

A naturalistic minority influence experiment: Effects on divergent thinking, conflict and originality in work-groups

Linn Van Dyne*

Department of Management, Michigan State University, East Lansing, MI 48824-1121, USA

Richard Saavedra

University of Michigan

This study examines the Nemeth (1986) model of minority influence in a field study of natural work-groups. Confederates (who were also permanent members of the ongoing, interacting groups) served as designated minority influence agents during the 10-week study. Results demonstrated that experimental groups engaged in more divergent thinking and developed more original products than control groups. Minority influence groups did not experience more social conflict than control groups. Contrary to expectations, minority influence agents received higher peer ratings than other group members. Exploratory analysis of qualitative data, however, indicates that the role of a minority influence agent is stressful. Results are discussed in terms of managing the minority influence process in organizations in order to facilitate divergent thinking and originality while protecting agents from excessive personal strain.

Nemeth's (1986) model of minority influence theorized that persistent minority influence leads to divergent thinking and qualitatively better decisions in groups because groups with minority influence agents exert more cognitive effort, consider more alternatives and engage in more divergent thinking. She suggested that these differential processes have major implications for group creativity, problem solving and decision making. To date, there is a significant amount of laboratory research that provides support for Nemeth's model of minority influence (see for example, Nemeth & Kwan, 1985, 1987; Nemeth & Wachtler, 1983). This study extends Nemeth's work and tests the effects of minority influence in a field experiment. We examine three group-level outcomes of minority influence (divergent thinking, social conflict and originality) and one individual level outcome (the amount of personal role strain experienced by the minority influence agents).

This research is important for two reasons. First, most of the research on minority influence has been done in laboratory settings with *ad hoc* groups of strangers. Typically the tasks used in these studies allow very little, if any, interaction among group members

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(Levine & Moreland, 1990; Levine & Russo, 1987; Mugny, 1982; Nemeth, 1992; Nemeth & Staw, 1989). The current study builds on this research and also follows the recommendation of Levine (1989) for field research on minority influence. We used a longitudinal design with natural groups (as opposed to 'concocted' laboratory groups; see, for example, McGrath, 1984, p. 41) to examine minority influence in ongoing groups where individuals have established patterns of behaviour and interact in a non-scripted fashion in a relatively permanent social context (see recommendations of Katzell & Austin, 1992). Although Locke (1986) has demonstrated that results of laboratory studies often generalize to field settings, it is important to assess the external validity of laboratory findings before extending results to organizational settings.

Second, this work is important because organizations that have greater need for innovation and originality (Miles, 1989; Porter, 1985) are searching for additional methods to enhance the creative potential of their work-groups (Ancona & Caldwell, 1992; Levine & Moreland, 1990). Laboratory research on minority influence has demonstrated consistent effects on divergent thinking and originality which can lead to improved performance. Focusing on the potential benefits of field applications of the minority influence paradigm, Hackman argued that minority influence can be especially 'helpful for learning new tasks or when new ideas or perspectives are required for success' (1992, p. 248). Similarly, Nemeth & Staw (1989) suggested that minority influence may be most beneficial during times of crisis or rapid change when a group or organization must increase its adaptiveness and innovation. Thus minority influence appears to have special relevance to groups and organizations that must respond to dynamic environments with innovative solutions.

In our research we were interested in contrasting experimental groups that included a designated minority influence agent and control groups that did not include a designated influence agent. We chose this contrast between minority influence groups and control groups (rather than the more traditional laboratory experiment comparison between minority influence groups and majority influence groups) because we believed the comparison between minority influence groups and control groups has more direct relevance to field settings which contain ongoing, interacting groups. During times of major change or crisis, senior management often empowers a change agent to serve as a catalyst for improved performance. Change agents are a practical application of the minority influence paradigm. When organizations use change agents, they often compare typical groups that do not include a change agent (where dissenting expressions are discouraged due to conformity pressures) to groups that do include a change agent.

Minority influence: Effects on divergent thinking

According to Nemeth, exposure to minority viewpoints causes group members to consider more aspects of a situation, evaluate more alternatives, and re-examine their premises. Although a minority may not prevail in the sense of causing the majority to accept the minority's position, a minority can, nevertheless, change a group's problem-solving process by stimulating the group to think divergently, to be less narrowly focused, and to exert more cognitive effort (Nemeth, 1985, 1986; Nemeth & Wachtler, 1983). 'When the source is a minority, attention and thought processes are widened to include additional information and alternative positions' (Nemeth, 1986, p. 26).

Laboratory research on minority influence (see reviews by Levine, 1989; Levine & Russo, 1987; Maass & Clark, 1984; Tanford & Penrod, 1984; Wood, Lundgren, Ouellette, Busceme & Blackstone, 1994) typically demonstrates that minority influence stimulates individuals to think divergently, resulting in more ideas and more classes of ideas (Nemeth, 1986). For example, Nemeth & Kwan (1987) found that individuals who were exposed to minority influence improved their problem solving by using varied performance strategies that detected more solutions. In contrast, respondents exposed to majority influence used the majority's strategy and did not perform as well. Nemeth & Kwan explained these effects in terms of enhanced information processing that occurs during problem solving due to minority influence. Specifically, they suggested that exposure to persistent minority views stimulates attention to more information and leads to consideration of more alternatives. Our interest in comparing 'typical' groups (control groups) and minority influence groups led us to extend the work of Nemeth and associates; our first hypothesis is that groups with a designated minority influence agent would engage in more divergent thinking during their problem-solving process than control groups.

