

# Minority Dissent and Team Innovation: The Importance of Participation in Decision Making

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This study integrates research on minority dissent and individual creativity, as well as team diversity and the quality of group decision making, with research on team participation in decision making. From these lines of research, it was proposed that minority dissent would predict innovation in teams but only when teams have high levels of participation in decision making. This hypothesis was tested in 2 studies, 1 involving a homogeneous sample of self-managed teams and 1 involving a heterogeneous sample of cross-functional teams. Study 1 suggested that a newly developed scale to measure minority dissent has discriminant validity. Both Study 1 and Study 2 showed more innovations under high rather than low levels of minority dissent but only when there was a high degree of participation in team decision making. It is concluded that minority dissent stimulates creativity and divergent thought, which, through participation, manifest as innovation.

To maintain or enhance effectiveness within rapidly changing and challenging environments, teams in organizations have to be innovative (West & Anderson, 1996). Team innovation refers to the introduction or application within a team of ideas, processes, products, or procedures that are new to that team and that are designed to be useful (West & Farr, 1990). Examples include a computer program to keep track of holidays and sick leave within the team, a protocol for handling complaints, a new strategy to introduce a product in the market, and a new service for valued customers. For teams to be innovative, team members need to generate creative ideas, and they must critically process these ideas so as to abandon those that appear useless and implement those that have promise (Amabile, Conti, Coon, Lazenby, & Herron, 1996).

The research described in this article seeks to expand knowledge about team innovation by considering team processes that foster individual creativity and the team's implementation of novel methods, products, and services. We report two studies in which we examined team innovation as a function of the degree of minority dissent and the degree of participation in decision making. Minority dissent occurs when a minority in a group publicly opposes the beliefs, attitudes, ideas, procedures, or policies assumed by the

majority of the group (McLeod, Baron, Marti, & Yoon, 1997). Before these studies are presented, we review research on the relationship between team diversity and opinion minorities on the one hand and creativity and decision quality on the other hand. We subsequently argue why participation in decision making is likely to interact with minority dissent to predict innovation in teams.

## Minority Dissent and the Quality of Group Decision Making

Group leaders often seek compliance and punish deviates so that individuals within groups have a strong tendency toward conformity and alignment with the majority perspective in their group (Baron, Kerr, & Miller, 1993). Although compliance and conformity pressures are functional in that they facilitate coordination and task performance, several downsides of concurrence seeking have been noted. Janis (1972) observed that conformity pressures and (extreme) concurrence seeking may lead to defective decision making with sometimes disastrous consequences. Likewise, Hackman and Morris (1975) argued that an important reason why groups fail to outperform individuals is their premature movement to consensus, with dissenting opinions being suppressed or dismissed.

The notion that conformity and compliance may be dysfunctional has produced several more or less related lines of research. On the basis of the assumption that compliance and conformity are more likely in homogeneous rather than heterogeneous groups (Hoffman & Maier, 1961), researchers have considered the relationship between team diversity (in terms of personality, training, background, and attitudes) and quality of group decision making (Williams & O'Reilly, 1998). Team diversity is likely to have positive effects on the quality of team decision making when it gives rise to debate and disagreement. For example, job-related diversity (i.e., functional background and tenure diversity) in top management teams interacts with the amount of debate in teams to

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predict inclusiveness in strategic decision making (Simons, Pelled, & Smith, 1999).

The research on diversity and the expression of dissent is consistent with research probing the effects of minority dissent. For example, Dooley and Fryxell (1999) observed that, provided loyalty and competence within teams, dissent was associated with higher decision quality in strategic decision-making teams in U.S. hospitals. Peterson (1997) showed that quality of team processes and outcomes depended on whether the leader was open to dissent. Peterson, Owens, Tetlock, Fan, and Martorana (1998) found that successful top management teams encouraged dissent in private meetings. Other research has indicated that exposure to minority dissent increases individual courage to resist group pressures to conformity (Nemeth & Chiles, 1988), prevents team members from polarizing their attitudes toward extreme viewpoints (Smith, Tindale, & Dugoni, 1996), and produces higher levels of cognitive complexity in members of the majority (Gruenfeld, Thomas-Hunt, & Kim, 1998). Finally, research examining the role of a devil's advocate—a team member who criticizes the assumptions and directions suggested by the rest of the team—showed that exposure to a devil's advocate improved the quality of group decision making (Schwenk, 1990).

### Minority Dissent and Divergent Thinking

Minority dissent in teams appears to prevent premature movement to consensus, promotes cognitive complexity, and prevents defective group decision making. Social psychological research suggests that minority dissent not only prevents defective group decision making but also increases individual creativity. It has been argued that minority dissent is surprising and leads majority members to wonder why the minority thinks the way it does (Nemeth, 1986). Rather than seeking verification and justification of the minority position, majority members seek understanding of the minority position to better reject it (Moscovici, 1980). In doing so, the majority is able to maintain its position while preserving harmony and effective intragroup relations (Crano & Chen, 1998). However, the tension produced by minority dissent and the majority's desire to resolve this tension produce divergent thinking: Majority members consider the issues from multiple perspectives, one of which is suggested by the minority (Nemeth, 1986).

Indirect evidence for the idea that minority dissent enhances creativity and divergent thought in majority members comes from research on the relationship between tension and creativity. Runco (1994) reviewed an extensive developmental literature and concluded that competition within families (e.g., between siblings) or pressure to stand out at school contributes to perceived tension, which can allow the child to develop autonomy, a crucial trait for independent and creative thought. More direct evidence comes from a program of research initiated by Nemeth (1986). For example, Nemeth and Kwan (1985) confronted participants with a series of blue slides that were consistently labeled *green* by either a minority or a majority of confederates. In a subsequent task, participants had to individually generate associations with the word *blue*. Results showed that participants confronted with a discrepant minority generated a larger number of original (i.e., unique) associations than participants confronted with a discrepant majority. Likewise, De Dreu and De Vries (1993) observed that individuals generated more original word associations when they

were confronted with a minority perspective on the subject matter. In general, this research argues for the importance of minority dissent, even dissent that is wrong. In either case, it appears to stimulate divergent thought. Issues and problems are considered from more perspectives, and group members detect new solutions and find more correct answers (Nemeth & Staw, 1989).

