kunnen zijn dat het positieve verband tussen leiderschapsgedrag en teamleergedrag (deels) verklaard wordt doordat de leider invloed heeft op de stabiliteit van zijn team. Deze veronderstelling werd echter niet door onze onderzoeksdata bevestigd. Een mogelijke verklaring hiervoor zou kunnen zijn dat wisselingen in een team meer voortkomen uit een veranderende capaciteitsbehoefte dan uit het gedrag van de teamleider. Wel werd wederom bevestigd dat een stabieler team meer teamleergedrag vertoont dan een minder stabiel team. Een verklaring hiervoor zou kunnen zijn dat bij wisselingen in een team steeds weer even tijd nodig is om onderling vertrouwen op te bouwen. Dit vertrouwen is immers nodig (zo blijkt ook uit eerder onderzoek door onder andere Edmondson (1999)) om bijvoorbeeld open met elkaar fouten te bespreken en te experimenteren met nieuwe werkwijzen. Het lijkt daarom juist in sterk qua samenstelling wisselende teams van belang dat de teamleider teamleergedrag vooral stimuleert door persoonsgericht leiderschapsgedrag.

De vierde onderzoeksvraag wordt beantwoord in *Study 4 (hoofdstuk 5)* en heeft betrekking op het fenomeen rolstress in projectteams. Onze interesse in rolstress kwam mede voort uit de veel gehoorde verklaring van projectleiders uit de praktijk dat zij aandacht voor het stimuleren van teamleergedrag wel heel belangrijk vinden, maar dat het er steeds bij inschiet. Bovendien hadden wij zelf de verwachting dat juist teamleergedrag een bijdrage zou kunnen leveren aan het ophelderen van onduidelijkheden en het slechten van rolconflicten. Rolstress is als concept in voorgaand onderzoek uitgebreid onderzocht als een individueel ervaren spanning naar aanleiding van rolonduidelijkheid, rolconflict of overbelasting en blijkt negatief samen te hangen met de prestaties en arbeidstevredenheid van een individu. Voor zover wij weten, is rolstress echter niet eerder onderzocht als een *gedeeld* ervaren spanning *door een geheel team* door toedoen van een onduidelijke opdracht, conflicterende belangen van diverse opdrachtgevers of een tekort aan expertise of capaciteit in het team. Zoals al eerder vermeld, hebben juist projectteams veelal te maken met verschillende

belanghebbenden met vaak conflicterende behoeften. En zeker in multi-projectsituaties zorgt de beperkte beschikbaarheid van mensen met bepaalde expertise voor de nodige overbelasting in projectteams. Daarom veronderstelden wij dat het wel eens zo zou kunnen zijn dat een teamlid niet alleen als individu rolstress kan ervaren over zijn eigen specifieke rol, maar dat een team als geheel spanning kan ervaren naar aanleiding van de rol van het team. Het zou zelfs zo kunnen zijn dat een teamlid over zijn eigen rol geen rolstress ervaart, maar hij en al zijn collega-teamleden wel gevoelens van spanning ervaren doordat verschillende partijen met elkaar conflicterende eisen stellen aan het team.

Deze *team*-rolstress wordt in meer of mindere mate gedeeld met de collega-teamleden. Onze onderzoeksresultaten bevestigen deze veronderstelling. En hoewel de variatie in teamrolstress tussen de projectteams in onze steekproef te klein was om de invloed van alle dimensies van team-rolstress (rolonduidelijkheid, rolconflict, en kwantitatieve of kwalitatieve overbelasting) op de teamprestaties te toetsen, werd duidelijk dat er een negatief verband bestaat tussen enerzijds kwantitatieve overbelasting en het moeten vervullen van conflicterende behoeften als team, en anderzijds teamprestaties. Hoewel onze kwantitatieve onderzoeksresultaten het bestaan van het concept rolstress op teamniveau bevestigen, zijn wij ons er terdege van bewust dat verder onderzoek, vooral ook bestaande uit kwalitatieve studies nodig, is om meer inzicht in teamrolstress te verkrijgen en om meer valide meetinstrumenten te ontwikkelen.