Minority influence: Effects on conflict

According to Moscovici (1980), the development and resolution of conflict is central to the process of minority influence and to social renewal. Moscovici and his associates defined influence as the negotiation of conflict for constructive redirection (Moscovici, 1980, 1985*a,b*; Moscovici & Faucheux, 1972; Moscovici & Lage, 1976) and argued that the power of minority influence comes from its ability to create uncertainty and social tension in the place of conformity (Moscovici & Mugny, 1983). For example, Moscovici & Faucheux suggested that 'The specific quality of this innovative modality of influence . . . revolves around the creation of conflicts' (1972, p. 178). Similarly, Maass & Clark (1984) emphasized that deviant views generate cognitive conflict (arguments and counter-arguments) and that the resolution of this conflict corresponds to the minority influence process.

In our research we were interested in contrasting the overall amount of social conflict in groups with a designated minority influence agent and the amount of social conflict in control groups that did not include a designated influence agent. Following Moscovici (1980, p. 213), we speculated that systematic and overt attempts by the minority influence agent to influence others would create cognitive conflict. Minority influence is designed to create cognitive conflict. Typical groups, however, often avoid divergent thinking and cognitive conflict because of the dissonance it evokes around issues of cohesiveness and belonging (Smith & Berg, 1987). Instead, they pursue their goals along the path of least resistance and frequently engage in satisficing behaviour (Simon, 1957). This suggests that minority influence groups will experience more cognitive conflict than control groups where influence attempts would be less common and less systematic. Moscovici & Lage (1976) discussed the relational conflict that is generated by the cognitive conflict that is fundamental to minority influence. Using their logic, we expected that the cognitive conflict created by minority influence attempts in the context of pressing needs for group locomotion (Levine, 1989) would result in social conflict. Therefore, our second hypothesis is that groups with a designated minority influence agent would report more social conflict than control groups.

Minority influence: Effects on originality

Originality is especially important when situations are dynamic (Nemeth & Staw, 1989) and when tasks have no predetermined 'correct' answer or solution (Larson & Christensen, 1993; McGrath, 1984; Shaw, 1981). Originality, however, has been defined in many different ways by researchers (see for example, Mooney, 1965, and Pelz & Munson, 1982). Some definitions focus on characteristics of the process while others emphasize characteristics of the output (product or service) or attributes of the group that created the product (Kimberly, 1981). In this study we defined originality as a characteristic of specific group products as rated by outside experts. More specifically, we used Amabile's definition of product originality: 'both a novel and appropriate, useful, correct, or valuable response to the task at hand' (1983, p. 360).

Nemeth (1986) has theorized that the primary effect of minority influence is a change in group problem-solving processes that leads to higher quality decisions and more innovative group outcomes. In other words, the focus is on improved group decision-making processes that increase originality and not on whether the minority convinces the majority to change their opinions.

Minority viewpoints are important, not because they tend to prevail but because they stimulate divergent attention and thought. As a result, even when they are wrong they contribute to the detection of novel solutions and decisions that, on balance, are qualitatively better. The implications of this are considerable for creativity, problem solving and decision making . . . (1986, p. 23).

These divergent cognitive processes allow the development of novel solutions and can result in more enlightened decisions (Nemeth, 1985, 1986; Nemeth & Wachtler, 1983). Three laboratory studies specifically examined the link between minority influence and originality. First, Nemeth & Kwan (1985) reported more original word associations to the colours *blue* and *green* following exposure to minority influence. Second, Nemeth & Wachtler (1983) demonstrated that groups with minority influence agents detected more novel solutions in a hidden figures task. Third, Mucchi-Faina, Maass & Volpato (1991) demonstrated that minority influence leads to more creative proposals than majority influence. In cases like these, the superior performance of minority influence groups is attributed to consideration of more alternatives (Nemeth & Kwan, 1985), multiple problem resolution strategies (Nemeth & Kwan, 1987), enhanced recall of information (Nemeth, Mayseless, Sherman & Brown, 1990) and divergent cognitive processes (Mucchi-Faina *et al.*, 1991). 'Minorities are less able to get their specific position accepted but, in the process, appear to force a re-examination of the stimulus array so that correct and novel solutions are detected' (Nemeth, 1986, p. 27). Thus, based on the work of Nemeth and associates, our third hypothesis suggests that groups with a designated minority influence agent would produce more original products than control groups.

