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Does team stability mediate the relationship between leadership and team learning? An empirical study among Dutch project teams

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Abstract

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-oriented and task-oriented leadership behaviors 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 found. 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.

Keywords: Leadership; Team stability; Team learning behaviors; Project teams

1. Introduction

Many knowledge-intensive work settings are characterized by overload, ambiguity, and politics (e.g., Savelsbergh et al., 2012). Highly specialized professionals, often drawn from different functional disciplines or departments, are brought together in temporary teams and contribute their expertise to a unique achievement, for instance, establishing an oil refinery in a place where land is to be claimed from the sea. These 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).

Teamwork in these kinds of 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. 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 and Nembhard, 2009; Edmondson and Smith, 2006). Hence they gain a better understanding of the whole project by viewing it through alternative eyes (Brown and Eisenhardt, 1995).

The importance of interpersonal exchanges in these project teams points to the value of team learning behaviors (Edmondson,

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1999) aimed at obtaining a thorough insight into the whole project and at the integration of different viewpoints, through continuous collective action and reflection. Team members need to get to know each other as individuals, and as a team, and ought to design work routines that fit their goals, circumstances and personalities. Continuous learning, in terms of both project content and interpersonal dynamics, is a key driver of the team's ability to remain adaptive and flexible. This is especially the case for project teams, which often have a unique focus and strong urgency. Project teams working in fluid, knowledge- intensive organizations are bound to encounter unexpected and ill-defined problems, for which there are no well-known solutions available.

Winter et al. (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. Although knowledge sharing, which as a concept is comparable to the explorative part of team learning, has frequently been studied previously in projects (Hasan, 2014; Park and Lee, 2014), only few studies (cf. Söderlund et al., 2008) on the concept of team learning behaviors in project teams are available. Especially, empirical studies in real-life project teams are lacking. With the present study, our focus is on those antecedents of team learning that can be influenced by the project team itself. Specifically, besides team leadership, we are interested in the influence of team stability, referring to the extent of team membership changes in the team. This is a major issue as expert-driven team membership changes are assumed to increase team instability in project teams. Obviously, the degree to which team members have a history of working together in the past influences the characteristics of the team, and thereafter its potential. There is a great deal of earlier scholarly work that supports the notion that new teams that are at earlier stages of development are fundamentally different from teams that are very mature or at later stages of working together (see Hollenbeck et al., 2012 for more detailed information). Moreover, past research has indicated that performance, learning, and cohesiveness grow as a result of having gone through a large number of performance/feedback cycles over time (Marks et al., 2001).

Previous research has shown that team learning is related to various leadership behaviors, such as transformational leadership (Schippers et al., 2003), empowering team leadership (Burke et al., 2006; Srivastava et al., 2006), and team leader coaching (Edmondson, 2003). Based on these results, it can be argued that the project manager, as the 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 and McDermott, 2003), and challenging and facilitating the processes of dialog and experimentation by de-emphasizing power differences and by facilitating a psychologically safe context (see e.g., Burke et al., 2006; Edmondson, 1999, 2003).

Notwithstanding the predictive value of leadership style for team learning, it is still unclear *how* the project manager can affect team learning. As we know from earlier studies (e.g., Edmondson, 1999), a shared sense of psychological safety is needed for team learning behaviors (such as, experimenting, sharing mistakes, and exploring new situations) to emerge. However, the development of psychological safety in a team takes time, as team members need to get acquainted with each other's norms and values to be able to predict one another's behaviors, and to feel comfortable to speak out about interpersonally difficult observations and questions (Edmondson, 2003; Edmondson et al., 2001). The interpersonal risks faced by new team members wishing to speak out may be intensified by power differences based on team tenure (Forsyth, 2009). Moreover, team members need shared norms and values, supported by clear and internalized rules about "how they play the game together" (Edmondson et al., 2007). In order to develop healthy team processes, such as learning, communication and coordination (Edmondson et al., 2007), team members ought to be kept together.