The effects of minority dissent on creativity have been studied in the laboratory using ad hoc groups with no history or future, and generalizing from these laboratory findings to the context of work teams may not be appropriate (Van Dyne & Saaverda, 1996). Researchers should also be cautious in generalizing these findings because this laboratory research has always contrasted a minority perspective condition in which participants face a discrepant minority opinion with a condition in which participants face a discrepant majority opinion (for an exception, see Nemeth & Kwan, 1987). Because these studies lack a condition in which participants are not confronted with either a majority or a minority perspective, it may be that people become less creative when confronted with a majority perspective, rather than more creative when confronted with a minority perspective. Evidence for a relationship between minority dissent and team innovation would clarify this issue.

### Participation and Innovation in Teams

Divergent thought and creativity are, as we have argued, a necessary but not a sufficient condition for team innovation. Innovation requires not only creative ideas but also the implementation of these ideas and insights (Amabile et al., 1996). Groups need to critically process creative ideas to drop those that appear useless and to implement those that have promise. Thus, group members need to share information and insights, and they need to work together to transform creative ideas into workable methods, products, and services. Simon (1985) argued that diverse knowledge structures coexisting in the same mind elicit the sort of learning and problem solving that yield innovation. Cohen and Levinthal (1990) argued that, assuming a sufficient level of knowledge overlap to ensure effective communication, interactions between individuals who each possess diverse and different knowledge structures will augment the organization's capacity for making novel linkages and associations beyond what any one individual can achieve. They suggested that the more an organization develops individuals' awareness of others' capabilities and knowledge, the stronger will be the organization's absorptive capacity—the ability to recognize the value of new information, assimilate it, and apply it to commercial ends. Thus, innovation in teams requires not only creative thinking, as may be triggered by minority dissent, but also the absorptive capacity to recognize, assimilate, and apply these creative ideas.

The absorptive capacity of a team will be higher when team members participate in decision making. Participation stimulates the exchange and integration of information (Stasser & Titus, 1987), reduces resistance to change, and facilitates team members' commitment to team decisions (e.g., King, Anderson, & West, 1992). Participation also fosters learning through the acquisition, sharing, and combining of knowledge (cf. Edmondson, 1999). Campion, Medsker, and Higgs (1993), for example, found significant and positive correlations between participation, social support, and cooperative communication. Latham, Winters, and Locke (1994) concluded that "participative decision making in . . . auton-

omous work teams is effective [because] if subordinates have task-relevant knowledge and are allowed to share and implement it, the resulting decisions should have a positive effect on performance" (p. 61). Finally, it has been argued that participation generates the social support needed for new ideas to be pursued and implemented (Mumford & Gustafson, 1988).

The research literature, therefore, suggests that participation is critical for a team's ability to turn new ideas and individually held knowledge into innovative procedures, services, and products. This literature leaves unanswered, however, the question of where creative ideas come from. Earlier in this article, we argued that minority dissent in teams is likely to stimulate divergent thinking. Accordingly, our hypothesis was that participation and minority dissent interact to predict innovation in teams: Higher levels of minority dissent lead to more divergent thought and creative ideas, but only under high levels of participation are these novel ideas turned into innovative procedures, services, and products. We tested this hypothesis in two studies. Study 1 involved self-managed postal service teams responsible for the distribution of parcels in a particular geographic region. Study 2 involved semi-autonomous product and management teams in a variety of organizations.

## Study 1

### Method

#### Research Site and Participants

This study was conducted in collaboration with an international postal service operating in the Netherlands. As part of its services, the organization introduced self-managed teams responsible for the distribution of parcels within a particular region. In addition to the distribution and delivery of parcels, teams were responsible for personnel administration; budgeting; maintenance of materials, including their trucks; and handling of complaints. Each team had five or six members, who at the time of the implementation of the teams were unacquainted and were individually selected from a pool of job applicants. However, most team members had prior experience as individual postal workers. Each team had a supervisor who coached at a distance. The coach was not part of the team and met with the team members on a weekly basis to discuss the work, to assist in solving problems, and to develop the team. Coaches were allocated to the teams to manage and facilitate the development of teamwork in the first 12 months of the teams' tenure (the period in which the study was conducted), after which they would withdraw and leave the team to be entirely self-managed. At each weekly meeting, coaches and team members together went through an extensive list of discussion items. These coaches, therefore, had a good feel for the problems and opportunities their teams faced, and they were well aware of innovations implemented by the team (see also the *Supervisor Measure of Innovation* section).

Twenty-one teams participated, with a total of 109 respondents. Almost all participants were male (97%), and their average age was 41.5 years. Most respondents had, in addition to a high school education, 2 or 3 years of vocational (mostly technical) training. Eighty-five percent had worked as individual postal workers, prior to entering the team, either in the parcel service (62%) or at the letter unit (38%). Average tenure with the organization was 15.6 years. There were small and nonsignificant variations only in terms of gender composition, age composition, and functional diversity. Therefore, differences in these aspects of the teams were unlikely to be confounded with the variables of interest in the present study.

### Team Measures

Individual team members were given a questionnaire by their supervisor and were asked to return a completed version in a sealed envelope. An accompanying letter from the researchers explained that the goal of the study was to investigate teams in organizations and also emphasized individual anonymity. The letter asked respondents to complete the questionnaire in their own time, independently and without consulting their peers, and to return the questionnaire within 2 weeks using a self-stamped return envelope. Supervisors reminded the team members 2 weeks later to return the questionnaires. For each team, at least an 85% response rate was achieved (in three different teams, one team member returned the questionnaire without answering most of the questions—the data from these respondents were dropped from the analyses).