Minority influence: Perceptions of the influence agent's contributions

Although prior laboratory research has indicated positive effects of minority influence for group problem solving and originality, it also has suggested that minority influence agent efforts are not always regarded positively by other group members. Voicing opposing

opinions is often considered deviant behaviour that should be minimized or eliminated (Hackman, 1992; Hornstein, 1986; Swap, 1984) because the expression of minority views threatens the cohesiveness of the group and often requires more time and effort for decision making (Nemeth, 1986). As a result, nonconforming group members are often evaluated negatively by their peers (Graham, 1984; Moscovici, 1985a; Nemeth & Staw, 1989; Nemeth & Wachtler, 1974, 1983). Applying this tendency for negative evaluation to our research suggested our final and fourth hypothesis that peer ratings of the contributions of minority influence agents would be less positive than peer ratings of other group members

Minority influence: Effects on the influence agent

The final element of our research design was exploratory. Here we examine the phenomenology of being a designated minority influence agent by exploring the implications of hypotheses 2 and 4 on the minority influence agent. Hypothesis 2 suggested that the presence of a designated minority influence agent would increase social conflict within the group and hypothesis 4 predicted lower peer performance ratings for minority influence agents. At this point we wanted to complement statistical hypothesis testing of quantitative data with content analysis of qualitative data.

It is important to note that our objective in this segment of the research was not to compare experimental and control groups. Instead, our objective was to develop an appreciation of the experience of being a designated minority influence agent *from the agent's perspective*. We believed that this multi-method approach (Brewer & Hunter, 1989) would enrich our understanding of the minority influence experience. Following the advice of Glaser & Strauss (1967), we did not develop any formal hypotheses but instead used the findings of prior research to speculate about what might occur. More specifically, Nemeth & Staw (1989) and Nemeth & Wachtler (1983) have suggested that a dissenting minority is often disliked, ridiculed and treated with disdain. Similarly, Allen (1965), Kiesler & Kiesler (1969), Levine (1989), Moscovici (1976, 1980) and others have discussed conformity pressures and the accompanying strain that is experienced by nonconforming group members. Extending this logic we speculated that the designated minority influence agents would emphasize role strain as a key characteristic of their personal experience. In other words, we anticipated that the positive benefits we had predicted for group level outcomes (divergent thinking and original products) would be accompanied by relatively high perceived costs from the perspective of the minority influence agents. Beyond this speculation, we planned to analyse the agents' descriptions of their experiences for possible themes that might provide material for future research on the personal experience of being a minority influence agent.

The role of behavioural style

Moscovici (1985a) has reported that behavioural consistency (as a symbol of certainty and commitment to a coherent choice) is the most fundamental dimension of behavioural style and that persistence is the critical determinant of minority influence. Minorities by definition lack power and status (Wood *et al.*, 1994). Therefore, their effectiveness depends on their behavioural style including 'the self-presentation of the sender, the

sequence of arguments, and other oratorical devices' (Moscovici & Faucheux, 1972, p. 158).

Consistency produces attitude change because a consistent minority is perceived as certain and competent (Maass & Clark, 1984; Mugny, 1982). This attribution occurs because majority members view consistency as an indicator of reliability. Given the important role of consistency in inferential processes (Kelley, 1967), a minority group member must emphasize his or her position consistently and confidently in order to influence other group members. In a recent meta-analytic review of the minority influence literature, Wood *et al.* (1994) found strong support for the importance of consistency in the minority influence process although these researchers concluded that consistency yields effects on attention rather than on attributions of certainty and commitment. Moreover, Nemeth (1986) has suggested that a group is more likely to consider a variety of alternatives when confronted by someone who consistently and honestly differs in viewpoint rather than from confrontation with an individual who is simply playing the role of devil's advocate.

Persistence is critical for the effective exercise of minority influence because most groups do not consider minority viewpoints seriously when they are first presented (Maass & Clark, 1984; Nemeth, 1986). In most groups, majority members initially assume that the minority position is incorrect and they dismiss divergent viewpoints (Asch, 1956; Deutsch & Gerard, 1955). Persistent expression over time, however, stimulates majority group members to examine alternative viewpoints in an attempt to understand the persistence of the minority (Maass & Clark, 1984; Nemeth & Staw, 1989). Thus persistent and consistent behavioural style in the expression of minority influence causes majority group members to reappraise the circumstances and consider alternative perspectives.

Method

Sample

In this study, we used a longitudinal design (10 weeks) with natural groups in a classroom setting to examine the effects of the minority influence process when group interaction was not constrained by laboratory conditions and scripts. Twenty-eight groups consisting of 126 individuals (51 women and 75 men) constituted the sample for this study. Students gave their informed consent to participate in the research which was described as a study on teaching and learning methods. Performance on group projects was graded within condition (experimental and control) to assure equitable grading of all participants.

Group task

Throughout the 10-week period, students completed a variety of group tasks as part of their regular course work. Group-based requirements totaled 40 per cent of each student's grade: group cases (30 per cent) and peer ratings (10 per cent). Each group analysed two ambiguous cases (from Thompson & Mathys, 1990) that emphasized divergent thinking and idea generation (McGrath, 1984). The first case, 'The Reliance Insurance Company', had no one correct or best solution. The second case, 'Too Many Stations', was more complex and required more cognitive effort to identify solutions. We specifically chose ambiguous cases to enhance group variability on conflict and originality. In addition, we used two cases to determine whether the effects of the minority influence intervention would result in consistent effects for two different group products.

