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Leadership, mood, atmosphere, and cooperative support in project groups

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Abstract

Purpose – To analyze the particular influence of leadership styles on voluntary collaboration between members of project groups.

Design/methodology/approach – Uses a field-study approach to gather data of 24 project groups in an academic learning context. Takes measures of different leadership styles, affective variables (mood, group atmosphere), and pro-social work behavior.

Findings – Supports theoretical assumptions about mediating influences of mood and group atmosphere. Shows that leaders of project groups may enhance cooperative support by considering the emotional impact of their behavior.

Research limitations/implications – The field context (academic learning setting, students as project group members) may set limitations to the generalizability of obtained findings.

Practical implications – Helps personnel managers to look at project group leadership from a different point of view.

Originality/value – Provides evidence about an emotionality link between leadership and cooperation.

Keywords Group work, Team management, Leadership, Organizational culture

Paper type Research paper

Working in project groups is a modern form of collaboration. It makes organizations flexible and adaptable since it addresses tasks and problems in a more direct and less formal manner. Project groups are special in several respects (see Goodman, 1981): they have to solve complex problems, sometimes novel in nature, within a limited span of time. They consist of five to ten members who are experts in different task-related domains and subjects. In many cases the group members work together for the first time, i.e. they do not know each other personally. Thus, time pressure combined with task difficulty, unclear role expectations, and undeveloped interpersonal relations may create constraints which usually are not found in regular teams and working groups.

From a psychological point of view, this configuration of demands raises interesting questions. Task and interpersonal requirements may lead to a greater cognitive and collaborative workload in project groups, and advanced strategies are needed to reach aspired goals. In permanent teams, tasks are generally more structured and transparent, roles and social relations are less ambiguous, and many procedures are well adapted and facilitated by approved rules of communication and information

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exchange (see Gersick and Hackman, 1990). To establish an effective project group, team members have to work hard and support each other to a substantial degree. The fact that complex problems must be solved within a fairly short time requires team members to swiftly find ways to communicate expert information and clarify task activities as well as interpersonal relations.

Given the high challenge of project group work, the task of leaders is likely to be more demanding than group leadership in permanent groups. Important responsibilities of project leaders are to help group members get along with each other and to resolve problems which may result from communication barriers, unclear role obligations, and other issues mentioned above (see Regenburg and van der Veen, 1990). Project leaders are expected to actively moderate discussions, encourage mutual understanding, and integrate different sources of expert knowledge. To accomplish this, they can use formal and directive methods to speed up progress within the group. However, they can also try to attain this goal by getting group members to organize themselves and help each other spontaneously if necessary. Such self-organizing processes are investigated in this study.

Project groups have a limited life span. Therefore, theory and research on phases in-group development are immediately relevant for understanding their functioning. The prevailing stage of the group's development is likely to influence the social-psychological processes between group members (Stahl, 2002). The processes in different phases of group life are modeled by the well-known forming-storming-norming-performing-adjourning framework (Tuckman, 1965; Tuckman and Jensen, 1977). This framework was revised by Gersick (1988) who contrasted two basic phases in the development of groups on the basis of empirical data: Whereas Phase 1 focuses on the diagnosis of the task, Phase 2 is characterized by attempts to solve the task which was identified by the group during the transition from Phase 1 to Phase 2. A first meeting and a completion phase are added to this framework, making it comparable to the model by Tuckman (1965). Gersick's (1988) "punctuated equilibrium model" emphasizes change processes, whereas the Tuckman framework is more descriptive assuming a linear development of groups.

Müller and Bierhoff (1994, 1998; see also Bierhoff and Müller, 1999) showed that an extended model of organizational spontaneity (see George and Brief, 1992; George, 1996) may be applied to explain why members of project groups cooperate on a voluntary basis and engage in prosocial behavior when working on their task. A key variable for facilitating this type of behavior is positive mood of group members. Another more proximal variable is the affective tone of the whole group, i.e. the perceived group atmosphere or emotional climate between group members. Note that the extended model of organizational spontaneity corresponds closely with George and Brief's (1992) original model, with the exception of the position of mood and group atmosphere in the chain of influences which leads to cooperative support. Whereas the original model assumes that mood is influenced by group atmosphere, the revised model states that group atmosphere is predicted by mood. This revision of the model is based on empirical and theoretical grounds. From a theoretical point of view, it seems more convincing to assume that group atmosphere is the result of the mood of individual group members rather than vice versa. The answer to the question of why group atmosphere should be the best predictor of cooperative support lies in the specifics of project groups. In such groups, members do not have much time to clarify