*Control variables: Goal interdependence, workload, and task conflict.* In addition to measures of our key dependent variables (minority dissent and participation in decision making; see below), we included control measures of cooperative goal interdependence, workload, and task conflict. Although the teams examined in this study were homogeneous in terms of composition and all performed the same set of tasks, workload varied depending on the particular region the team was responsible for. In addition, pilot interviews suggested that members in some teams perceived much stronger cooperative goal interdependence than members in other teams, and research suggests that perceived cooperative goal interdependence influences team effectiveness (for a review, see Tjosvold, 1997). Workload was measured with three items derived from Anderson and West (1998), with an example being "Because there is so much work to do, we have great difficulty finishing our tasks." Cooperative goal interdependence was measured with three items derived from Janssen, Van de Vliert, and Veenstra (2000), with an example being "When one or more team members excel in their work, I benefit from that." Answers were given on 5-point scales ranging from 1 (*not at all*) to 5 (*very much*). Both scales were reliable (Cronbach's  $\alpha$ s = .82 and .78, respectively).

Recent research has examined the influence of task-related conflict on team functioning and effectiveness (e.g., Jehn, 1995). Task conflict refers to general disagreements and fights about task-related issues. Because the measure of task conflict and our measure of minority dissent (see below) were conceptually related, we wanted to assess whether our measure of minority dissent could be distinguished empirically from task-related conflict. Therefore, we assessed task-related conflict by using the four-item scale developed by Jehn (1995). A sample item is "How frequently are there conflicts about ideas in your team?" Answers were rated on 5-point scales ranging from 1 (*not at all*) to 5 (*very often*). Cronbach's alpha was .79.

*Minority dissent.* At the outset, minority dissent was defined as instances in which a minority in a group publicly opposed the beliefs, attitudes, ideas, procedures, or policies assumed by the majority of the group. Such a minority could consist of a single individual or several individuals opposing the majority perspective. Past research on minority dissent has been conducted in the laboratory, and minority dissent was induced by using confederates (e.g., Van Dyne & Saaverda, 1996) or by leading participants to believe that a minority in their reference group opposed the participants' opinions (e.g., De Dreu & De Vries, 1993). To our knowledge, no instrument has been published to measure minority dissent in work teams. We developed a scale consisting of four items to be answered on 5-point scales ranging from 1 (*very rarely*) to 5 (*very frequently*). When answering the items, respondents were instructed to think about the past 3 months. The items in the scale are (a) "Individuals disagree with the rest of the team"; (b) "Within my team everyone tends to immediately agree with one another" (reverse coded); (c) "In this team, members go along with the majority opinion" (reverse coded); and (d) "One or two members disagree with the majority in the team." In this study, the scale had good internal reliability (Cronbach's  $\alpha$  = .81).

We believe that these items together measure minority dissent because they directly ask about the extent to which one or two team members

disagree with the rest of the team (i.e., the majority) or whether a minority disagrees with a majority. The remaining item asks about the extent to which the team is characterized by mere conformity (i.e., the flip side of the occurrence of minority dissent). Also, the items explicitly consider whether a minority confronts a majority, and thus do not necessarily refer to situations in which each and every one in a team disagrees with one another. Such situations may reflect general task conflict but not necessarily minority dissent. This reasoning was supported by the results of factor analyses reported in the *Discriminant validity* section.

**Participation in decision making.** This construct was assessed with three items derived from Campion et al. (1993), to be answered on 5-point scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The items in the scale were (a) "As a member in this team, I have a real say in how the team carries out its work"; (b) "Most members in this team get a chance to participate in decision making"; and (c) "My team is designed to let everyone participate in decision making." The scale has been shown to have good construct validity (Campion et al., 1993). In this study, Cronbach's alpha was .83.

**Discriminant validity.** Principal-components analysis with varimax rotation was used to assess whether the items for each of the aforementioned scales loaded on the intended scale. Results showed five factors with an eigenvalue greater than 1.00. The relevant statistics are given in Table 1, from which one can see that the factor solution mapped nicely onto the five scales (task conflict, minority dissent, goal interdependence, participation, and workload, respectively).

### Supervisor Measure of Innovation

Innovation was assessed through interviews with the team supervisors, which were conducted by two research assistants 3 months after the questionnaires had been returned. The research assistants received extensive interview training both as part of their general training in psychology and for the specific purposes of this study. The research assistants were unaware of the goals and hypotheses of the study (they were told only that the study was concerned with team functioning).

The research assistants explained that the purpose of the interview was to obtain additional insight into the functioning of the team. They asked (and always obtained) permission to audiotape the interview and provided

the supervisor with a written definition of innovation (i.e., a novel procedure, method, product, or service that the team implemented to improve its work). Subsequently, supervisors were asked to describe as many innovations as possible. Interviewers stimulated supervisors to think of innovations by giving them some examples and then asked them to describe team innovations in some detail. These descriptions allowed us to double-check whether a particular innovation indeed matched our definition and also discouraged supervisors from making up innovations.

Interviewers subsequently asked supervisors to indicate for each of the innovations they identified whether the innovation was primarily the result of (a) the entire team; (b) one individual team member; (c) outside sources, including other teams in the postal service; or (d) the supervisor himself or herself. Most innovations (86%) were attributed to the entire team (we had no data to assess the accuracy of these attributions, however). We decided to focus only on team-based innovations (including all innovations in the analysis that yielded a similar pattern of results, leading to identical conclusions). Examples of the innovations described included a self-built box for address cards that fitted on the truck's dashboard, a self-made computer program to keep track of holidays and sick leave, a protocol for handling complaints, and a novel and more efficient system for sorting parcels.