According to Moscovici & Lage (1978) and Maass & Clark (1984), a consistent minority will be more influential when originality is desirable. Groups were instructed to analyse the cases, generate innovative ideas or alternatives and develop original recommendations that were feasible for implementation. We believe that this design (interdependent group members working on a task with no one correct solution) replicates

dynamic work situations where originality is an important component of group effectiveness and divergent expression can potentially improve the performance of the group (Hall & Williams, 1966).

Procedure

During the first class, participants completed a background information questionnaire which was used to select confederates (see explanation below). A teaching assistant who was unaware of the experimental manipulations or hypotheses randomly created 14 groups of four individuals and 14 groups of five individuals based on pre-class enrolment rosters. She then randomly assigned confederates to the four-person groups resulting in 28 five-person groups. We specifically designed the study to include only one minority influence agent in each confederate group because a single individual is more likely to appear confident when maintaining a deviant position (Nemeth, Wachtler & Endicott, 1977; Wood *et al.*, 1994). We assumed that the 14 control groups would represent typical groups where dissent would occur relatively infrequently.

Group members completed a second questionnaire immediately after turning in their written case analyses. This questionnaire assessed group problem-solving processes. At the end of the course, group members completed peer evaluations and a final questionnaire that included self-report measures of social conflict and a confederate training check which was used to assess the effectiveness of our manipulation and training intervention. Confederates also completed debriefing questionnaires describing their experiences as agents of minority influence and participated in a 1.5 hour recorded discussion and debriefing session which provided qualitative data for analysing the phenomenology of being a designated minority influence agent.

Selection of confederates

A teaching assistant who was unaware of the experimental manipulations or hypotheses used responses to the first questionnaire to assess minority influence expectations and the value that each individual placed on conflict. These two measures were adapted from Argyris (1969) to select confederates who had a natural tendency to exercise dissenting influence. We specifically chose this approach (selection based on existing behavioural tendencies enhanced by training) to strengthen the power and believability of our intervention. We were concerned that random selection of confederates would include some individuals who would be uncomfortable speaking up and challenging the majority and who would consequently not enact their assigned roles.

The first confederate selection measure assessed minority influence expectations with four items on a seven-point scale (1 = very inaccurate; 7 = very accurate): 'I expect to take risks with regard to expressing my ideas in my group'; 'I expect to take risks with regard to expressing my feelings in my group'; 'I value novelty in human behaviour'; 'I am attracted to individuals who hold divergent views from myself' (Cronbach's alpha = .74). The second measure assessed opinions on the value of conflict (1 = very inaccurate; 7 = very accurate) with the following: 'Conflict should be avoided in order to work effectively in groups' (reverse coded).

Based on analysis of minority influence expectations and the value of conflict, the teaching assistant asked the 14 individuals (nine males and five females) with the highest composite score on both measures to participate in the study as confederates. All 14 individuals agreed to assume the confederate role and typically voiced their enthusiasm for expressing their own views regardless of the majority's position on a topic. ANOVA analysis demonstrated that confederates had significantly higher expectations for expressing minority influence ($F(1,123) = 5.74, p < .05; M = 5.75, 5.15$) and were less likely to agree that conflict should be avoided in work-groups compared to non-confederates ($F(1,123) = 28.65, p < .001; M = 6.53, 4.00$). *t* tests revealed no differences between confederates and non-confederates on age, sex, GPA, academic major, the perceived value of group work, expected commitment to the work-group or years of prior work experience.

Training of confederates

To enhance consistency and persistence, which are the critical elements of behavioural style in the minority influence paradigm, each confederate participated in both individual and group training sessions which were conducted by the authors. Each confederate also received a written set of guidelines that described the min-

ority influence process and summarized the major points that were presented in the training sessions. Trainers told minority agents that they would be exempt from peer ratings for course grade calculations because some accounts indicate that nonconforming members are evaluated negatively.

During the first half of the group training session, influence agents were told that their goal was to express their own opinions and to try to influence other members of their groups. Minority agents were instructed to use *consistent*, well-framed arguments (Nemeth & Wachtler, 1974). Consistency was described as maintaining the same general position on a topic. Confederates could repeat judgements, positions and arguments as long as they presented an issue in a coherent fashion (Mugny, 1982). Trainers also encouraged minority agents to be *persistent* about voicing their opinions (Moscovici, 1980). Persistence was defined as tenacity. During the training sessions, however, trainers discouraged the use of verbatim and inflexible persistence or consistency. Instead, they recommended that minority influence agents vary the words and examples that they used to support their points while maintaining the same basic position on an issue. This combination of a persistent and consistent position presented in a flexible manner was described as the most effective means of exercising minority influence (Nemeth & Brilmayer, 1987). In addition, based on Nemeth (1986), trainers told confederates to exercise minority influence only on issues where they honestly differed in viewpoint rather than simply playing the role of devil's advocate.

