

Emergent Power Hierarchies and Group Performance

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In newly formed groups, informal hierarchies emerge automatically and readily. In this study, we argue that emergent group hierarchies enhance group performance (Hypothesis 1) and we assume that the more the power hierarchy within a group corresponds to the task-competence differences of the individual group members, the better the group performs (Hypothesis 2). Twelve three-person groups and 28 four-person groups were investigated while solving the Winter Survival Task. Results show that emerging power hierarchies positively impact group performance but the alignment between task-competence and power hierarchy did not affect group performance. Thus, emergent power hierarchies are beneficial for group performance and although they were on average created around individual group members' competence, this correspondence was not a prerequisite for better group performance.

Keywords: Emerging power hierarchies; Task-competence; Group performance.

Since the last two decades it has become apparent that organizations are moving from hierarchical structures with pronounced power differences between superiors and subordinates to flatter hierarchical structures (Daft & Lewin, 1993). Also, on the work group level, hierarchies are typically flat with group members possessing equal power or status and no assigned leader (Chenhall, 2008). Despite the lack of a formal hierarchy of such leaderless groups, an informal hierarchy readily emerges (Bass, 1954). Whether or not such an informal hierarchy is functional for the group depends on whether it increases group performance. The group constellation (e.g., individual abilities) and the group structure (e.g., group size, formal leadership) are important components affecting group performance (Stewart & Barrick, 2000). In this research, we are interested in the *hierarchical structure of a group* (=power hierarchy) and how it affects group performance and whether group performance only increases if the power hierarchy reflects the group members' individual task-competence differences.

By power hierarchy, we mean the relative power difference between group members. Power is understood as the extent to which a person can influence or control other group members (Halevy, Chou, & Galinsky, 2011a; Schmid Mast, 2001). It is used as an umbrella term for

different concepts such as dominance, status, leadership or authority, which all stand for the vertical organisation (hierarchy) in a social relationship or interaction (Schmid Mast, 2010). *Emergent power hierarchies* are defined as hierarchies based on the group member's *perception* of each other's *dominance behaviour* (Ridgeway & Berger, 1986). Dominance behaviour is any behaviour that is shown with the intention to gain control or influence over another person (Schmid Mast, 2010). Perceived dominance is therefore a measure of power based on the observation and interpretation of other people's interpersonal behaviour.

In newly formed groups, a power hierarchy emerges regularly and automatically (Fiske, 2010; Magee & Galinsky, 2008; Ridgeway & Berger, 1986). If hierarchies in groups form automatically and quickly, they might be functional for the success of the group. Halevy and colleagues (2011a) suggest that a hierarchy enhances coordination and cooperation among group members and thus reduces intra-group conflict, which in turn results in a positive impact on group performance. Magee and Galinsky (2008) state that a hierarchy serves two specific functions: (a) "establishing order and facilitating coordination" and (b) "motivating individuals" (Magee & Galinsky, 2008, p. 353). Empirical evidence suggests

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that a power hierarchy can be beneficial for a group's task-performance. For instance, for low power group members (i.e., entry-level employees), power dispersion had a positive impact on conflict resolution, a prerequisite for effective leadership (Greer & Van Kleef, 2010). DeSouza and Klein (1995) showed that groups with a clearly emerging leader (rated by external observers) performed better on a word puzzle task than groups in which no clear leader emerged. And, more hierarchically structured basketball teams performed better in the National Basketball League (NBA) than less hierarchically structured teams (Halevy, Chou, Galinsky, & Murnighan, 2011b). It has to be noted that these positive effects of power hierarchies on group performance have been shown for formal hierarchies (e.g., Greer & Van Kleef, 2010) and for groups with an emergent leader (DeSouza & Klein, 1995). However, it has not been shown for *emerging power hierarchies*. This is important to study because very often there is no formal hierarchy assigned to work teams; but power hierarchies still form.

In this research, we test whether the more a group of people (who do not know each other and interact with each other for the first time) is hierarchically structured with respect to power, the better that group performs on a problem solving task (Hypothesis 1).

An emergent group hierarchy will most likely be perceived as legitimate by the group members because emergent power hierarchies are typically formed based on individual group members' task-competence. Expectation States Theory (EST; Ridgeway & Berger, 1986) claims that group members in peer groups judge other group members with respect to their task-competence in that they build performance expectations about the other group members' ability to contribute to the task. These expectations become self-fulfilling prophecies: Group members behave according to these performance expectations. To the extent that actual task-competence is expressed by the competent group members and perceived as such by the others, the emerging power hierarchy should reflect the actual task-competence hierarchy in a group. Such an alignment of the power hierarchy with the task-competence hierarchy seems beneficial because it provides the most task-competent group members with the most influence, increasing the likelihood of a group performing well. We therefore expect that the more the power hierarchy within a group corresponds to the group's task-competence hierarchy, the better the group performs (Hypothesis 2).