## Results

### Treatment of the Data

Individual missing values were substituted by the individual's team average for that particular item, provided the number of missing values per individual did not exceed 10% of his answers (which was the case for three individuals, each from a different team; the data for these individuals were dropped from the analyses). To examine whether response rate reflected team functioning, we correlated a team's response rate with the variables in the study. Because no significant correlations were found ( $r < 1.081$ ), we concluded that response rate was not related to how well teams functioned.

Responses by individual team members may be interdependent within teams, which would lead to violations of the independence assumption in regression analyses (Kenny & LaVoie, 1985). One way to deal with this violation is to conduct multilevel analyses (Bryk & Raudenbusch, 1992). However, in both this study and the next study, we had a rather small number of observations, thus making multilevel analyses less than optimal. An alternative solution is to aggregate individual responses within teams for further analyses. To justify aggregation, we computed the eta-squared statistic, which indicates whether individuals within the same team are more similar than individuals in different teams. Eta-squared statistics for workload, cooperative goal interdependence, task conflict, minority dissent, and participation in decision making were .61, .54, .55, .58, and .49, respectively, and exceeded Georgopoloulos's (1986) minimum criterion of .20. To further assess within-group agreement, we computed  $R_{wg}$  (James, Demaree, & Wolf, 1984).  $R_{wg}$  ranged between .79 and .86. These statistics justified aggregation of the data to the group level.

### Descriptive Statistics

Descriptive statistics are given in Table 2. Correlations were low and nonsignificant, with a few exceptions. Consistent with past research, participation was positively and significantly correlated with team innovation (West & Anderson, 1996), and cooperative

Table 1  
Factor Analysis of the Team Measures ( $N = 109$  Individuals)

Factor	Factor loading				
	1	2	3	4	5
Task Conflict 1	.84	-.03	-.01	.07	.05
Task Conflict 2	.83	.04	.12	-.11	.13
Task Conflict 3	.81	.06	.08	-.03	.05
Task Conflict 4	.76	-.02	.09	-.15	.14
Minority Dissent 1	.24	.83	-.08	-.09	-.02
Minority Dissent 2	.10	.79	-.08	.02	-.06
Minority Dissent 3	-.06	.74	.03	-.01	.13
Minority Dissent 4	.23	-.52	-.04	-.18	-.07
Goal Interdependence 1	.10	-.03	.88	-.13	.01
Goal Interdependence 2	.01	-.16	.86	-.05	-.12
Goal Interdependence 3	.14	.04	.79	-.27	-.11
Participation 1	-.02	.12	-.08	.85	-.01
Participation 2	-.08	.06	-.14	.84	.04
Participation 3	-.09	-.14	-.20	.74	-.23
Workload 1	.25	-.04	-.10	.06	.83
Workload 2	.09	-.08	-.06	-.15	.80
Workload 3	.02	.30	-.06	-.04	.73
Eigenvalue	3.63	2.90	2.07	1.81	1.24
% explained variance	21.4	17.1	12.2	10.6	7.3

Table 2  
Means, Standard Deviations, and Intercorrelations for All Variables in Study 1 ( $N = 21$ )

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Workload	3.64	0.49	—	-.01	.22	.19	-.11	-.01
2. Cooperative goal interdependence	3.87	0.21		—	.14	-.13	.52*	.06
3. Task conflict	2.86	0.32			—	.61*	-.21	-.20
4. Minority dissent	3.17	0.28				—	-.36†	.02
5. Participation in decision making	3.77	0.25					—	.45*
6. Innovation	2.14	1.62						—

†  $p < .10$ . \*  $p < .05$ .

goal interdependence and participation in decision making were positively correlated (cf. Campion et al., 1993). Finally, minority dissent and task conflict were positively correlated, but because each related differently to goal interdependence and to innovation ( $p < .05$  according to  $t$  tests using Fisher  $Z$ -transformed correlation coefficients), constructs appeared to be related but not identical.

### Innovation as a Function of Minority Dissent and Participation

Our hypothesis was tested using hierarchical regression analysis. In the first step, we entered workload, cooperative goal interdependence, and task conflict as control variables. The main effects for minority dissent and participation were entered in Step 2, and the interaction between minority dissent and participation was entered in the third step. Team innovation was the dependent variable. To be able to interpret the interaction effect, we centered the predictor variables. Because some predictors were correlated (see Table 2), we checked the variance inflation factors (VIFs). Stevens (1992) noted that VIFs should not exceed 10.0. Because in this study all VIFs were less than 2.3, we concluded that multicollinearity was not a problem.

Results are summarized in Table 3. As one can see in Table 3, the control variables had no significant relationship with team innovation,  $F(3, 14) < 1$ ,  $ns$ . The main effects explained a significant amount of variance in team innovation,  $R^2 = .33$ ,  $F(2, 14) = 5.95$ ,  $p < .02$ . More innovations were reported when teams had a higher level of participation ( $p < .05$ ). Consistent with our hypothesis, the interaction term added in the third step explained

Table 3  
Results of the Hierarchical Regression Analysis for Study 1 ( $N = 21$ )

Variable	$R^2$	$\Delta R^2$	$B$
Step 1 (control variables)	.08		
Workload			-0.12
Cooperative goal interdependence			-2.72
Task conflict			-0.29
Step 2 (main effects)	.41**	.33**	
Minority dissent (MD)			1.94
Participation in decision making (PDM)			5.24**
Step 3 (interaction effect)	.52**	.11*	
MD $\times$ PDM			12.17*

\*  $p < .05$ . \*\*  $p < .025$ .

an additional amount of variance in team innovation,  $\Delta R^2 = .11$ ,  $F(1, 14) = 5.13$ ,  $p < .05$ . As one can see in Figure 1, minority dissent was associated with more innovations when there were high levels of participation,  $B = 4.71$ ,  $t(19) = 2.59$ ,  $p < .025$ , rather than low levels of participation,  $B = -0.79$ ,  $t(19) = -0.48$ ,  $p < .64$ .<sup>1</sup>

### Discussion and Introduction to Study 2

The results of Study 1 provided evidence for the reliability of the newly created scale for measuring minority dissent and suggested discriminant validity with regard to the related concept of task conflict. Specifically, principal-components analysis resulted in the expected factor structure, and correlations showed that minority dissent and task conflict related differentially to cooperative goal interdependence and team innovation (we return to the conceptual distinction between generic task conflict and more specific minority dissent in the General Discussion section). More important, the study provided encouraging support for our hypothesis that, holding workload, cooperative goal interdependence, and task conflict constant, minority dissent explained team innovation under high (but not low) levels of participation in decision making.