During the second half of the group training sessions, confederates discussed their roles, practised flexible execution of consistent and persistent positions, asked questions, and reiterated their objectives. In the follow-up individual training sessions, confederates met one-to-one with a trainer for approximately 15 minutes. During this session, trainers emphasized the importance of consistent and persistent expression of minority viewpoints.

Measures

Divergent thinking was assessed in an individual self-report questionnaire which was completed immediately after group members turned in their written case assignments. Five questions measured subject perceptions of their group's divergent thinking using a five-point scale (1 = strongly disagree; 5 = strongly agree). Items included 'Our group identified a large number of alternatives that were available'; 'Our group identified many advantages and disadvantages to each alternative'; 'Our group focused on a few of the alternatives that were available' (reverse coded); 'Members of our group thought that there weren't really many viable alternatives' (reverse coded); 'Our group thought there were only a few advantages and disadvantages to each alternative' (reverse coded) (Cronbach's alpha = .67).

Social conflict was measured at the end of the course with a self-report questionnaire. These items were based on a measure adapted from Hackman (1982) which included the following items: 'There is a lot of unpleasantness among people in our group' and 'There is a lot of tension among people in our group'. These items were measured on a seven-point scale (1 = disagree strongly; 7 = agree strongly) (Cronbach's alpha = .81).

Originality was determined by two outside experts. Each work-group in the study prepared two group cases which were assessed for originality by the raters who were organizational psychology students. These outside experts were experienced in case analysis methods and were blind to our manipulation and the hypotheses of the study. Originality was defined, based on Amabile (1983), as novel and useful or feasible analyses and recommendations. Raters were trained to assess originality by rating three practice cases and discussing their ratings with the experimenter and each other and then rating a second set of three practice cases. After reviewing the definition of originality and the rating technique, each rater independently used the 'sort-resort' procedure adapted from Hackman, Jones & McGrath (1967) to develop a numerical assessment of the originality of each group case. The 28 cases for the first group case assignment were randomly ordered by the experimenter. Each rater sorted these cases into three categories ('highly original', 'moderately original' and 'average') and then ranked cases within each category so that high scores indicated more originality. Inter-rater reliability for the sorting and ranking procedure was .90. Then the outside experts interdependently assigned scores to each case on a continuous response scale of 0 to 100 points to maximize the richness of information measured by the originality construct (Russell & Bobko, 1992). The same process was repeated for the second group case assignment (inter-rater reliability was .88).

Peer ratings were assessed with a forced-distribution peer rating scheme which represented a simple and efficient performance appraisal system. Group members assigned peer ratings based on the following instructions: 'Please allocate a total of 100 points among group members, excluding yourself, with higher points going to those members of the group who contributed most'. Points were then summed for each individual. Group members who made superior contributions could receive more than 100 points if other group members received less than 100 points.

Level of analysis

Divergent thinking and social conflict were assessed by individual group members but each item was anchored at the group level. A one-way ANOVA was performed at the individual level of analysis to determine whether the between-group variance was statistically greater than the within-group variance at a significance level of $p < .05$. In addition, the η^2 statistic was calculated to ascertain the level of agreement/similarity of responses on each variable within each group and to determine what portion of the variance in the individual responses could be explained by the cluster. Results for the F tests were significant at $p < .05$. For divergent thinking $\eta^2 = .57$ and for social conflict $\eta^2 = .62$, demonstrating that each variable met or exceeded the minimum criteria of .20 suggested by Georgopoulos (1986). Both variables passed these tests, so the measures were aggregated to form group-level variables. Originality was conceptualized and measured at the group level of analysis. Peer ratings were conceptualized and measured at the individual level of analysis.

Results

Manipulation check

A two-item training check which was included in the final questionnaire demonstrated significant differences in the behaviour of the confederates compared to other group members ($F(1,118) = 14.37$, $p < .001$; $M = 6.43$, 5.25) and suggested the effectiveness of our manipulation. The items were 'When I disagreed with the group, I voiced my opinion in a consistent, confident and persistent manner' and 'When I disagreed with the group, I was cautious and reluctant in expressing my views' (reverse coded). These items were measured on a seven-point scale with 1 = disagree strongly; 7 = agree strongly (Cronbach's alpha = .72).

Tests of hypotheses

Means and standard deviations are reported in Table 1.

