

Crossing power level and power use: Differential effects on performance and learning

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Social power may be used in line with the interests of other(s), called promotive control, or used against their interests, called restrictive control. The authors predicted that promotive control would further knowledge acquisition in collaborative decision making, leading to near-optimum solutions, whereas restrictive control would distort information processing and impair the decision quality. Moreover, the more powerful were predicted to learn less from collaboration if they used restrictive control because they were expected to be less interested in another's knowledge. A 2 (power level) \times 2 (power use) experiment set up as an assessment center supported these hypotheses. Overall, this research points to the superiority of the promotive use of power over its restrictive use.

Keywords: Power potential; Power use; Group decision making; Learning; Performance.

Social power pervades our lives. As children we have to cope with our parents' power, and we try to enlarge our discretion, to modify our parents' behavior, and to influence their thoughts in a desired direction. Similar things happen at school, in leisure time, and at work with our supervisors, colleagues, and subordinates, with our friends and partners. It is no wonder that "power" or "dominance–submission" has been shown to be the second most important universal interpersonal dimension after "affiliation" or "friendliness–hostility" (Foa, 1961; Lonner, 1980; Wiggins, 1991; Wish, Deutsch, & Kaplan, 1976). While there is a growing body of research on

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We thank Paul R. Nail, the associate editor in charge, and the anonymous reviewers for helpful suggestions.

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<http://www.psypress.com/socinf> DOI: 10.1080/15534510903160522

power and power bases as a *potential* to obtain desired outcomes (e.g., Brauer & Bourhis, 2006; Hollander, 1985; Keltner, Gruenfeld, & Anderson, 2003; Overbeck & Park, 2006; Raven, Schwarzwald, & Koslowski, 1998), there is less systematic research on the *uses and abuses* of power (e.g., Cialdini, 1993; Coleman, 2004; Georgesen & Harris, 2006; Kipnis, 1976; Lee-Chai & Bargh, 2001; Scholl, 1996, 1999, 2007). In two special fields one can find more systematic research on such different uses of power and their consequences for effectiveness. One is the research on democratic versus authoritarian leadership following Lewin, Lippitt, and White (1939). The other is the research on conflict management styles following Blake and Mouton (1970), distinguishing especially between problem solving/collaboration versus forcing/contending. But using power is not confined to leadership or conflict management; it is a ubiquitous phenomenon in any kind of social interaction. Therefore we distinguish systematically between using power as promotive control versus restrictive control (see next section). Further, we will consider the combinations of different power potentials with different modes of using power in behavioral interaction and investigate their consequences in decision making with regard to learning and performance. This field is of great relevance for everyday collaboration.

CONCEPTS AND HYPOTHESES

The use of power is usually termed social influence without further systematic distinctions (e.g., Cartwright, 1959; Raven, 1992): "Influence is power in action" (Hogg & Vaughan, 2002, p. 238). But beneath that generally accepted view there are several side currents with a qualitative distinction between power and influence. For instance (Turner, 1991, p. 85):

...in reality, power and influence are alternatives. One resorts to coercion when one cannot influence; and if one can influence, one does not need power (Moscovici, 1976). It is questionable how far influence can be explained by power.

Somewhat different is the following conceptual distinction of Partridge (1963, p. 111):

Influence: "A affects the behavior of B in intended ways, without its being true that B is required to subordinate his own wishes, inclinations, beliefs, interests, etc. to those of A."

Power: "A directs or controls the behavior of B and where A's wishes prevail over those of B."

Similar distinctions have been made by other authors (e.g., Abell, 1977; Etzioni, 1968; McClelland, 1970; Simon & Oakes, 2006). And in terms of the

interpersonal circumplex (e.g., Freedman, Leary, Ossorio, & Coffey, 1951; Wiggins, 1991) there is the well-established distinction between hostile dominance, where the preferences of others are hurt, and friendly dominance, where others are supported, given advice, or are freely rewarded.