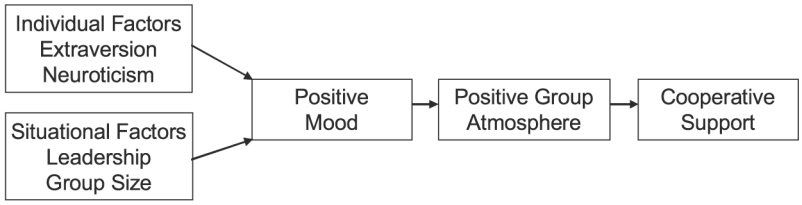
interpersonal relations or negotiate stable routines of socio-emotional exchange. Therefore, they may have to rely on cues of "swift" trust (Meyerson *et al.*, 1996), which could make interpersonal implications of group processes more salient and explain why group atmosphere is assumed to be such a powerful determinant of cooperative support.

Empirically, Bierhoff and Müller (1999) found that the correlation between positive group atmosphere and cooperative support is higher than the correlation between positive mood and cooperative support suggesting that group atmosphere is the proximal variable. Bierhoff and Müller (1999) obtained measures of mood, group atmosphere, and cooperative support. Path analyses revealed that positive mood of individual group members is an antecedent variable of positive group atmosphere and that group atmosphere, not mood as in the original model of organizational spontaneity, influences cooperative support in the ongoing process of task accomplishment.

The extended model of organizational spontaneity distinguishes between input variables, mediator variables, and cooperative support as an output variable (Figure 1). On the input side, the model specifies individual factors and situational variables which may influence affective states of individual group members. As mediator, the model proposes that perceived group atmosphere is a more proximal variable to cooperative support than the mood of individual group members.

With regard to individual input variables, dispositional affectivity, i.e. the general tendency to feel positively or negatively attached, is found to influence individual mood states of group members. More specifically, neuroticism turns out to be a negative predictor of positive mood. In addition, extraversion seems to have a positive influence on mood (George and Brief, 1992). As situational variables, group size and leadership behavior need to be considered. Group size, for example, was found to be negatively related to the affective tone in groups (George and Brief, 1992).

Regarding situational variables, the present study undertook a more detailed analysis of influences due to leadership behavior. Bierhoff and Müller (1999) found that less directive leadership behavior does promote positive mood and group atmosphere, and as a consequence cooperative support in project groups. This finding, however, requires further investigation since the obtained evidence is based on a rather global and undifferentiated measure of leadership behavior. As outlined above, leadership in project groups implies different tasks, multiple requirements, and complex coordination demands. Hence, a full rage model of leadership seems to be more appropriate to describe and explain which impact leadership behavior may have on these groups. Such a model was proposed by Bass (1985). It suggests three dimensions



Source: Bierhoff and Müller (1999)

Figure 1.
Extended model of organizational spontaneity

of leadership including delegating, transactional as well as transformational leadership behavior.

The Multifactor Leadership Questionnaire (MLQ) designed by Bass and Avolio (1990) measures seven dimensions or styles of leadership behavior. Studies with a German version of this questionnaire could not replicate all seven styles (see Geyer and Steyrer, 1998). Instead, only four styles of leadership behavior were confirmed:

(1) idealistic or symbolic influence behavior;

(2) individualistic consideration;

(3) exchange- or task-related influence behavior; and

(4) non-directive influence or delegating behavior.

In accordance with results of previous studies (Müller and Bierhoff, 1998; Bierhoff and Spanke, 2002), we would expect individual consideration, task-related influence behavior, and non-directive influence behavior to have an effect on mood and group atmosphere, and – mediated by these affective variables – on cooperative support within these groups. Therefore, we included these three scales of the German MLQ in our study.

From the perspective of the group development framework it is plausible to assume that the importance of affective variables (e.g. mood and group atmosphere) is greater in Gersick's Phase 1 (finding a preliminary consensus about the group task) than in Phase 2 (solving the group task). Phase 1 is more likely than Phase 2 to elicit strong emotions among group members (as is well described by Tuckman's term "storming"). Since the variables of our model were measured early in the process of group development, it is plausible to assume that they are associated with cooperative support in the early phase of group development.