ANOVA analysis demonstrated support for hypothesis 1. The experimental groups engaged in more divergent thinking ($F(1,26) = 11.15$, $p < .01$, $\eta^2 = .30$; $M = 3.45$, 2.92) than the control groups. Hypothesis 2, however, was not supported. Experimental

Table 1. Descriptive statistics (28 groups)

	M	SD
1. Originality, case 1	85.57	7.14
2. Originality, case 2	85.14	7.18
3. Divergent thinking	3.19	.49
4. Social conflict	2.47	1.07

groups did not experience more social conflict than control groups ($F(1,26) = .05$, n.s.; $M = 2.43, 2.52$). Hypothesis 3 was supported; outside experts rated the cases of experimental groups as more original than those of control groups (case 1: $F(1,26) = 5.50$, $p < .05$, $\eta^2 = .18$; $M = 88.50, 82.64$; case 2: $F(1,26) = 5.74$, $p < .05$; $\eta^2 = .18$; $M = 89.14, 83.14$). Results for hypothesis 4 were significant but in the opposite direction of our prediction. The average peer evaluation for minority influence agents was significantly higher than that of other group members ($F(1,124) = 9.06$, $p < .01$, $\eta^2 = .27$; $M = 108.86, 98.53$).

Exploratory research: Effects on the influence agent

The final element of our research design was an examination of the phenomenology of being a designated minority influence agent. Based on an extension of hypotheses 2 and 4 we had speculated that minority influence agents would emphasize role strain in their descriptions of their experiences. Qualitative analysis of the self-report debriefing questionnaires and transcriptions of the debriefing session indicated that role stress was a fundamental problem for minority influence agents. Table 2 summarizes this information and presents composite profiles of the comments from the 14 minority influence agents.

Thirteen of the 14 minority influence agents used negative emotional terms to answer the following question from the debriefing questionnaire: 'What was your personal reaction to your experience as a minority influence agent?' Examples included 'I was angry at three out of four group members' (A1), 'It was not easy' (A2), 'The role was stressful' (A3), 'Difficult for me' (A4), 'Most of the time another group member and I were at each other's throats' (A6), 'It was me against four others' (A7), 'I was angry at the shirker in the group' (A8), 'It was hard because others didn't appreciate my influence' (A9), 'It is difficult being in the minority' (A10), 'I felt unsure of myself' (A11), 'The experience was stressful' (A12), 'I found the experience exceedingly stressful' (A13), and 'He and I were usually in conflict' (A14).

In addition, agents indicated that they disliked the interpersonal conflict that their roles generated. For example, A2 indicated 'the conflict was unpleasant' and A13 said 'There was much conflict and it was hard to work'. In some situations (such as A3, A6 and A14), minority influence attempts led to dyadic conflict where a second individual counter-challenged the ideas of the agent. These pairings sometimes produced relationships characterized by continuing conflict. Nevertheless, most agents tried to maintain a positive climate and felt they avoided destructive arguments. Minority influence agents had strong negative reactions to other group members who shirked their responsibilities or engaged in social loafing (Harkins & Szymanski, 1989). For example, see Table 2 for the comments of agents A1, A4, A6, A8 and A10. In addition, in some cases (such as A1 and A6), a shirker and an influence agent maintained a conflictual relationship throughout the life of a group.

Three agents found their roles as agents of minority influence particularly stressful. Agent A13 was a woman in an all-male group. She reported, 'I found the experience exceedingly stressful and difficult. As the only female, this was awful. The entire group experience was stressful. Overall, the whole thing was worse than I ever imagined it could be. I didn't fit in'. Agent A4 was an Afro-American. He reported that he found it difficult to work with one other group member: 'I felt real confident except in a relationship with

Table 2. Minority influence agent profiles

Agent	What was your personal reaction to your experience as a minority influence agent?	How did other group members treat you?	Other comments
A1	I was angry at three out of five group members. Sometimes I hated the group. I expected more from group members.	I was seen as the leader. One shirker in the group was annoyed with me and also annoyed the other group members.	We had many meetings. It was a slow process
A2	There was some conflict with two other group members. It was not easy. The conflict was unpleasant.	There were always good discussions. Two other members cooperated well with me.	The discussion meetings went better than when we worked on writing the paper.
A3	It was scary at first. Two dominant group members created tension with me so I had to back off. The role was stressful and I felt the pressure of my role.	I felt the others in the group did not like me.	I felt like the others in my group respected me but that they thought I was slowing down the group.
A4	I felt real confident except in a relationship with a shirker who happened to be white. This guy regularly discounted my contributions. This made it difficult for me to express minority influence.	I was in conflict with a dominant group member.	
A5	It felt pretty natural to me.	I was seen favourably by most group members. I had a confrontation with one shirker in the group who was not cooperative. This person offered destructive criticism.	It was more difficult to remain a minority toward the end of the group's work together.
A6	Subgroups formed and reformed so my allies changed. Most of the time another group member and I were at each other's throats. It was me against four others. It was interesting but I would have preferred an ally.	At first others were shy. Later they agreed easily with me.	At first I was seen as deviant. Later they seemed to view me as a persuasive group member.
A7	It was me against four others. It was interesting but I would have preferred an ally.	Some listened to me and some ignored me.	Most of my ideas were ignored.
A8	It felt good. I was angry at the shirker in the group.	Others just followed. Most didn't care—including one shirker. Often there was no resistance to my ideas.	My participation resulted in long meetings.
A9	It was hard because others didn't appreciate my influence.	My allies changed based on particular subgroups.	
A10	It is difficult being in the minority. Working with 30 to 40 ideas can be frustrating.	One person was not cooperative and did not contribute fairly.	I liked the group and thought this experience was fun. This was a mature group.
A11	I felt unsure of my role.	I was not viewed as a deviant.	This whole idea was good because after a while everyone was doing it—giving suggestions and thinking about alternatives. People realized they could stick their necks out without getting hammered.
A12	The experience was stressful for me and for other group members. What was most troubling was that it was hard to tell whether others in the group were showing passive acceptance or passive aggression.	Two members formed a subgroup. Two other members were passive and angered easily.	There were many strong members. I was very pleased with my group.
A13	There was much conflict and it was hard to work. I found the experience exceedingly stressful and difficult. As the only female, this was awful. The entire group experience was stressful. Overall the whole thing was worse than I ever imagined it could be. I didn't fit in.	I had little support. I needed more strength. Two members were quieter and passive. The others were aggressive.	I had to learn to be patient and to let group members talk first. It was important not to be too dominant. A group needs time to get before introducing minority influence. It was better toward the end.
A14	One member was a troublemaker. He just disagreed all the time. He and I were usually in conflict.	I was shot down quickly.	I was often excluded from group meetings—the men gave me the wrong time or place for the meeting. I was in the minority every time we got together.
			I expected things to work out. My role was much easier in discussion tasks than in writing tasks.