The obvious fact that there are fundamentally different modes to use a power potential should be conceptualized systematically. In line with the above-cited view of Partridge (1963), the critical difference seems to be that the preferences or interests of the target person are either taken into consideration, preserved, and possibly promoted, or ignored, harmed, and restricted. In the first case, the autonomy of the other is respected; one's own freedom to act is not used to restrict the freedom of the other, whereas the opposite holds true in the second case. So, while seeing social influence as power in action, we can further distinguish between promotive and restrictive influence, or between *promotive and restrictive control* (Scholl, 1999, 2001), where "control" emphasizes the active, intentional use of power—a potential (cf. Tannenbaum, 1968; Tannenbaum, Kavcic, Rosner, Vianello, & Wiesner, 1974). Thus, *promotive control* is defined as an intended impact *in line with* the interests of the target individual(s), whereas restrictive control is defined as an intended impact *against* their interests.¹ In our orthogonally designed experiment we compared high and low power as distinct potentials, and promotive and restrictive control as different usage of such power potentials.

The distinction between promotive and restrictive control makes it possible to form and test new hypotheses. Promotive control by definition respects the interests and opinions of others so that people can learn from one another and produce new knowledge about the task at hand. With restrictive control, people try to push their own interests and opinions through, and they either ignore the opinions of others or try to make them conform to their own ideas with assertive techniques or biased information. In organizations, restrictive control may take more severe forms of exerting conformity pressures as highlighted in group-think research (Janis, 1982; Tetlock, Peterson, McGuire, Chang, & Feld, 1992), excluding relevant others from decision making, using the tactic of accomplished fact, or by

¹ This distinction, developed in Scholl (1992) and renamed for English language use by Scholl (1999), resembles that of Simon and Oakes (2006) and also encompasses dependencies and the construction of meanings. On the other hand, it does not imply that incompatible interests, goals, and values are solely originating from differing identities and are directly tied to coercive, repressive uses of power. Incompatible interests often originate from similar identities, which lead to competition, e.g., getting a top position. And although incompatible interests often give rise to using power as restrictive control there are still the possibilities of abstaining from repressive, restrictive uses of power in fair competition as well as the promotive use of power in searching for alternative solutions that better satisfy the interests of all involved.

making authoritarian decisions (see the cases in Scholl, 2004). Thus, the knowledge of others is not taken into account in decision making, less knowledge is produced in the relevant social unit, and the effectiveness is negatively affected. Our first hypothesis is that *using power as promotive control leads to better knowledge and higher effectiveness than using restrictive control (H1)*.

Using power in a restrictive way may be an important cause of process losses in the sense of Steiner's (1972, 1976) model of group productivity. If the information and opinions of others are not seriously taken into account as a consequence of restrictive control, then process losses are almost certain. On the other hand, promotive control is likely to activate others to contribute as much as possible to the common endeavor. Therefore, the second hypothesis states that *restrictive control produces process losses that can be largely avoided by using promotive control (H2)*.

Power can be acquired via different bases. In our experiment we chose information as a power base (Raven, 1992) because it is simple to handle and it can be used for promotive as well as restrictive control like all other bases of power (Buschmeier, 1995; Scholl, 2007), for example by giving or refusing information, or by reflecting or discarding the information given. If information is used as a power base, then *a person who has more information than his or her collaborators will have a greater impact on the joint decision, regardless of the mode of using power, i.e., as promotive or restrictive control (H3)*.

Perhaps most interesting is the last hypothesis, which deals with the interaction of the level of power and its use as promotive or restrictive control. Earlier we argued that power used as restrictive control harms or even impedes the discussion and learning process. The question is whether all those involved learn less; or primarily the less powerful because they have fewer resources to understand the problem; or mainly the more powerful by ignoring the possible contributions of the less powerful. The evidence speaks for the last alternative. Fiske (1993) found that powerful people are less attentive and react with more stereotypic cognitions than less powerful people. In a field study on innovation processes, Scholl (2004, Ch. 6) found that the knowledge of lower ranks is often underestimated by higher-ranking people and is not adequately used in decision making. Klocke (2004) found that experimentally induced power holders gained significantly more task knowledge under promotive control than under restrictive control during joint task completion; such differential effects were not found for the target persons, presumably because high-power people state their opinions at length, no matter whether it is accompanied by promotive or restrictive control. Therefore, the fourth hypothesis is that *high power people using restrictive control learn less from collaboration (i.e., show less improvement through discussion) than those using promotive control (H4)*.