In summary, our hypotheses are the following: First, we expect to replicate the basic structure of the extended model of organizational spontaneity, including the mediating role of the link between mood and group atmosphere on cooperative support in project groups. Second, we hypothesize that leadership as represented by the German MLQ-scales individual consideration, exchange- or task-related influence behavior, and non-directive influence or delegating behavior will have an affective impact and, by this, facilitate group members' cooperative support. A requirement to verify these hypotheses is that affective states, cooperative support, and leadership behavior are assessed in the same phase of group development. The analysis of the hypotheses is based on a path-analytic approach including an analysis of direct and indirect effects.

Method

Participants

Participants were 122 undergraduate students of psychology (76.2 per cent female, 23.8 per cent male) at the universities of Bochum and Koblenz-Landau, Germany. Most of them studied in their third term (93.4 per cent), a small minority (6.6 per cent) in higher terms. The students took obligatory courses of experimental methodology which were organized as group learning projects. Requirements for the groups included planning, conducting, analyzing, and documenting a small laboratory or field study, a rather complex and novel task for most students although they had acquired theoretical and

statistical knowledge before starting this course. The mean age of participants was 24.5 years (SD = 5.1). The age distribution of participants is summarized in Table I.

A total of 24 groups were examined. The groups varied in size: two groups had two members, six groups three members, ten groups four members, five groups five members, and one group seven members.

Measures

Table II summarizes the descriptive results for all variables considered. They will be discussed in more detail in the following.

Leadership behavior. Leadership behavior was measured by the German Multifactor Leadership Questionnaire (Geyer and Steyrer, 1998) from which we selected 20 items referring to individual consideration, task-related exchange, and delegation. Items of individual consideration describe behavior such as developing trustful relationships within the group or encouraging group members in stressful situations. Items of task-related exchange refer to behavior like planning work in accordance with the goals of the leader or giving and exchanging information about the way the group has to proceed. Items of delegation describe behavior such as avoiding interventions as long as group members make progress on their own or being confident that group members are able to accomplish most tasks on their own initiative. The items had to be answered on four-point rating scales ranging from does not at all apply (1) to does fully apply (4).

Applying factor analysis we were able to replicate these three dimensions of the full-range model of leadership behavior. The factor-analytic results, which are summarized in Table III, are based on a principal component analysis. The Scree-test favored a three factor solution in accordance with theoretical considerations. Three factors were extracted and rotated using Varimax. Items on the first factor represent

Age range in years	Frequency	Per cent
20-21	38	31.1
22-23	20	16.4
24-25	26	21.3
26-27	14	11.5
28-32	11	9.0
33-36	9	7.4
37-46	4	3.3

Table I.
Frequency distribution of age of participants

Variable	Number of items	Range of scale	M	SD	α
Exchange	6	1-4	3.10	0.59	0.78
Consideration	5	1-4	2.75	0.64	0.76
Delegation	3	1-4	3.00	0.61	0.65
Positive mood	14	1-7	3.74	0.88	0.83
Positive group atmosphere	10	0-3	2.06	0.53	0.85
Cooperative support	18	1-5	3.63	0.53	0.84

Table II.
Descriptive statistics of model variables

Items	Component 1	2	3
3	0.778		
11	0.644		
19	0.636		
17	0.634		
16	0.624		
4	0.540		
20	0.487	−0.422	
1		0.766	
6		0.730	
9		0.680	
12		0.652	
13		0.603	
15		0.571	
14			0.771
7	−0.309		0.695
5			0.623
18			0.615
10		0.300	0.584
2	0.407		0.581
8	0.355		0.566

Notes: $N = 120$; only loadings equal to or above 0.30 are included

Table III.
Rotated factor matrix of MLQ items

individual consideration, items on the second factor refer to task-related exchange, and items on the third factor represent the leadership style of delegation. After rotation, the three factors together represent 49.2 per cent of the variance, and individually explain 17.3 per cent, 16.6 per cent, and 15.3 per cent, respectively, of the variation.

From the rotated component loadings, items for the three scales were derived. Three rules were applied for the generation of the leadership scales. First, only items with loadings of 0.40 and above on the expected factor were included. Second, items which showed double loadings (defined as a second loading of 0.30 and above on another component than the expected one) were not considered. By this criterion, five items were eliminated (see Table III). Third, only items which had an item-total correlation of 0.40 or above were retained for the scale. By this criterion, one further item of the scale measuring individual consideration (item 4 in Table III) was eliminated. As a consequence, five items were retained in the scale of individual consideration, attaining an internal consistency of $\alpha = 0.76$, six items were retained in the scale of task-related exchange ($\alpha = 0.78$), and three items were retained in the scale of delegation ($\alpha = 0.65$). Note that the individual-consideration scale would achieve exactly the same level of internal consistency if Item 4 would have been included. The internal consistencies of the three scales are either good or satisfactory. Although the somewhat lower alpha of the scale of delegation is disappointing, the scale includes only three items which show high item-total correlations.