While there is empirical evidence available about the influence of the antecedents mentioned above in the context of project teams, the possible impact of team stability remains largely unexplored as yet. Nevertheless, the many membership changes taking place in project teams could have a detrimental effect on their ability to learn. The aim of this study is to investigate to what extent project managers can affect team stability in order to promote team learning behaviors in their project teams. Our mediation model is aimed at clarifying the predictive validity of a number of factors influencing team learning behaviors and at providing recommendations for effective managerial interventions.

2. Theory

2.1. 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 towards 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 et al., 1992, p. 126). In particular, *project teams* are characterized by a unique goal and a planned start and ending (Cohen and Bailey, 1997; Turner, 1999). Turner (1999) determines three levels of project teams: the primary, secondary, and tertiary groups. The primary group or task force comprises the set of people who work face to face and who know everyone else in the group. They are the immediate team members. 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 assigned 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 and Bailey, 1997). Multiple activities are done simultaneously, rather than sequentially, to save time (Brown and Eisenhardt, 1995).

In defining the concept of *team learning*, some researchers have emphasized the process of learning (e.g., Edmondson, 1999, 2002; Gibson and Vermeulen, 2003; Kasl et al., 1997), while others have stressed its outcomes (e.g., Ellis et al., 2003). The present study follows scholars who have discerned several team learning behaviors, all of which refer to an ongoing process of collective reflection and action (Edmondson, 1999; Gibson and Vermeulen, 2003; Kasl et al., 1997). More specifically, we adhere to Edmondson (1999), who defined team learning as 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. Savelsbergh et al. (2009) elaborated Edmondson's definition into a measurement instrument that distinguishes among these various learning behaviors using work of other authors, who "zoomed in" on one or two of the specific behaviors as mentioned in the definition by Edmondson (1999). Their measurement instrument comprises 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 (Savelsbergh et al., 2009).

2.2. Leadership and team learning behaviors

Previous research has shown a positive relationship between team learning behaviors and team performance (Gibson and Vermeulen, 2003; Savelsbergh et al., 2012; Van der Vegt and 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 et al. (1991), the dichotomy of 'consideration' and 'initiating structure' leadership behaviors is the most common classification of leadership in literature. It is still considered valid by many today (e.g., Burke et al., 2006; Judge et al., 2004; Kozlowski and Ilgen, 2006). Moreover, these concepts "have proven to be among the most robust of leadership concepts" (Fleishman, 1995, p. 51) and have widespread face validity in organizational practice.

Consideration represents person-oriented leadership behavior, which is characterized by showing concern and respect for followers, looking out for their welfare, and giving support (Bass, 1990; Stogdill, 1950), and it appears to facilitate team performance and/or development (Popper and Lipshitz, 1992). 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). A person-oriented leader acts as a coach giving guidance, encouragement and support to the team members (Redshaw, 2000).

Initiating structure as the counterpart of consideration represents task-oriented leadership behavior, which comprises behaviors that work to ensure that team members have a clear sense of direction and purpose, and which guides team action towards goal attainment. Task-oriented leadership behavior reflects a situation wherein the leader defines, directs, and structures the roles and activities of subordinates towards the attainment of the team's goals (see e.g., Bass, 1990; Fleishman, 1973), and wherein the leader tells employees what to do and how to do it (Stoker, 2008), that is, initiates structure.

In this study, we adhere to these traditional leadership concepts depicting the dichotomy of person- and task-oriented leadership; however, we follow Stoker (1999) in adding Coaching, Participative, and Charismatic leadership, besides Consideration, as aspects of contemporary person-oriented leadership behaviors that are expected to influence the outcomes of self-managed work teams. These four aspects of person-oriented leadership behavior all differ in focus and in how they influence team learning behaviors.

Coaching has been defined as the day-to-day encouragement of employees to improve their own performance (Popper and Lipshitz, 1992). A coaching leader is supportive and provides non-defensive responses to questions and challenges. Coaching leadership behavior may help team members to 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 (Koopman and Wierdsma, 1998) is characterized by mutual open communication between leader and followers, by which the latter can influence decision-making (Mulder et al., 1986; Somech, 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 means of behavior that shows a powerful personality and vision, which helps the leader to 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 through 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. Given the developmental and self-actualization effects of idealized influence (charisma) (Bass, 1999), we advocate classifying charismatic leadership behavior as a person-oriented leadership behavior (Burke et al., 2006).