A 2×2 experiment (high versus low power, and promotive versus restrictive control) was conducted in order to test these hypotheses.

METHOD

Participants and design

A total of 80 students (26 male, 54 female) from various departments of two Berlin universities participated in an experimental session which was announced as an assessment center exercise, a situation of high relevance when applying for one's first full-time job. Individual feedback was promised (and given in the debriefing phase). Additionally, the three best participants could win EUR 20, 15, and 10, and small prizes were promised for the fourth to tenth best participants. In each session, lasting about 1½ hours, two students solved two tasks on their own and one task as a dyad. In a 2×2 mixed factorial design, students and dyads were randomly assigned to the different conditions: level of informational power (high vs low), manipulated within dyads, and control mode (promotive vs restrictive control), manipulated between dyads.

Main task

Participants had to rank 10 luxury goods according to their price level. The goods ranged from an Arab dressage stallion for EUR 10,000 up to a Cessna Station Air 206H airplane for EUR 280,000. Since exact prices are subject to fluctuations and may be negotiated, only the ranking of the prices of the 10 goods had to be judged. Individual solutions were used to calculate nominal group performance as the potential group productivity baseline. The task contains disjunctive and compensatory elements (Steiner, 1976): Large price and rank differences can be distinguished with some background knowledge (disjunctive part), whereas the precise ranking of these 10 goods cannot really be known, so that intuition is important and an overestimation may be compensated by the underestimation of the other (compensatory part). Both experimental participants received some information about each item to give them background expertise for the estimation. While the task may not be usual in everyday life, such a mix of disjunctive and compensatory elements is typical for all important economic and political decisions because they reach into an unknown future: Although guesses from experts will on average be better than those from lay-people (disjunctive part), even the brightest persons and groups also have to rely on their intuition in order to grasp at least the main trends (compensatory part). For instance, whether the appropriate mix of technology, usability, design, and price of a new product was chosen for the intended customer group and whether competitors will bring better or less-attractive rival products to the market

cannot be known in advance, so collaborative guesses by the involved experts are necessary (compensatory part), although it is possible to assemble a lot of information about all these aspects in order to base one's decisions on reasonable assumptions (disjunctive part).

Procedure and experimental manipulations

Two students, unknown to each other, came to the group laboratory. They were introduced to the purpose and procedure of a typical assessment center. They were informed that the 10 best-performing individuals on all three subsequent tasks would receive graded rewards. They responded to some socio-demographic questions about age, gender, college GPA, years of study and/or professional experience, study subject, and degree of acquaintance to assess variables that could bias the dependent variables. They then received the task sheet and a sheet with additional information, and were asked to work on the price rank estimation task on their own. In order to manipulate different power levels, they were told that there was more information on one sheet than on the other. In a random procedure one participant received more information than the other, thus getting more informational power. It was important that both participants knew who had more information because the subjective opinion that one has more of a needed resource than the other is more relevant for the effect of a power base than the actual possession of the resource. Participants were then offered 15 minutes to read the information and to complete the ranking task individually.

Next in the supposed assessment a "language test" was given to the dyads, actually a priming task to induce either promotive or restrictive control behavior during the following discussion. The priming task was the so-called Scrambled Sentence Test where in each of several items four out of five "scrambled" German words had to be brought into the right order of a meaningful sentence (Srull & Wyer, 1979). In the two manipulated versions 15 of the 30 items contained an adjective, noun, verb, or word group semantically related to either promotive or restrictive control; the other 15 items were neutral. Examples for the 15 critical stimuli employed for the promotive control version are the German words for *to advise*, *to support*, *tolerance*, and *cooperative*; e.g., "much tolerance drinks water he." For the restrictive control version examples of the 15 critical stimuli are *to assert*, *dominated*, *competition*, and *authority*. The words associated with the concept of promotive control were based on the dominant-friendly quadrant of the Interpersonal Adjective List (IAL), a German version of the interpersonal circumplex (Jacobs & Scholl, 2005), and the words associated with restrictive control on the dominant-hostile quadrant, because these two quadrants are perfect representations of the basic