De vijfde en laatste onderzoeksvraag is eveneens gerapporteerd in *Study 4*. Voorgaand onderzoek op individueel niveau heeft het verband tussen stress, leren en presteren op het individuele niveau al aangetoond, hoewel tot nog toe onduidelijk is gebleven of stress een hindernis vormt om te kunnen leren of dat leren helpt stress te verminderen. Omdat in teams niet alleen het leren en presteren van individuen onder invloed kunnen staan van stress, maar ook het leren en presteren van het hele team, kozen we in deze studie een multi-level perspectief. Onze onderzoeksresultaten tonen negatieve effecten aan van zowel individuele rolstress op individueel presteren als van teamrolstress op het teampresteren. Wat betreft de relatie tussen rolstress en leren tonen onze resultaten aan dat teamleergedrag kan helpen om de door het individu gepercipieerde roloverbelasting te verminderen. Met andere woorden, teamleergedrag helpt om individuele rolstress te verminderen. Onze resultaten tonen echter ook aan dat een hoge mate van kwantitatieve teamoverbelasting (een van de dimensies van team-rolstress) ertoe leidt dat teamleden minder participeren in teamleergedrag. Een verklaring hiervoor zou kunnen zijn dat zodra teamleden de druk van de 'deadline' van het project voelen, zij zich minder 'veroorloven' met elkaar de tijd te nemen voor discussies die niet direct leiden tot resultaten, zoals het met elkaar reflecteren op het teamproces.

Echter aangezien in deze steekproef ook een positief verband van teamleergedrag met zowel individueel als teampresteren werd aangetoond, durven wij op grond van onze bevindingen te adviseren dat het juist in situaties waarin een team onder hoge tijdsdruk staat van belang is om bewust de tijd te nemen voor (het stimuleren van) teamleergedrag. Het alternatief neigt naar een negatieve spiraal: tijdsdruk leidt tot minder teamleergedrag en tot meer individuele rolstress. Vervolgens gaan teamleden minder presteren of vallen zelfs uit. Hierdoor nemen het capaciteitstekort en daarmee de tijdsdruk alleen nog maar verder toe, waardoor het presteren van zowel individuele teamleden als het team als geheel nog meer daalt.

Reflectie op het Onderzoek

Onderzoek naar leerprocessen en gedrag in echte praktijkteams, met name in projectteams, is nog beperkt beschikbaar. Veel studies rondom dit onderwerp zijn uitgevoerd in laboratoriumsituaties, waardoor de complexiteit van processen en factoren die spelen in 'real-life' projectteams onvoldoende kan worden onderzocht. Mede omdat voor ons de verbinding tussen theorie en praktijk zo'n centraal uitgangspunt was, kozen wij ervoor ons onderzoek in het 'echte werkveld' uit te voeren. Zo konden we immers ook bijdragen aan een grotere uitwisseling van kennis tussen de academische en praktijkwereld rondom teams. Door de praktijkbetrokkenen vanaf het begin van de vraagformulering bij het onderzoek te betrekken, bereikten we een grote mate van betrokkenheid en bereidheid mee te doen aan de uitvoering van het onderzoek. Deze betrokkenheid hebben we gedurende de verschillende studies steeds proberen vast te houden, door uitleg van het onderzoek aan betrokkenen, en door een gedegen terugkoppeling van resultaten en de praktische relevantie daarvan. Bovendien hebben we niet alleen gefocusseerd op publicaties in wetenschappelijke tijdschriften, maar ook op vakbladen die toegankelijk zijn voor de praktijk.

Om de objectiviteit in ons onderzoek te vergroten hebben we de perspectieven en meningen over het teampresteren verzameld van meerdere bij het team betrokken partijen, namelijk de teamleider, de opdrachtgever, en de teamleden. Het voordeel van deze aanpak is dat deze verschillende perspectieven een breder en objectiever zicht geven op het presteren van een team. Bovendien gaf deze aanpak de mogelijkheid feedback te leveren aan de teams over het teampresteren vanuit verschillende perspectieven, en vormden de resultaten van ons vragenlijstonderzoek directe 'leerinput' voor de deelnemende teams.
Bij de data-analyse hebben we gebruik gemaakt van Structural Equation Modelling (SEM), waardoor het mogelijk was de onderlinge relaties tussen de modelvariabelen tegelijkertijd te toetsen in één onderzoeksmodel, en diverse hypothetische modellen onderling te vergelijken op grond van de data. SEM bood ons daarmee de mogelijkheid om de door ons veronderstelde samenhang tussen teamleergedrag, rolstress en presteren in één model te toetsen, en bovendien de samenhang tussen leiderschap, teamstabiliteit en teamleergedrag ook mee te nemen. Naast SEM hebben we in de laatste studie gebruik gemaakt van multi-levelanalyse, wat juist in teamonderzoek als essentieel wordt beschouwd. Er kan immers worden verondersteld dat het lidmaatschap van een team invloed heeft op een individu en, omgekeerd, dat een individueel teamlid invloed heeft op het team. De multi-levelanalyse bood de mogelijkheid bij het onderzoeken van de relatie tussen teamvariabelen (zoals teamleergedrag en team-rolstress) en individuele variabelen (zoals individuele rolstress en individueel presteren) rekening te houden met het effect van het teamlidmaatschap op de perceptie van het individu.