Findings from previous studies confirm that person-oriented leadership behavior relates to team learning. Burke et al. (2006) demonstrated that person-oriented leadership behavior explains

nearly 30% of variance in team learning outcomes. 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 et al. (2006) showed that empowering leadership, conceptualized in five person-oriented 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. Within the context of projects, more recently the concept of transformational leadership (resembling person-oriented leadership), which refers to charisma, inspiration, consideration and stimulation, has been suggested to bring strong value in project contexts (Tyssen et al., 2014). 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-oriented leadership behaviors to be positively related to team learning behaviors in project teams.

Initiating structure, being the task-oriented leadership behavior in this study, refers to the degree to which a leader defines and organizes his or her role and the roles of followers. A task-oriented 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-oriented leadership and team learning. Findings do, however, demonstrate a moderate influence of task-oriented leadership on team performance (r = .23) (Judge et al., 2004). This suggests employing a research design that takes into account task-oriented leadership behavior as a possible factor to explain team learning behaviors.

Task-oriented 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-oriented leadership may frustrate the self-management potential of a team (Stewart and 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. However, if clear team goals are set, while at the same time the way to accomplish these goals is not (completely) prescribed, we expect a positive relationship between task-oriented leadership and team learning behaviors. The following hypotheses are therefore investigated:

H1. *Person-oriented leadership behavior, subsuming Consideration, Coaching, Participative, and Charismatic leadership behaviors, is positively related to team learning behaviors in project teams*.

H2. *Task-oriented leadership behavior is positively related to team learning behaviors in project teams*.

2.3. Team stability: towards a mediation model of leadership and team learning behaviors

Across the studies on team learning reviewed by Edmondson et al. (2007), next to team leader behavior also team stability is mentioned as an essential variable 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, and 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 and Leyden, 1991); similarly, to build a team identity rather than remaining 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 et al. (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 et al., 1995). Nevertheless, the relationship of team stability with team learning and performance is a matter of some debate in the literature (Edmondson et al., 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 et al., 2003). Moreover, teams with a more stable composition demonstrate higher rates of improvement. Especially when it comes to learning by doing, Edmondson et al. (2007) claimed team stability to be an influencing factor. As a result of working together over a longer period of time, the team members might become more capable of coordinating collective learning behaviors. In sum, 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.

On the other hand, over time, stable teams may become slaves to routine (Edmondson et al., 2001), may develop collective blind spots and group think (Snell, 2010), and may fail to respond to changing conditions, and, as such, lack the positive effects of team entrees and withdrawals (Eskerod and Blichfeldt, 2005; Van den Ende and Van Marrewijk, 2014). In line with Van Woerkom and Croon (2009), however, we expect the positive effects to outweigh the possible negative effects. Arguing that team stability influences the prevalence of team learning behaviors, especially project teams seem to be suitable for providing us with insight on the effects of team instability. Given that project teams have a limited life-span with an assignment that is to some extent unique each time, there is little chance that the same team members remain together in the same job for years on end. After

all, a frequently occurring reason why individuals join or leave the team during the already limited life-time of a project, is that project managers make them enter or leave the team depending on their specific expertise and the project stage in which it is needed. The variability and fluctuation of expertise needed in project teams are likely to be higher in comparison to other more continuous operation types of teams with a more permanent and/or routine type of task, which may cause relatively higher team membership instability due to such expertise-driven team membership changes.

As it is the project manager who decides about changes in team membership, we hypothesized that one of the mechanisms by which a team leader can promote team learning is by controlling team stability. Team stability gives team members time spent together and thus facilitates them to internalize rules, norms, and values. Specifically, we anticipate that team stability, which facilitates team learning behaviors, can be promoted by the leader, especially in project teams. Person-oriented as well as task-oriented leadership intentions may cause project managers to endeavor to keep the team together.