conceptual distinction explained above. Since student participants (perhaps especially German ones) are not inclined to use restrictive control in an experimental situation, behavioral instructions based on Hall (1971) and Klocke (2004) were employed additionally, to manipulate the two control modes. The promotive control instruction stressed openness to others' opinion and constructive discussion as assessment criteria, whereas the restrictive control instruction stressed remaining firm, being assertive, directing the discussion, and prevailing with one's opinion if personally convinced. Both instructions, although quite different, employ everyday thoughts about the behavior of people in powerful positions. Each is well prepared through the preceding priming task, and strengthens and prolongs the priming effect over the whole interactive period. In addition, in order to secure the manipulation, we manipulated both discussants with either promotive or restrictive control because both behaviors shown by one person tend to reinforce similar behavior by the other, in the experiment as well as in organizational reality (Scholl, 2007, 2009).²

The final discussion task consisted of working as a dyad on the estimation task by discussing the existing information and the individual estimations in order to arrive at a best possible joint estimation. For a really good estimation, the two participants would have to thoroughly exchange and evaluate their information during the dyadic discussion. This aspect partly resembles hidden profile experiments (Stasser & Titus, 1987), and should mirror the collaboration of diverse experts in complex decisions.

Measures

In order to measure the effectiveness of the estimation task, the rankings of the items were evaluated by comparing them to the correct solution. The differences between the correct and the estimated ranks were given a negative sign and were summed up into a final score; for instance, if item G is the 3rd most expensive one but a participant ranked it 1st (or 5th), then he earned -2 points. Sums over all estimated ranks could range from 0 to -50, a complete reversal of the correct ranking, and a total of -25 would not be better than chance. For ease of graphical presentation, a constant of +25 is

² In a pilot study we first tried to prime and to instruct only one dyad member to use either promotive or restrictive control, but in the interaction with the "normal" other student the verbal and non-verbal indications for restrictive control behavior soon disappeared; most probably the situation for our students in an experiment is by far not so grave and not so habituated as in a real-life context. With a cluster analysis we found either mutual promotive collaboration or mutual restrictive control behavior in our field study on conflicts in innovation processes (Scholl, 2009), which justifies subjecting both of the dyad members either to the promotive or to the restrictive control manipulation.

added to the totals so that 0 is the chance value and 25 a perfectly correct result.

In order to test whether the priming and the instructions worked and to gain additional information about possible confounding variables, a questionnaire was created. It included questions to assess whether the intention of the ostensible language test (the priming task) and the instructions had been discovered (e.g., Did some words from the Language Test appear conspicuous to you? Yes - No. If yes, which ones?). Questions on age, gender, study subject and experience, degree of acquaintance, etc. were measured as possible confounding variables. For a manipulation check of the control mode, the questionnaire comprised two participation scales to rate how well the participant and the partner could bring their ideas and information into the discussion (scaled from 1 = not at all to 5 = very well). The manipulation of the power level was checked with feeling powerful. The Self-Assessment Manikin (SAM: Bradley & Lang, 1994), measuring dominance in a graphical presentation scaled from 1 to 9 (besides pleasure and arousal), was completed before the first task as a baseline and again after the manipulation of the power level and the individual task completion.

In the course of the experiment five dyads were substituted with new ones because two had possibly detected the hidden meaning of the priming task and three had not completely filled out the questionnaire.

Data were obtained from individuals, except the dyadic ranking, which is a genuine group measure. All statistical tests of the hypotheses are one-sided.

RESULTS

Manipulation checks

Participants with high informational power showed—only after the power level manipulation—significantly more dominant feelings than participants with low informational power as assessed by means of the SAM (Bradley & Lang, 1994). Whereas at the beginning of the experiments the dominance feelings were almost identical ($M_{\text{HighPower}} = 5.52$, $M_{\text{LowPower}} = 5.55$), after the manipulation and after the individual task completion participants in the low power condition felt significantly less powerful ($M_{\text{HighPower}} = 5.55$; $M_{\text{LowPower}} = 4.98$); a two-way repeated measures ANOVA comparing post-with pre-manipulation scores delivers a significant interaction effect: $F(1, 39) = 5.12$, $p < .05$, $\eta^2 = .12$, a medium effect. Thus, the manipulation of power was assumed to work in the required way. Moreover, participants with more information performed significantly better than those with less information ($M_{\text{MoreInfo}} = 10.1$, $SD = 5.6$; $M_{\text{LessInfo}} = 7.7$, $SD = 6.2$); $t(78) = -1.8$, $p < .05$, $d = 0.40$. In order to see whether different information

levels are really differently strong bases of power, the reader is referred to the test of the third hypothesis.