a shirker who happened to be white. This guy regularly discounted my contributions. This made it difficult for me to exercise minority influence'. In this case, the shirker provoked the agent by communicating destructive criticism until there was a public confrontation. Agent A12 was visually handicapped. He described the experience as stressful both for him and for the other members of his group. He thought the group was 'quiet' and commented that, given his visual handicap, 'it was hard to tell whether others in the group were showing passive acceptance or passive aggression'. In this instance the silence of others was unsteady to the agent who, over time, became more self-conscious about being visually handicapped.

Discussion

Results of this naturalistic experiment provide substantial support for the Nemeth (1986) model of minority influence. Experimental groups which contained designated minority influence agents demonstrated more divergent thinking and produced more original cases than control groups. In addition, the differences in originality were robust across two different case analyses, strengthening the reliability of our finding. We believe that these differences in divergent thinking and originality are particularly important because we are unaware of other research that has examined the effects of minority influence on originality in ongoing work-groups with embedded relationships.

Contrary to expectations, groups with designated minority agents did not experience more social conflict than control groups. In their meta-analytic review, Wood *et al.* (1994) also reported that conflict was not associated with minority influence. Although Moscovici and his associates emphasized the fundamental role of conflict in the minority influence process, Nemeth places less emphasis on the role of conflict. Instead, she suggests that minority influence will generate less conflict than majority influence. We offer two speculations as possible explanations for the lack of differences in social conflict in our study. First, the minority influence groups developed original cases and knew that they had done a good job on the assignment. Thus, even if group members experienced social conflict at some point during the process, this may not have been salient at the end of the study when they completed the questionnaire items on social conflict. Second, the overall amount of social conflict in all groups was relatively low ($M = 2.47$ on a scale of 1 to 7). Perhaps the debriefing comments of the minority influence agents about interpersonal conflict reflect their own personal role stress and are not indicative of the strain or conflict that was experienced by group members in general.

Also contrary to expectations, minority influence agents did not receive lower peer performance ratings compared to other group members. Instead, the average peer evaluation for minority influence agents was significantly higher than ratings in the rest of the sample. Unquestionably, groups recognized the contributions of minority agents even if they ignored the ideas of the agent (A7), didn't appreciate the influence of the agent (A9), excluded the agent from group meetings (A13) or shot down the ideas of the agent (A14) (see Table 2). This finding is consistent with observations of Levine (1989) as well as Nemeth & Chiles (1988) that minority members are often rated positively in terms of admiration, respect and courage (see also Maass & Clark, 1984).

Analysis of the qualitative debriefing information clearly shows that agents focused much of their attention on the role strain that they experienced. In one sense this is para-

doxical given the absence of statistical differences in the overall level of social conflict experienced by experimental and control groups. On the other hand, this indicates that the strain was localized—experienced by the agents and not by other group members. This suggests that the benefits of minority influence (divergent thinking and originality) can be obtained without significant conflict at the group level, but that it is extremely important to recognize the role stress and subsequent personal costs that are experienced by the agents of minority influence.

We offer two additional sets of speculative observations based on our qualitative data analysis. First, three of the agents reported particularly negative experiences. In each case, these individuals were double minorities who differed from the rest of the group on two counts. Double minorities express different opinions and also are members of different social categories (e.g. being a woman, being black, or being visually handicapped). Maass & Clark (1984) have suggested that when minority influence is exercised by double minorities, the majority may discount their comments by attributing differing opinion to self-interested behaviour that favours the minority's special group. Thus even when the agent is building on his or her natural tendency to express dissenting opinions (as represented by our selection procedure), the role of a double minority agent can be extremely stressful.