We argue that person-oriented leadership behavior might prevent team members from leaving the team when things are frustrating them, when leaders are considerate, participative, supportive, and persuasive with a clear vision, that is, charismatic. This type of leadership behavior indicates a considerate and supportive style that leaves room for team members themselves to draw the necessary expertise from outside into the team. Task-oriented leadership, on the other hand, might influence team stability by enabling quick decisions and by providing clear strategies that help prevent team member turnover. This indicates a decisive style that aims to keep the team composition as it is, if feasible, in order to prevent time loss due to non task-oriented activities as a result of newcomers entering a team (Chen, 2005).

As such, we argue that the project manager's leadership behavior (a combination of both person-oriented and task-oriented behavior) does not only have a direct influence on team learning but also an indirect effect through his or her efforts at keeping the team stable. In line with this argumentation, we assume that leadership affects team stability and that team stability, in turn, affects team learning behaviors. In other words, we expect team stability to mediate (partly) the relationship between person-oriented as well as task-oriented leadership, on the one hand, and team learning behaviors, on the other hand. This leads to the following hypotheses (see also Fig. 1):

H3. *Team stability is positively related to team learning behaviors in project teams*.

H4. *Person-oriented leadership is positively related to team stability*.

H5. *Task-oriented leadership is positively related to team stability*.

H6. *The relationship between person-oriented leadership behavior and team learning behaviors is* (*partly*) *mediated by team stability*.

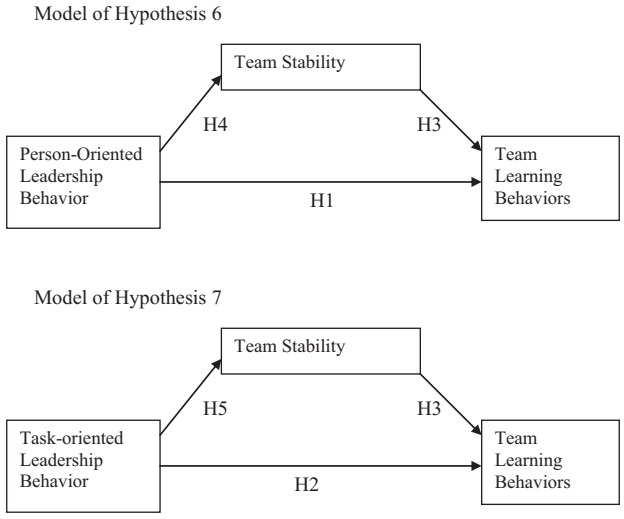

Fig. 1. Team stability (partly) mediates the relationship between leadership behaviors and team learning behaviors.

H7. *The relationship between task-oriented leadership behavior and team learning behaviors is* (*partly*) *mediated by team stability*.

3. Method

3.1. Subjects and procedure

Our study employed a cross-sectional approach among 40 project teams with highly unique tasks 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 either the design, development, or 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. We excluded a total of ten teams 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% 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% 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%. 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 tenure of the team members and the project managers was 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 assigned 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%; *SD* = 34.5). The mean meeting frequency of the team was 3 times per month (*SD* = 1.6). Furthermore, 63.3% of the project teams were working in the realization phase, 13.3% were preparing for realization, 16.7% were in the design phase, and 3.3% were in the idea and definition phase.

3.2. Measures

A survey was designed to measure leadership behaviors, team stability, and team learning behaviors. The survey was pre-tested in face-to-face interviews using think-aloud protocols with three individuals (two team members and one project manager) 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 min, ranging from 29 min to 40 min. For Dutch-speaking respondents, the English survey items were translated into Dutch using the translation-back-translation method (Hambleton, 1994). The purpose of the double translation was to allow experts to examine both versions of each questionnaire item in order to establish conformity of meaning. In case of inconsistencies the items were reformulated.

All scales covering leadership and team learning behaviors were derived from previously developed and psychometrically validated instruments, which we nevertheless checked carefully with regard to their factor structures and validity. Unless otherwise noted, five-point Likert-type scales ranging from 1 (*completely disagree*) to 5 (*completely agree*) were used in this study.