As manipulation check for the second factor, participants rated their ability to bring in their ideas and information as better when working under the promotive control condition than when working under the restrictive control condition ($M_{\text{promotive}} = 4.2$, $SD = 0.9$; $M_{\text{restrictive}} = 3.7$, $SD = 0.6$); $t(68.8) = -2.520$, $p < .05$, $d = 0.57$. Almost the same ratings were given on average for their partners' participation ($M_{\text{promotive}} = 4.3$, $SD = 0.6$; $M_{\text{restrictive}} = 3.8$, $SD = 0.7$); $t(1.78) = -3.053$, $p < .01$, $d = 0.69$). Thus the manipulation of the control mode apparently worked as desired.

The confounding check showed that none of the variables in question (gender, age, study, etc.) correlated with the dependent variables.

Test of the main hypotheses

An independent samples t -test was run, showing that dyads under the promotive control condition had a higher performance score ($M = 14.40$, $SD = 4.7$), i.e., a better ranking result than participants under the restrictive control condition ($M = 12.05$, $SD = 3.7$) (see Figure 1). Thus, dyads under the restrictive control condition performed significantly worse than dyads under the promotive control condition, $t(38) = 1.75$, $p < .05$, $d = 0.51$. This is a medium effect, supporting hypothesis 1. Because of some outliers the analysis was repeated with a Mann-Whitney U Test; it almost reached 1% significance ($U = 124$; $p = .018$).

What does this result mean compared to the potential productivity of the dyad *sensu* Steiner (1972)? In order to check for possible process losses of the dyads, nominal group productivities were calculated, i.e., the productivities that would result if group members optimally combined their individual solutions. As the estimation task consisted of disjunctive as well as of compensatory elements (see the procedure section), disjunctive as well as compensatory nominal group scores (Steiner, 1976) were calculated and then averaged. That is, for the disjunctive baseline the better of the two individual ranks for each of the 10 items was chosen to calculate a potential effectiveness score; for the compensatory baseline the average of the two individual ranks for each of the 10 items was chosen. Finally, the average of disjunctive and compensatory potential productivity scores was calculated for each dyad as the most appropriate group potential productivity score. As expected, nominal group scores did not differ between the power mode conditions because of the randomized allocation of the participants to the experimental conditions (see Figure 2). Figure 2 also shows that under the promotive control condition there were almost no losses in productivity compared to the nominal group—14.5 nominal versus 14.4 real—whereas

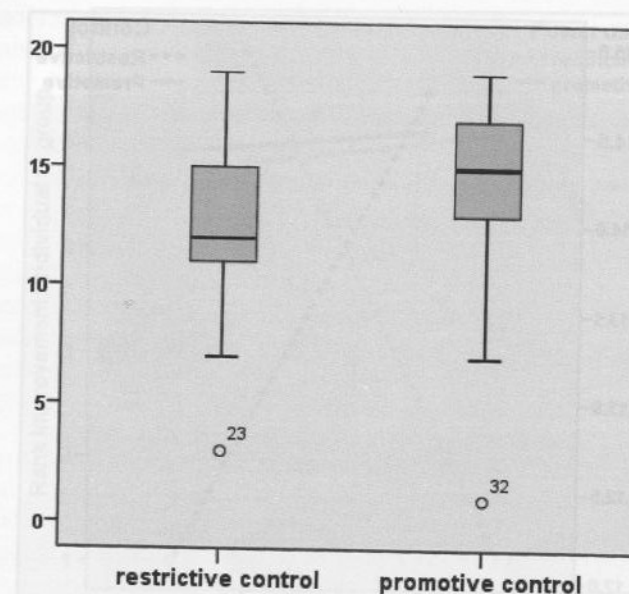


Figure 1. Effects of control mode on group performance. (Ordinate = ranks better than chance; small circles are outlier groups.)

losses were substantial under the restrictive control condition, with 14.8 nominal versus 12.1 real.

