BELIEFS AND DISAGREEMENT IN ORGANIZATIONS[†]

Authority versus Persuasion

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Managers often face a choice between authority and persuasion. In particular, since a firm's formal and relational contracts and its culture and norms are quite rigid in the short term, a manager who needs to prevent an employee from undertaking the wrong action has the choice between either trying to persuade this employee or relying on interpersonal authority.[1] Herbert Simon (1947) noted, for example, that "when … disagreement is not resolved by discussion, persuasion, or other means of conviction, then it must be decided by the authority of one or the other participant" and that "in actual practice … authority is liberally admixed with suggestion and persuasion." Obviously, in choosing between persuasion and authority, the manager makes a cost-benefit trade-off. This paper studies that trade-off, focusing in particular on agency conflicts that originate in open disagreement, in the sense of differing priors.

To that purpose, I will study a setting in which a principal and an agent are involved in a project. The project's outcome depends both on decisions and on implementation effort by the agent, i.e., on effort to execute the decisions. A key issue is that the principal and agent may openly disagree on which decisions are most likely to lead to a success, even though no player has private information, i.e., the players have differing priors. For such setting, Van den Steen (2002, 2004) and, independently, Yeon-Koo Che and Navin Kartik (2007) showed that open disagreement gives rise to persuasion in a very natural way: each player believes that new information will confirm her prior and thus "persuade" the other. It is exactly this type of persuasion that I will study here.[2] Apart from such persuasion by collecting new information, I will also allow the principal to impose interpersonal authority, i.e., to make it costly for the agent to disobey an order of the principal. The sources of such interpersonal authority in a setting with open disagreement were studied in Van den Steen (2007), which showed that a firm, with its low-powered incentives and asset ownership, may be an important vehicle to convey authority to a principal. In this paper, I will use a reduced form that simply imposes a cost on the agent if he disobeys the principal.

Probably the most important result of this paper is that the principal will rely more on persuasion for projects with a high need for motivation or effort. The reason is that—under the assumption that implementation effort is a complement to correct decisions, i.e., that executing a good project is more valuable than executing a bad project—the agent will exert more effort if

[1] Interpersonal authority can be defined as "the right or power to give orders and enforce obedience." Kenneth J. Arrow (1974) stated that "the giving and taking of orders … is an essential part of the mechanism by which organizations function," while Simon (1947) observed that "[of] all the modes of influence, authority is the one that chiefly distinguishes the behavior of individuals as participants of organizations from their behavior outside such organizations."

[2] There is another natural form of persuasion in a context with differing priors. Suppose that players with differing priors also have private information. The combination of information and priors makes observing others' beliefs insufficient to infer their private information. Communication of private information may then serve to "persuade" others. As shown in Van den Steen (2004), players will want to communicate information that confirms their belief to "persuade" the other and will want to hide information that contradicts their beliefs. Obviously, weak attempts at "persuasion" will be interpreted as a negative signal. But in the context of this paper's model, persuasion would again lead to motivation.

he believes more in the project. From the manager's perspective, persuasion will thus motivate the agent. This makes, in turn, persuasion more attractive on projects where effort or motivation are more important.

Since persuasion can cause compliance even in the absence of authority, it seems that an increase in persuasion should lead to a decrease in the reliance on authority. This is only partially true, however: persuasion and authority can be both substitutes and complements. In particular, I will show that authority and persuasion are substitutes when authority is highly effective but complements when authority is not very effective. To see why, note that if authority alone is not sufficient to make the agent comply, but the combination of authority and persuasion is, then authority is more attractive in the presence of persuasion and vice versa, making them complements. In the other extreme, i.e., at high effectiveness, there are actually two mechanisms that make authority and persuasion substitutes. First, if both authority and persuasion induce compliance, then some of the potential (compliance) benefits of each have already been realized by the other, so that persuasion becomes less attractive in the presence of authority and vice versa. A second mechanism comes from the fact that persuasion may actually fail—when the new information contradicts the principal's belief—and then "wake up sleeping dogs." In particular, if the (persuasion) signal confirms the agent's view, then an agent who *would* have obeyed otherwise may now decide *not* to obey. In that case, persuasion weakens authority, making authority and persuasion substitutes.

It further follows that more important effort or motivation will make the principal rely less on authority in the case when authority is very effective. Finally, authority and persuasion being substitutes also implies, from the perspective of the principal, a trade-off between motivation and cooperation. This trade-off is recognized as one of the fundamental issues in organization design (John Roberts 2004).

Another interesting, but less central, result is that the principal will rely more on persuasion (without authority) when agents have strong pay-for-performance incentives. The reason is that incentives and confidence in the project work multiplicatively. More intuitively, if the agent does not care about the outcome, then there is

little gain from persuading him. Finally, there is also a positive relationship between the confidence of the principal and the use of persuasion (unless effort is not important and authority is very effective). This is caused by the fact that a more confident manager is more convinced that she will persuade the agent, making persuasion more attractive in her eyes. The reason why this relationship does not hold everywhere is that a more confident manager also cares more about the employee choosing the (subjectively) "correct" action, which can make authority more attractive when effort is unimportant and authority is very effective.