Task-oriented leadership behavior was measured using three items (based on Mulder et al., 1971; the Ohio-State Leadership Questionnaire by Stogdill, 1974). Before testing our hypotheses, the reliability of the task-oriented 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'. It is possible that a too detailed level of task prescription is counterproductive in knowledge-intensive teams, where highly specialized professionals need to collaborate. 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-oriented leadership behavior, consisting of four factors, was measured using the 20 items of an instrument developed by Stoker (1999). *Consideration* was measured using four items (based on Mulder et al., 1971; the Ohio-State Leadership Questionnaire by Stogdill, 1950). 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 et al., 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-oriented 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 the project manager of the team 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 *in*stability). 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; Schippers et al., 2003; Van den Bossche et al., 2006; Van Dyck, 2000; Van Dyck et al., 2005; Van Woerkom, 2003). This instrument breaks down team learning behavior 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.

3.3. 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 the level of both between-group difference and within-team agreement in the team learning behaviors measure prior to aggregating them to the team level. To do so, we used the Intra-Class Correlation coefficients (Klein and Kozlowski, 2000) and the multiple-item estimator r_{wg} (James et al., 1984). ICC(1) indicates whether a construct has sufficient homogeneity within groups to justify aggregation to the group

level. Values range from −1 to +1, with values between .05 and .20 being most typical (Bliese, 2000). ICC(2) refers to the degree to which group means can be reliably differentiated. Values equal to or above .50 are considered acceptable. The 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} of .97 (the r_{wg} of the sub-scales of team learning behaviors ranged between .71 and .89). Therefore, we also conducted one-way ANOVAs on the aggregated data set, which showed a statistically significant between-group difference in the average team learning behaviors score ($F(30, 237) = 1.54$, $p < .05$). Moreover, although the ICC(1) and ICC(2) were rather low compared to the usual cut-off for aggregation, the r_{wg} 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 and 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 and 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 among the independent variables: (1) person-oriented leadership; (2) task-oriented 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-oriented leadership', and 'task-oriented 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 and Sörbom, 1998). To test a mediation model, we followed the four steps as described by Baron and Kenny (1986). This resulted in testing two separate structural equation models.

4. Results

4.1. Descriptive measures

Table 1 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. All constructs demonstrated acceptable to good internal consistencies (Cronbach's alpha > .62). Person-oriented leadership as well as task-oriented leadership correlated significantly with team learning behaviors. Furthermore, team stability correlated significantly with team learning behaviors.

4.2. 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 and 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 et al. (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.

4.3. Testing the team learning behaviors enhancement models

First, the direct relationships between each independent variable (person-oriented and task-oriented leadership behavior and team stability) and the dependent variable (team learning behaviors) were examined (Hypotheses 1, 2 and 3). Second, the relationships between each independent variable and the mediator (team stability) were tested (Hypotheses 4 and 5). Third, the relationship between the mediator (team stability) and the dependent variable (team learning behaviors) was examined using SEM (Baron and Kenny, 1986) (Hypotheses 6 and 7). Table 2 presents the outcomes of these analyses.

Person-oriented and task-oriented 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 the second step testing the relationships among the independent variables, person-oriented and task-oriented leadership respectively, and the expected mediator, team stability. These relationships appeared to be non-significant (see Table 2), implying that mediation through team stability of the relationships established in Step 1 could not be tested due to a violation of the assumption (Step 2) from Baron and Kenny (1986).