Study 2 was designed to replicate these findings for two reasons. First, we had a rather small number of teams in our first study, and replication was deemed necessary to assess the robustness of our results. Second, the teams in Study 1 were homogeneous in terms of tasks, demographic background (i.e., age and gender), and level of education, and we wanted to know whether the pattern of results would be found in other settings and populations. Thus, in Study 2, we accessed a heterogeneous sample of teams performing a variety of tasks. The teams varied in terms of team size, task interdependence, and the extent to which cooperative goal interdependence was experienced. These three constructs were used as control variables when we tested our hypothesis that, holding team size, task interdependence, and goal interdependence constant, minority dissent would be positively related to team innovation under high (but not low) levels of participation.

<sup>1</sup> To explore whether minority dissent (and the interaction with participation) had a curvilinear relationship with innovation, we also conducted a hierarchical regression analysis in which we entered the squared term for minority dissent. Because this addition did not explain any additional variance, we concluded that, in this study, no evidence for such a curvilinear relationship was found. We repeated this procedure in Study 2 and again did not find any evidence for a curvilinear effect.

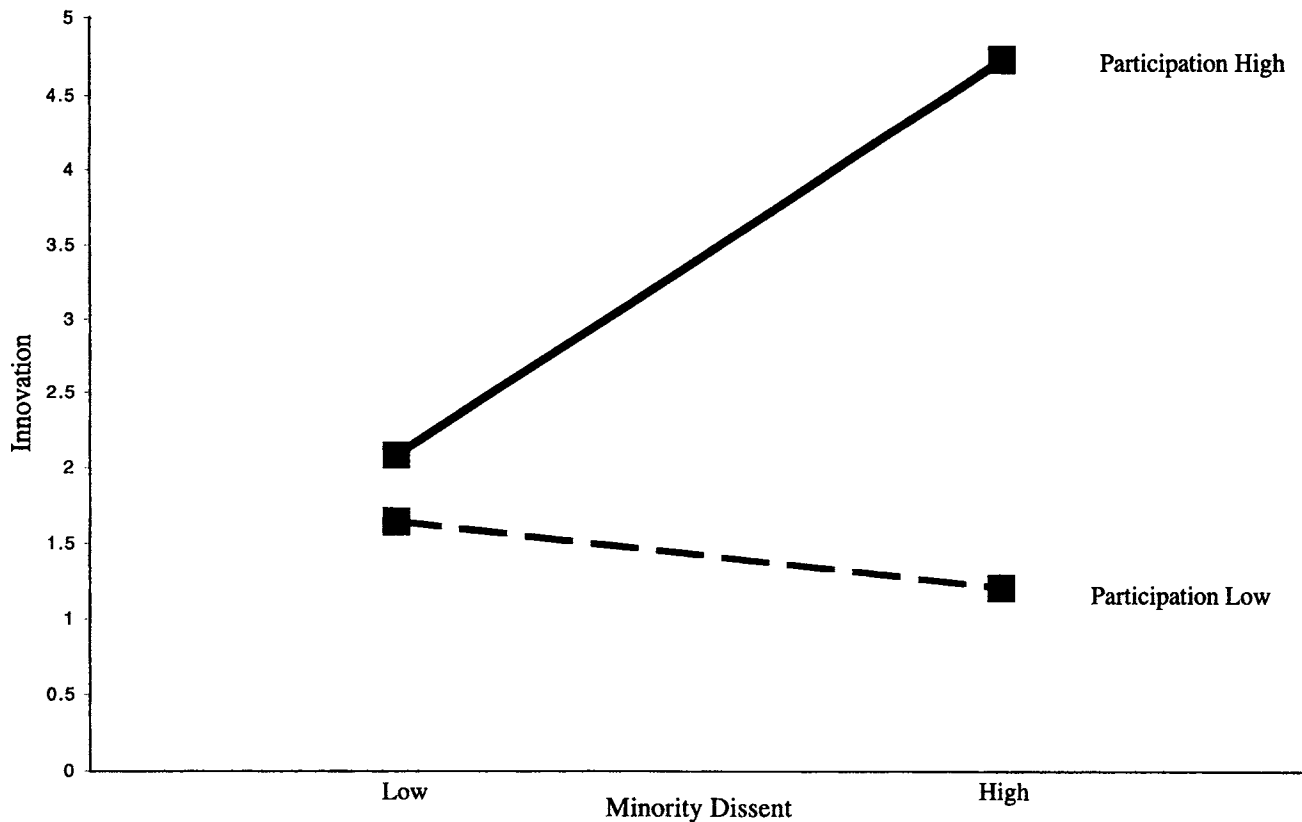


Figure 1. Team innovation as a function of minority dissent and participation in decision making in Study 1.

### Method

#### Participants and Procedure

A database of a private company involved in recruitment, selection, and assessment was used to randomly select past or current clients who were part of organizational groups that fitted the definition of teams as ongoing, semiautonomous groups in which members had joint responsibility for accomplishing a set of tasks (Guzzo & Shea, 1992). The randomly selected 28 clients were approached by a research assistant and asked to introduce the researchers to their team supervisor. All clients agreed, and all supervisors whom we approached subsequently responded positively, resulting in 28 teams.