Apart from the work already mentioned, this paper is related to a number of strands in the literature. The first is work on persuasion, such as Paul Milgrom (1981), Vincent Crawford and Joel Sobel (1982), Milgrom and Roberts (1986), or Mathias Dewatripont and Jean Tirole (1999), and work on belief formation, such as Roland Bénabou and Jean Tirole (2006) or Bénabou (2008). The second is work that compares different modes of decision making related to authority and persuasion, such as Philippe Aghion and Tirole (1997) or Wouter Dessein (2007). Of particular interest is also Bénabou and Tirole (2002), who studied the connection between confidence and motivation, although they study confidence about one's own abilities rather than confidence about the quality of a project. These two are not unrelated, however: skill and project quality both affect how effort translates into output. That relationship is reflected in the fact that both papers' results are affected by whether effort is a complement to—versus a substitute for—skill or project quality. The two do have very different interpretations and very different implications, however. Finally, the mechanism for motivation in this paper is also related to the result in Van den Steen (2006) that delegation motivates an agent when principal and agent disagree on the optimal course of action: the agent will believe more strongly in projects that he chose himself and thus be more motivated. The difference between that paper and the current model is obviously that in this paper motivation gets induced by persuasion rather than by delegation.

The next Section lays out the model. Section II presents the results, while Section III concludes. All proofs are in the online Appendix (available at http://www.aeaweb.org/articles.php?doi=10.1257/aer.99.2.448).

I. Model

Consider a setting in which an agent executes a project for a principal. The project will be either a success or a failure. A success gives the principal and the agent respective payoffs $\gamma_P, \gamma_A \geq 0$, while their payoffs upon failure are normalized to 0. The project's probability of success (Q) depends on two decisions (D_1 and D_2) and on implementation effort (e) by the agent. The effort $e \in [0, 1]$ is chosen by the agent at private cost $c(e)$, specified below. Each decision D_k is a choice from the set $D_k \in \{X, Y\}$, one and only one of which is correct as captured by the state variable $S \in \{X, Y\}$, which is the same for both decisions.

The state S is unknown, but each player i has a subjective belief about S. A key assumption is that (it is common knowledge that) players have differing priors, i.e., they can disagree about S even though neither has private information.[3] Since the players may have differing priors but have no private information about S, they will not update their beliefs when they meet someone with a different belief: they simply accept that people sometimes disagree. To keep the analysis simple, I will immediately assume that the principal and the agent disagree on S. In particular, it is common knowledge that the principal believes that $S = X$ with probability $\nu_P > 0.5$, while the agent believes that $S = Y$ with probability $\nu_A > 0.5$.[4] Note that the ν_i are the players' confidence in their beliefs.

With $d_k = I_{D_k=S}$, the indicator function that decision D_k is correct and with $\alpha, \beta \geq 0$ (with $\alpha + \beta < 1$) parameters that capture the importance of pure decision making and of implementation effort, the probability of success equals $Q = \alpha d_1 + \beta d_2 e$. This is the simplest functional form that captures all elements necessary to bring out the intuition of the paper. The first term of Q depends completely on a decision by the agent, and its importance is measured by α. The second term depends on the agent's implementation effort, with implementation effort a complement to the decision D_2 so that effort to implement a good project is more valuable than effort to implement a bad project, an assumption that I will discuss below. To simplify the analysis (considerably), I will also assume that the principal gets full and free compliance on D_2, so that it is as if the principal chooses D_2 and so that compliance and authority matter only for D_1. While this functional form for Q is not the most elegant, it is very transparent and will make it very clear what is driving the results.[5]

The timing of the game is very simple. First, in period 1, the principal can try to convince the agent by drawing, at a private cost c_p, a signal about the state of the world. The drawing and the signal itself are publicly observed.[6] The signal is commonly known to be correct with probability p. At the same time as her decision to draw a signal or not, the principal also decides whether to exert interpersonal authority. Exerting interpersonal authority, which comes at a private cost c_a to the principal, makes it costly for the agent to undertake an action against the will of the principal. In particular, the agent will incur a private cost c_d from choosing Y rather than X, i.e., from "disobedience."

In period 2, once the principal has decided on authority and persuasion, both players (simultaneously) choose their actions: the principal (essentially) chooses D_2 while the agent chooses D_1 and e. The cost of implementation effort to the agent equals $c(e) = \beta e^2/2$. The (only) reason to normalize effort by β is to make very clear that the results are not driven by the fact that effort would become cheaper (on a relative basis, in the absence of this normalization) when the part that depends on effort becomes more

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[3] See Stephen Morris (1995), Muhamet Yildiz (2000), or Van den Steen (2007) for more discussion of differing priors.

