# Evidence for the Dispersed Leadership Theory in Teams: A Policy-Capturing Study

Udo Konradt
Yvonne Garbers
Julia Hoch
Thomas Ellwart

Evidence for the Dispersed Leadership Theory in Teams:

A Policy-Capturing Study

Udo Konradt

Yvonne Garbers

Julia Hoch

Thomas Ellwart

# Abstract

Based on the Dispersed Leadership Theory in Teams, we examined the simultaneous influence of three factors on team members' attitudes and behavior: (1) interactional leadership carried out by leaders, (2) team leadership performed by team members, and (3) structural leadership exerted by work and organizational structures. Results from two policy-capturing studies revealed that structural, interactional and team leadership simultaneously affect an individual's behavior in terms of task behavior, task performance and commitment. Results also indicated that the need for dispersed leadership was particularly high in situations with high task uncertainty and where the learning of new task behavior was required. Results from Study 2 further demonstrated the positive relationship between interactional leadership, team leadership, and structural leadership with team members' task performance and commitment. Taken together, these findings provide evidence for the Dispersed Leadership Theory in Teams which showed a way to structure and extend future leadership research.

*Keywords:* Distributed leadership, structural leadership, interactional leadership, team leadership, policy-capturing

# Evidence for the Dispersed Leadership Theory in Teams: A Policy-Capturing Study

In leadership research there is a longstanding tradition to conceive leadership as a dyadic and reciprocal process which takes place between superior and subordinate within an organization (Bass & Avolio, 1993; Pearce & Conger, 2003). However this view needs to be re-conceptualized for the following reasons. First, the prevalence of team work in today's working environment has directed our attention to team leadership (Kozlowski, Gully, Salas, & Cannon-Bowers, 1996; Zaccaro, Rittman, & Marks, 2001) and different types of vertical and shared leadership (e.g., House & Aditya, 1997; Mohrman, Cohen, & Mohrman, 1995; Pearce, 1997; Pearce & Sims, 2002). Burke, Stagl, Klein, Goodwin, Salas and Halpin (2006) argue that the traditional definitions mainly neglect the mutual influence of team members. Second, new and compelling types of team work such as empowered, autonomous and self-managed teams require more extensive models of leadership. Pearce and Manz (2005) describe this as "the silver bullets for the dawn of a new era of leadership" (p. 133). Similarly, Cordery, Morrison, Wright and Wall (2010) suggested that empowered and autonomous teams have been proposed as a possibility to manage uncertain situations. Third, new forms of team work are required because there is a high degree of dispersed time and space as well as new forms of communication in the modern work environment (Bell & Kozlowski, 2002). The implementation of virtual teams or other geographically distributed teams have led to distributed forms of work that also require new forms of leadership (e.g., e-leadership; Avolio, Kahai, & Dodge, 2001). Together, these misgivings demonstrate that traditional conceptions of leadership are insufficient and need to be improved.

These gaps are somewhat surprising because the idea of other forms of leadership is not new but has been ignored in favor of the dyadic process (Ensley, Pearson, & Pearce, 2003). Researchers have adopted team-based approaches to leadership (Shamir, 1999) such as shared leadership (Pearce & Conger, 2003), collective leadership (Shamir, 1999), delegated and peer leadership (House & Aditya, 1997), which assume that leadership is performed collectively by members within a team. The concept of distributed leadership (House & Aditya, 1997; Gronn, 2002) also involves the idea that leadership is distributed across different instances or agents within an organization (see Day, Gronn, & Salas, 2004; Carson, Tesluk, & Marrone, 2007, for reviews). However, these concepts do not reflect aspects of leadership which are formed by contextual or situational factors regarding the task and organization. Empirical evidence supported the influence of situational factors on motivation and behavior (see Vroom & Jago, 2007, for an overview). Based on these ideas, we provide

evidence for a theory which assumes a broader understanding of leadership by investigating a three factor model of dispersed leadership.

The purpose of this research is to provide empirical evidence for the Dispersed Leadership Theory in Teams (i.e., DLT, Konradt, 2011) which assumes three styles of leadership which simultaneously influence individual attitudes and behavior: interactional leadership exerted by leaders, team leadership provided by team members, and structural leadership in a work and organizational context (i.e., task, organizational structures, and customers). The DLT integrates different leadership approaches (i.e. shared leadership, Pearce & Conger, 2003; distributed leadership, Gronn, 2002; and team leadership, Hackman & Walton, 1986) and techniques in one theory to determine simultaneous effects of leadership dispersion. In addition, the theory enhances previous leadership theories by adding a further leadership source of influence that is derived from situational leadership theories (Vroom & Jago, 2007). By the combination of different well established styles of leadership (e.g., structural, interactional and team leadership) the DLT is a promising model especially in very task specific situations often found in practice. In this case the reduced leadership influence of one source could be compensated by the other two sources. This paper presents evidence that DLT is beneficial in tasks with high environmental uncertainty and learning (vs. routine) assignments. In Study 1, we examined organizational conditions (i.e. task uncertainty, task behavior, work domain, and work experience) influencing the need for dispersed leadership (i.e. three simultaneously effective styles of leadership. Study 2 examined the main assumption of the DLT, suggesting that each of the three leadership styles explains a unique part of the variance within behavior and attitudes. Figure 1 summarized our research model for both studies. To address these issues, we use a policy-capturing design that allows for causal inferences regarding the hypothesized effects which have been used in various leadership research fields (e.g., Ensari & Murphy, 2003; Nuttall, 2004; Powell, Butterfield, Alves, & Bartol, 2004).

Figure 1

*Overview of the Research Model and Variables Included in the Two Studies with the Three Leadership Styles of the Dispersed Leadership Theory as the central variables for both studies.*
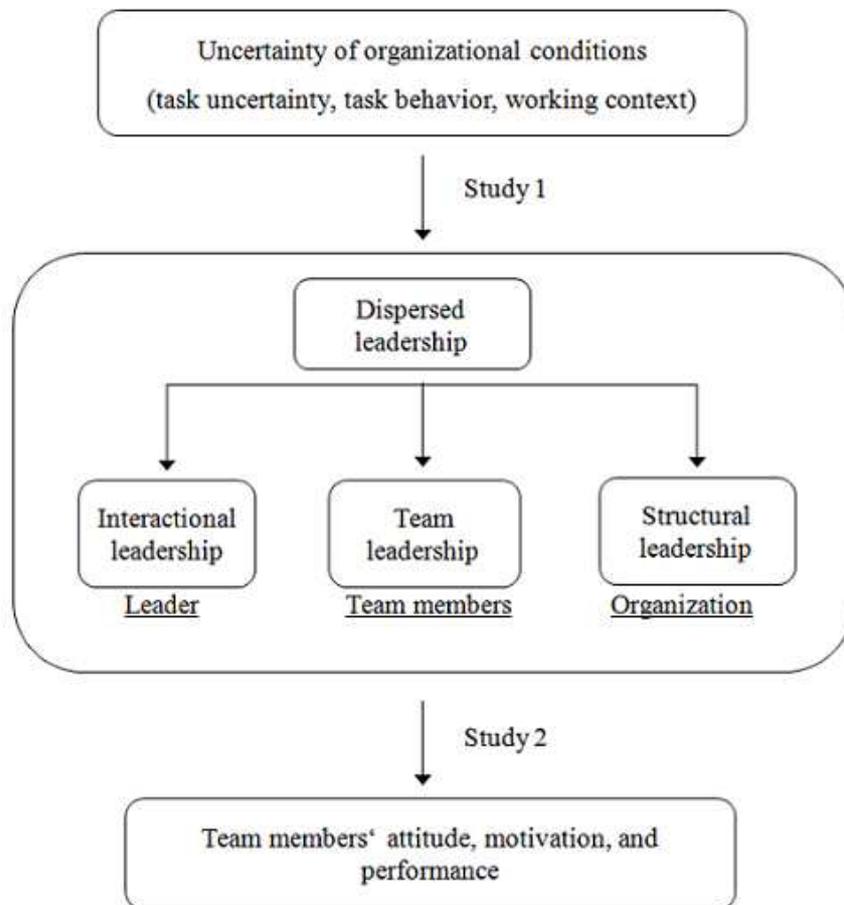


*Notes.* In Study 1 the three leadership styles were used as the dependent variables; for Study 2, the three leadership styles were used as independent variables.

# Theoretical Background

While there are theoretical advances in leadership theory building, leadership research and theories predominately focus on the processes between leader and follower. Given this theoretical restriction to vertical or interactional leadership, researchers recently proposed forms of horizontal leadership, including team leadership (Hackman & Walton, 1986), shared leadership (Pearce & Conger, 2003; Shamir, 1999; Sivasubramaniam, 2002) and distributed leadership (House & Aditya, 1997; Gronn, 2002). In general, theories on distributed as well as

shared leadership conceptualize leadership as a set of practices that can be enacted by people at all organizational levels. This conceptualization contrasts traditional leadership theories focusing on sets of personal characteristics and attributes possessed by people in top positions (Badaracco, 2001; Kouzes & Posner, 2002). Both distributed and shared leadership focus the leadership of teams. Team leadership is defined as "not concentrated in the hands of a single person or a small group, but divided and performed collectively by many if not all team members simultaneously or sequentially" (Shamir, 1999, p. 50).[1] Therefore theories of team leadership enhanced distributed and shared leadership in respect to how leadership in a team can be shared. In support, Carson et al. (2007) argue that the existing research on team leadership largely neglected the leadership provided by team members (Kozlowski & Bell, 2003).

The DLT (Konradt, 2011) combines aspects of distributed and shared leadership and enhances these theories with structural leadership as a third source of leadership influence. In this context, Konradt (2011) defines leadership in terms of distribution across three styles of leadership as "a pattern of conjoint personal and situational influence of employees which is exerted by the leader, by team members, and by the organizational management. This is intended to guide, structure, and facilitate personal choice, stabilization, and modification of attitudes and behaviors in a working team." (p. 4). In this definition, the leader, the team and the organization are distinct and equal instances of leadership which use different techniques to influence individuals in teams. Thus, leadership may be distributed across different instances within an organization, such as structural, interactional or team leadership (e.g., distributed leadership; Gronn, 2002; House & Aditya, 1997; Brown & Gioia, 2004), but it might be collectively performed within a team (e.g., shared leadership; Pearce & Conger, 2003; Shamir, 1999).

More in detail, distributed leadership (Gronn, 2002, 2003) focuses on the different instances that constitute leadership. Distributed leadership conceives leadership as being distributed across different instances of leadership including superior based leadership (e.g., managerial leadership, Bowers & Franklin, 1977), and team leadership (Pearce & Conger, 2003; Shamir, 1999; Sivasubramaniam, 2002). Distributed leadership suggests that leadership is performed by different agents at different hierarchies (Gronn, 2002; House & Aditya, 1997) because leadership is needed at different levels within the organization (Brown & Gioia, 2002; McAdam, 2002). Ensley et al. (2006) argue that in top management teams, two potential sources of leadership exist: the vertical leader and the team. The influence of the leader has been studied in different ways (Gerstner & Day, 1997; Schriesheim, Tepper, & Tetrault, 1994) in contrast to the team as a second source of leadership (Burke, Fiore, & Salas, 2003; Gronn, 2003; Pearce & Conger, 2003).

Focusing on the team, the concept of shared leadership has to be considered (see Day, Gronn, & Salas, 2006, for a review). Shared leadership emphasizes a process of upward, downward, and lateral leadership by the team. Thus, team leadership should not be conceptualized as a centralized downward influence on subordinates and an appointed leader (Pearce & Conger, 2003). The concept stresses the importance of leadership being shared among team members. Thus, leadership is collectively performed by many or all members of a team who conjointly undertake leadership functions (Yukl, 1999). There is consistent evidence that shared leadership is positively related to self-reported ratings of effectiveness (Avolio, Jung, Murra, & Sivasubramaniam, 1996) in conventional teams (Ensley, Hmieleski, & Pearce, 2006; Pearce & Sims, 2002) and virtual teams (Pearce, Yoo, & Alavi, 2004).