Mood. Individual feeling states of the group members were assessed by a German version of the Frequency of Emotion Index (FEI) (Simpson, 1990). The FEI consists of 14 descriptive attributes which refer to positive emotions (e.g. joyful, happy, optimistic). The participants were asked to report how often they had experienced

different emotions during their meetings with the project group. All items had seven-point rating scales ranging from never (1) to very often (7). The scale score for positive mood was calculated by averaging across all 14 items. The German version of the FEI has good psychometric properties (see Bierhoff and Müller, 1999). The internal consistency was $\alpha = 0.83$.

Group atmosphere. Similar to mood, group atmosphere is an affective state variable, but it refers to group climate, whereas mood refers to individuals. Group atmosphere was measured by attributes which were taken from a modular team climate inventory by Müller and Bierhoff (2000). Ten attributes referred to a positive group atmosphere (e.g. active, open, friendly). The items had to be answered on four-point rating scales ranging from fully disagree (0) to fully agree (3). The scale scores were calculated by averaging across items. Internal consistency of the scale was high ($\alpha = 0.85$).

Cooperative support. In order to measure cooperative support an 18-item scale was used. Seven items of this scale were taken from the altruism scale of the Organizational Citizenship Behavior Questionnaire (OCBQ) by Smith *et al.* (1983). They refer to issues like "helping others who have been absent", "volunteering for things that are not required", or "helping others who have a heavy work load". For the German version of this scale additional items were developed which refer to behaviors such as "encouraging each other" or "giving advice to each other" (see Bierhoff *et al.*, 2000). In accordance with other studies (e.g. Podsakoff *et al.*, 1997; see also Podsakoff *et al.*, 2000) the methodology of the original scale was also modified. Whereas the OCBQ addresses the individual person, the version we used addresses the whole group. The items had to be answered on five-point rating scales ranging from never (1) to always (5). The scale scores were calculated by averaging across items. Consistent with results of previous studies, the internal consistency of the scale was high ($\alpha = 0.84$).

Data collection and analytical procedure

The groups were led by members of the teaching staff who accompanied all phases of the project. Five instructors led three groups each, two instructors led two groups each, one instructor led four groups, and one instructor led only one group. Although the same teacher was present in more than one group (with one exception), this does not constitute a statistical artifact because instructors were the stimulus persons whose leadership styles were assessed by the students. This is equivalent to an experiment in which several confederates are used as stimulus persons, each of whom is assessed by several participants or groups of participants. Such a procedure is a common practice in social-psychological experiments when the confederate assesses the participants with respect to certain attributes which are relevant for the study. All measures were taken six weeks after the projects had started.

Since the dependent variable of the study (cooperative support) reached beyond the individual person, a group-level analysis seemed to be appropriate (see Sirotnik, 1980). As a result, individual measures were converted into group scores. In previous studies we found that the similarity of individual response data within the groups was high on leadership behavior descriptions, mood and group atmosphere measures as well as ratings of cooperative support (Bierhoff and Müller, 1999; Bierhoff and Spanke, 2002). So, similarity between group members on individual measures could also be assumed for this study. Group scores were calculated by dividing the sum of individual scores by the number of members in each project group. The unit of analysis is the group.

Because 24 groups were included in this study, the sample size is 24 in statistical analyses.

The theoretical model (Figure 1) is represented as a path-analytic flow diagram. Three independent variables are used to predict three dependent variables. A comprehensive test of the theoretical model outlined in Figure 2 requires a path analysis. However, the small sample size of 24 constitutes a problem for the use of such a statistical procedure. Several considerations suggest, however, that a path-analytic procedure is viable with the given model and the given data. First, the model focuses on only a few manifest variables. Therefore, the number of model parameters is small. Second, we compared the results of two estimation procedures: maximum likelihood and unweighted least squares. Whereas the maximum likelihood approach is widely recommended as an appropriate estimation procedure, the unweighted least squares approach is especially appropriate with small samples. Note that it does not presuppose a normal distribution of the variables included in the model. Third, we also conducted a check on the results of the path analysis by computing regression analyses on the three dependent measures of the path-analytic model. Reliability of the estimated parameters of the path-model is underlined if they correspond with the results obtained from regression analyses.