METHOD

Participants

Participants were 100 men and 48 women. Their average age was 25 years ranging from 18 to 46. The

sample consisted of 12 three-person groups and 28 four-person groups. Twenty-five of those 40 groups were mixed-gender groups, one all-female group and the rest were all-male groups.

Flyers announcing the study and motivating people to participate were placed at two Swiss universities and at one Business and Management School, both located in the French speaking part of Switzerland. The flyers informed people that they would be paid the equivalent of 20 US\$ for their participation. Participants were master or PhD students mostly from natural science.

Procedure

Participants engaged in a group discussion that was based on the "Winter Survival Task" (Johnson & Johnson, 1987) which is often used as a tool to investigate emergent group hierarchies and problem solving in small groups (Littlepage, Schmidt, Whisler, & Frost, 1995). The task requires a group to come to a consensus decision reached through a group discussion. After the group discussion, participants indicated how dominant they perceived each group member to be. Participants were then debriefed, thanked and paid.

Material

Winter Survival Task (Johnson & Johnson, 1987)

Group members are told to imagine just having survived an airplane crash in Northern America. They are lost in the wilderness and should consider the number of people in their group as the number of plane crash survivors. Some of the group members have salvaged 12 items (e.g., ball of steel wool or compass). The group's task is to rank those 12 items according to the importance for their survival. Before the discussion starts, each participant is asked to complete the ranking of the 12 items individually on a sheet of paper. Participants are then given 15 minutes to find a consensus solution (average length: 14.61 minutes, range: 8–19 minutes). A validated expert solution is compared to the individual and the group solutions to obtain a measure of individual task-competence and of group performance.

Measures

Perceived dominance

After the group task, participants indicated how dominant they perceived each group member to be on seven items: dominates, imposes, addresses the group, forces his or her views, is not easily persuaded, gets involved in the discussion, and leads, using a Likert scale ranging from

TABLE 1

Partitioned variance for perceived dominance as a measure of interdependency between group members (Social Relations Model; Kenny & La Voie, 1984)

<i>Effects</i>	<i>Perceived dominance</i>
Perceiver	.08
Target	.24
Relationship	.08

Note: Entries are estimates of covariance parameters.

1 (*not at all*) to 5 (*frequently, if not always*). For each participant, how dominant he or she was perceived by every group member was calculated by first averaging the seven dominance items per perceiver and then averaging across perceivers ($M = 2.99$, $SD = 0.58$). Each participant obtained therefore a perceived dominance rating from all other group members. Means ranged from 2.40 to 3.40 (SD from 0.14 to 1.21) across all groups. Note that perceived dominance of a participant means the degree to which he or she was perceived as behaving dominantly by all other group members. The inter-rater agreement between the group members on the perceived dominance ratings was high ($ICC[1] = .38$, $ICC[2] = .61$, $F = 3.19$, $p < .05$, $r_{wg} = .84$).

To test the reliability of the group members' ratings on the group level, we conducted a social relations model analysis (Kenny & La Voie, 1984). This analysis informs about whether the perceived dominance rating really is an assessment of the targets more so than it reflects the assessment style of the perceiver. Table 1 shows the partitioned variance for perceived dominance, indicating that the target effect explained most of the variance in the perceived dominance ratings. Thus, perceivers revealed a high consensus in evaluating other group members (targets).

Emergent power hierarchy

We calculated the degree of hierarchical organization within each group based on the perceived dominance ratings. If each group member is perceived as equally dominant, there is no hierarchical organization in the group. Conversely, if some participants are seen by their group members as more dominant than others, a power hierarchy is present. We used the standard deviation of perceived dominance across group members within each group ($M = 0.54$, $SD = 0.28$) as the measure of hierarchical organization within a group (Roberson, Sturman, & Simons, 2007).

Group performance

The group performance was assessed on the basis of the sum of absolute differences between the group's

final ranking and the experts' ranking for each item. With this scoring, a small value indicates a good group performance. For convenience, we reversed the score so that higher values stand for better group performance ($M = 25.28$, $SD = 9.70$, range from 12 to 50).

Individual task-competence

To assess the task-competence of each participant individually, we calculated the sum of absolute differences between the expert's final ranking and each participant's initial ranking for each of the items to be ranked. Because also here a small value indicates a good individual task-competence, we reversed the scoring so that higher values correspond to better individual task-competence ($M = 22.40$, $SD = 4.35$).