An analysis of variance was run with promotive versus restrictive control as between dyads factor and with nominal versus real group productivity as within dyads factor. As hypothesized, the interaction is significant: $F(1, 38) = 5.24$, $p < .05$, with partial $\eta^2 = .12$. This finding supports hypothesis 2 that productivity losses can largely be avoided if promotive instead of restrictive control is used in groups. Also, as often found in group experiments, there is a significant main effect that nominal groups are better than real groups (14.6 versus 13.3); $F(1, 38) = 6.33$, $p < .01$, partial $\eta^2 = .14$. But it can be seen very clearly from Figure 2 that this effect is almost solely due to the process losses in the restrictive control condition.

In order to see whether high informational power individuals had a stronger impact on the group estimate than low informational power individuals (hypothesis 3), the differences between individual and group estimates were computed over all 10 items and averaged. Here the idea is that a higher power level will bring the group estimate closer to the individual estimate of the powerholder. In a repeated measures ANOVA with power level as within factor and control mode as between factor, the

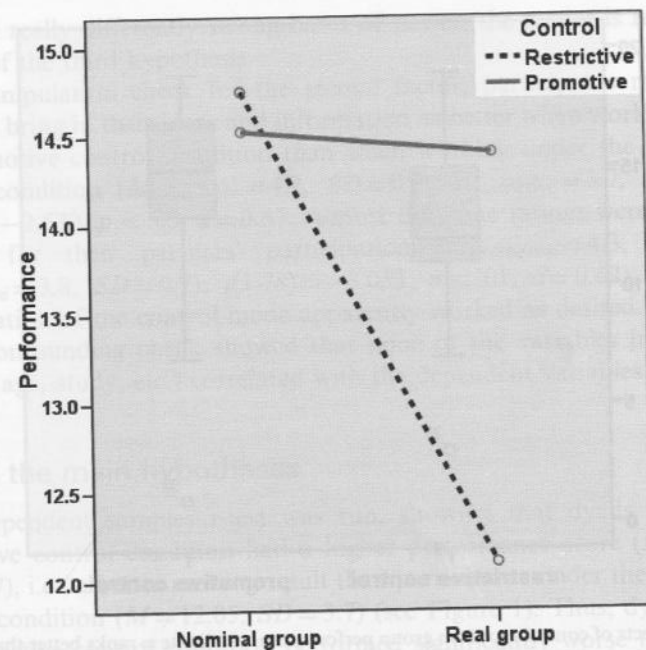


Figure 2. Effects of control mode on process losses.

average group estimates were significantly more similar (=smaller differences) to the preceding individual estimates of the high informational power participants than to those under low informational power ($M_{\text{HighPower}} = 1.26$, $SD = 0.66$; $M_{\text{LowPower}} = 1.64$, $SD = 0.65$); $F(1, 38) = 5.50$, $p < .05$. This result supports the idea that the different information given was used by the participants as a power base. Additionally interesting is that the differences between individual and group estimates for promotive control are similar, even a little smaller than for restrictive control; the difference is not significant ($M_{\text{Promotive}} = 1.36$, $SD = .51$; $M_{\text{Restrictive}} = 1.56$, $SD = 0.78$); $F(1, 38) = 1.86$, $p = .18$. It may be concluded that informational promotive control is (at least) not "weaker" than restrictive control.