Results

Cooperative support

The intercorrelations of variables which we expected to have an impact on cooperative support within the project groups are shown in Table IV.

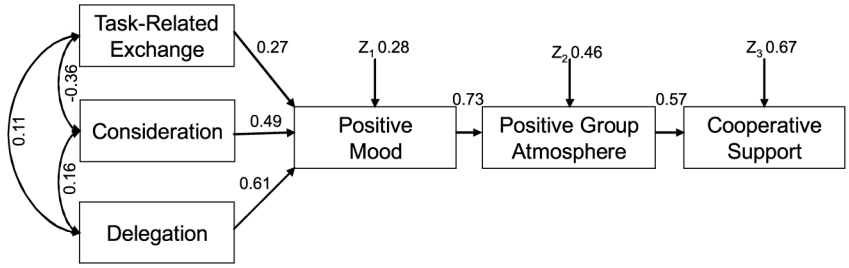


Figure 2.
Path-analytical model of leadership influences on cooperative support

	(1)	(2)	(3)	(4)	(5)	(6)
Exchange (1)	–					
Consideration (2)	−0.355	–				
Delegation (3)	0.110	0.160	–			
Positive mood (4)	0.161	0.493*	0.719**	–		
Positive atmosphere (5)	−0.109	0.594**	0.485*	0.733**	–	
Cooperative support (6)	−0.065	0.200	0.125	0.415*	0.571**	–

Notes: * $p < 0.05$, ** $p < 0.01$; $n = 24$

Table IV.
Relationship between leadership, affective responses, and cooperative support

An inspection of the correlations shows that styles of leadership behavior were intercorrelated. In addition, positive mood and positive group atmosphere were highly positively correlated. Finally, the correlations between mood and group atmosphere on the one hand and cooperative support on the other hand were significant: Positive mood and group atmosphere correlated positively with cooperative support. These coefficients were in the same range as those obtained in our previous study (Bierhoff and Müller, 1999).

The coefficients between leadership variables and mood and group atmosphere, respectively, suggest the following: Task-related exchange, individual consideration, and delegation were positively correlated with positive mood and positive group atmosphere with four of the six correlation coefficients being significant. Although the correlations between leadership variables and cooperative support tended to be positive, none of the coefficients turned out to be significant.

In order to analyze the correlational pattern within the frame of our extended model of organizational spontaneity, we specified a path-analytical model whose fit to the correlation matrix could be tested. The model included task-related exchange, individual consideration, and delegation as well as positive mood, positive group atmosphere, and cooperative support (see Figure 2). Another model was specified which included the same variables but which reversed the link between mood and group atmosphere. Such a model is suggested by the original model of organizational spontaneity by George and Brief (1992).

The path-analytic model assumes that the three styles of leadership will influence positive mood which in turn will influence cooperative support via positive group atmosphere. A LISREL-analysis of this model, which is illustrated in Figure 2, was based on a maximum likelihood estimation and revealed a satisfactory statistical fit (see Table V).

All paths in the diagram in Figure 2 are significant ($p < 0.05$). Task-related exchange, individual consideration, and delegation all contributed to positive mood of the group members. The coefficients indicate that person-related and non-directive leadership behavior had a greater impact than task-related leadership behavior. Positive mood in turn influenced positive group atmosphere which is a significant predictor of cooperative support. As expected, the influence of leadership behavior was mediated by mood and group atmosphere, and had no direct impact on cooperative support in the project groups. Hence, the more personally concerned and less directive leaders behaved, the more positive mood and group atmosphere emerged, leading to more voluntary support.