Table 1
Means, standard deviation, reliability coefficients (Cronbach's alpha, in italics 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-oriented leadership	30	4.16	0.37	*.77*											
2	Task-oriented 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*								
5	Exploring dif. perspectives	237	3.86	0.61	.02	.15	.09	.70 **	*.70*							
6	Co-construction of meaning	237	3.98	0.67	.20	.35 *	.21 **	.65 **	.71 **	*.74*						
7	Error analysis	237	3.66	0.80	.19	.45 **	.14 *	.81 **	.60 **	.54 **	*.83*					
8	Error communication	237	3.72	0.77	.24	.28	.12 *	.80 **	.64 **	.56 **	.77 **	*.82*				
9	Reflection on outcomes	237	3.47	0.84	.43 **	.73 **	.14 *	.84 **	.47 **	.45 **	.61 **	.61 **	*.81*			
10	Reflection on processes	237	3.07	0.84	.24	.56 **	.12 *	.83 **	.41 **	.39 **	.57 **	.51 **	.70 **	*.80*		
11	Feedback seeking behavior	237	2.90	0.87	.43 **	.61 **	.06	.81 **	.43 **	.35 **	.54 **	.52 **	.67 **	.74 **	*.75*	
12	Experimenting	237	3.29	0.94	.29	.48 **	.21 **	.74 **	.33 **	.25 **	.46 **	.43 **	.60 **	.67 **	.64 **	*.80*

** $p < .01$.
* $p < .05$.

Hence, our hypotheses about team stability as a mediator between both leadership behaviors and team learning behaviors could not be accepted; however, person-oriented leadership, task-oriented 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 model. By testing them simultaneously, chance capitalization could be prevented. The first row in Table 3 shows that the combined model of person-oriented leadership, task-oriented 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 that included only one or two of the independent variables (person-oriented leadership, task-oriented leadership, and team stability, respectively) related to team learning behaviors. The results (see Table 3; the second, third, and fourth rows for two combined independent variables; rows five, six, and seven for each independent variable separately) showed that the combined model (M1) did not differ significantly from the models with two of the independent variables (M2, M3, and M4) (Delta χ^2 (2) = 3.55, $p = .06$, Delta χ^2 (3) = 2.44, $p = .012$, and Delta χ^2 (4) = 3.67, $p = .06$), although the χ^2 of the combined model showed the lowest value. Furthermore, the data demonstrated a significantly better fit of the combined model to the data in comparison with each of the single independent variable models (M5, M6, and M7) (Delta χ^2 (5) = 6.62, $p = .036$, Delta χ^2 (6) = 7.29, $p = .026$, and Delta χ^2 (7) = 9.00, $p = .011$).

Taken together, these findings indicate that the combined model of person-oriented leadership, task-oriented leadership, and team stability as independent variables (see also Fig. 2) explains a significantly larger amount of variance in team learning behaviors (37%) than each of the one or two independent variable models do (see Table 3, last column, M2 to M7, ranging from 32 to 16% explained variance). Although the significance of the relationship between task-oriented leadership and team learning in the combined model with person-oriented leadership and team stability disappears, a larger amount of variance in team learning behaviors is explained than without task-oriented leadership.

5. Conclusions and discussion

5.1. Reflection on 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, especially leadership and team stability. 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-oriented and task-oriented leadership were found to be positively related to team learning behaviors in project teams (Hypotheses 1 and 2). For person-oriented leadership this relationship is consistent with findings from

Table 2
Significance of relationship between each single independent variable (task-oriented leadership, person-oriented leadership), the expected mediator (team stability) and the independent variable (team learning behaviors).

	Standardized beta	P	Explained variance of team learning
Person-oriented leadership–team learning behaviors	.49	.007	24%
Task-oriented leadership–team learning behaviors	.46	.011	21%
Person-oriented leadership–team stability	Not significant		
Task-oriented leadership–team stability	Not significant		
Team stability–team learning behaviors	.40	.028	16%

Table 3
Results of SEM-analyses: fit indices of the combined model "person-oriented leadership, task-oriented leadership and team stability being the independent variables, related to team learning behaviors being the dependent" and the alternative models with a single or two independent variables (standardized maximum likelihood estimates), N = 30.