Though the significance of situational factors and their influence on the impact of shared leadership (Pearce, 2004) were addressed by different theoretical approaches (i.e., contingency model, Fiedler, 1967; path-goal theory, Evans, 1970; House, 1971; House & Dessler, 1974; House & Mitchell, 1974; normative and descriptive models, Vroom, 2000; Vroom & Jago, 1988; Vroom & Yetton, 1973; see Vroom & Jago, 2007, for an overview) this has not been evidenced. Neither shared nor distributed leadership took this recommendation into account. As argued by Hackman and Wageman (2007) and Hersey and Blanchard (1982) leadership research should consider situational factors by adopting a specific leadership style. To contribute to these recommendations, the DLT integrates structural leadership as the third leadership style. According to Kerr and Jermier (1978), leadership substitutes are viewed as special styles of neutralizers that reduce a leader's ability to influence subordinates' attitudes, perceptions, and performance, and change a leader's behavior on their own. Consequently, leadership approaches should attempt to discover situations that determine when leadership makes a difference (cf. Hackman & Wageman, 2007). In addition, leaders and consequences of their behavior may be affected by their environment and therefore situational characteristics shape a leader's behavior (cf. Vroom & Jago, 2007). One leadership style may be effective in one situation but may be ineffective in another situation.

In their early approach to team leadership, the functional leadership theory, Hackman and Walton (1986) postulate that different techniques of leadership can simultaneously be effective in teams. Thus, one main assumption of the DLT is that leadership is distributed within instances of the organization. Dispersed leadership includes three styles of leadership: (1) Structural leadership as a vertical, downward and indirect form of leadership which entails of set of entities (i.e., reward systems, information and communication tools, and task autonomy) which are implemented by the management in order to exert a positive impact on subordinates' motivation and behavior; (2) Interactional leadership as a vertical, dyadic and

reciprocal process of interaction between a formalized leader and follower which is exerted on team members by transformational and transactional leadership as well as leader-member exchange and coaching; and (3) Team leadership as a direct but horizontal style of leadership and is collectively performed leadership carried out by the entire group whereby some individuals may contemporaneously enact the same specific leader behaviors.

The theory assumes that the three styles of leadership, as multiple leadership impulses, simultaneously influence team members' motivation and behavior. Thus, distributed leadership exists when more than one leadership style is simultaneously effective in a given situation. Dispersed leadership can be conceptualized as a consequence of actions of different instances which are separated but directly connected to each other (concertive action, Gronn, 2002). The assumption of the model is that a high amount of dispersed leadership has positive effects on team work because an ineffective leadership styles can be compensated by more leadership effort in the other two sources.

Another assumption of this model is based on the principle of equifinality (Gresov & Drezin, 1997) which refers to a characteristic in system theory (Bertalanffy, 1960) and denotes that the same results can be achieved through different processes and using different resources and methods. More precisely, equifinality assumes that different organizational leadership techniques can be equally effective in achieving high team performance (Fiss, 2007; Galunic & Eisenhardt, 1994; Gresov & Drazin, 1997).

Initial empirical evidence demonstrates the impact of the single styles of leadership on team outcome measures. In a cross-sectional study, Hoch (2007) examined the impact of the three leadership styles on team cohesion and organizational commitment. Results indicate that the model predicts organizational commitment, while structural leadership and team leadership were strong predictors of team cohesion. Therefore, empirical data provides the first encouraging evidence for the basic assumptions proposed by the DLT.

There are two main applications for dispersed leadership in organizational teams. The first application area is leadership in situations with high demands and low in job control, classified as high strain jobs (job demand-control model; Karasek, 1979). Dispersed leadership can reduce the potential stress of leadership responsibilities by distributing leadership from more than one source. Structural leadership techniques in organizations, such as reward systems and communication tools (Kerr, 1977; Kerr & Jermier, 1978; Rynes & Gerhart, 2000; Rynes, Gerhart, & Parks, 2005), are promising leadership techniques.

A second promising area of application is the leadership of virtual teams (Hertel, Geister, & Konradt, 2005; Webster & Staples, 2006), also referred to as e-leadership (Avolio, et al., 2001). Combining different styles of leadership (e.g., structural, interactional and team

leadership) the DLT is a promising model for e-leadership because reduced leadership influence of one source could be compensated by the other two sources.

## Task Uncertainty, Task Behavior and Dispersed Leadership

The assumption of equifinality deserves a closer examination regarding the misgiving of empirical models (Fiss, 2007). Gresov and Drazin (1997) proposed that the investigation of equifinality requires the examination of the origin condition. Organizational conditions and leadership change while ambiguity grows (White & Shullman, 2010). To emphasize, Karakas (2009) described these organizational changes as an age of uncertainty. In addition, uncertainty is one of the new challenges that organizations and leaders have to expect and to handle (Heifetz, Grashow, & Linsky, 2009; Lloyd, 2009). As a consequence, Latham and Ernst (2006) argue that single leaders are not enough to motivate employees and therefore leadership will be distributed among people who act in a dynamic process. Although there are many definitions of uncertainty (Spender, 1986; Milliken, 1987; Van der Heijdn, 1996; Sutcliffe & Zaheer, 1998) these definitions are similar in relation to the perceived influence, a lack of information and knowledge (Johnston, Gilmore, & Carson, 2008). In detail, people in uncertain environments (Wall, Cordery, & Clegg, 2002) are required to quickly adjust to changing tasks and demands. Environmental uncertainty determines the degree to which tasks, roles and responsibilities are unpredictable (Duncan, 1972). This definition states that a main characteristic of an uncertain environment relates to the task uncertainty and the task behavior.

We define task uncertainty as the uncertainty about how specific goals have to be achieved, which task-related factors can be manipulated, and which actions are appropriate to achieve these goals (Galbraith, 1973; Mintzberg & Ouinn, 1991). Task uncertainty is related to complexity, diversity and the predictability of achieving tasks (Gibson, 1999; Lindsley, Brass, & Thomas, 1995; Saavedra, Earley, & Van Dyne, 1993). Previous research demonstrated that task uncertainty has a negative impact on task performance (Daft, 2001; Schoenmaker, 1993) and thus may increase a subordinate's need for diversity of leadership. In highly uncertain environments, organizational decisions may produce many errors and mistakes, because workers cannot determine or predict which alternative is best in order to resolve a problem (Daft, 2001; Schoenmaker, 1993). In general, task uncertainty influences managerial perceptions of the environment negatively (Jauch & Kraft, 1986; Randolph & Dess, 1984) and may thus also increase the need for additional styles of leadership. Keith, Demirkan, and Goul (2010) examined the influence of task uncertainty on collaborative technology knowledge and advice network structures involving graduate students in working groups. The results indicate that an individual's technology knowledge leads them to become more central when

task uncertainty was high. In summary, high task uncertainty should be increased an individual's need for dispersed leadership, indicated by high values for all three leadership styles.

*Hypothesis 1: Task uncertainty increases a subordinate's need for dispersed leadership.*

Aside from task uncertainty, the required task behavior is also an aspect of an uncertain environment. Task behavior has been included in models of workplace performance in order to accurately reflect the demands of changing and uncertain work contexts (Griffin, Neal, & Parker, 2007). Organizational literature suggests that non-routine tasks (i.e., complex problem solving) are highly uncertain, and require flexible and various procedures (Galbraith, 1977; Van de Ven, Delbecq, & Koenig, 1976). For example, Faraj and Yan (2009) found that higher task uncertainty, operationalized by a lack of well-defined operational steps and routines, strengthened the relationship between team boundary work and team performance. In addition, Nidumolu (1995) found that horizontal coordination (i.e. team leadership) is more effective than vertical coordination when uncertainty in task environment is higher. Non-routine tasks are similar to task uncertainty and require adapted forms of leadership, indicated by high values for all three leadership styles.

*Hypothesis 2: A subordinate's need for dispersed leadership is greater in learning new behavior than in correcting behavior.*

The effects of task uncertainty and task behavior should not be influenced by the kind of job they are working on. Workers perceptions of the usefulness and effectiveness of the three styles of leadership should be similar in different working areas (e.g., work domain). The need for all of the three styles should be stable across work domains. Subordinates should perceive structural, interactional and team leadership as effective in order to increase their individual task performance and thus demand a comparably strong need for all three leadership styles.

In contrast to the assumed stability across work domains, a subordinate's need for leadership should vary according to increasing work experience. This assumption can be derived from motivational and learning theories (i.e., self-regulation theory, Bandura, 1991; self-management, Manz & Sims, 1980, self-leadership, Manz, 1986). Moreover, the process of achieving work experience is equal to trainings of self-regulation. Whereas interventions based on self-regulation theories include trainings regarding goal setting, self-regulation (e.g., Latham & Frayne, 1990) and coaching interventions. In detail, knowledge, skills and abilities increase as a consequence of self-monitoring whereby employees collect information about the goal pursuit and their accuracy, consistency, and frequency. In addition, self-evaluation processes lead to improved personal standards that result from comparison with

relevant others, from observational learning, or from direct training (Bandura, 1986). Finally, rewards or punishment in the period of self-reaction lead to an increase of self-efficacy, including the choice of aspiration level, perception of own performance, intensity and duration of effort, and evaluation of performance results (Bandura & Locke, 2003; Vancouver, Thompson, Tischner, & Putka, 2002). As a consequence, employees with more work experience use self-leadership and self-management to achieve or increase their personnel efficacy (Neck & Houghton, 2006). To conclude, employees with more work experience are less constrained to external leadership because of internal self-leadership techniques. In order to generalize the results we assume:

*Hypothesis 3: A subordinate's need for dispersed leadership will be stable across different work domains.*

*Hypothesis 4: The relationship between task uncertainty and task behavior with dispersed leadership will be moderated by an individual's work experience in such a way that the need for dispersed leadership for individuals with more experience will be less.*

# Study 1

**Method**

**Participants**

Participants were 65 German employees. The majority of the participants were male (53.1%). Their age ranged from 19 to 58 and had an average of 30.6 years (*SD* = 10.0). The average amount of job experience was 9.1 years (*SD* = 10.1). Participants were students and apprentices (46.8%), clerks (31.2%), 6.5% were company employees 3.9% self-employed, 5.2% part-time workers, and 6.5% were unemployed.

**Materials and Design**

To explore the proposed causal effects and to identify conditions suitable for dispersed leadership, we adopted policy-capturing which is a methodology in which participants are asked to reply to a number of hypothetical scenarios which contain the experimentally manipulated independent variables as cues. Policy-capturing is a simulation-based technique that demonstrates how a person makes decisions or judgments in situations without observing persons face-to-face in a real-life context. Research has generally shown policy-capturing to be an effective method (e.g., Cable & Judge, 1994; Dineen, Noe, & Wang, 2002; Kristof-Brown, Jansen, & Colbert, 2002; Harold & Ployhart, 2008). The method of policy-capturing has already been used in various research areas including job choice (Cable

& Judge, 1994), absenteeism (Martocchio & Judge, 1994), and leadership (Ensari & Murphy, 2003; Nuttall, 2004; Powell et al. 2004).

To develop realistic descriptions of the cues, we used critical incidents technique (Flanagan, 1954) with several employees with academic or professional experience. The short description of a general work situation was manipulated in the dimensions of task uncertainty (high vs. low) and task behavior (learning new behavior vs. correcting behavior). To increase the generalizability of our results and to make answers independent from specific occupational contexts, we set the scenarios in four different work domains (i.e. market research, data processing, sales department, and marketing). Two pilot studies were conducted to determine whether the scenarios were easy to understand and whether the manipulated cue levels generated the expected perceptions of the 16 scenarios (2×2×4). Independent $t$-tests on the mean level of leadership demonstrated statistically significant differences among the high and low levels of each cue in the expected directions. Table 1 provides an overview of the manipulated variables in the scenarios.