A total of 207 participants responded (84%), for an average response rate per team of 89% (range = 67%–100%). Fifty-five percent of the respondents were male. Respondents averaged 35.8 ( $SD = 8.9$ ) years of age. Level of education was substantially higher compared with that of the respondents in the first study, ranging from community college degrees (16%) to university degrees (84%). Participants worked in management and (cross-functional) project teams in several different organizations, including local government (6 teams), consulting (15 teams), financial planning and accounting (5 teams), and research and development (2 teams). (Exploratory analyses involving type of organization yielded no effects for this variable, and it is not discussed any further.) All teams were semiautonomous and performed nonroutine, complex tasks that required differential expertise and skills. All teams were mixed-sex. Team members interacted at least once a week in collective planning meetings and informally on a day-to-day basis.

Team members were told that the purpose of the study was to gain an understanding of the way in which organizational teams function and work

together. The teams were surveyed about the level of task interdependence, cooperative goal interdependence, the occurrence of minority dissent, and participation in decision making. Information about team size and team innovation was obtained from the teams' supervisors. Teams were promised and given feedback based on the survey. Individual anonymity was ensured, and it was emphasized that data would be aggregated before feedback would be provided. Team members were given the survey during their weekly meeting and were asked to fill it out on their own time, independently and without consulting their peers, and to return the questionnaire within 2 weeks. Supervisors received their questionnaire 1 to 3 weeks later and were also given 2 weeks to complete it. As a reminder and to motivate team members to return the materials, a research assistant attended a team meeting approximately 2 weeks after team members received their questionnaire. Because all teams we approached were randomly selected and all agreed to participate, self-selection bias seems unlikely.

#### Team Measures

*Control variables: Goal interdependence and task interdependence.* Because teams came from a variety of organizations and had a variety of tasks, we decided to assess several control variables. Specifically, team members were asked how much task interdependence and how much cooperative goal interdependence they thought existed in their team. Task interdependence was measured with three items derived from Campion et al. (1993), with a sample item being "I cannot accomplish my tasks without information or materials from other members in my team." Cooperative goal interdependence was measured with the same three items as those used in Study 1. All items were answered on 5-point scales ranging from 1

(strongly disagree) to 5 (strongly agree), and both scales were measured reliably (Cronbach's  $\alpha$ s = .78 and .84, respectively).

Minority dissent was measured with the same scale as that used in Study 1 (Cronbach's  $\alpha$  = .74). The team questionnaire also included the participation-in-decision-making scale used in Study 1 (Cronbach's  $\alpha$  = .85).

**Discriminant validity.** Principal-components analysis with varimax rotation was used to assess whether the items measured the four different constructs as intended. Results showed four factors with an eigenvalue greater than 1.00. Table 4 presents the relevant statistics. As one can see, the observed factor structure matched nicely onto the intended structure, suggesting the scales used in this study had discriminant validity.

**Supervisor Measures**

Team supervisors were in close contact with their teams (80% of the respondents reported having frequent to very frequent contact with their supervisor) and were knowledgeable about team innovations. Team innovation was measured using four items adapted from Anderson and West (1998) to be answered on 5-point scales ranging from 1 (strongly disagree) to 5 (strongly agree): (a) "Team members often implement new ideas to improve the quality of our products and services"; (b) "This team gives little consideration to new and alternative methods and procedures for doing their work" (reverse coded); (c) "Team members often produce new services, methods or procedures"; and (d) "This is an innovative team." Cronbach's alpha was .84.

As an additional control variable (see above), team size was assessed by asking supervisors how many members their team had. The number provided always matched or slightly exceeded the number of respondents per team (i.e., in those cases in which not all team members responded to the survey). One team had 4 members, four teams had 5 members, three teams had 6 members, four teams had 7 members, four teams had 8 members, two teams had 9 members, five teams had 11 members, two teams had 12 members, one team had 14 members, and one team had 17 members. Of the total number of participants, 207 (85%) responded.

**Results**

**Treatment of the Data**

As in Study 1, individual missing values were substituted by the individual's team average for that item, provided the number of

missing values per individual did not exceed 10% of his or her answers (which was the case for five individuals from four different teams; data provided by these individuals were dropped from the analyses). As in Study 1, we correlated a team's response rate with the variables in the study. Because no significant correlations were found ( $r < .1071$ ), we concluded that response rate was not related to team functioning.

Responses by individual team members were aggregated to the group level. Eta-squared statistics for task interdependence, goal interdependence, minority dissent, and participation in decision making were .55, .61, .52, and .67, respectively.  $R_{wg}$  averaged .84, .82, .86, and .83, respectively. These statistics justified aggregation of the data to the group level.

**Descriptive Statistics**

Table 5 provides the descriptive statistics for all variables. Correlations were low and nonsignificant, with a few exceptions. First, a negative correlation was found between task interdependence and minority dissent. A possible explanation is that dissent is more costly and disruptive in conditions of high rather than low task interdependence, resulting in more (self) censorship. Second, participation and minority dissent were negatively correlated. When there is high participation, there may be less need for minorities to dissent because issues are being thoroughly and carefully analyzed and multiple perspectives are being considered. In contrast, individuals may not give dissenting views for fear of the group's reactions under high rather than low levels of participation. Whatever explanation is most viable, however, our hypothesis was that when minority dissent occurred in the context of high levels of participation in decision making, this would likely lead to innovation. Minority dissent when there was low team member participation in decision making would likely not lead to innovation.

**Innovation as a Function of Minority Dissent and Participation**

To test our hypothesis that innovation is explained by the interaction between minority dissent and participation, we conducted a hierarchical regression analysis. Team size, task interdependence, and goal interdependence were entered first as control variables; the main effects for minority dissent and participation were entered second; and the interaction between minority dissent and participation was entered in the third step. Team innovation was the dependent variable. We centered the predictor variables and checked the VIFs. Because all were less than 2.1, we concluded that multicollinearity was not a problem.