Hypothesis 4 states that powerful people learn less if they use restrictive control rather than promotive control. Discussion improvement scores were calculated by subtracting the individual differences to the correct rankings from the respective group differences. A two-factorial ANOVA with repeated measures for informational power yields a significant main effect of power level ($M_{\text{HighPower}} = 3.1$, $SD = 4.8$; $M_{\text{LowPower}} = 5.4$, $SD = 6.7$);

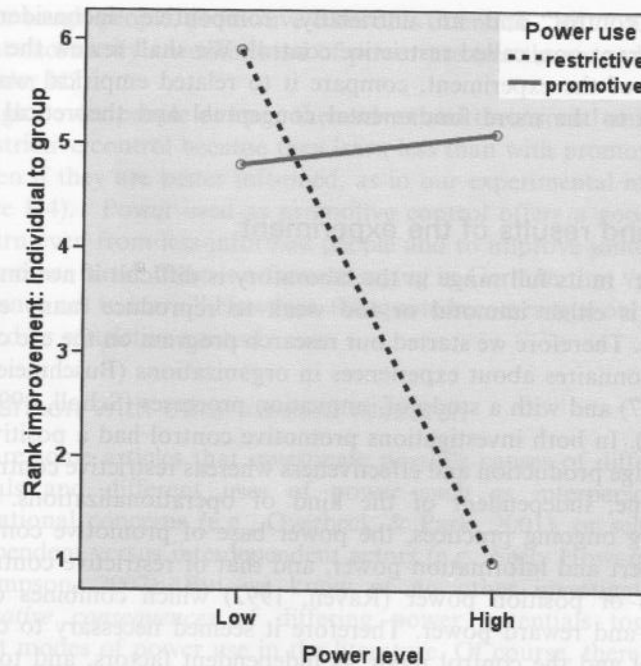


Figure 3. Improvement from individual to group estimates.

$F(1, 38) = 2.83$, $p = .05$; partial $\eta^2 = .07$. This result shows that the information given to the high-power participants was really more useful than that given to the low-power participants. More important, the ANOVA also yields a significant interaction effect of the power level with the control mode ($M_{\text{HP-PC}} = 5.1$, $SD = 3.5$; $M_{\text{HP-RC}} = 1.0$, $SD = 5.2$; $M_{\text{LP-PC}} = 4.8$, $SD = 5.3$; $M_{\text{LP-RC}} = 5.9$, $SD = 8.0$); $F(1, 38) = 3.61$, $p < .05$; partial $\eta^2 = .09$; (see Figure 3). This result supports hypothesis 4 that high power individuals learn or profit less from the discussion with low power individuals if they use restrictive instead of promotive control. The main effect of the control mode is not significant, i.e., the real source of the worse performance of using restrictive instead of promotive control is the combination of higher power with its restrictive use.

DISCUSSION

Our experiment extends a line of research that systematically distinguishes between the main interactive qualities of using power, i.e., between a friendly, cooperative, or at least respectful and considerate one, called

promotive control, and an unfriendly, competitive, inconsiderate, or simply ignorant one, called restrictive control. We shall review the method and results of the experiment, compare it to related empirical work, and then go on to the more fundamental conceptual and theoretical aspects involved.

Method and results of the experiment

Using power in its full range in the laboratory is difficult if not impossible because it is either immoral or too weak to reproduce many everyday experiences. Therefore we started our research program on the use of power with questionnaires about experiences in organizations (Buschmeier, 1995; Scholl, 2007) and with a study of innovation processes (Scholl, 1996, 1999, 2001, 2004). In both investigations promotive control had a positive effect on knowledge production and effectiveness whereas restrictive control had a negative one, independent of the kind of operationalizations. Yet, in representing ongoing practices, the power base of promotive control was mostly expert and information power, and that of restrictive control most often legal or position power (Raven, 1992) which combines coercive, legitimate, and reward power. Therefore it seemed necessary to cross the power level and the control mode as independent factors, and to use the same power base for that purpose. Informational power was used because it is best suited to be brought into the laboratory.

Even with informational power it is difficult to induce students to use restrictive control, perhaps especially in real behavioral interaction as in our experiment. So two experimental manipulations, priming and instructions, were combined for that purpose, and the experimental scenario of an assessment center gave both methods an appropriate frame. Also, the newly constructed task has several advantages: It was engaging for the participants, it was largely unknown to them so that information could be manipulated as the relevant power base, it allowed several precise calculations, and its mix of disjunctive and compensatory elements mirrors the quality of the most important decision matters in life, such as economic or political strategies, product and process innovations, long-term investments, choosing a life partner, or raising children.