We used a complete crossover design in which subjects responded to all possible scenarios (cf. Graham & Cable, 2001) with the factors 'task uncertainty' (high vs. low), 'task behavior' (learning vs. correcting), and 'work domain' (market research vs. data processing vs. sales department vs. marketing), resulting in 16 scenarios.[2]

Table 1

*Overview of the Manipulation of Variables in the Scenarios with the Variables 'Task Uncertainty' (High vs. Low), 'Task Behavior' (Learning vs. Correcting), and 'Work Domain' (Market Research vs. Data Processing vs. Sales Department vs. Marketing)*

| Task Uncertainty | Working Context | Task Behavior | |
|---|---|---|---|
| | | Learning | Correcting |
| High | Data processing<br>You are working in a team in the **electronic data processing department** of a large company and are concerned with data acquisition | Your current project is **difficult** to work on and settled in a new working field<br><br>Till now you were only responsible for ... **now you're going to be responsible for the whole process** | Your current project is **difficult** to work on and settled in a new working field<br><br>You're responsible for ... but you failed repeatedly. **Now you were told to increase your output quality** |
| | Market research<br>You are working in a **team in market research** and are concerned with sales orders | | |

| | | | |
|---|---|---|---|
| | sales department<br>You are working in a team in **order processing and transaction** in a large company and are concerned with filling errands and taking orders | | 12 |
| | Marketing department<br>You are working in a team in the **marketing department** of a large company and are concerned with different projects | | |
| Low | Data processing<br>You are working in a team in the **electronic data processing department** of a large company and are concerned with data acquisition | Your current project is **easy** to work on and settled in a well-know area of work<br><br>Till now you were only responsible for … **now you're going to be responsible for the whole process** | Your current project is **easy** to work on and settled in a well-know area of work<br><br>You're responsible for … but you failed repeatedly. **Now you were told to increase your output quality** |
| | Market research<br>You are working in a team in **market research** and are concerned with sales orders | | |
| | sales department<br>You are working in a team in **order processing and transaction** in a large company and are concerned with filling errands and taking orders | | |
| | Marketing department<br>You are working in a team in the **marketing department** of a large company and are concerned with different projects | | |

*Note.* Modified words for manipulation of variables are in bold.

Table A1

*Results of Common Method Bias Analyses in Study 1 and Study 2*

| Construct | Indicator | R1 | R1$^2$ | R2 | R2$^2$ |
|---|---|---|---|---|---|
| *Study 1* | | | | | |
| | Uncertainty | .29 | .08 | .61 | .37 |
| | Task Behavior | .29 | .08 | .61 | .37 |
| | Work domain | .29 | .08 | .27 | .07 |
| Structural | Development | .15 | .02 | .75 | .56 |
| | Reward | .16 | .03 | .25 | .06 |
| Interactional | Feedback | .18 | .03 | .76 | .58 |
| | Praise | .19 | .04 | .27 | .07 |
| Team | Decision | .16 | .03 | .91 | .83 |
| | Support | .20 | .04 | .62 | .38 |
| Average | | .21 | .05 | .62 | .37 |
| | | | | | |
| *Study 2* | | | | | |
| Structural | Reward | .05 | .00 | .58 | .34 |
| | Autonomy | .08 | .01 | −.14 | .02 |
| | Goals | .03 | .00 | −.42 | .18 |
| Interactional | Trust | .02 | .00 | −.14 | .02 |
| | Praise | .06 | .00 | .58 | .34 |
| | Coaching | .09 | .01 | −.44 | .19 |
| Team | Communication | .03 | .00 | .53 | .28 |
| | Decision | .08 | .01 | −.14 | .02 |
| | Support | .04 | .00 | −.41 | .17 |
| Performance | 1 | .04 | .00 | .94 | .88 |
| | 2 | .04 | .00 | .94 | .88 |
| | 3 | .04 | .00 | .93 | .86 |
| Commitment | 1 | .03 | .00 | .63 | .40 |
| | 2 | .03 | .00 | .64 | .41 |
| Average | | .05 | .01 | .29 | .36 |

Note. *R1* = Method Factor Loading; *R2* = Substantive Factor Loading.


**Measures**

**Leadership.** We used formative indicators to measure the three leadership styles. [3] The relevance for the behavior was measured with two items for each leadership style:

(1) *Structural leadership* was measured using personnel development strategies ("You receive a training, which fits your needs") and reward systems ("You receive performance-based rewards for successful work").

(2) *Interactional leadership* was measured using individual feedback discussions ("Your leader speaks with you about possible problems and solutions"), commendation and acknowledgement ("Your leader commends you for your work and acknowledges your job performance").

(3) *Team leadership* was measured using supporting behavior ("The colleagues of your team support each other during the work") and shared decision-making in the team ("Your team makes important decisions together").

After each scenario, the participants responded on a 6-point Likert scale ranging from *'not important'* (1) to *'very important'* (6) the importance of each leadership style for their behavior ("To show such a behavior it is important for me that ..."). The dependent variable was dispersed leadership, which was calculated by the mean of the standardized sum scores of the three leadership styles.

**Dispersion of Leadership.** In addition to the separate influence of the three leadership styles as indicators of dispersed leadership, we assess the amount of dispersion of leadership between the three leadership styles using an adaptation of the average deviation score (AD, Burke & Dunlap, 2002; Burke, Finkelstein, & Dusig, 1999). The AD has many advantages compared to other indices for estimating interrater agreement (Burke & Dunlap, 2002). For instance, the same metric allows relating the distribution of leadership with the leadership style (average deviation). The absolute level of distribution of leadership is indicated by the group mean score. The average deviation score is subtracted from the mean score (Ellwart, Biemann, & Rack, 2011; Ellwart & Konradt, 2007). Our measure offers a global measure for dispersion (i.e. of leadership styles) and it also enables researchers to conclude which leadership style is over- or underrepresented. Therefore it provides more information compared to other possible measures of dispersion (e.g., ICC, Shrout & Fleiss, 1979; Gini-coefficient, Gini, 1921). Other statistical measures of homogeneity, concentration or correlation, which were also possible dispersion measures, have the disadvantage of certain distribution requirements and are therefore inappropriate.

**Procedure**

Data was collected from employees from different companies who were acquainted with students of a particular course. All employees were sent a questionnaire packet, which included a cover letter explaining the purpose of the study, a questionnaire, and a postage-paid envelope. The questionnaire included 16 scenarios which were presented in randomized order to control for sequencing effects. Cue order within the scenarios remained constant for all scenarios to simplify understanding. Participants were instructed to read each scenario carefully, to identify with each situation, and report their honest reactions.

**Analyses**

Data was analyzed by hierarchical linear modeling (HLM; Bryk & Raudenbusch, 1992, 2002). The technique has been advocated for policy-capturing data because it allows a parsimonious examination of within- and between-person variance (Mellor, Paley, & Holzworth, 1999; Morrison & Vancouver, 2000; Judge & Bretz, 1992; Kristof-Brown, Jansen, & Colbert, 2002). In the Level 1 (within-subject) analysis, ordinary least square regression equations were calculated in which the amount of dispersed leadership in work situations with different task uncertainty ($\beta_1$) and work behaviors ($\beta_2$) varied. As a third variable, the work domain ($\beta_3$) was included in the regression equation to test whether the work situation (task uncertainty and work behavior) can explain a unique part of the variance of the dependent variable (dispersed leadership).[4]

**Common method bias.** To assess the possible influence of common method bias in our studies, we added an unmeasured latent method factor in both study models (cf. Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). We specified all manifest (indicator) variables of the models to load on the new method factor (in addition to their construct variable). To get an indicator of common method variance, we compared the explained variance of the substantive indicator and the method factor. In both studies, the average substantively explained variance of the common method factor (.05 and .01, respectively) is very much lower than the substantive factor explanation of variance (.37 and .36) (see Appendix). Therefore, common method bias is unlikely to be a concern of our studies.

**Results**

Descriptive statistics and correlations for the main measures are reported in Table 2.

Table 2

*Means, Standard Deviations and Correlations among Study Variables in Study 1*

| Variable | *M* | *SD* | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 1 Dispersed leadership[a] | 4.05 | 0.80 | | | | |
| 2 Structural leadership[a] | 3.69 | 1.15 | .74** | | | |
| 3 Interactional leadership[a] | 4.26 | 1.01 | .79** | .50** | | |
| 4 Team leadership[a] | 4.22 | 1.16 | .65** | .11** | .27** | |
| 5 Task uncertainty[a, c] | 1.50 | 0.50 | .27** | .28** | .17** | .12** |
| 6 Task behavior[a, c] | 1.50 | 0.50 | −.06 | −.06 | .04 | −.09** |
| 7 Work domain[a, c] | 2.50 | 1.12 | .04 | −.01 | .05 | .05 |
| 8 Age[b] | 30.55 | 10.08 | −.13 | −.02 | −.10 | −.16 |
| 9 Gender[b, d] | 1.53 | 0.50 | −.13 | .01 | −.09 | −.10 |

*Note.* [a]*N* = 1040. [b] *N* = 65 participants.
[c] Because the study utilized a completely crossed design correlations among independent variables are zero by definition and therefore are not shown.
[d] 1 = female, 2 = male.
**$p < .01$ (two-tailed).

**Level 1 Analysis**

The null model in which the outcome variable was regressed on a unit vector, where no parameters are selected (Hofman, 1997), revealed that 52% of the explainable variance in the dependent variable is due to differences between subjects who indicated that a multilevel analysis is appropriate. Hypothesis 1 predicted that situations with high task uncertainty would lead to higher values of dispersed leadership than in situations with low task uncertainty. The average intercept for dispersed leadership differed significantly from zero ($t(64) = 3.48$, $p < .01$). The positive direction of the task uncertainty coefficient ($\beta_{1j} = .42$; $p < .01$) indicates that a participants' need for dispersed leadership significantly increased in situations with high task uncertainty, supporting Hypothesis 1.

Hypothesis 2 predicted that a participants' need for dispersed leadership would be greater in learning behavior situations than in correcting behavior situations. Again the average intercept differed significantly from zero for dispersed leadership $t(64) = 3.48$, $p < .01$. The positive direction of the task behavior coefficient ($\beta_{1j} = .09$; $p < .01$) indicates that a

participants' need for dispersed leadership increased in situations with learning behavior, supporting Hypothesis 2. Results for Level 1 Model variables are summarized in Table 3.

Table 3

*Level 1 Model of Task Uncertainty, Task Behavior and Work Domain on Dispersed Leadership*

| Variable | Coefficient | $SE$ [a] | $T$ | Variance [b] |
|---|---|---|---|---|
| Intercept. $\beta_{0j}$ | 3.48** | 0.12 | 29.38 | .76** |
| Task uncertainty. $\beta_1$ | 0.42** | 0.04 | 10.93 | .05** |
| Task behavior. $\beta_2$ | 0.09** | 0.04 | 2.38 | .04** |
| Work domain. $\beta_3$ | 0.03** | 0.01 | 2.11 | .01** |
| Effect size (%) [c] | | | | 31.02 |

*Note. N* = 65 subjects. *N* = 1040 observations.
[a] Average estimated *SE* of the Level 1 regression coefficients.
[b] Variance in Level 1 parameter estimates and chi-square test of significance of variance.
[c] Percentage of explainable Level 1 variance in the dependent variable accounted for by fit cues.
**$p < .01$.

The impact of task uncertainty and task behavior with the predictor work domain as a control variable (Hypothesis 3) indicates that task uncertainty (7%) as well as task behavior (3%) explains a unique part of the variance of dispersed leadership and are therefore independent of the work domain. Our results also revealed a significant positive coefficient for work domain on dispersed leadership ($\beta_{3j}$ = .03, $p < .05$). A comparison of the different work domains revealed that, for market research, dispersed leadership was higher than in the domain of data processing ($\beta$ = .10, $p < .01$). Hypothesis 3 is thus partly supported.

To assess the amount of variance explained by the predictors of Level 1 analysis, we computed the $R^2$ value (cf. Hofman, 1997; Raudenbush & Bryk, 2002) which accounted for 31% of the variance of the dependent variable. The model fit of the Level 1 model was significantly better than the fit of the null model ($\chi^2$ = 226.71, $df$ = 9, $p < .001$).

