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-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,
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 claimed from the sea. The project teams face a multitude of problems and possible solutions. There is no one 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 alternate 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;

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
of project teams: the primary, secondary, and tertiary group. The primary group or
A 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. 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.
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 will 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 upon 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 (re)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 to explore, experiment, and reflect 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 will therefore be investigated:

**Hypothesis 1:**
Person-focused leadership behavior, subsuming Consideration, Coaching, Participative, and Charismatic leadership behaviors, is positively related to team learning behaviors.

**Hypothesis 2:**
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):

Hypothesis 3:
Team stability is positively related to team learning behaviors in project teams.

Hypothesis 4:
Person-focused leadership is positively related to team stability.

Hypothesis 5:
Task-focused leadership is positively related to team stability.

Hypothesis 6:
The relationship between person-focused leadership behavior and team learning behaviors is (partly) mediated by team stability.

Hypothesis 7:
The relationship between task-focused leadership behavior and team learning behaviors is (partly) mediated by team stability.

**** Insert Figure 1 about here ****

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 bringing to life 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 till 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 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, 1963; 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’. 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 $r_{wg}$ (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 $r_{wg}$ of .97 (the $r_{wg}$ 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 $r_{wg}$ 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 $r_{wg}$ 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 & 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.

**** Insert Table 2 about here ****

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 a 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.
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. And 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.

*Insert Table 3 about here*

Person-focused and Task-focused leadership appeared to be significantly related to team learning behaviors, herewith confirming hypotheses 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), hereby implying that mediation of the relationships between neither person-focused leadership and team learning, nor task-focused leadership and team learning, through team stability, being the mediator, could be tested due to violation of the assumption (step 2) by 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 will 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 row for two combined independent variables and row 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), $\Delta \chi^2(2) = 3.55, p = .06$, $\Delta \chi^2(3) = 2.44, p = .012$, and $\Delta \chi^2(4) = 3.67, p = .06$, 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), $\Delta \chi^2(5) = 6.62, p = .036$, $\Delta \chi^2(6) = 7.29, p = .026$, and $\Delta \chi^2(7) = 9.00, p = .011$. 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). And 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, a larger amount
of variance in team learning behaviors is explained than without task-focused leadership.

**** Insert Table 4 about here ****

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) also was 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 tell us 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 lengthiness 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. Furthermore, all data were collected using questionnaires, which opens up the possibility of response set consistencies.
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).

**Acknowledgement**

The research described in this paper was made possible in part by a grant from the Project Management Institute Inc, USA.
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consequences of stress at work. Chichester: John Wiley & Sons.


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and a priori tests. In: J.G. Hunt & L.L. Larson (eds.). Contingency
approaches to leadership. Carbondale: Southern Illinois University Press.


Table 1: Definitions Of The Dimensions Of Team Learning Behaviors (Savelsbergh et al., 2009).

<table>
<thead>
<tr>
<th>New definitions of Team Learning Behaviors</th>
<th>Item Example</th>
<th>Cronbach's $\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>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).</td>
<td>If a team member gives his/her opinion he/she subsequently asks for the opinion of the others.</td>
<td>.70</td>
</tr>
<tr>
<td>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).</td>
<td>Information of team members is completed with information of other team members.</td>
<td>.74</td>
</tr>
<tr>
<td>3. Error analysis: discussing and analyzing errors collectively to prevent them (based on Van Dyck, 2000).</td>
<td>After making a mistake, we try to analyze what caused it.</td>
<td>.83</td>
</tr>
<tr>
<td>4. Error communication: sharing errors collectively to prevent them (based on Van Dyck, 2000).</td>
<td>Team members communicate their mistakes, to prevent that others make the same mistake.</td>
<td>.82</td>
</tr>
<tr>
<td>5. Reflection on outcomes: collectively look back or ahead on experiences and actions (for example by feedback or</td>
<td>In our team we check what we can learn from</td>
<td>.81</td>
</tr>
</tbody>
</table>
communicated errors) to evaluate and learn from them (based on Reflexivity by evaluating/learning, Schippers et al., 2003).

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)

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Reflection on processes</strong></td>
<td>We often discuss our team's work methods.</td>
</tr>
<tr>
<td><strong>Feedback seeking behavior</strong>: seeking feedback internally among team members and externally from outside the team in order to reflect (based on Schippers et al., 2003).</td>
<td>‘We analyze our performance in accordance with other teams.</td>
</tr>
<tr>
<td><strong>Experimenting</strong>: collectively doing things differently than before and measuring differences in outcome (based on Van Woerkom, 2003).</td>
<td>We experiment collectively with other working methods.</td>
</tr>
</tbody>
</table>