Hierarchical regression analysis (see Table 6) revealed that the control variables entered in the first step were not related to innovation,  $R^2 = .02$ ,  $F(3, 24) < 1$ , *ns*. Likewise, there were no significant main effects for minority dissent and participation,  $\Delta R^2 = .04$ ,  $F(2, 22) < 1$ , *ns*. As we predicted, however, the interaction between minority dissent and participation contributed significantly to the prediction of innovation,  $\Delta R^2 = .16$ ,  $F(1, 21) = 4.15$ ,  $p < .05$ . Consistent with our hypothesis, minority dissent predicted innovation when there was a high level of participation,  $B = 1.13$ ,  $t(26) = 2.17$ ,  $p < .05$ , but not when there was a low level of participation,  $B = -0.21$ ,  $t(26) = -0.34$ ,  $p < .68$ .

Table 4  
Factor Analysis of the Team Measures (N = 207 Individuals)

Factor	Factor loading			
	1	2	3	4
Task Interdependence 1	.85	.20	.03	-.03
Task Interdependence 2	.80	.16	.01	.15
Task Interdependence 3	.71	.17	.07	.14
Task Interdependence 4	.68	.18	.06	.26
Minority Dissent 1	.18	.84	.06	-.11
Minority Dissent 2	.11	.81	.07	.10
Minority Dissent 3	.23	.80	.04	.01
Minority Dissent 4	.21	.58	-.07	.26
Goal Interdependence 1	.04	.04	.85	-.01
Goal Interdependence 2	.01	.06	.83	.08
Goal Interdependence 3	.08	-.06	.81	.12
Participation 1	.14	.01	.15	.86
Participation 2	.08	-.06	.04	.80
Participation 3	.21	.28	.01	.65
Eigenvalue	4.15	2.18	1.70	1.27
% explained variance	29.7	15.6	12.2	9.0

Table 5  
Means, Standard Deviations, and Intercorrelations for All Variables in Study 2 ( $N = 28$  Teams)

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Team size	8.71	3.14	—	.14	.20	-.05	-.01	-.05
2. Task interdependence	3.50	0.41		—	.07	.36†	-.38*	-.07
3. Goal interdependence	4.58	0.28			—	.24	-.14	.11
4. Participation in decision making	3.54	0.62				—	-.50*	-.09
5. Minority dissent	3.04	0.38					—	.21
6. Innovation	3.81	0.81						—

†  $p < .10$ . \*  $p < .05$ .

### General Discussion

One of the main threats to effective group work is the group's tendency to move to premature consensus (Hackman & Morris, 1975; Janis, 1972). Accordingly, various streams of research have examined variables that prevent or inhibit consensus-seeking processes in groups. As a case in point, the present research examined the relationship between minority dissent and team innovation. Building on social psychological research (e.g., Nemeth, 1986), we hypothesized that minority dissent in organizational teams would increase creativity and divergent thought. We further argued that creativity induced by minority dissent would lead to innovation only when team members participated in decision making. Through participation, creative ideas and solutions induced by minority dissent may be critically examined and adopted or rejected on the basis of arguments and evidence. The results of the two studies supported this hypothesis: Minority dissent was associated with team innovation under high (but not low) levels of participation in decision making. This pattern of results was found both in a homogeneous set of teams sampled from a national postal service and in a more heterogeneous set of teams sampled from a variety of organizations. Across studies, the type of team tasks and the average level of education varied considerably. As such, the support for our hypothesis appears to be reliable and to generalize across tasks and organizational settings and populations.

### Design and Measurement Issues

Before we discuss theoretical implications and avenues for future research, we consider some measurement issues. First and foremost, we note that the design of our studies was cross-

Table 6  
Results of the Hierarchical Regression Analysis for Study 2 ( $N = 28$ )

Variable	$R^2$	$\Delta R^2$	<i>B</i>
Step 1 (control variables)	.02		
Team size			-0.01
Task interdependence			0.06
Goal interdependence			0.64
Step 2 (main effects)	.06	.04	
Minority dissent (MD)			0.36
Participation in decision making (PDM)			-0.09
Step 3 (interaction effect)	.24	.16*	
MD × PDM			1.57*

\*  $p < .05$ .

sectional, thus prohibiting claims about causality. However, laboratory research has provided abundant evidence that minority dissent produces creative and divergent thinking (e.g., Nemeth, 1986), and in Study 1, newly formed teams were surveyed and innovations were assessed 3 months later. However, studies using experimental or longitudinal designs are needed to settle this issue.

Second, we assessed the occurrence of minority dissent through a newly developed scale. In both studies, the four-item scale proved to have acceptable internal consistency, and factor analyses showed that it could be distinguished from other team process variables, including task conflict, goal interdependence, task interdependence, and participation in decision making. Note, however, that scale reliabilities for minority dissent were sufficient but not excellent. A related point is that although minority dissent and participation in decision making loaded on different factors (see Tables 1 and 3), these constructs were negatively correlated in each of the two studies (average  $r = -.44$ ,  $N = 49$ ). McClelland and Judd (1993) noted that in field studies interaction effects are less likely to be found when significant covariation exists among the independent variables. As such, the fact that we observed a significant interaction between minority dissent and participation in Study 1 as well as Study 2 suggests that we detected a reliable pattern.

Further research is needed to develop the measure of minority dissent and to gain insight into the convergent and construct validity of our measure by relating it to other measures of minority dissent. It would be particularly interesting to examine the relationship between observed instances of minority dissent during group discussions and the current scale to measure minority dissent. One way to do this is to compare small groups in which one group member is induced to assume a minority position with small groups in which this procedure is absent and to (a) code behavioral instances of minority dissent and (b) assess observers' and group members' reports of minority dissent using the scale used in the present study. If the minority dissent scale developed in this study is indeed valid, small groups with minority dissent should show higher scores on the scales in both self-reports and observer reports, and these ratings should be positively related to observed instances of minority dissent.