**Level 2 Analyses**

We added predictors on Level 2 (i.e. work experience, age and gender), in order to test Hypothesis 4 and determine the possible impact of individual variables on the relationship of task uncertainty or task behavior on dispersed leadership. Analyses revealed a significant result for work experience ($\gamma_{13}$ = −.01, $p < .01$), only for task uncertainty. The negative coefficient indicates that the influence of task uncertainty on dispersed leadership is weaker for people with more work experience. Results are depicted in Table 4. Thus,

Hypothesis 4 is supported for task uncertainty. Overall, 35% of Level 2 variance was explained by the (inter-) individual differences, indicating that the results in Level 1 analyses are influenced by subject variables but were relatively stable across them. The model fit of the Level 2 model was better than the Level 1 model fit ($\chi^2$ = 105.15, $df$ = 2, $p$ < .001).

Table 4

*Results of Hierarchical Linear Modeling Level 2 Analysis for Work Experience, Age and Gender for Study 1*

| Variable | Coefficient | $SE^{\,a}$ | T |
|---|---|---|---|
| Intercept. $\gamma_{00}$ | 3.54** | 0.10 | 34.67 |
|    Work experience. $\gamma_{13}$ | −0.01* | 0.01 | −1.82 |
|    Age. $\gamma_{23}$ | 0.00 | 0.00 | −0.09 |
|    Gender. $\gamma_{33}$ | 0.00 | 0.00 | 0.90 |
| Task uncertainty. $\gamma_{10}$ | 0.43** | 0.03 | 14.25 |
|    Work experience. $\gamma_{13}$ | −0.01* | 0.01 | 2.11 |
|    Age. $\gamma_{23}$ | 0.00 | 0.00 | −0.90 |
|    Gender. $\gamma_{33}$ | 0.00 | 0.00 | −0.61 |
| Task behavior. $\gamma_{20}$ | −0.09** | 0.03 | −2.89 |
|    Work experience. $\gamma_{13}$ | 0.00 | 0.00 | 0.33 |
|    Age. $\gamma_{23}$ | 0.00 | 0.00 | −0.15 |
|    Gender. $\gamma_{33}$ | 0.00 | 0.00 | 0.10 |

*Note. N* = 65 subjects. *N* = 1040 observations.
$^{a}$ *SE* = Average estimated SE of the Level 1 regression coefficients.
*p* < .05, **p* < .01.

**Dispersion of Leadership Analyses**

The results of the additional analysis are presented in Table 5. In support of Hypothesis 1, analyses revealed higher dispersion values for situations with high task uncertainty. Results suggest that leadership is more dispersed or dispersed in situations with high task uncertainty. In contrast to Hypothesis 2, dispersion results showed no higher values in situations regarding learning new behavior than in situations concerning correcting behavior. The dispersion results also support Hypothesis 3 because no systematic variation of the four work domains is revealed. The deviations from the dispersion for the three leadership styles show that, apart from one score, the deviation of structural leadership was positive and is therefore underrepresented compared to interactional and team leadership.

Table 5

*Dispersion Index and Deviations from the Index (Index – Index Leadership Style) for each Scenario and each Leadership Style*

| Dispersion Index | Structural | Interactional | Team | Task Uncertainty | Task Behavior | Work Domains |
|---|---|---|---|---|---|---|
| 2.73 | 0.46 | −0.32 | −0.14 | low | learning | data processing |
| 2.86 | 0.53 | −0.39 | −0.13 | low | learning | market research |
| 2.91 | 0.46 | −0.32 | −0.14 | low | correcting | Marketing |
| 2.94 | 0.53 | −0.39 | −0.13 | low | learning | Marketing |
| 3.02 | 0.48 | −0.09 | −0.39 | low | correcting | data processing |
| 3.05 | 0.69 | −0.28 | −0.41 | low | learning | sales department |
| 3.07 | 0.53 | −0.14 | −0.39 | low | correcting | sales department |
| 3.14 | 0.32 | −0.41 | 0.09 | low | correcting | market research |
| 3.19 | 0.36 | −0.13 | −0.22 | high | correcting | market research |
| 3.23 | 0.47 | −0.17 | −0.30 | high | learning | market research |
| 3.37 | 0.29 | −0.20 | −0.10 | high | correcting | data processing |
| 3.39 | 0.48 | −0.25 | −0.23 | high | learning | marketing |
| 3.47 | −0.01 | 0.04 | −0.03 | high | learning | sales department |
| 3.53 | 0.34 | −0.29 | −0.05 | high | learning | data processing |
| 3.56 | 0.17 | −0.21 | 0.04 | high | correcting | sales department |
| 3.75 | 0.27 | −0.02 | 0.12 | high | correcting | marketing |

**Discussion of Study 1**

The main purpose of the present study was to demonstrate the simultaneous effect of structural, interactional and team leadership and the influence of task uncertainty and task behavior on dispersed leadership. Consistent with our hypotheses, results indicated that the need for dispersed leadership depends on task uncertainty and task behavior. However the amount of dispersed leadership was higher in uncertain and learning situations than in situations in which well-known behavior should be corrected. Furthermore, work experience and work domain moderated the relationship between task uncertainty and dispersed leadership. In addition, our results of AD analyses demonstrated the dispersion of leadership. These findings support the proposition of equifinality in the DLT and extended prior studies which mainly focused on separate relationships (Avolio, Sosik, Jung, & Berson, 2003). Our results demonstrate a simultaneous effect and are consistent with the substitute for leadership theory (Kerr & Jermier, 1978) and its empirical validation (Podsakoff et al., 1996).

There are three main limitations of Study 1. First, in respect to the policy-capturing approach we used a cold cognition model (Schwarz, 1998) which neglects affective consequences. Therefore, we used affective commitment in Study 2 as a dependent variable. Second, Study 1 is limited as regards the full crossed factorial and balanced design which misses repeated scenarios to minimize the number of scenarios and the participants' monotony. As a consequence, we have no information concerning the stability of judgments. In Study 2, we also address this concern by using repeated scenarios to assess the consistency of an individual's answers. Finally, we used the three leadership styles in Study 1 as dependent variables to reveal a simultaneous effect and organizational conditions increasing the need for dispersed leadership. Therefore, results only reveal the positive effect of the existence or absence of leadership styles. To address this concern, we used the leadership styles as independent variables in Study 2 to examine the combination of the leadership styles and the predictive influence of dispersed leadership on performance and affective commitment. According to our result that the need for dispersed leadership is particular high for employees with lower work experience, we decided to keep the work experience constantly low in Study 2.

# Study 2

**Dispersed Leadership and Success Criteria**

Structural leadership as mentioned above included different aspects of reward systems, information and communication tools in order to positively affect subordinates' behavior. Validity evidence for positive effects on subordinate task performance and commitment has been found for reward systems (Bartol, 1979; Folger & Konovsky, 1989; Schminke, Cropanzano, & Rupp, 2002) as well as clarity and efficiency of information and communication (Faraj & Sproull, 2000; Kraut & Streeter, 1995; O'Reilly & Roberts, 1978; Postmes, Tanis, & de Wit, 2001).

Interactional leadership as a dynamic and reciprocal process of interaction between leader and follower also has an impact on task performance and commitment. Thereby recent research in organizational psychology has documented that perceptions of fairness and trust (Colquitt, 2001; DeCremer & Van Knippenberg, 2002; Hofman, Gerras, & Morgeson, 2003; Kacmar, Witt, Zivnuska, & Gully, 2003; Kim, Ferrin, Cooper, & Dirks, 2004; Morgan & Hunt, 1994; Scott, 1981), coaching and mentoring (Hackman & Wageman, 2005; Scandura & Williams, 2004; Tansky & Cohen, 2002), and goal-participation and feedback discussions (Hertel, Konradt, & Orlikowski, 2004; Konradt, Hertel, & Schmook, 2003; Meyer, Becker, & Vandenberghe, 2004; Rodgers & Hunter, 1991) are positively related to subordinate task performance and commitment.

Team leadership stresses aspects of task-related exchange as well as mutual support and the sharing of decision latitude within teams (Pearce & Conger, 2003; Taggar, Hackett, & Saha, 1999). In recent psychological research, team-based concepts such as the quality of team-member exchange (Seers, 1989, 1996; Seers, Ford, Wilkerson, & Moorman, 2001; Seers et al., 2003; Seers, Petty, & Cashman, 1995), reciprocal team support (Colquitt, Noe, & Jackson, 2002; Pearce & Herbik, 2004) or shared responsibility (Chen, Webber, Bliese, Mathieu, Payne, Born, & Zaccaro, 2002; DeCremer & Van Knippenberg, 2002) were all positively related to subordinate task performance and commitment. We assume that each of the three leadership styles explains unique variance in task performance and commitment.

*Hypothesis 5: Interactional leadership, team leadership, and structural leadership are positively related to follower's task performance and commitment.*

**Method**

**Participants**

Participants were 113 employees who studied economic science on a part-time basis at a German business school. The majority of the participants were male (57.1%). Their average age was 18.01 years (*SD* = 2.37). Participants had an average of 2.2 years (*SD* = 1.48) and 5.8 months (*SD* = 8.99) of full-time work experience, covering a wide range of areas including technical, economical, and social occupations.

**Materials and Design**

The method used in this second study is also a policy-capturing approach which has already been described in Study 1. With regard to the results of the first study, we did not manipulate the work domain and fixed it in the Marketing domain.

A short description of a general work situation and three statements for each structural, interactional and team leadership were generated. Due to the multi-dimensional structure, each leadership style was represented by several variables. Structural leadership consisted of reward systems, communication systems, and subordinate empowerment. Interactional leadership consisted of trustful and fair interaction, superior coaching, and feedback. Team leadership consisted of mutual team support, shared team decisions and a high quality of team task-related exchange. Each statement was given in a positive and a negative form (e.g., "Members in your team support each other …", and "Members in your team do not support each other…").

A pilot study was conducted to determine whether the manipulated cue levels generated the expected perceptions of high and low interactional, team, and structural

leadership. Independent *t*-tests on the mean level of leadership demonstrated statistically significant differences among the high and low levels of each cue in the expected directions.

An orthogonal cue structure was deemed appropriate, because although structural, interactional and team leadership might be interdependent, we were interested in their independent impact on follower performance. We therefore used a complete crossover design with the factors 'structural leadership' (high vs. low), 'interactional leadership' (high vs. low), and 'team leadership' (high vs. low), resulting in 24 scenarios (each leadership style with three variables). A full factorial design was used in which subjects responded to all possible scenarios (Graham & Cable, 2001). Table 6 gives an overview of the manipulation of variables in the scenarios.

Table 6

*Overview of the Manipulation of Variables in the Scenarios with the Variables 'Leadership Style' (Structural vs. Interactional vs. Team) and 'Variable Value' (High vs. Low)*

| Structural Leadership (high vs. low) | Interactional Leadership (high vs. low) | Team Leadership (high vs. low) |
|---|---|---|
| Reward systems: Your reward systems at work are clear and **fair/approachable** | Trust, Fairness: Your superior **often/ seldom** trusts you and your competencies | Support: Member in your team **don't/** support each other in performing their tasks |
| Communication systems: You /**don't** receive all important information right away | Coaching: Your superior **often/ seldom** talks to you about task related problems | Decisions: Member in your team **don't**/ shared decision latitude and responsibility |
| Autonomy: You have **much/ less** autonomy on how to perform your work | Feedback: Your superior **often/ seldom** gives you reward and praise | Communication: Member in your team **don't**/ communicate trustfully |

*Note.* Modified words for manipulation of variables are in bold.

Two replicated scenarios were included in order to assess within-rater judgment consistency, resulting in 26 scenarios. Consistency was calculated by taking the square root of the difference between the total variance in an individual's judgment minus the variability in their evaluation of the repeated scenarios divided by their total variance (cf. Hamond, Stewart, Brehmer, & Steinmann, 1975). Average consistency was high (.53 to .73), suggesting that subjects used stable judgments in their responses to the same scenarios.