Correspondence between power and task-competence hierarchy

To assess the degree of correspondence between the perceived dominance rating and the actual individual task-competence, we correlated these two variables within each group. The correlation coefficient was Fisher-transformed for normalisation ($M = .43$, $SD = 1.32$). The perceived dominance ratings were significantly positively related to individual task-competence scored in groups, $t(39) = 2.07$, $p = .045$.

Task-competence hierarchy

Similar to the power hierarchy, we assessed task-competence hierarchy based on the standard deviation of individual task-competence across group members within each group ($M = 7.62$, $SD = 3.43$).

RESULTS

To test our hypotheses, we regressed group performance onto emergent power hierarchy and onto the correspondence between the power and the task-competence hierarchies, including group size and the percentage of women in the group¹ as a control variable. In order to control for the mean level of perceived dominance and task-competence, as well as the task-competence hierarchy, we also included these variables in our regression model. Table 2 shows the results of this analysis. Confirming Hypothesis 1, the hierarchical power structure in the group positively influenced group performance. Hypothesis 2 was, however, not confirmed: Group performance was unaffected by the degree of correspondence between the power and the task-competence hierarchies within a group. The mean level of individual

¹ To address potential gender differences within group, we controlled for the percentage of women in each group.

TABLE 2

Multiple regression analysis with emergent power hierarchy, power-competence alignment, task-competence hierarchy, mean perceived dominance and mean task-competence predicting group performance (controlling for group size and proportion of women in the group)

Variables	B (SE B)	β
Emergent power hierarchy	12.32 (5.20)	.36*
Power-competence alignment	-0.58 (1.13)	-.08
Task-competence hierarchy	-0.17 (0.45)	-.06
Mean perceived dominance	-0.70 (5.70)	-.02
Mean task-competence	0.86 (0.34)	.39*
Proportion of women in the group	-2.33 (5.74)	-.06
Group size	-7.19 (3.22)	-.34*

Note: $R^2 = .36$ ($p = .033$). * $p < .05$.

task-competence was positively related to the group performance, whereas the mean level of perceived dominance and the task-competence hierarchy both were unrelated to group outcome. Finally, the smaller the group, the better it performed.

DISCUSSION

The goal of this study was to test whether the degree of hierarchical structure within a group affects group performance (Hypothesis 1) and whether the group's power hierarchy needs to correspond to the group's competence hierarchy in order to result in better group performance (Hypothesis 2). Confirming existing results showing that a more hierarchical power structure is beneficial for group performance (DeSouza & Klein, 1995; Greer & Van Kleef, 2010), we showed that increased power hierarchy was related to better group performance in a context of *emergent hierarchies* in peer groups. To study emergent hierarchies in such groups is important because many work teams do not have a formal hierarchy in place when they work together on a project. Nevertheless, hierarchies form. The emergence of such hierarchies seems beneficial because—as our results illustrate—they are related to better group performance. Power structures thus seem to help the group members to focus on the task at hand, most likely because power hierarchies—not only established ones but also emergent ones—reduce power struggles and thus group conflict (e.g., Greer & Van Kleef, 2010; Halevy et al., 2011b).

Typically, power hierarchies form around group members' individual task-competence differences (EST; Ridgeway & Berger, 1986). This correspondence, however, did not affect group performance (Hypothesis 2 was not confirmed). Put differently, the degree to which the power hierarchy is based on the task-competence hierarchy within a group does not affect overall group performance. An *emergent* power hierarchy might create a constructive work atmosphere (by reducing eventual

power struggles and thus conflict) which might free up cognitive resources in the group members and thus enable the group to focus on the task at hand with the result that the suggestions of the less dominant but task-competent group members are taken into account for the task solution. Our results also show that the more task-competent the group members were overall, the better the group performed. This is not surprising, as research shows that highly competent group members lead to better group performance (Laughlin, 1978).

For groups working on tasks that require different types of expertise for the successful task solution (interdependent tasks) it has been suggested that hierarchies are beneficial (Halevy et al., 2011b). Our research shows that also for a non-interdependent, disjunctive task, power hierarchies can be beneficial. Moreover, Halevy and colleagues (2011a) suggest that only in groups in which the group members perceive the hierarchy as legitimate does the existence of a hierarchy result in better group performance. Even if emergent hierarchies are most likely perceived as being legitimate, future research might want to investigate this aspect in a systematic way and disentangle legitimacy of the hierarchy from the type of task (interdependent or non-interdependent).

If emergent power hierarchies are beneficial for the group's task solution, groups can be taught that building hierarchies is in the interest of task accomplishment and that they should not try to adhere to a flat hierarchical structure. Our results serve to educate people and to show the benefits of emergent power hierarchies. They might also serve to put power hierarchies in a more favourable light than they currently are (Galinsky, Magee, Inesi, & Gruenfeld, 2006).

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