The experiment supported our hypotheses unambiguously. Promotive control is superior to restrictive control in key aspects:

- There is more collective knowledge production, resulting in better estimates and higher effectiveness (see H1).
- Process losses, which often devalue the expected advantages of group work and joint decision making, can be largely avoided with promotive control rather than restrictive control (see H2).

- For tough people, promotive control is often too "soft"; however, it is not necessarily a weaker kind of power use (see the second main effect under H3).
- High power people damage themselves and their social unit if they use restrictive control because they learn less than with promotive control, even if they are better informed, as in our experimental manipulation (see H4). Power used as promotive control offers a good chance to learn even from less-informed people and to improve joint results. On the other hand, there is a famous saying in German that "power is the chance not to learn." However, this quote becomes true only if power is used as restrictive control.

Comparison with other related research

There are some articles that investigate possible causes of differing power potentials and different uses of power such as interpersonal versus organizational concerns (e.g., Overbeck & Park, 2001), or self-construals as independent versus interdependent actors (e.g., Seely Howard, Gardner, & Thompson, 2007). But we know of no other investigation of the *collaborative consequences* of differing power potentials together with different modes of power use in the literature. Of course, there are several hints that point in the same direction as our results. Maier (1967) reviewed his studies about assets and liabilities in group problem solving. He concluded that the assets of groups can be utilized and the liabilities largely avoided if the leader acts as a facilitator for group deliberation, not as a proponent of his personal opinions. Reflected in our terms, facilitators secure promotive control in the group (Schimansky, 2006), whereas if leaders act in a more directive way their opinions partly suppress those of other group members, apparently because of their superior sanctioning power. This topic was sharpened by the group-think research of Janis (1982) and followers. Again, the main factors for bad decision making are directive leadership and conformity pressures (Esser, 1998), or in our terms restrictive control based on a higher power level. As an alternative, vigilant decision making is proposed, which involves an active exposure to the divergent opinions of others, unbiased by status differentials—an instance of promotive control. Yet, in both kinds of research, the level of power is not varied randomly.

Most directly relevant is the research on conflict management styles (Pruitt & Kim, 2004; Thomas, 1992) because a style of "collaboration" is defined by high level of concern about one's own outcomes and those of others, which is a good description of promotive control, whereas a style of "contending" involves to a large extent restrictive control; it is defined by a high concern about one's own outcomes and a low concern about others'.

outcomes. De Dreu, Harinck, and Van Vianen (1999), in their review of research, show that collaboration is a more productive style for solving conflicts whereas contending usually has negative consequences for task accomplishment and breeds further conflict. That is what we also found in innovation processes, and we could show that the lower effectiveness of "contending" was mediated by more "information pathologies," i.e., a lower production of knowledge (Scholl, 1999, 2001)—exactly what is demonstrated here. Again, the level of power was not varied randomly at the same time.

One limitation of our experiment is the investigation of a single power base, namely informational. In future research it would be useful to conduct similar experiments with other bases of power. In our field research we observed that all bases of power can be used for promotive as well as for restrictive control (Buschmeier, 1995; Scholl, 2007); so there should be no problem studying these dynamics with other power bases.

Conclusion

Power can be used to produce more and better knowledge, and better knowledge leads to higher effectiveness; but if power is used restrictively it impedes knowledge production, as shown by this experiment and by earlier field research. The pressing question is why power is so often used as restrictive control, as our field studies or any newspaper show. Is this confirmation that "power corrupts, and absolute power corrupts absolutely" (e.g., Kipnis, 1976; Mitchell, Hopper, Daniels, Falvy, & Ferris, 1998)? Rephrased in our terminology, this would mean that in everyday life the level of power and the control mode are not as independent as in our experiment: the greater the level of power (and the larger the power difference between those involved), the more likely it is that the available power will be used restrictively, at least if the checks and balances are not sufficient. Such a high-power restrictive control syndrome damages the target individuals, and the insight and moral stance of the power holder, as well as the effectiveness of the relevant social unit. Not only may power corrupt, but power "is the chance not to learn," and both together often lead to the ruin of organizations and whole nations, as shown in history. Therefore, extending our research and combining it with Kipnis's ideas should be most worthwhile.

Manuscript received 12 February 2009

Manuscript accepted 24 June 2009

First published online 30 September 2009

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