To control for sequencing effects, scenarios were presented in two different randomized orders (version A or version B). Cue order within the scenarios remained constant for all scenarios in order to simplify understanding. Independent sample *t*-tests on

questionnaire versions indicated no differences with regard to dependent variables ($t < 1$, *ns.*).

As the number of 26 scenarios might produce possible fatigue effects (cf. Aiman-Smith, Scullen, & Barr, 2002; Karren & Barringer, 2002), we compared the variance explained in the first half scenarios with the last half of scenarios by using the method recommended by Judge and Bretz (1992). A substantial decrement in the square multiple correlation for the second set of scenarios would indicate respondent fatigue. The difference in $R^2$ between the two sets of scenarios was .02 for task performance and .10 for satisfaction. Both scores are very small, indicating that an individuals' response to the scenarios is not biased by fatigue.

**Measures**

All items were responded using 6-point Likert scales ranging from *'don't agree at all'* (1) to *'fully agree'* (6).

**Task performance.** Three items from Hoegl and Gemuenden (2001) were used to measure task performance. In the present study, the reliability (α) of the scale was .96.

**Commitment.** Commitment was measured with the two-item scale from Semmer (1984). The reliability (α) of the measure was .92.

**Procedure**

As school administration and teachers consented to the study, subjects participated during their class hours. Participants received the questionnaire which requested them to provide demographic information and to respond to items pertaining to task performance and commitment. They were told to thoroughly read each scenario, and give their ratings on likely task performance and commitment regarding each scenario. Participants were instructed to take a break if they felt tired. The whole procedure took about a half hour.

*Results*

Descriptive statistics and correlations for main measures are reported in Table 7.

Table 7

*Means, Standard Deviations and Correlations among Study Variables in Study 2*

| Variable | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| 1 Structural leadership[a, c] | 1.66 | 0.98 | - | | | | | | |
| 2 Interactional leadership[a, c] | 1.66 | 0.98 | - | - | | | | | |
| 3 Team leadership[a, c] | 1.65 | 0.99 | - | - | - | | | | |
| 4 Task performance | 4.80 | 1.29 | .25** | .26** | .23** | (.96) | | | |
| 5 Commitment | 3.43 | 1.60 | .35** | .40** | .43** | .61** | (.95) | | |
| 6 Age[b] | 18.17 | 1.80 | .00 | .00 | −.00 | −.03 | −.03 | - | |
| 7 Gender[b, d] | 1.57 | 0.50 | .00 | .00 | −.00 | −.12** | −.01 | .32** | - |

*Note.* [a] $N = 113$ participants. [b] $N = 2938$ scenarios.
[c] Because the study utilized a completely crossed design, correlations among independent variables are zero by definition and therefore are not shown.
[d] 1 = female, 2 = male.
**$p < .01$ (two-tailed).
Internal consistencies in parenthesis.

## Level 1 Analysis

For Hypothesis 5 which predicted that individual' task performance and commitment would be influenced by structural, interactional and team leadership, effect size measures indicate that the set of fit predictors averaged across subjects accounted for over 41% of the explainable variance for task performance and 9% for commitment, respectively (see Table 7). The estimates of the average intercepts and slopes across individuals are also reported in Table 7. The average intercept and the average slope coefficients for structural, interactional and team leadership differed significantly from zero with regard to task performance and commitment. Structural leadership ($\beta = .18$; $p < .001$), interactional leadership ($\beta = .22$; $p < .001$), and team leadership ($\beta = .16$; $p < .001$) each had a positive impact on task performance. Also, in support of Hypotheses 4, structural ($\beta = .23$; $p < .001$), interactional ($\beta = .39$; $p < .001$), and team leadership ($\beta = .48$; $p < .001$) each were positively related to commitment. Results are summarized in Table 8.

Table 8

*Level 1 Model of Structural, Interactional and Team Leadership on Task Performance and Commitment*

| | Task performance | | | | Commitment | | | |
|---|---|---|---|---|---|---|---|---|
| Variable | Coefficient | *SE* [a] | *t* | Variance [b] | Coefficient | *SE* [a] | *T* | Variance [b] |
| Intercept. $\beta_{0j}$ | 3.82*** | 0.13 | 29.26 | 1.62*** | 1.56*** | 0.08 | 20.62 | 7.12*** |
| Structural leadership. $\beta_1$ | 0.18*** | 0.02 | 8.40 | 0.11*** | 0.22*** | 0.03 | 9.11 | 0.22*** |
| Interactional leadership. $\beta_2$ | 0.22*** | 0.02 | 11.32 | 0.18*** | 0.36*** | 0.02 | 16.99 | 0.28*** |
| Team leadership. $\beta_3$ | 0.16*** | 0.02 | 9.36 | 0.14*** | 0.51*** | 0.02 | 21.51 | 0.18*** |
| Effect size (%) [c] | | | | 11.06 | | | | 41.31 |

*Note. N* = 113 subjects. *N* = 2938 observations.
[a] Average estimated SE of the Level 1 regression coefficients.
[b] Variance in Level 1 parameter estimates and chi-square test of significance of variance.
[c] Percentage of explainable Level 1 variance in the dependent variable accounted for by fit cues.
***$p < .001$.

Analysis of systematic variance across the slopes of subjects' regression equations shows significant variance in the slopes for each of the Level 1 predictors, suggesting that individuals' reaction differed on the three styles of leadership. A residual ICC of 3% with regard to task performance and 4% with regard to commitment indicated that the portion of total variance remaining could be explained by individual differences. These scores are relatively small, but significantly different from zero (for task performance: $\chi^2$ = 1446.70, *df* = 104, *p* < .001, for commitment: $\chi^2$ = 245.45, *df* = 104, *p* < .001, respectively) and the remaining variance was thus modeled by using Level 2 predictors.

**Discussion of Study 2**

Study 2 was designed to improve Study 1 in three ways. Firstly, we examined the impact of the three leadership styles by using the styles of dispersed leadership as independent variables of this study. Secondly, we used commitment in addition to performance as dependent variables representing affective aspects. To address methodological concerns in Study 1, we used repeated scenarios to determine the amount of judgmental consistency.

The main results of Study 2 reveal a positive impact for all three leadership dimensions on task performance and commitment. These findings are consistent to theoretical and empirical approaches on the organizational effectiveness of each leadership style (structural: Faraj & Sproull, 2000; Schminke, Cropanzano, & Rupp, 2002; interactional: DeCremer & Van Knippenberg, 2002; Hackman & Wageman, 2005; team: Pearce & Conger, 2003; Pearce & Herbik, 2004). Moreover, our results suggest that all three styles

simultaneously have a positive impact on performance and commitment. Therefore, results suggest that dispersed leadership has a predictive and explanatory quality and is also dependant on situational task characteristics (Study 1).

**General Discussion**

The purpose and major contribution of this study was to provide empirical evidence for the DLT. In two policy-capturing studies, we showed that the three styles of dispersed leadership had an impact on peoples' behavior and attitude towards their work in different contexts. Furthermore, in Study 1, we documented the impact of the three styles of leadership being related to work context and task uncertainty, and that these relationships were stable across work domains. A simultaneous effect of the three leadership styles was demonstrated for the first time. Therefore, we demonstrated that the three leadership styles simultaneously interact and not only act separately. Study 2 explored whether the three predictors structural, interactional and team leadership had a unique impact on task performance and commitment. We demonstrated a corresponding result that was consistent with empirical research on the unique effects of different leadership styles on performance and commitment.

**Theoretical and Practical Implication**

The results of the studies make considerable contributions to the areas of shared leadership (Day et al., 2004; Pearce & Conger, 2003), distributed leadership (Gronn, 2003) and situational leadership (Vroom & Jago, 2007). We further contribute to recent research on situational and task characteristics relating to leadership (Daft, 2001; Gibson, 1999) by demonstrating the negative impact of task uncertainty and uncertain task behavior on all three leadership styles.

The major contribution of our study was to provide evidence of an extended dispersed leadership model. First, our study provides new evidence that supports the assumption that followers' behaviors are simultaneously influenced by structural, interactional, and team leadership. As suggested by many scholars, the central finding of dispersed leadership demonstrated that the three leadership styles could interact and perhaps have compensatory or neutralizing effects on each other (Kerr & Jermier, 1978; Niehoff, Paul & Turnley, 2000).

Furthermore, our results are consistent with theories that assume special combinations of leadership techniques can have neutralizing (Kerr & Jermier, 1978). Moreover, Stewart and Manz (1995) theoretically argue that a constellation of democratically organizational orientation (structural leadership) and a passive interactional leader could

enhance self-regulatory behavior in teams (team leadership). As far as we know, our study is the first to provide evidence that all three leadership styles have a simultaneous effect.

Secondly, in accordance with recent leadership theories (Gronn, 2002; Pearce & Conger, 2003) and reviews (Day et al., 2006), we expanded shared leadership theory that focuses on personalized leadership and included external structural leadership, which constitute a salient stimulus within the entire leadership process. This synthesis provides not only a theoretical foundation for identifying and categorizing leadership cues, but also a basis for investigating the relative impact of single leadership styles in less structured environments. In addition, leadership research mainly focused on the dyade leader-member and largely neglected depersonalized situational leadership (Vroom & Jago, 2007) and team leadership or treated team related variables only as moderators (Zaccaro et al., 2001). The main advantage of the DLT is that it is possible to combine different leadership theories of situational, interactional and team leadership. As such, the impact of different leadership techniques can be investigated in a conjoint concept and existing theories can be augmented. To clarify, we conceptualized structural and interactional leadership in accordance with vertical leadership and team leadership in accordance to Pearce and Conger (2003), Shamir (1999) and Sivasubramaniam (2002).

Thirdly, our study results contribute to the validity and stability of the DLT. With performance and commitment as success criteria we used two outcome variables which in fact correlate ($r = .20$) but conceptually reflect two central but different domains of successful team work (Riketta, 2002). Our results revealed the positive impact of leadership styles for both criteria, which confirmed the external validity of the DLT regarding affective (i.e., commitment) and behavioral (i.e., performance) variables. This therefore augments the validity and significance of the DLT. In addition, we could not demonstrate the influence of the different moderator variables (i.e., work domain and work experience) which also confirms the stability and validity of the DLT.

The results of our studies also have practical implications for the leadership of teams in respect to organizations, leaders and teams. The DLT provides multiple possibilities and instructions of efficient leadership tools, which simultaneously are exchangeable. Moreover, the DLT provides a leadership guideline for leaders, organizations and teams. First, on organizational level, fair reward systems, clear communication systems and empowerment of subordinates are useful structural leadership techniques and have a direct impact on the different success criteria (e.g., Postmes, Tanis, & de Wit, 2001; Schminke, Cropanzano, & Rupp, 2002). Second, in respect to interactional leadership, fairness and trust, goal-participation feedback and coaching had positive impacts on job-related factors. Therefore, leaders could be trained to give administrable feedback and how to coach effectively in order

to augment a teams' success (e.g., Meyer, Becker, & Vandenberghe, 2004). Finally, useful team leadership functions are shared responsibility, team support and quality of task-exchange. For example, team training and team coaching are effective strategies to enhance team support and the communication quality of teams (e.g., Hackman & Wageman, 2005).

The findings also confirm that organizational teams working on uncertain tasks, with uncertain task behavior (for example complex, diverse and less predictable tasks or goals) and with a majority of team members with minor work experience should be led with different distributed functions of leadership. Alternatively, team leaders in organizations which lack structural leadership should either foster team leadership as an additional source of leadership or should reduce task uncertainty for their team. In addition, leaders should employ more experienced team members for uncertain tasks or tasks that require new behavior when dispersed leadership is not available.