	ML-Model 1	ML-Model 2	UL-Model 2
Chi^2	9.59 (7), $p = 0.21$	9.59(10), $p = 0.48$	2.21(10), $p = 0.99$
RMSR	0.086	0.086	0.068
GFI	0.89	0.89	0.98
AGFI	0.67	0.77	0.96

Note: In model 1 the variances of predictors in the correlation matrix are not fixed (df = 7). In model 2 the variances of predictors are fixed as 1 (df = 10). RMSR = Root Mean Square Residual, GFI = Goodness of Fit Index, AGFI = Adjusted Goodness of Fit Index. ML = Maximum Likelihood estimate, UL = Unweighted Least Squares estimate

Table V.
Goodness of fit indices of selected path-analytic models

Because the analysis was based on correlations, the variances of the three leadership variables are assumed to be 1. Thus, it is possible to fix these values to 1 in the LISREL-analysis. The results for this analysis indicate that the fixed variances of the predictors do not make a difference in the results except that three additional degrees of freedom are gained. As a consequence, the model fit improves. Table V summarizes several fit statistics separately for both LISREL-analyses. Because Model 2 is more adequate we will concentrate on its results. The fit of the model is good as indicated by the non-significant Chi^2-value. The good fit is underlined by the relatively small RMSR and the large GFI which is only reduced to 0.77 after adjustment. Therefore, the fit indices indicate that the data fit the model quite well although the small sample size impairs the stability of the results which is indicated by the drop in the AGFI.

Note that the maximum likelihood estimate is appropriate for large sample sizes. In order to conduct a LISREL test better suited for small sample sizes, the maximum likelihood estimate was replaced by an unweighted least squares estimate, which is more appropriate for small samples (the method parameter ML was replaced by UL in the LISREL input). The results for Model 2 (fixed variances of the predictors, ten degrees of freedom) show that the model in Figure 2 is viable. All fitness indicators turn out to be very satisfactory including the Adjusted Goodness of Fit index which reflects the stability of the results.

To confirm the path-analytic results, a series of regression analyses was performed. First, positive mood was regressed on individual consideration, task-related exchange, and delegation. The prediction was highly significant, $R = 0.851$, $R^2 = 0.724$, $F(3, 20) = 17.508$, $p < 0.001$. Each of the three leadership styles is a significant predictor (individual consideration $beta = 491$, $t = 3.814$, $p = 0.001$, task-related exchange $beta = 0.268$, $t = 2.095$, $p < 0.05$, delegation $beta = 0.611$, $t = 5.051$, $p < 0.001$). The beta-weights correspond with the path coefficients in Figure 2. Next, positive group atmosphere was regressed on the three leadership styles as well as positive mood. The resulting prediction is significant, $R = 0.787$, $R^2 = 0.620$, $F(4, 19) = 7.755$, $p = 0.001$. Only positive mood is a significant predictor, $beta = 0.631$, $t = 2.343$, $p < 0.05$. The leadership styles, however, are not significant, with $p > 0.25$. Note that the regression of positive mood on positive atmosphere yields a *beta* of 0.733 which corresponds to the respective path coefficient in Figure 2. Finally, leadership styles and affective variables were regressed on cooperative support. The prediction was significant, $R = 0.677$, $R^2 = 0.458$, $F(5, 18) = 3.048$, $p < 0.05$. Only group atmosphere was a significant predictor, $beta = 0.666$, $t = 2.368$, $p < 0.05$. The other predictors were not significant, with $p > 0.05$. The regression of group atmosphere on cooperative support yields a *beta* of 0.571, corresponding to the respective path value in Figure 2. In summary, the regression analyses confirm the results of the path analysis which also includes an overall test of the complete model. Due to the small sample size, we have put some emphasis on the issue of the stability of results. In summary, the series of analyses strongly supports the adequacy of our theoretical model. We will return to this point in the discussion section.

An additional LISREL-analysis was performed in order to assess direct and indirect effects separately. The model in Figure 2 includes three direct effects (from leadership styles to positive mood) and seven indirect effects: Three indirect effects of leadership styles on group atmosphere are mediated by positive mood; three additional indirect

effects of leadership styles on cooperative support are mediated by positive mood and positive group atmosphere; finally, the indirect effect of positive mood on cooperative support is mediated by group atmosphere.

The direct effects correspond to the path coefficients of individual consideration, task-related exchange, and delegation in Figure 2. Indirect effects are derived from the products of the respective path coefficients. For example, the indirect effect of individual consideration on positive group atmosphere is $0.491 \times 0.733 = 0.359$. LISREL computes these indirect effects and indicates whether they are significant or not. The indirect effects of individual consideration and delegation on group atmosphere and cooperative support, respectively, are all significant ($p < 0.05$). In contrast, the indirect effects of task-related exchange are not significant ($p < 0.05$). Finally, the indirect effect of positive mood on cooperative support (0.419) is significant ($p < 0.05$).