Model	χ^2	df	χ^2/df	Delta χ^2	GFI	RMSEA	NNFI	CFI	R^2
M1. Combined model person-oriented leadership & task-oriented leadership & team stability related to team learning behaviors	48.72	40	1.22	–	.79	.09	.79	.95	.37
M2. Person-oriented leadership & task-oriented leadership related to team learning behaviors	52.26	41	1.28	3.55	.76	.10	.78	.94	.32
M3. Person-oriented & team stability related to team learning behaviors	51.15	41	1.25	2.44	.78	.09	.78	.94	.32
M4. Task-oriented leadership & team stability related to team learning behaviors	52.38	41	1.28	3.67	.78	.10	.78	.94	.28
M5. Person-oriented leadership related to team learning	55.33	42	1.32	6.62 *	.76	.11	.76	.93	.24
M6. Task-oriented leadership related to team learning behaviors	56.00	42	1.33	7.29 *	.76	.11	.76	.92	.21
M7. Team stability related to team learning behaviors	57.70	42	1.37	8.99 *	.76	.11	.75	.91	.16

Note. ^{2} = chi-square; df = degrees of freedom; GFI = goodness-of-fit index; RMSEA = root mean square error of approximation; NNFI = non-normed fit index; and CFI = comparative fit index.
* $p < .05$.

earlier research (Burke et al., 2006; Fleishman et al., 1991; Judge et al., 2004; Kozlowski and Ilgen, 2006; Stogdill, 1950). Previous research was less clear, however, about the relationship between task-oriented leadership and team learning. In our study, task-oriented leadership (i.e., facilitating team members, giving them clear directions, challenging them to give their utmost) appeared to be also related to team learning behaviors.

Second, neither person-oriented nor task-oriented leadership behavior was found to be related to team stability, which was not in line with our expectations (Hypotheses 4 and 5). Perhaps it is not the leader's behavior that matters here; changes in project requirements throughout several phases could also determine team members' entering and leaving. Moreover, many other variables, for example, organizational climate (Bamel et al., 2013) or psychological contract breach (De Jong et al., 2009) may cause an individual to leave his or her current job. 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, the fact that team stability was found to be unrelated to leadership implies that it cannot mediate the relationships between either person- or task-oriented leadership behavior and team learning (Hypotheses 6 and 7). Apparently, there are other factors that explain these strong positive relationships. One such factor could be team members' perceptions of role stress, which could inhibit learning (Beauchamp and Bray, 2001). The demand–control–support model (Karasek and Theorell, 1990) predicts a negative effect of role stress on learning at the individual level. Task-oriented 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-oriented 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 established as an antecedent of team learning from previous work by Edmondson (1999) is the concept of psychological safety. Her study indicates that

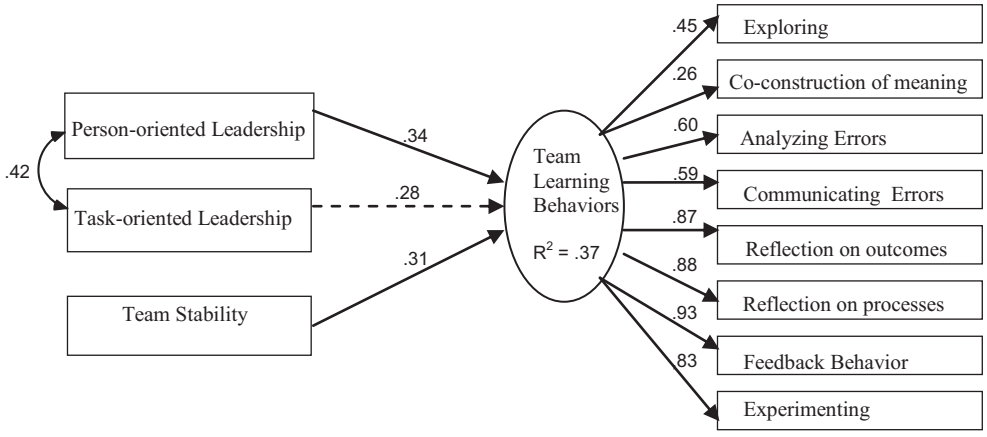

Fig. 2. Combined effect of team stability and person-oriented and task-oriented leadership behavior as independent variables on team learning behaviors based on SEM (standardized estimates) (χ^2 = 48.7; *df* = 40; χ^2/df = 1.238; p = .162; NFI = .791; CFI = .951.; RMSEA = .087; PCLOSE = .256). Dotted arrows indicate non-significant contributions.