**Strengths, Limitations and Future Research**

Notwithstanding the contributions listed above, our study has certain limitations. First, in regard to policy-capturing methodology, there are limitations to discuss. As participants are asked to read a number of scenarios and to make well-reasoned decisions about the information, in a short period of time, results may lack external validity. Also, policy-capturing is a simulation-based technique which is susceptible to possible fatigue effects (Hamond et al., 1975; Judge & Bretz, 1992). In order to prevent such effects, we used a small number of manipulated cues and scenarios (Study 1: 16 scenarios, Study 2: 26 scenarios) in contrast to the existing policy-capturing studies (e.g., Brannick & Brannick, 1989; Judge & Bretz, 1992) in order to minimize the possibility of participants skimming through the material. Even though participants did not have to execute as many scenarios as in other policy-capturing studies and our results from Study 2 indicate no fatigue effect, the cognitive demands when answering the scenarios were high. We reduced cognitive demands by presenting the cues in paragraph form and by asking the same questions for each scenario. For Study 2, high within-person consistency ratings and the lack of fatigue effects suggest that participants did pay attention to the task during the entire experiment. Nevertheless, results should be replicated using alternative methods of data collection.

Second, inherent to the nature of policy-capturing, the external validity of policy-capturing results might be impaired. The generalizability of the results depends on the quality of the cues and the familiarity of the subjects with similar judgment experiences. We used critical incident technique to develop adequate, realistic and behavioral relevant scenarios. Moreover, pre-tests for each study confirmed the participant's perceived external validity. Nevertheless, we focused mainly on leadership cues while other context variables

(e.g., conflicts, task coordination) and personality variables (e.g., extraversion, agreeableness) were excluded. This limits the conclusions to the interaction of multiple styles of leadership. Another question concerns whether the participants in both studies had sufficient work experience to understand the importance of all three styles of leadership. Subjects had previous work experience within multiple companies in a wide range of functional backgrounds, and in interacting with co-workers or classmates. Particular in Study 2, participants were very young. The finding that the results were relatively stable across the two studies with two different occupational groups reduces this concern.

Another potential concern refers to the statistical analysis on individual level, which neglected the variation of team characteristics (Avolio et al., 2003). Alternatively, incomplete factorial designs with different scenarios for separate groups of participants (cf. Graham & Cable, 2001) can be applied, though the number of required participants would increase.

Our research also had a number of strengths. First the method allows for measuring participants' behaviors and attitudes in a simulation-based context therefore it was economically efficient as regards time and costs. The experimental design enables us to draw causal conclusions (cf. Karren & Barringer, 2002) regarding the impact of the three styles of dispersed leadership. By using scenarios of diverse domains, results can also be generalized for specific occupational contexts which improve external validity. As an additional strength, we made several efforts to ensure the internal validity of the study. For Study 2, we used repeated scenarios to check for consistency within subjects' judgments. For both studies, we presented the scenarios in completely randomized order to reduce order effects. Findings of Study 1 supported that the impact of dispersed leadership is stable across work contexts.

As regards the methodological strengths, we used multi-level statistical methods which enable us to analyze and relate individual judgments and the response bias of different participants (Bryk & Raudenbush, 1992, 2002). Moreover, we used an adaptation of the AD to provide evidence for the simultaneous effects of the three leadership styles which enables us to integrate the absolute value of each leadership technique and the equal distribution of the three styles into a single index.

The evidence that multiple styles of leadership simultaneously influence work attitudes indicates the utility of an embedded, contextual understanding of multifaceted dispersed leadership. The next step is to move this research into a natural work environment to assess individuals' and teams' perceptions of dispersed leadership in contextually rich and potentially complex circumstances. Clearly, more research is needed to explore how dispersed leadership styles interact to influence work attitudes and behaviors.

Future research could therefore create a specific, "dispersed leadership" situation in order to replicate the present findings. To this end, the effectiveness of all three styles independently and simultaneously could be investigated to clarify relationships among the leadership styles (i.e., additive, conjunctive, and disjunctive) and style of effect or result (i.e., intensifying, reducing, and neutralizing). Alternatively, researchers could further manipulate situational (contextual) factors (i.e. for example team characteristics, individual characteristics and interdependence) and measure the impact on dispersed leadership.

**Conclusion**

In conclusion, this research provides the first comprehensive investigation on the dispersed leadership theory in teams suggesting that interactional, team and structural leadership simultaneously influences team members' task performance and work-related attitudes. Results of Study 1 provide evidence that relationships can be generalized to different situational work domains, however, they can be perceived to strongly correspond to situational demands. Specifically, our results provide a first step toward a better model for understanding the effects of dispersed leadership. Moreover, the current findings have important implications not only for theoretical and empirical research on leadership but also for organizations, leaders and teams in real working contexts and therefore enhances the theoretical and practical role of different styles of leadership in an organizational team working context.

# References

Aiman-Smith, L., Scullen, S., & Barr, S. (2002). Conducting studies of decision making in organizational contexts: A tutorial for policy-capturing and other regression-based techniques. Organizational Research Methods, 5, 388–414.

Avolio, B. J., Jung, D., Murry, W., & Sivasubramaniam, N. (1996). Building highly developed teams: Focusing on shared leadership process, efficacy, trust, and performance. In D. A. Beyerlein, D. A. Johnson & S. T. Beyerlein (Eds.), Advances in interdisciplinary studies of work teams (pp. 173–209). Greenwich, CT: JAI Press.

Avolio, B. J., Kahai, S., & Dodge, G. E. (2001). E-Leadership: Implications for theory, research, and practice. The Leadership Quarterly, 11, 615–670.

Avolio, B. J., Sosik, J. J., Jung, D. I., & Berson, Y. (2003). Leadership models, methods and applications: Small steps and giant leaps. In W. C. Borman, R. J. Klimoski, D. J. Ilgen & I. B. Weiner (Eds.), Handbook of Psychology (Vol. 12, pp. 277–307). New York: John Wiley & Sons.

Badaracco, J. L. (2001). We don't need another hero. Harvard Business Review, 79, 121.

Bandura, A. (1991). Social cognitive theory of self-regulation. Organizational Behavior and Human Decision Processes, 50, 248–287.

Bandura, A. (Ed.). (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. Journal of Applied Psychology, 88, 87–99.

Bartol, K. M. (1979). Professionalism as a predictor of organizational commitment, role stress, and turnover: a multidimensional approach. Academy of Management Journal, 22, 815–821.

Bass, B. M., & Avolio, B. J. (1993). Transformational leadership: A response to critiques. In J. G. Hunt, B. R. Baliga, H. P. Dachler & C. A. Schriesheim (Eds.), Emerging leadership vistas (pp. 29–40). Lexington, MA: D.C. Health.

Bell, B. S., & Kozlowski, S. W. J. (2002). Goal orientation and ability: Interactive effects on self-efficacy, performance, and knowledge. Journal of Applied Psychology, 87, 497–505.

Bertalanffy, L. v. (1960). Principles and theory of growth. In W. W. Nowinski (Ed.), Fundamental aspects of normal and maligant growth. Amsterdam: Elsevier.

Bollen, K., & Lennox, R. (1991). Conventional wisdom measurement: A structural equation perspective. Psychological Bulletin, 110, 305–314.

Bowers, D. G., & Franklin, J. L. (Eds.). (1977). Data-based Organizational Change. California: La Jolly.

Brannick, M. T., & Brannick, J. P. (1989). Nonlinear and noncompensatory porcesses in performance evaluation. Organizational Behavior and Human Decision Processes, 44, 97–122.

Brown, M. E., & Gioia, D. A. (2002). Making things click, Distributive leadership in an online division of an offline organization. The Leadership Quarterly, 13, 397–419.

Bryk, A. S., & Raudenbusch, S. W. (Eds.). (1992). Hierarchical linear models: Applications and data analysis methods. Newbury Park, CA: Sage.

Bryk, A. S., & Raudenbusch, S. W. (Eds.). (2002). Hierarchical linear models: Application and data analysis methods (2nd ed.). Newbury Park, CA: Sage.

Burke, C. S., Fiore, S. M., & Salas, E. (2003). The role of shared cognition in enabling shared leadership and team adaptability. In C. L. Pearce & J. A. Conger (Eds.), Shared leadership: Reframing the hows and whys of leadership (pp. 103–121). Thousand Oaks, CA: Sage.

Burke, C. S., Stagl, K. C., Salas, E., Pierce, L., & Kendall, D. (2006). Understanding team adaptation: A conceptual analysis and model. Journal of Applied Psychology, 91, 1189–1207.

Burke, M. J., & Dunlap, W. P. (2002). Estimating interrater agreement with the average deviation index: A user's guide. Organizational Research Methods, 5, 159–172.

Burke, M. J., Finkelstein, L. M., & Dusig, M. S. (1999). On average deviation indices for estimating interrater agreement. Organizational Research Methods, 2, 49–68.

Cable, D. M., & Judge, T. A. (1994). Pay preferences and job search decisions: A person-organization fit perspective. Personnel Psychology, 47, 317–348.

Carson, J. B., Tesluk, P. E., & Marrone, J. A. (2007). Shared leadership in teams: An investigation of antecedent conditions and performance. Academy of Management Journal, 50, 1217–1234.

Chen, G., Webber, S. S., Bliese, P. D., Mathieu, J. E., Payne, S. C., Born, D. H., Zaccaro, S. J. (2002). Simultaneous examination of the antecedents and consequences of efficacy beliefs at multiple levels of analysis. Human Performance, 15, 381–409.

Colquitt, J. A. (2001). On the dimensionality of organizational justice: A construct validation of a measure. Journal of Applied Psychology, 86, 386–400.

Colquitt, J. A., Noe, R. A., & Jackson, C. I. (2002). Justice in teams: Antecedents and consequences of procedural justice climate. Journal of Applied Psychology, 55, 83–109.

Cordery, J. L., Morrison, D., Wright, B. M., & Wall, T. D. (2010). The impact of autonomy and task uncertainty on team performance: A longitudinal field study. Journal of Organizational Behavior, 31, 240–258.

Daft, R. L. (Ed.). (2001). Organizational theory and design (7th ed.). Cincinnati, OH: South-Western.

Day, D., Gronn, P., & Salas, E. (2004). Leadership capacity in teams. The Leadership Quarterly, 15, 857–880.

Day, D., Gronn, P., & Salas, E. (2006). Leadership in team-based organizations: On the threshold of a new era. The Leadership Quarterly, 17, 211–216.

DeCremer, D., & Van Knippenberg, D. (2002). How do leaders promote cooperation? The effect of charisma and procedural fairness. Journal of Applied Psychology, 87, 858–866.

Dineen, B. R., Noe, R. A., & Wang, C. (2002). Perceived fairness of a web-based applicant screening system: Weighing the rules of justice. Paper presented at the Presented at the annual meeting of the Academy of Management.

Duncan, R. B. (1972). Characteristics of organizational environments and perceived environmental uncertainty. Administrative Science Quarterly, 17, 313–327.

Edwards, J. R., & Bagozzi, R. P. (2000). On the nature and direction of relationships between constructs and measures. Psychological Methods, 5, 155–174.

Ellwart, T., Biemann, T., & Rack, O. (2011). Measurement of team knowledge in the field: Methodological advantages and limitations. In M. Boos, M. Kolbe, P. M. Kappeler & T. Ellwart (Eds.), Coordination in human and primate groups (pp. 155–176). Heidelberg: Springer.

Ellwart, T., & Konradt, U. (2007, May). Explicit and implicit team coordination: Influences of planning and shared mental models on team conflicts and coordination success. Paper presented at the 13th Congress of Work and Organizational Psychology.

Ensari, N., & Murphy, S. E. (2003). Cross-cultural variations in leadership perceptions and attribution of charisma to the leader. Organizational Behavior and Human Decision Processes, 92, 52–66.

Ensley, M. D., Hmieleski, K. M., & Pearce, C. L. (2006). The importance of vertical and shared leadership within new venture top management teams: Implications for the performance of startups. The Leadership Quarterly, 17, 217–231.