The alternative model outlined in the introduction was also tested. It assumes that leadership styles influence group atmosphere which, in turn, influences cooperative support via positive mood. The test reported here is based on a maximum likelihood estimation. The fit statistics of such a model are as follows: $\text{Chi}^2 = 27.52$ ($\text{df} = 7$, $p = 0.0003$, $\text{RMSR} = 0.111$, $\text{GFI} = 0.75$, $\text{AGFI} = 0.26$). The implications are straightforward: The alternative model is much less adequate than the models depicted in Figures 1 and 2. This is clearly indicated by the highly significant Chi^2 and the unsatisfactory goodness of fit indices.

Discussion

The path-analytic results strongly confirm the extended model of organizational spontaneity. This conclusion is supported by several pieces of evidence. First, the fit-indices of the model test are satisfactory. In the most appropriate type of analysis, in which an unweighted means squares analysis is performed that takes the small number of groups into account, the Adjusted Goodness of Fit measure is very satisfactory indicating that the model's fit is not compromised by the small sample size. Finally, the alternative model in which the sequence of positive mood and positive group atmosphere is reversed into positive group atmosphere and positive mood is much less adequate than the extended model of organizational spontaneity depicted in Figure 1.

The model's implications for the explanation of cooperative support are the following: Group members' mood is positively related to group atmosphere, which in turn is the best predictor of cooperative support. The influence of mood on cooperative support is mediated by the emotional climate in the group. The results replicate evidence reported by Bierhoff and Müller (1999). Beyond the earlier results, the present study also indicates that all three leadership styles contribute to positive mood. High individual consideration, high task-related exchange, and high delegation foster positive mood of individual group members. The explained variance in positive mood on the basis of the three leadership styles is substantially high, indicating that leadership as measured here is an important determinant of the mood of group members. However, the effect of task-related exchange on positive mood is the smallest of the three direct effects. Whereas the indirect effects of individual consideration and delegation on positive group atmosphere and cooperative support, respectively, are all significant, the respective indirect effects of task-related exchange are not significant.

Therefore, the conclusion is warranted that among the leadership styles individual consideration and delegation exert the primary influence in the model depicted in Figure 2. They foster a positive group atmosphere via positive mood and, in addition, cooperative support via positive mood and positive group atmosphere. The results for delegation which represents non-directive leadership corroborate the findings by Bierhoff and Müller (1999) that non-directive leadership enhances mood and cooperative support.

Positive mood has an indirect effect on cooperative support via positive group atmosphere, and group atmosphere is a significant predictor of cooperative support on its own. This chain also supports the validity of the proposed path-analytic model. In contrast, the alternative model which assumes a reversed chain from group atmosphere via mood to cooperative support fits less well.

These results show two things. First, they point to the influence of positive mood and positive group atmosphere on cooperative support. The importance of affective variables for cooperative support is in full agreement with arguments put forward by theorists on group development. As our measures were taken in the early phase of group development (they were obtained six weeks after forming the group and ten weeks before finishing the project), it is likely that the control of emotional uncertainties of group members is reflected in them. In such a potentially arousing context, positive mood and positive group atmosphere are presumably reassuring, whereas negative mood and negative group atmosphere are disturbing. Therefore, positive affect is likely to encourage solidarity behavior, whereas negative affect is likely to discourage it.

Second, the results show that leadership is relevant for the affective responses of group members, emotional climate in the group, and the group level of cooperative support. We found that the influence of the three styles of leadership on positive mood was significant for each style, although less for task-related exchange, and more for individual consideration and delegation. In addition to the direct effects of the three independent variables in the model, indirect effects of leadership style emerged that relate to positive group atmosphere. Group atmosphere was indirectly influenced by individual consideration and delegation. Furthermore, these leadership variables show significant indirect effects on cooperative support. These results point out that no single style of leadership is exclusively associated with cooperative support via affective variables. Whereas more cooperative support was given by the group members when they experienced positive mood and positive group atmosphere, these emotional experiences were facilitated by person-related leadership behavior (individual consideration) and delegating leadership behavior. The importance of task-related exchange in this respect was less clear because its indirect effects on positive group atmosphere and cooperative support were not significant. The obtained results support a full range model of leadership behavior (see Bass, 1985), which assumes multiple sources of effective leadership. It also underscores the important role of group leaders in the early phases of group development.