We zijn ons echter ook bewust van de beperkingen van dit onderzoek. Het cross-sectionele, kwantitatieve karakter maakt het immers onmogelijk om uitsluitsel te geven over de causaliteit van de verbanden tussen teamleergedrag, rolstress, leiderschapsgedrag, teamstabiliteit en presteren. Bovendien is het niet mogelijk om iets te zeggen over de vraag hoe deze variabelen zich in de tijd ontwikkelen in onderlinge samenhang. Om dat echt te kunnen begrijpen is het onder andere nodig om gegevens te verzamelen door directe observatie,

en op meerdere momenten in de tijd, in echte projectteams. Met dit soort onderzoek kunnen vragen beantwoord worden als: In welke projectfase is teamleergedrag het meest van belang voor presteren?

Eveneens zijn de concepten rolstress en teamleiderschapsgedrag 'slechts' gemeten met behulp van zelfrapportage-vragenlijsten. Het gevolg hiervan kan zijn dat individuen in hun antwoorden streven naar consistentie in het antwoordpatroon, waardoor de onderzochte relaties in het onderzoeksmodel sterker naar voren komen dan ze in werkelijkheid zijn. Hoewel we projectteams vanuit verschillende sectoren in ons onderzoek hebben betrokken, zoals onder andere de infrastructurele en utiliteitsbouwsector en de bodemreinigingssector, zijn wij ons ervan bewust dat de generaliseerbaarheid van onze bevindingen nader moet worden bepaald door andere sectoren en andersoortige teams, zoals managementteams en operationele teams in verder onderzoek te betrekken.

Om de objectiviteit te vergroten bevelen we bovendien methodetriangulatie aan door gebruik te maken van observatie en additionele interviews en door van verschillende bronnen, zoals individuele teamleden, de teamleiders en andere betrokken partijen, data over teamleergedrag, rolstress en leiderschapsgedrag te verzamelen. Dit is precies wat wij in ons vervolgonderzoek op deze dissertatie van plan zijn om op te pakken, en dat hier verderop nog verder zal worden toegelicht. Maar allereerst staan we stil bij de relevantie van onze onderzoeksresultaten.

Relevantie van de Onderzoeksresultaten

Met dit promotieonderzoek wilden we een bijdrage leveren aan het beter begrijpen van het proces en het onderliggende gedrag dat nodig is om een team te vormen uit een groep individuen en met dit team tot nieuwe en/of steeds betere resultaten te komen. En we wilden meer zicht krijgen op de invloed van leiderschapsgedrag van de teamleider op dit proces. Bovendien hebben we een bijdrage willen leveren aan de theorie rondom het fenomeen rolstress, dat op individueel niveau al veelvuldig is onderzocht, maar waarvan op teamniveau (in het bijzonder in projectteams) nog weinig bekend is. We wilden bovendien meer inzicht in de samenhang tussen deze concepten, teamleergedrag en rolstress, en het presteren in projectteams. Vanuit *theoretisch* perspectief heeft ons onderzoek een drietal resultaten opgeleverd. Ten eerste resulteerde het onderzoek in twee multi-dimensionele meetinstrumenten, één voor teamleergedrag en één voor team-rolstress, die in vervolgonderzoek naar deze concepten kunnen worden gebruikt. De tweede bijdrage vult de bestaande theorie van teamleren aan, en was gericht op het aannemelijk maken van het complementaire karakter van de diverse onderkende teamleergedragingen, waarbij we hebben laten zien dat de teamleergedragingen in onderlinge samenhang een sterker positief verband laten zien met teampresteren dan de teamleergedragingen apart. En als derde bijdrage aan de theorie leveren de onderzoeksresultaten aanvullende inzichten ten aanzien van de relaties tussen teamleergedrag, rolstress, presteren en leiderschapsgedrag.