Ensley, M. D., Pearson, A., & Pearce, C. L. (2003). Top management team process, shared leadership, and new venture performance: A theoretical model and research agenda. Human Resource Management Review, 13, 329–346.

Evans, M. G. (1970). The effects of supervisory behavior on the path–goal relationship. Organizational Behavior and Human Performance, 55, 277–298.

Faraj, S., & Sproull, L. (2000). Coordinating expertise in software development teams. Management Science, 46, 1554–1568.

Faraj, S., & Yan, A. (2009). Boundary work in knowledge teams. Journal of Applied Psychology, 94, 604–617.

Fiedler, F. E. (Ed.). (1967). A theory of leadership effectiveness. NY: McGraw-Hill.

Fiss, P. C. (2007). A set-theoretic approach to organizational configurations. Academy of Management Review, 32, 1180–1198.

Flanagan, J. C. (1954). The critical incident technique. Psychological Bulletin, 51, 327–358.

Folger, R., & Konovsky, M. A. (1989). Effects of procedural and distributive justice on reactions to pay raise decisions. Academy of Management Journal, 32, 115–130.

Galbraith, J. R. (Ed.). (1973). Designing complex organizations. Reading: Addison-Wesley.

Galbraith, J. R. (Ed.). (1977). Organization design. Reading: Addison-Wesley.

Galunic, D. C., & Eisenhardt, K. M. (2001). Architectural innovation and modular corporate forms. Academy of Management Journal, 6, 1229–1249.

Gerstner, C. R., & Day, D. V. (1997). Meta-analytic review of leader-member exchange theory: Correlates and construct issues. Journal of Applied Psychology, 82, 827–844.

Gibson, C. B. (1999). Do they do what they believe they can? Group efficacy and group effectiveness across tasks and cultures. Academy of Management Journal, 42, 138–152.

Gini, C. (1921). Measurement of inequality of income. Economic Journal, 31, 22–43.

Graham, M. E., & Cable, D. M. (2001). Consideration of the incomplete block design for policy-capturing research. Organizational Research Methods, 4, 26–45.

Gresov, C., & Drazin, R. (1997). Equifinality: Functional equivalence in organization design. Academy of Management Review, 22, 403–428.

Griffin, M. A., Neal, A., & Parker, S. K. (2007). A new model of work role performance: positive behavior in uncertain and interdependent contexts. Academy of Management Journal, 50, 327–347.

Gronn, P. (2000). Distributed properties: A new architecture for leadership. Educational Management and Administration, 28, 317–338.

Gronn, P. (2002). Distributed leadership as a level of analysis. The Leadership Quarterly, 13, 423–451.

Gronn, P. (2003). Leadership's place in a community of practice. In M. Brundrett, N. Burton & R. Smith (Eds.), Leadership in Education. London: Sage.

Hackman, J. R., & Wageman, R. (2005). A theory of team coaching. Academy of Management Review, 30, 269–287.

Hackman, J. R., & Wageman, R. (2007). Asking the right questions about leadership. American Psychologist, 62, 43–47.

Hackman, J. R., & Walton, R. E. (1986). Leading groups in organizations. In P. S. Goodman (Ed.), Designing effective work groups (pp. 72–119). San Francisco, CA: Jossey-Bass.

Hamond, K. R., Stewart, T. R., Brehmer, B., & Steinmann, D. O. (1975). Social judgement theory. In M. K. S. Schwartz (Ed.), Human judgement and decision processes (pp. 271–312). New York: Academic Press.

Harold, C. M., & Ployhart, R. E. (2008). What do applicants want: Examining changes in attribute importance judgments over time. Journal of Occupational and Organizational Psychology, 81, 191–218.

Heifetz, R., Grashow, A., & Linsky, M. (2009). Leadership in a (permanent) crisis. In K. Dillon (Ed.), The Harvard Business Review (pp. 62–69). Boston: Harvard Business Publishing.

Hersey, P., & Blanchard, K. (Eds.). (1977). Management of organizational behaviour: Utilizing human resources. Englewood Cliffs, NJ: Prentice-Hall.

Hertel, G., Geister, S., & Konradt, U. (2005). Managing virtual teams: A review of current empirical research. Human Resource Management Review, 15, 69–95.

Hertel, G., Konradt, U., & Orlikowski, B. (2004). Managing distance by interdependence: Goal setting, task interdependence, and team-based rewards in virtual teams. European Journal of Work and Organizational Psychology, 13, 1–28.

Hoch, J. E. (2007). Verteilte Führung in virtuellen Teams. [Distributed leadership in virtual teams, PhD thesis]. URL: http://e-diss.uni-kiel.de/index.html, Kiel.

Hoegl, M., & Gemuenden, H. G. (2001). Teamwork quality and the succuess of innovative projects. Organization Science, 12, 435–449.

Hofman, D. A. (1997). An overview of the logic and rationale of hierarchical linear models. Journal of Management, 23, 723–744.

Hofman, D. A., & Gavin, M. B. (1998). Centering decisions in hierarchical linear models: Implications for research in organizations. Journal of Management, 24, 623–641.

Hofman, D. A., Gerras, S. J., & Morgeson, F. P. (2003). Climate as a moderator of the relationship between leader-member exchange and content specific citizenship: Safety climate as an exemplar. Journal of Applied Psychology, 88, 170–178.

House, R. J. (1971). A path– goal theory of leader effectiveness. Administrative Science Quarterly, 16, 321–338.

House, R. J., & Aditya, R. N. (1997). The social scientific study of leadership: Quo vadis? Journal of Management, 23, 409–473.

House, R. J., & Dessler, G. (1974). The path– goal theory of leadership: Some post hoc and a priori tests. In J. G. Hunt & L. L. Larson (Eds.), Contingency approaches to leadership (pp. 29–55). Carbondale, IL: Southern Illinois University Press.

House, R. J., & Mitchell, T. R. (1974). Path– goal theory of leadership. Journal of Contemporary Business, 3, 81–97.

Jauch, L. R., & Kraft, K. L. (1986). Strategic management of uncertainty. Academy of Management Review, 11, 777–790.

Johnston, M., Gilmore, A., & Carson, D. (2008). Dealing with environmental uncertainty: the value of planning for SMEs. Commentary, European Journal of Marketing, 42, 1170–1178.

Judge, T. A., & Bretz, R. D. (1992). Effects of work values on job choice decisions. Journal of Applied Psychology, 77, 261–271.

Kacmar, K. M., Witt, L. A., Zivnuska, S., & Gully, S. M. (2003). The interactive effect of leader-member exchange and communication frequency on performance ratings. Journal of Applied Psychology, 88, 764–772.

Karakas, F. (2009). New paradigms in organization development: Positivity, spirituality, and complexity. Organization Development Journal, 27, 11–26.

Karren, R. J., & Barringer, W. M. (2002). A review and analysis of the policy-capturing methodology in organizational research: Guidelines for research and practice. Organizational Research Methods, 5, 337–361.

Keith, M., Demirkan, H., & Goul, M. (2010). The influence of collaborative technology knowledge on advice network structures. Decision Support Systems, 50, 140–151.

Kerr, S. (1977). Substitutes for leadership: some implications for organizational design. Organization and Administrative Sciences, 8, 135–146.

Kerr, S., & Jermier, J. M. (1978). Substitutes for leadership: Their meaning and measurement. Organizational Behavior & Human Performance, 22, 375–403.

Kim, P. H., Ferrin, D. L., Cooper, C. D., & Dirks, K. T. (2004). Removing the shadow of suspicion: The effects of apology versus denial of repairing competence- versus integrity-based trust violations. Journal of Applied Psychology, 89, 104–118.

Konradt, U. (2011). The dispersed leadership theory in teams: Model and empirical evidence (Working Paper 11). Kiel: Institute of Psychology. Retrieved July 7, 2011, from http://www.uni-kiel.de/psychologie/AOM/index.php/reports.html.

Konradt, U., Hertel, G., & Schmook, R. (2003). Quality of management by objectives, task-related stressors and non-task-related stressors as predictors of stress and job satisfaction among teleworkers. European Journal of Work and Organizational Psychology, 12, 61–80.

Kouzes, J. M., & Posner, B. Z. (Eds.). (2002). The leadership challenge (3rd ed.). San Francisco, CA: Jossey-Bass.

Kozlowski, S. W. J., & Bell, B. S. (2003). Work groups and teams in organizations. In W. C. Borman, D. J. Ilgen & R. J. Klimoski (Eds.), Handbook of Psychology Industrial and Organizational Psychology (Vol. 12, pp. 333–375). Hoboken, NJ: John Wiley & Sons.

Kozlowski, S. W. J., Gully, S. M., Salas, E., & Cannon-Bowers, J. A. (1996). Team leadership and development: Theory, principles, and guidelines for training leaders and teams. In M. Beyerlein, D. Johnson & S. Beyerlein (Eds.), Advances in interdisciplinary studies of work teams: Team leadership (pp. 251–289). Greenwich, CT: JAI Press.

Kraut, R. E., & Streeter, L. A. (1995). Coordination in software development. Communication of the ACM, 38, 69–81.

Kristof-Brown, A., Jansen, K. J., & Colbert, A. E. (2002). A policy-capturing study of the simultaneous effects of fit with jobs, groups and organizations. Journal of Applied Psychology, 87, 985–993.

Latham, G. P., & Ernst, C. T. (2006). Keys to motivating tomorrow's workforce. Human Resource Management Review, 16, 181–198.

Latham, G. P., & Frayne, C. A. (1989). Self-management training for increasing job attendance: A follow-up and a replication. Journal of Applied Psychology, 74, 410–416.

Lindsley, D. H., Brass, D. J., & Thomas, J. B. (1995). Efficacy-performance spirals: A multilevel perspective. Academy of Management Review, 20, 645–678.

Lloyd, B. (2009, July). Power, responsibility, and wisdom: Exploring the issues at the core of ethical decision-making and leadership. Paper presented at the Proceedings from the World Future Society annual conference, Bethesda, MD.

MacCallum, R. C., & Browne, M. W. (1993). The use of causal indicators in covariance structure models. Some practical issues. Psychological Bulletin, 114, 533–541.

Manz, C. C. (1986). Self-leadership: Toward an expanded theory of self-influence processes in organizations. Academy of Management Review, 11, 585–600.

Manz, C. C., & Sims, H. P. (1987). Leading workers to lead themselves: the external leadership of self-managing work teams. Administrative Science Quarterly, 32, 106–129.

Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. Academy of Management Review, 26, 356–376.

Martocchio, J. J., & Judge, T. A. (1994). A policy-capturing approach to individuals' decisions to be absent. Organizational Behavior and Human Decision Processes, 57, 358–386.

McAdam, N. (2002). A brain style model of change responsiveness and distributed leadership in 21st century network organizations. International Journal of Behavior, 5, 213–241.

Mehra, A., Smith, B. R., Dixon, A. L., & Robertson, B. (2006). Distributed leadership in teams: The network of leadership perceptions and team performance. The Leadership Quarterly, 17, 232–245.

Mellor, S., Parley, M. J., & Holzworth, R. J. (1999). Fans' judgements about the 1994-95 major league baseball players' strike. Multivariate Behavioral Research, 34, 59–87.

Meyer, J., Becker, T., & Vandenberghe, C. (2004). Employees commitment and motivation: A conceptual analysis and integrative model. Journal of Applied Psychology, 89, 991–107.

Milliken, F. J. (1987). Three types of perceived uncertainty about the environment: State, effect, and response uncertainty. Academy of Management Review, 12, 133–143.

Mintzberg, H., & Quinn, J. R. (Eds.). (1991). Strategic process-concepts, contexts, cases. Inglewood Cliffs: Prentice Hall.

Mohrman, S. A., Cohen, S. G., & Mohrman, A. M. J. (Eds.). (1995). Designing team-based organizations: New forms for knowledge work. San Francisco: Jossey-Bass.

Morgan, R. M., & Hunt, S. D. (1994). The commitment –trust theory of relationship marketing. Journal of Marketing, 58, 20–38.