[4] This assumption is made to simplify the model. See Van den Steen (2007) for a setting where the beliefs are private information, the principal gives an "order," and "disobedience" is disregarding the order. The results of this paper would extend to such a context.

[5] Very similar results obtain in a similar setting with $Q = [\alpha d_1 + \beta e]d_2$ and independent decisions. In that case, the principal's decision is a complement to the agent's full productivity. The main results also seem to hold without the assumption for the original Q that the principal gets free and full compliance on D_2, but at the cost of a considerable increase in complexity. See Rosen (1982) for a motivation why the principal's decision and the agent's effort would be complements.

[6] As pointed out by the discussant, Navin Kartik, the results would also hold if the signal was observed only by the agent. An interesting alternative formulation that fits some settings better would be to let the principal first observe the outcome of her persuasion attempt before deciding on authority.

important. The decisions are noncontractible and each player is free to choose any decision he or she wants, taking into account the private and public costs and benefits.

In period 3, the state is revealed and the project outcome is realized. The players then get the benefits γ_A and γ_P upon success. No further contracting on outcomes or payoffs is possible, so that these payoffs are completely exogenously given. All players are risk-neutral and thus simply maximize the expected value of their project payoffs minus any private costs.

In terms of parameters, I will assume that $\nu_P > \nu_A$ and $\nu_P > p$. The first ensures that the principal will always follow her own beliefs while the second ensures that the signal never changes the principal's mind.[7] These assumptions exclude some cases that, while sometimes interesting in their own right for different reasons, do not contribute to the analysis of this paper. To simplify the statements and analysis, I will also assume that, when indifferent, each player does what the other prefers, not only on the action choice but also for persuasion and authority. That implies that the principal will use persuasion when indifferent but will not use authority when indifferent. Finally, all costs are nonnegative.

II. Results

Let me start by showing that authority and persuasion are complements when interpersonal authority is not very effective, and substitutes when it is very effective. To state this formally, remember that exerting interpersonal authority implies that the agent incurs a cost c_d when going against the principal's beliefs. The agent is thus more likely to obey when c_d is higher, so that c_d is a good measure for the effectiveness of authority. In fact, c_d can be interpreted directly as a measure of the agent's "zone of acceptance" or "zone of indifference." The following proposition then captures the result.

PROPOSITION 1: *Authority and persuasion are complements when* $c_d < \alpha \gamma_A (2\nu_A - 1)$*, and substitutes when* $c_d \geq \alpha \gamma_A (2\nu_A - 1)$*.*

The intuition for this result was explained in the introduction. The nonsymmetric nature of the result, i.e., the fact that the effectiveness of authority plays a role but not the effectiveness of persuasion, may be slightly surprising. This seems to be partially due to the way that persuasion is conceptualized here. In particular, it seems that persuasion along the lines of footnote 2 would result in a more symmetric result. This, and especially its further implications, seems an interesting direction for future research.

I now turn to the most important result of the paper: that the manager will use more persuasion when employee effort or motivation is more important.

PROPOSITION 2: *The set of parameters for which the principal uses persuasion increases in* β*. The set of parameters for which the principal uses authority decreases in* β *if* $c_d \geq \alpha \gamma_A (2\nu_A - 1)$*.*

The intuition is that, with effort complementary to making the right decisions, persuading the agent will increase his effort or motivation. When effort becomes more important, persuasion becomes more attractive and will thus be used more. The negative effect on authority when authority is relatively strong is caused by the fact that the two are substitutes in that case.

This result relies on the assumption that implementation effort is a complement to making the right decisions, i.e., that effort to execute the project is more valuable for good projects than for bad projects. (The case with substitutes is not analyzed here, but I conjecture that the result would go the other way.) This obviously raises the question whether it is indeed the case that effort and decisions are complements. An important element here is the fact that the paper has focused on effort to implement or execute the project rather than on what one could term "corrective effort" which compensates for shortcomings in the project. While the latter is usually a substitute, the first is typically a complement. Of course, unless these two can be distinguished empirically, that only redefines the question. A more direct indication is the work of, among others, Sherwin Rosen (1982) and Michael Kremer

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[7] If $\nu_P < \nu_A$, then the principal may prefer to choose the agent's preferred action on D_2 since the motivating effect can dominate the cost of choosing the (subjectively) "wrong" action (Van den Steen 2006). While this is an interesting observation, it would considerably complicate the analysis without, it seems, adding anything to the central arguments of this paper.

authority is relatively ineffective but substitutes when authority is very effective. This may provide a partial explanation for the well-known motivation-cooperation trade-off. Finally, the principal will also rely more on persuasion (without authority) when agents have higher pay-for-performance incentives.

The paper focused on persuasion by means of collecting new information, but also pointed to persuasion mechanisms by means of existing information. This seems to be an interesting avenue for future research.

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