We staan nu wat uitgebreider stil bij de *praktische relevantie* van ons onderzoek. In de vele interviews en informele gesprekken met projectleiders en projectdirecteuren ontdekten we enerzijds hoe belangrijk zij teamleren vinden, maar anderzijds hoe weinig er in de praktijk bekend is van de reeds uit onderzoek beschikbare kennis, methoden en strategieën.

De aandacht voor leren bleek in hoofdzaak beperkt te blijven tot de eindfase van een project, in de vorm van een project-evaluatie. Hoewel de geleerde lessen uit een dergelijke evaluatie van waarde zijn voor volgende soortgelijke projecten, komt een dergelijke evaluatie voor het team zelf een beetje laat om nog aan de eigen werkwijze te kunnen sleutelen. Tijdens een project bleken de teamleden hoofdzakelijk gedreven te worden door deadlines en op te leveren resultaten. Een lerende instelling, waarbij bewust tijd wordt gepland om als team te leren van ervaringen, bleek in de dynamische projectenwereld nagenoeg niet te bestaan. Daarom denken we dat de resultaten van ons onderzoek in verschillende opzichten bruikbaar zullen zijn voor projectteams en hun leiders om het lerend vermogen in hun team te vergroten. We zetten ze hieronder op een rij:

1. De uitwerking van het concept teamleergedrag in acht concrete observeerbare teamgedragingen en het bijbehorende meetinstrument kunnen de projectleider en zijn team helpen bij het diagnosticeren van het leergedrag in het eigen team, en met het stellen van verbeterdoelen. Bovendien kan de aangetoonde positieve relatie tussen teamleergedrag en teampresteren helpen te rechtvaardigen dat een team bewust tijd neemt voor teamleergedrag.
2. De bevestiging van het bestaan van rolstress op teamniveau zou projectleiders en hun teams kunnen helpen zich hiervan bewust te worden en de mate van team-rolstress in hun team te diagnosticeren. Het in dit onderzoek ontwikkelde meetinstrument zou daarbij behulpzaam kunnen zijn. Deze bewustwording kan helpen om op zoek te gaan naar mogelijke oorzaken van deze gezamenlijk ervaren rolstress en er samen iets aan te doen.
3. Wanneer één of enkele teamleden kampen met individuele rolstress (door bijvoorbeeld onduidelijkheid over de eigen taak of bijvoorbeeld een overbelast gevoel) kunnen zij geholpen worden door bewust met het team tijd vrij te maken, en gezamenlijk de werkwijzen en rolverdeling van het team te bespreken, teamleergedrag dus.
4. Verder kunnen projectleiders van ons onderzoek leren dat vooral in teams waar de tijdsdruk (kwantitatieve roloverbelasting van het team) heel hoog is het teamleergedrag erbij kan inschieten. Hij kan daarop inspelen door dit gedrag bewust te stimuleren en er tijd voor in te plannen.
5. Tenslotte worden projectleiders door de resultaten van ons onderzoek uitgedaagd niet alleen prestatiedoelen (door taakgericht leiderschap) maar ook leerdoelen (door persoonsgericht leiderschap) te stimuleren, mede door onder andere zelf het goede voorbeeld te geven en aandacht te hebben voor het team, door bijvoorbeeld uit te nodigen op teamprocessen te reflecteren, door met het team samen verbetervoorstellen te genereren en te experimenteren met andere werkwijzen, door teamleden uit te nodigen hun perspectief op een situatie te geven en dit onderling uit te wisselen en hen te laten participeren in de besluitvorming.