Our second speculative observation concerns comments made by agents about the timing of their influence attempts (see the 'other comments' section of Table 2). Moreland & Levine (1982) emphasized the importance of examining group processes in the context of group life stages. According to agents A6 and A12, attempts to influence their groups in the very early stages of group development appeared dysfunctional and slowed group progress. We speculate that influence agents may have interfered initially with the development of group cohesiveness, but that they also may have promoted role differentiation and may have enabled specialization that later increased performance (Hackman, 1976).

Agents (see for example A2 and A14) also commented that it was easier for them to propose different ideas during the discussion or formulation stages of their projects rather than during the implementation or writing stages. Given the importance of predictability and order for most groups (Hackman, 1976), minority influence may be more effective in the problem formulation stage of group work than in the solution implementation stage. Similarly, minority agents such as A5 experienced difficulty maintaining their roles as the deadline for completion of case analyses drew near. Once a group has generated a set of alternatives in response to divergent thinking and multiple perspectives on a problem, convergent processes are required to integrate these perspectives and develop a feasible solution which is generally acceptable to all group members. Hence, minority influence attempts in later stages of a project or during solution implementation may be seen as dysfunctional because they can divert the group from timely completion of objectives.

Overall, this study has several important strengths. First, the study demonstrated the positive benefits of minority influence in terms of divergent thinking and group originality in a field study of natural work-groups. Compared to much of the prior laboratory research, this study has stronger external validity since it involved non-scripted interaction among group members with embedded relationships. Second, these results are especially important for organizations seeking techniques that can increase the originality of their work-groups in efforts to increase competitive advantage. In addition, these results

have special relevance for groups which operate in dynamic environments and which must develop innovative solutions to problems.

As with all studies, there are limitations to this research. First, our results may be applicable only to situations involving ambiguous tasks where there is no predetermined 'correct' answer or solution. Thus our results are domain specific and most likely will not generalize to efficiency tasks that require application of standard procedures (Hackman, 1992).

Second, we purposefully did not script the minority agent behaviour entirely to test the minority influence paradigm outside of tightly controlled laboratory conditions. Although randomization allowed us to compare control and experimental conditions on our criteria of interest, we could not assign the *same* confederate to each of the experimental groups because the design required that the groups interact over time to allow members to develop relationships with each other. Thus, it is possible that each confederate may have enacted his or her role somewhat differently and this variation may have reduced the internal validity of the study. This design feature, however, was a conscious choice because we wanted to enhance the external validity of the experiment by examining minority influence in ongoing, intact work-groups to see if results obtained in prior studies of *ad hoc* laboratory groups could be replicated in ongoing task groups (see recommendations of Berscheid, 1992). Debriefing discussions, however, indicated that agents used remarkably similar approaches and experienced similar outcomes. Thus, even though the experimental setting was complex and minority influence agent behaviour included discretionary elements, we believe that the agents enacted their roles as intended in the experimental design.

Future research and managerial implications

Levine (1989) has recommended that future research examine the psychological mechanisms associated with different types of social influence. Research is needed on the psychological processes that occur in work groups when members are exposed to minority influence. By manipulating minority influence in a group and assessing psychological processes over time, researchers could study the dynamic effects of minority influence on the interaction among group members as well as on group effectiveness. In addition, designs that allow direct observation of minority influence attempts could assess the persistence and consistency of agents and the effects of these behaviours over time. Our final recommendation is to encourage other researchers to study minority influence in ongoing, interacting work-groups in the field.

Minority influence applications

Managers and researchers are increasingly recognizing the value of divergent expression (Schwenk, 1990). Minority influence can prevent excessive conformity by providing a model of dissenting behaviour which bolsters the courage of other group members to speak up. For example, Nemeth & Chiles (1988) demonstrated that individuals can be influenced to be more independent and to resist conformity pressure simply by exposure to dissent. Minority influence can lead to better scanning of the environment, more flexibility and higher responsiveness to external change (Nemeth & Staw, 1989). In addition,

the results of this study suggest that change agents (a specific application of minority influence) can be effective in enhancing the originality and divergent thinking of work-groups even if they do not persuade other group members to change their opinions.

A final implication of this research concerns the personal costs to the minority influence agents. Our qualitative data indicated that minority influence agents experienced high levels of role stress. Thus even though minority influence can produce benefits (originality as rated by outside experts and high peer ratings of performance), the potential costs to the influence agents must be acknowledged. In general, minority influence agents must have a personal tendency to express dissenting opinions and must have a high tolerance for criticism and occasional ostracism (Nemeth & Wachtler, 1983).

In conclusion, research on minority influence may assist work-group leaders who wish to stimulate originality and minimize conformity. Nevertheless, this study demonstrates that minority influence also entails costs to the minority influence agent. Consequently work-group leaders might consider establishing norms for disagreement that permit or encourage members to voice their opinions without excessive personal costs (Maier, 1967). A work-group leader can enhance the quality of decision making by encouraging expression of minority viewpoints while at the same time protecting these influence agents through judicious use of formal position power (Maier & Solem, 1952).

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