### Implications for Theory and Avenues for Future Research

The results contribute to the literature in a number of ways. The present results demonstrated, for the first time, that minority dissent is related to innovation in work teams and suggest that social



psychological experiments on minority influence may be relevant to organizational settings. This finding is important because, unlike most laboratory groups, the teams in the present studies had a past and a future—team members knew each other, had interacted, and were likely to continue to interact over longer periods of time than group members in laboratory contexts. In spite of the substantial differences between the laboratory and the field settings in which the present research was conducted, minority dissent in both settings was apparently related to divergent thought and creativity.

Some researchers in the field of minority influence tend to assume a direct relationship between creativity and divergent thinking on the one hand and innovation on the other. Recall, for instance, Nemeth and Staw (1989) concluded that the value of minority dissent is that issues and problems are considered from more perspectives so that group members detect new solutions and find more correct answers. As we mentioned in the introduction, however, creativity is a necessary but not a sufficient condition for innovation. For the latter to occur, shared and critical processing of information, low resistance to change, and mutual willingness to influence and to be influenced are required. Through participation in decision making, these conditions are met, enabling teams to benefit from minority dissent. Consistent with the present results, we tend to conclude that the relationship between minority dissent and innovation is not as straightforward as some researchers have suggested. Instead, minority dissent explains team innovation only when there is a high level of participation in decision making.

Related to the issue of minority dissent is research on the effects of having a devil's advocate in the team. An interesting question that awaits future research is whether devil's advocacy and the more authentic forms of minority dissent as studied here have similar effects on team innovation. We know from the various literatures that having a devil's advocate or having an authentic minority within a group prevents premature movement to consensus and, thereby, increases the quality of group decision making (Nemeth, 1986; Schwenk, 1990). The remaining question is whether devil's advocacy, like minority dissent, increases creative thinking and team innovations. This may not be the case because the critical process mediating between minority dissent and creativity is the tension and surprise produced by the minority position (cf. Crano & Chen, 1998; Nemeth, 1986; see also Runco, 1994). A devil's advocate in a team involves role-playing behavior by one member who is suspected or known to disagree with the majority perspective out of duty rather than conviction *per se*. Such a devil's advocate is unlikely to lead to the tension and surprise needed to induce creative thinking, and, indeed, we are unaware of research showing that devil's advocacy increases divergent thinking and creative thought. Future research is needed, however, to examine whether the effects observed in the present research are limited to authentic forms of minority dissent or can be induced through appointing a devil's advocate.

In the present research, we used a newly developed scale to assess minority dissent in organizational teams. The scale appeared to be related but not identical to the measurement of task conflict. This is interesting because it suggests that various forms of conflict in teams may have quite different consequences for team effectiveness, the quality of group decision making, and team innovation. Previous research established that task conflict may have more beneficial consequences for team effectiveness and team decision making than conflicts related to interpersonal issues (e.g.,

Jehn, 1995). As such, task conflict shares with minority dissent its positive relationship with the quality of group decision making. Unlike minority dissent, however, task conflict appears not to be or is negatively related to creativity and innovation (O'Reilly, Williams, & Barsade, 1997). This finding suggests that task conflict and minority dissent, like a devil's advocate, can stimulate the questioning of underlying assumptions and prevent premature movement to consensus. The unique contribution of minority dissent is, once again, that it stimulates divergent thinking and creativity. Research is needed to test these assertions, for example, by measuring task conflict and minority dissent and assessing their influences on various components of group decision making, such as the questioning of assumptions, the exchange and integration of information, and the generation of ideas and insights.

In the introduction, we noted some parallels between research on team diversity and the quality of group decision making and research on minority dissent and creative thinking. Our first study involved teams that were highly similar in terms of gender and age composition, team tenure, and educational background. Our second study involved teams that were rather similar in terms of gender and age composition but different in terms of team tenure and educational background. The fact that both studies showed that minority dissent explains innovation only under high levels of participation in decision making suggests that this result is relatively independent of the specific nature of the team, its task, and its composition in terms of team tenure and educational background. However, research is needed to increase our understanding of the interplay between opinion minorities and social category minorities in teams and their isolated and combined effects on team innovation.

Another avenue for future research concerns a more detailed consideration of the consequences of minority dissent in teams. Past research revealed beneficial effects of minority dissent on the quality of team decision making, and the present research revealed positive effects of minority dissent on team innovations. We should, however, be careful not to overestimate the positive consequences of minority dissent in teams. There is good evidence that being a dissenter within one's team can negatively influence one's affective well-being. Being a dissenter is stressful (Van Dyne & Saaverda, 1996) and may increase anxiety and fear of being expelled from the group. Thus, a second avenue for future research is to include a more balanced set of dependent variables and to consider not only creativity and innovation but also consequences for well-being.

An implicit assumption that we made is that there is a linear relationship between the frequency of minority dissent and innovation. This assumption was empirically justified, but failure to detect a reliable curvilinear relationship may be due to lack of statistical power. In fact, some authors (Broadbent, 1971; Jehn, 1995) have suggested curvilinear relationships between stress and conflict on the one hand and performance on the other. These literatures indicate that a certain level of stress and conflict is needed to perform, but too much stress and conflict shuts down the system, resulting in poor performance. We need more research to examine whether more minority dissent is better (provided high levels of participation) or whether there are diminishing returns at some point. It could be that extremely high levels of minority dissent impede the quality of team decision making and team innovation.

### Conclusion

Scholars tend to argue that any organizational culture that values the process of continuous learning fosters dissent as a necessary and desirable part of organizational life (Argyris, 1982; Schilit & Locke, 1982). The present research provides empirical support for this general notion, in that it showed that minority dissent relates to innovation in teams. More important, this research showed that organizations that want to benefit from minority dissent not only need to foster dissent but also need to ensure high degrees of participation in decision making. Only then will the creativity triggered by minority dissent translate into innovative products, practices, and services.

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