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 (Hypothesis 3), 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 up a team learning routine. Indeed, a laboratory study by Argote et al. (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 to become familiar with each other, which helps them to transcend the norms prevalent in their respective professions and to understand the views of other team members. Future research on the concept of stability in project teams is needed to gain insight on how this positive relationship with team learning can be explained.

Fifth, the relationships found between task-oriented leadership and team learning became non-significant in combination with person-oriented leadership and team stability (Hypothesis 7). 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 than person-oriented leadership combined with team stability did. There seems to be merit, therefore, in including both types of leadership as well as team stability in studies of team learning.

5.2. Strengths and limitations of the study

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

The present study has a number of limitations as well. First, all data were 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 were employed, any attempt at a causal explanation of the results must remain tentative. A longitudinal study might reduce these limitations, although such a design also has limitations, for example, the problem of selecting appropriate time intervals (Kessler and 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 can (Taris and Kompier, 2003).

A third limitation is the relatively low internal consistency of the task-oriented leadership scale (.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, although 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; the more items in a scale, the more reliable it 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-oriented 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.

A fourth limitation of this study is that it 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 included.

A fifth limitation is that team leadership behavior was measured using 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 (Atwater et al., 2002) could be used to obtain unique and valuable information adding incremental validity to the assessment of individual performance (Borman, 1997), in our case leadership behavior. Moreover, they enable us to compare the different perceptions of various categories of respondents and can shed more light on opportunities for improvement as well.

Finally, although 237 respondent utilities and infrastructure industries 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, to include multiple mediation models, and to compare findings among a larger variety of industries.

Future studies with larger numbers of teams in different project phases, should also examine whether the leadership behaviors that promote team learning vary over time depending on the project phase. This would help project managers to 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.

5.3. 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. Our outcomes may help project managers develop helpful leadership behaviors to foster team learning behaviors in their project teams. Especially person-oriented leadership behavior seems to increase the learning behaviors of teams. Putting more pressure on getting the tasks done as agreed upon in case things go wrong, could be

less important than sitting back with a team to reflect on 'what did we want to accomplish', 'is this still what we want to accomplish' and 'how did we try to accomplish this so far'. Furthermore, this study suggests that project managers face a trade-off in using temporary team membership. On the one hand, it helps to 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).

Acknowledgments

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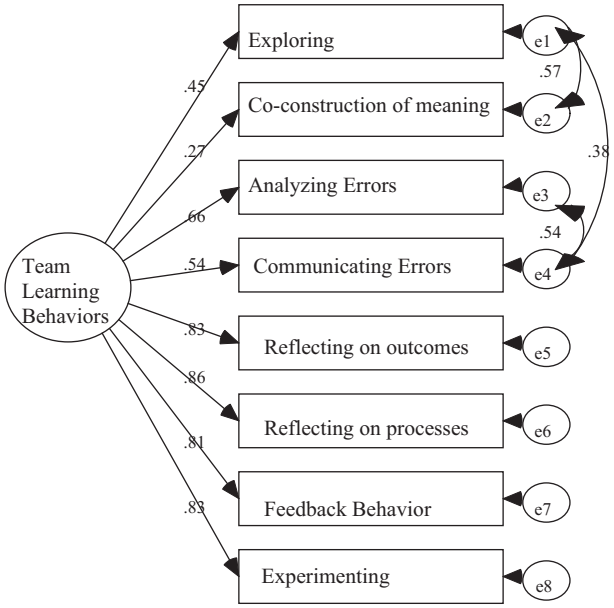
Appendix 1

Second-Order SEM Model of Team Learning Behaviors (at the Team Level, N = 40).



(χ^2 = 20.1; df = 17; χ^2/df = 1.182; p = .269; NFI = .902; CFI = .982.; RMSEA = .068; and PCLOSE = .369).

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