Vervolgonderzoek

Naar aanleiding van de resultaten van dit onderzoek zijn nieuwe vragen opgeborreld. Zoals al eerder gezegd, werd in gesprekken met projectleiders uit de praktijk veelvuldig geopperd dat teams niet gewend zijn om tijd te nemen die puur bedoeld is voor reflectie en leren samenspelen zonder dat daar een directe noodzaak voor is. Maar zouden zij meer bereid zijn om tijd te steken in teamleren als ze ervoor beloond werden? Welke beloning zou dan kunnen helpen? En wat zou de projectleider in dit opzicht kunnen doen? Om (een deel van) deze vragen te kunnen beantwoorden willen wij in vervolgonderzoek het effect van verschillende interventies (al dan niet door de projectleider) op team-rolstress en teamleergedrag bestuderen. Een dergelijk onderzoek zou ook inzicht kunnen geven in vragen als: Welke interventies zou de teamleider kunnen inzetten om teamleergedrag te stimuleren? Wanneer is welke interventie geschikt? Welke factoren beïnvloeden het succes van de interventies? Zijn in het ene team andere interventies nodig dan in het andere, en waarom? En wat is de optimale balans tussen taakgericht en persoonsgericht leiderschapsgedrag om teamleergedrag en teampresteren te optimaliseren in een team?

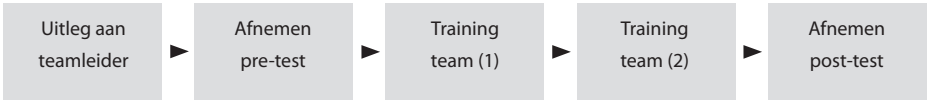
Vanuit theoretisch perspectief beogen we met dit vervolgonderzoek vooral inzichten te verwerven in de kenmerken van effectieve interventies ter stimulering van teamleergedrag, en welke condities van invloed zijn op de effectiviteit van deze interventies. Vanuit praktisch perspectief willen we bereiken dat de deelnemende projectteams:

- leren "leren" om steeds beter samen te spelen;
- als gevolg hiervan problemen eerder signaleren die opgelost worden door het team zelf;
- hun prestatievermogen, als gevolg hiervan, zichtbaar verbeteren;
- teamleiders hebben die de teamleden leren om deze ontwikkeling zelf in gang te zetten en blijvend te stimuleren.

We zullen nu kort onze concrete aanpak voor het vervolgonderzoek toelichten.

Concrete aanpak vervolgonderzoek

Om ideeën te ontwikkelen voor interventiestrategieën hebben we de terugkoppelingssessie benut die we organiseerden na analyse van het vragenlijstonderzoek. In deze sessie hebben we projectleiders, projectdirecteuren en teamleden, de vraag voorgelegd: "Hoe kunnen we het projectteam en zijn teamleider helpen om de resultaten van dit onderzoek te benutten om het presteren en leren in zijn team te verbeteren?" Op basis van de daaruit voortkomende discussie hebben we een vijfstappen interventie schema ontwikkeld (zie Figuur 2).



Figuur 2: Schema om teamleergedrag te ontwikkelen

Dit interventieschema hebben we gebaseerd op de volgende aannames:

1. Betrokkenheid en begrip van de teamleider (projectleider) zijn essentieel om de initiële condities te creëren die nodig zijn om teamleergedrag te stimuleren, en als gedragspatroon te onderhouden na de training.
2. Leren is een abstract concept. Mensen zijn het snel eens met de stelling dat het in teams belangrijk is om te leren 'samen spelen' om een gezamenlijke taak te volbrengen, maar ze hebben vaak geen helder idee van 'wat' ze dan moeten leren en 'hoe'. Daarom geven we in het programma concrete beschrijvingen van teamleergedragingen, zodat deze gemakkelijk gerelateerd kunnen worden aan de concrete ervaringen van een team.
3. Feedback is een essentieel element in een leerproces. Daarom nemen we een pre-test en een post-test af waarvan we de resultaten als feedback teruggeven aan het team. Deze test laat onder andere zien: Hoe goed scoren wij nu eigenlijk op teamleergedrag? En hoe presteren we? Hoe scoren we op team-rolstress? De test is zodanig opgezet dat het team deze test ook in de toekomst makkelijk zelf kan herhalen om de verdere teamontwikkeling te stimuleren.
4. Teamleergedrag omvat nogal wat verschillende gedragingen. Het is voor een individu moeilijk om meerdere gedragingen tegelijkertijd in te slijten. Waarschijnlijk is dit voor een groep mensen zelfs nog moeilijker. Daarom gebruiken we de testresultaten ook om focus in de training aan te brengen, namelijk op die leergedragingen waarop het team achterblijft. En we bouwen meerdere trainingssessies in, enerzijds om herhaald te trainen, anderzijds om de ruimte te hebben meerdere achtergebleven teamleergedragingen te kunnen trainen.
5. Werkgerelateerd leren is meer stimulerend dan traditioneel onderwijs, omdat je precies dat leert wat je op dat moment in je werk nodig hebt. Daarom gebruiken wij alleen concrete situaties en ervaringen van het team zelf. Deze worden meestal door de teamleider ingebracht.
6. Roloverbelasting (te veel werk voor het team) is een bekend fenomeen in projectteams. Projectleiders en hun teams zullen daarom weifelend staan tegenover langdurige training om te 'leren leren hoe je je samenspel als team kunt verbeteren'. Daarom streven wij naar een korte doorlooptijd van het programma waarin een minimum aan tijdsinvestering door het team wordt gevraagd. Bovendien zijn de teams ook tijdens de training met hun eigen werksituaties bezig.
7. Om het interventieschema te kunnen laten passen bij de verschillende praktijksituaties, zullen we waar nodig kleine aanpassingen in het schema aanbrengen. We kunnen, bijvoorbeeld, coaching van de projectleider toevoegen als aanvulling op de training van het team.