Morrison, E. W., & Vancouver, J. B. (2000). Within-person analysis of information seeking: The effects of perceived costs and benefits. Journal of Management, 26, 119–137.

Neck, C. P., & Houghton, J. D. (2006). Two decades of self-leadership theory and research: Past developments, present trends, and future. Journal of Managerial Psychology, 21, 270–295.

Nidumolu, S. R. (1995). The effect of coordination and uncertainty on software project performance: Residual performance risk as an intervening variable. Information Systems Research, 6, 191–219.

Niehoff, B. P., Paul, R. J., & Turnley, W. H. (2000). Empowerment, expectations, and the psychological contract - Managing the dilemmas and gaining the advantages. Journal of Socio-Economics, 29, 471–485.

Nuttall, J. (2004). Mode of interpersonal relationship in management organizations. Journal of Change Management, 4, 15–29.

O'Reilly, C. A., & Roberts, K. H. (1974). Information filtration in organizations: Three experiments. Organizational Behavior and Human Performance, 11, 253–265.

Pearce, C. L. (1997). The determinants of change management team (CMT) effectiveness: A longitudinal investigation. College Park.

Pearce, C. L., & Conger, J. A. (Eds.). (2003). Shared Leadership: Reframing the hows and whys of leadership. Thousand Oaks: Sage.

Pearce, C. L., & Herbik, P. A. (2004). Citizenship behavior at the team level of analysis: The effect of team leadership, team commitment, perceived team support and team size. The Journal of Social Psychology, 114, 293–310.

Pearce, C. L., & Manz, C. C. (2005). The new silver bullets of leadership: The importance of self- and shared leadership in knowledge work. Organizational Dynamics, 34, 130–140.

Pearce, C. L., & Sims, H. P. J. (2002). Vertical versus shared leadership as predictors of the effectiveness of change management teams: An examination of the aversive, directive, transactional, transformational and empowering leader behaviors. Group Dynamics, 6, 172–197.

Pearce, C. L., Yoo, Y., & Alavi, M. (2004). Leadership, social work and virtual teams: The relative influence of vertical vs. shared leadership in the nonprofit sector. In R. E. Riggio & S. Smith-Orr (Eds.), Improving leadership in nonprofit organizations (pp. 180–203). San Francisco: Jossey-Bass.

Podsakoff, P. M., MacKenzie, S. B., & Bommer, W. H. (1996). Transformational leader behaviors and substitutes for leadership as determinants of employee satisfaction, commitment, trust, and organizational citizenship behaviors. Journal of Management, 22, 259–298.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. Journal of Applied Psychology, 88, 879–903.

Postmes, T., Tanis, M., & de Wit, B. (2001). Communication and commitment in organisations: a social identity approach. Group Processes and Intergroup Relations, 4, 207–226.

Powell, G. N., Butterfield, D. A., Alves, J. C., & Bartol, K. M. (2004). Sex effects in evaluations of transformational and transactional leaders. Paper presented at the Conference proceedings of the Academy of Management, New Orleans.

Randolph, W., & Dess, G. (1984). The congruence perspective of organization design: A conceptual model and multivariate research approach. Academy of Management Review, 9, 114–128.

Riketta, M. (2002). Attitudinal organizational commitment and job performance: A meta-analysis. Journal of Organizational Behavior, 23, 257–266.

Rodgers, R., & Hunter, J. E. (1991). Impact of management by objectives an organizational productivity. Journal of Applied Psychology, 76, 322–336.

Rynes, S., & Gerhart, B. (Eds.). (2000). Compensation in organizations: Current research and practice. San Francisco, CA: Jossey-Bass.

Rynes, S. L., Gerhart, B., & Parks, L. (2005). Personnel psychology: Performance evaluation and pay for performance. Annual Review of Psychology, 56, 571–600.

Saavedra, R., Early, P. C., & Van Dyne, L. (1993). Complex interdependence in task-performing groups. Journal of Applied Psychology, 78, 61–72.

Scandura, T. A., & Williams, E. A. (2004). Mentoring and transformational leadership: The role of supervisory career mentoring. Journal of Vocational Behavior, 65, 448–468.

Schminke, M., Cropanzano, R., & Rupp, D. E. (2002). Organizational structure and fairness perceptions: the moderating effects of organizational level. Organizational Behavior and Human Decision Processes, 89, 881–905.

Schoemaker, P. (1993). Strategic decisions in organizations: rational and behavioural views. Journal of Management Studies, 30, 107–129.

Schriesheim, C. A., Castro, S. L., & Cogliser, C. C. (1999). Leader-member exchange (LMX) research: A comprehensive review of theory, measurement, and data-analytic practices. The Leadership Quarterly, 10, 63–113.

Schwarz, N. (1998). Warmer and more social: Recent developments in cognitive social psychology. Annual Review of Sociology, 24, 239–264.

Scott, W. R. (Ed.). (1981). Organizations: Rational, natural and open systems. Englewood Cliffs, NJ: Prentice Hall.

Seers, A. (1989). Team member exchange quality: A new construct for role making research. Organizational Behavior and Human Decision Processes, 43, 118–135.

Seers, A. (1996). Better leadership through chemistry: Toward a model of emergent shared team leadership. Advances in Interdisciplinary Studies of Work Teams, 3, 145–172.

Seers, A., Ford, L. R., Wilkerson, J. M., & .Moorman, T. E. (2001). The generation of influence: Effects of leader-member exchange and team-member exchange. Paper presented at the annual meeting of Southern Management Association.

Seers, A., Keller, T., & Wilkerson, J. M. (2003). Can team members share leadership? Foundations in research and theory. In C. L. Pearce & J. A. Conger (Eds.), Shared Leadership: Reframing the hows and whys of leadership. California: Sage.

Seers, A., Petty, M. M., & Cashman, J. F. (1995). Team-member exchange under team and traditional management: A naturally occurring quasi-experiment. Group and Organization Management, 20, 18–38.

Semmer, N. (Ed.). (1984). Stressbezogene Tätigkeitsanalyse [strain-based work analysis]. Weinheim: Beltz.

Shamir, B. (1999). Leadership in boundaryless organizations: Disposable or indispensable? European Journal of Work and Organizational Psychology, 8, 49–71.

Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. Psychological Bulletin, 86, 420–428.

Sivasubramaniam, N. (2002). Articles - A longitudinal model of the effects of team. Group & Organizational Management: An International Journal, 27, 66–96.

Spender, J. C. (Ed.). (1986). Strategy making in business. Ann Arbor, MI: University Microfilm International.

Stewart, T. R., & Manz, C. C. (1995). Leadership for self-managing work teams: A typology and integrative model. Human Relations, 48, 747–770.

Sutcliffe, K. M., & Zaheer, A. (1998). Uncertainty in the transaction environment: An empirical test. Strategic Management Journal, 19, 1–23.

Taggar, S., Hackett, R., & Saha, S. (1999). Leadership emergence in autonomous work teams: Antecedents and outcomes. Personnel Psychology, 52, 899–925.

Tannenbaum, R. E., & Schmidt, W. H. (1958). How to choose a leadership pattern. Harvard Business Review, 36, 95–101.

Tansky, J. W., & Cohen, D. J. (2001). The relationship between organizational support, employee development, and organizational commitment: an empirical study. Human Resource Development Quarterly, 12, 285–300.

Van De Ven, A. H., Delbecq, A. L., & Koenig, R. J. (1976). Determinants of coordination modes within organizations. American Sociological Review, 41, 322–338.

Van der Heijden, K. (Ed.). (1996). Scenarios, the art of strategic conversation. Chichester: Wiley.

Vancouver, J. B., Thompson, C. M., Tischner, E. C., & Putka, D. J. (2002). Two studies examining the negative effect of self-efficacy on performance. Journal of Applied Psychology, 87, 506–516.

Vroom, V. H. (2000). Leadership and the decision-making process. Organizational Dynamics, 28, 82–94.

Vroom, V. H., & Jago, A. G. (2007). The role of the situation in leadership. American Psychologist, 62, 17–24.

Vroom, V. H., & Jago, A. G. (Eds.). (1988). The new leadership: Managing participation in organizations. Englewood Cliffs, NJ: Prentice Hall.

Vroom, V. H., & Yetton, P. W. (Eds.). (1973). Leadership and decision making. Pittsburgh, PA: University of Pittsburgh Press.

Wall, T. D., Cordery, J. L., & Clegg, C. W. (2002). Empowerment, performance and operational uncertainty: A theoretical integration. Applied Psychology: An International Review, 51, 146–169.

Webster, J., & Staples, D. S. (2006). Comparing virtual teams to traditional teams: An identification of new research opportunities. Research in Personnel and Human Resources Management, 25, 181–215.

White, R. P., & Shullman, S. L. (2010). Acceptance of uncertainty as an indicator of effective leadership. Consulting Psychology Journal: Practice and Research, 62, 94–104.

Yukl, G. (1999). An evaluation of conceptual weakness in transformational and charismatic leadership theories. The Leadership Quarterly, 16, 285–305.

Zaccaro, S. J., Rittman, A. L., & Marks, M. A. (2001). Team leadership. The Leadership Quarterly, 12, 451–483.

# Footnotes

[1]We conceive "team leadership" as a style of leadership whereby leadership functions are executed by multiple team members. This conception is broadened and conceptualized "team leadership" not only as the leading of a team (e.g., Zaccaro, Rittman, & Marks, 2001).

[2]The number of scenarios used and the amount of participants in both studies followed theoretical and empirical approaches. Following suggestions by Aiman-Smith et al., 2002, the number of written scenarios should be less than 80, and the minimum ratio of scenarios to factors should be considered to be 5:1 (cf. Cooksey, 1996; Karren & Barringer, 2002) (for Study 1: 3 factors × 5 = 15; for Study 2: 4 factors × 5 = 20). To identify the optimal number of sample sizes compared to the number of scenarios, we analyzed previous empirical studies using policy-capturing approach. The 'n-to-scenario-ratios' ranged from 0.52 to 12.94 (Cable & Graham, 2000; Cable & Judge, 1994; Dineen, Noe, & Wang, 2002; Greenhaus & Powell, 2003; Harold & Ployhart, 2008; Judge & Bretz, 1992; Kristof-Brown et al., 2002). Since most of the studies had a ratio below 4, we used this factor as a lower limit for our sample sizes (for Study 1: 16 × 4 = 64; for Study 2: 26 × 4 = 104).

[3] Formative indicators are defined as causing the latent variable (leadership styles) rather than being caused by it (MacCallum & Brown, 1993; Bollen & Lennox, 1991). The formative measures formed the dependent variable (Edwards & Bagozzi, 2000). Changing the indicators will change the value of the dependent variable. The formative indicators are theoretical developed and can therefore be uncorrelated because they are independent parts of the dependent variable (Edwards & Bagozzi, 2000).

[4] Because the cue levels were experimentally controlled and were the same across subjects, centering would not influence the results (Kristof-Brown, Jansen, & Colbert, 2002;

Hofmann & Gavin, 1998). The Level 2 (between-subject) analysis used a restricted maximum

likelihood approach in which the intercept and slope coefficients estimated in the Level 1

model were regressed onto Level 2 predictors (work experience, age, gender). This set of

analyses enabled us to test whether the personal variables were associated with variance in

regression slopes across individuals, and to determine the moderating impact of personal

variables on the relationship between leadership and working situation (task uncertainty and

work behavior).

WORKING PAPERS*

Editor: Udo Konradt

2014:14   Udo Konradt, Yvonne Garbers, Julia Hoch & Thomas Ellwart, Evidence for the Dispersed Leadership Theory in Teams: A Policy-Capturing Study,

2012:13   Kristina Hauschildt & Udo Konradt, A conceptual framework of self-leadership in teams, 25pp.

2011:12   Annika Wiedow, Understanding direct and indirect effects of team process improvement: A conceptual framework, 19pp.

2011:11   Udo Konradt, The dispersed leadership theory in teams: Model and empirical evidence, 23pp.

* A list of papers in this series from earlier years (only available in German) will be sent on request by the institute.