The first and second hypotheses of the study were supported. Specifically, the mediating role of group atmosphere on cooperative support in project groups was confirmed. Additionally, the hypothesis that individual consideration, exchange-related behavior, and delegating behavior will have affective impact and,

by this, facilitate group members' cooperative support was confirmed for individual consideration and delegation.

It is interesting to note that leadership has reliable indirect effects on cooperative support. The confirmation of these indirect effects is a strong argument for the kind of model on which we based our research (see Figure 1 and Figure 2). The model clearly emphasizes the links between leadership and cooperative support which are assumed to mediate facets of leadership before they finally influence cooperation among group members. This link-based approach to cooperative support is strongly supported by the results of the statistical analyses. An appropriate analysis strategy for such an approach is the path-analytic approach that was undertaken in this research.

Since the number of groups analyzed was quite small we took several cautionary measures in order to ensure that the path-analytic results are not coincidental but reliable indicators. In retrospect, the results are encouraging. First, it was possible to replicate the path coefficients by multiple regression analyses. Second, the LISREL-analysis which was specifically modified to take the small sample size into account produced better and more satisfactory fit statistics than the standard analysis which is based on a maximum likelihood estimate. As the model is also plausible from a theoretical point of view, it seems appropriate to consider it viable at the current point of research.

From an applied point of view, the results related to leadership styles are of particular importance. First, the fact that individual consideration, task-related exchange and delegation all contribute to positive mood of the group members suggests that their realization by the leader in general has positive affective effects. In addition, high individual consideration and high delegation also contribute to a positive group atmosphere. Person-related leadership, which encourages trustful relationships, seems to have a reliable positive impact on the emotional climate in the project group. Furthermore, a non-directive leadership style which emphasizes the autonomy of the group members seems to foster a positive group atmosphere. The same leadership characteristics are also positive predictors of cooperative support in project groups. Therefore, they tend to enhance the level of cooperation among group members. A high level of cooperation among group members is an attractive goal in many project groups. The key input leader variables of such a desirable state seem to be individual consideration and delegation.

Another application is based on the result that affective variables are related to cooperative support. In cases where it is not possible to influence mood and emotional climate by leadership, the goal of cooperative support may also be achieved through interventions other than leadership which contribute to positive feelings among group members and, hence, a positive group atmosphere. For example, if group members feel that they earn good pay for their work the resulting perceived equity may facilitate a positive emotional climate.

From the perspective of practical project management, these results have important implications. Group leaders may be well advised to enhance positive mood of group members and positive group atmosphere because these affective variables may contribute to cooperative support among group members. Although solidarity between group members may not be the highest priority in Phase 1 of group development, it is likely to be very important in Phase 2. The emergence of cooperative support in Phase 1 may facilitate cooperative support and the formulation of a common group goal in

Phase 2. In correspondence with this suggestion Bierhoff and Müller (1999) showed that cooperative support measured in Phase 1 of group development correlates significantly with cooperative support measured in Phase 2. Although the correlation is not very large in size (about $r = 0.60$), it indicates that Phase 1 cooperation exerts a positive influence on Phase 2 cooperation.

Limitations

In this final section, some limitations of this study are pointed out. The project groups included only psychology students. Therefore, they represent groups which consist of members of similar knowledge and scientific background. This homogeneity of expertise of the group members contrasts with other project groups which mainly consist of interdisciplinary members. In addition, project groups may be heterogeneous with respect to other variables like ethnic background which may elicit additional group processes. Empirical results indicate that negative effects of ethnic diversity of group members on cooperative support may be counterbalanced by strong group identification (van der Zee, in press). The same may be true regarding problems related to the diversity of professional expertise of group members, which also might be overcome by high group identification. In addition, other variables like a heavy work load which is frequently associated with work in project groups, the inconsistency of goals of the project group and goals of the regular group, and the importance which the group members attribute to the success of the project group might modify the results.

The leadership scales were measured on the basis of the German MLQ. In future research it would be interesting to include the fourth MLQ scale, idealistic or symbolic influence behavior, and test hypotheses about its influence on affective experience and cooperative support of group members in project groups.

Further studies may shed light on these issues. Specifically, in future studies the hypothesis might be tested that a combination of the extended model of organizational spontaneity and the framework of group development as proposed by Gersick (1988) in her "punctuated equilibrium model" may explain group performance at different phases of group development. In order to test this assumption, it would be necessary to obtain leadership measures, affective measures, and performance measures in the first and second phase of group development as outlined by Gersick (1988).

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