Zoals hopelijk duidelijk wordt uit het bovenstaande, beogen we ook dit interventieonderzoek uit te voeren in de praktijk, als veldonderzoek dus. Met onze aanpak, waarbij we werken vanuit de eigen teamsituatie, streven we een action-research aanpak na, waarbij het empirisch onderzoek niet gescheiden wordt van het teamfunctioneren in de praktijk. Bovendien en aanvullend, beogen we in dit vervolgonderzoek op meerdere momenten in de tijd (minstens twee, namelijk voorafgaand aan en na het interventieprogramma) metingen te doen om de effecten van de interventies op teamleergedrag, rolstress en presteren te kunnen meten.

De interventieoefeningen in het programma zullen we richten op het stimuleren van teamleergedrag. Als voorbeeld van zo'n oefening kan men denken aan een teamopdracht, waarbij de teamleden samen de belangrijkste stakeholders in kaart brengen en formuleren waarover zij van elke stakeholder feedback zouden willen hebben, en hoe ze die gaan verzamelen en bespreken. Hiermee worden diverse leergedragingen getraind, namelijk feedbackgedrag, maar ook reflecteren en wellicht ook experimenteren. Met de pre- en post-test willen we inzicht krijgen in de effecten van de interventies en de dynamiek van de variabelen in deze studie (teamleergedrag, rolstress, presteren, leiderschapsgedrag). Om de objectiviteit van het onderzoek te vergroten zullen we niet alleen gebruik maken van een kwantitatieve aanpak, maar ook van een kwalitatieve aanpak. Casusbeschrijvingen van de context van de teams, interviews met verschillende stakeholders binnen de deelnemende organisaties, logboeken van projectleiders over hun eigen interventies en waargenomen effecten, en nauwgezette en gecontroleerde verslaglegging over de trainingssessies zullen worden gebruikt om meer aanvullende kwalitatieve gegevens te verzamelen. We verwachten dat deze aanvullende gegevens meer inzichten kunnen geven in de factoren die van invloed zijn op het effect van de interventie.

About the Author

Born in Heerlen on the 30th October 1966, Chantal Savelsbergh went to secondary school at the Coriovallum College in Heerlen where she finished gymnasium education in 1985. In 1989 she gained her Master's degree in Industrial Engineering and Management Science at the Technical University of Eindhoven.

Then she left the academic world to focus her activities on management in practice and started as a consultant, first at DSM (chemical industry), later at ABP (investments company). Her consultancy activities were concentrated around organising ICT management, human resource topics and facilitating strategy development processes. After 13 years, she returned to the academic world.

Since 2002, she is working as an assistant professor and researcher at the Open University of the Netherlands. Her experience as an internal consultant in several companies has taught her that there is still a major gap between what academics want to know and what practitioners need to know. The starting point of all her research activities is that outcomes should contribute to both theory and practice in order to construct bridges to cross this gap. For that reason, since 2006, she is combining her academic activities with the development of project managers and teams in practice as a senior consultant of Kennis&Co. The emphasis in her consulting, teaching and research has been and still comprises the areas of teamwork, project management and human resource development.

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