80
Table 2: Means, Standard Deviation, Reliability Coefficients (Cronbach’s alpha; in italics on the main diagonal), And Correlations Between The Model Variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
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<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
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<tbody>
<tr>
<td>1 Person-focused Leadership</td>
<td>30</td>
<td>4.1</td>
<td>0.3</td>
<td>6</td>
<td>7</td>
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<td>2 Task-focused Leadership</td>
<td>30</td>
<td>3.2</td>
<td>0.7</td>
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<td>.42*</td>
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<td>3 Team Stability</td>
<td>30</td>
<td>0.5</td>
<td>0.3</td>
<td>1</td>
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<td>.11</td>
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<td>4 Team Learning Behaviors</td>
<td>237</td>
<td>3.5</td>
<td>0.6</td>
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<td>2</td>
<td>.34*</td>
<td>.59**</td>
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<td>5 Exploring different perspectives</td>
<td>237</td>
<td>3.8</td>
<td>0.6</td>
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<td>Co-construction of meaning</td>
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<td>Reflection on processes</td>
<td>Feedback seeking behavior</td>
<td>Experimenting</td>
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Note. ** p < .01, * p < .05.
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).

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Standardized Beta</th>
<th>P</th>
<th>Explained Variance of Team Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person Focused Leadership – Team Learning Behaviors</td>
<td>.49</td>
<td>.007</td>
<td>24%</td>
</tr>
<tr>
<td>Task-focused Leadership – Team Learning Behaviors</td>
<td>.46</td>
<td>.011</td>
<td>21%</td>
</tr>
<tr>
<td>Person Focused Leadership – Team Stability</td>
<td></td>
<td></td>
<td>Not significant</td>
</tr>
<tr>
<td>Task Focused Leadership – Team Stability</td>
<td></td>
<td></td>
<td>Not significant</td>
</tr>
<tr>
<td>Team Stability– Team Learning Behaviors</td>
<td>.40</td>
<td>.028</td>
<td>16%</td>
</tr>
</tbody>
</table>
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 Variable (Standardized Maximum Likelihood Estimates), N = 30.

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2$/df</th>
<th>Delta $\chi^2$</th>
<th>GFI</th>
<th>RMSEA</th>
<th>NNFI</th>
<th>CFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1. Combined Model Person-focused Leadership &amp; Task-focused Leadership &amp; Team Stability related to Team Learning</td>
<td>48.72</td>
<td>40</td>
<td>1.22</td>
<td>-</td>
<td>.79</td>
<td>.09</td>
<td>.79</td>
<td>.95</td>
</tr>
<tr>
<td>M2. Person-focused Leadership &amp; Task-focused Leadership related to Team Learning</td>
<td>52.26</td>
<td>41</td>
<td>1.28</td>
<td>3.55</td>
<td>.76</td>
<td>.10</td>
<td>.78</td>
<td>.94</td>
</tr>
<tr>
<td>M3. Person-focused &amp; Team stability related to Team Learning</td>
<td>51.15</td>
<td>41</td>
<td>1.25</td>
<td>2.44</td>
<td>.78</td>
<td>.09</td>
<td>.78</td>
<td>.94</td>
</tr>
<tr>
<td>M4. Task-focused Leadership &amp; Team Stability related to Team Learning</td>
<td>52.38</td>
<td>41</td>
<td>1.28</td>
<td>3.67</td>
<td>.78</td>
<td>.10</td>
<td>.78</td>
<td>.94</td>
</tr>
<tr>
<td>M5. Person-focused Leadership related to Team Learning</td>
<td>55.33</td>
<td>42</td>
<td>1.32</td>
<td>6.62*</td>
<td>.76</td>
<td>.11</td>
<td>.76</td>
<td>.93</td>
</tr>
<tr>
<td>M6. Task-focused Leadership related to Team Learning</td>
<td>56.00</td>
<td>42</td>
<td>1.33</td>
<td>7.29*</td>
<td>.76</td>
<td>.11</td>
<td>.76</td>
<td>.92</td>
</tr>
<tr>
<td>M7. Team stability related to Team Learning</td>
<td>57.70</td>
<td>42</td>
<td>1.37</td>
<td>8.99*</td>
<td>.76</td>
<td>.11</td>
<td>.75</td>
<td>.91</td>
</tr>
</tbody>
</table>

* p < .05

Note. $\chi^2$ = 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 1: Team Stability (Partly) Mediates The Relationship Between Leadership
And Team learning.
* Dotted arrows indicate non-significant contributions.

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

Team learning behaviors
Chisquare = 20.100; Df = 17; P = .269
GFI = .890
NFI = .902
CFI = .982
RMSEA = .068; PCLOSE = .369

[Diagram showing factor loadings and relationships between team learning behaviors and factors]

ExploringSUM_mean
CoconstructmeanSUM_mean
AnalyseeerrorsSUM_mean
CommunicateerrorsSUM_mean
RefloutcomesSUM_mean
ReflProcesSUM_mean
CollectfeedbackSUM_mean
ExperimentingSUM_mean