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On the optimality of diverse expert panels in persuasion games ☆

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ABSTRACT

We consider a persuasion game where the decision-maker relies on a panel of biased experts. An expert's preference is parameterized by his ideal action, or agenda. Common intuition suggests that more information is revealed if the panel includes experts with opposed agendas, because such experts will undo each other's attempts to conceal unfavorable information. In contrast, we show that recruiting experts with diverse agendas is optimal only if the correlation between the experts' types—i.e., whether they are informed or not—is above a threshold. Moreover, if the experts' types are independent, under mild assumptions it is optimal to recruit experts who have extreme but identical agendas. These findings suggest that the diversity of preferences must be considered in conjunction with the diversity of information sources, and it is generally sub-optimal to seek diversity in both dimensions.

1. Introduction

Decision-makers often rely on experts for information. However, the experts themselves may have preferences over the decision and strategically manipulate their advice. For example, suppose that the government is contemplating a policy for environmental regulation and seeks advice from a panel of experts on how stringent the regulation needs to be. An expert may be pro-industry and prefer to remove the regulation altogether, or pro-environment and prefer to have the most stringent regulation feasible. The ideological leanings of the potential members may be publicly known from their past records of public service and/or institutional affiliation. A natural question to ask in such an environment is the following: if the decision-maker could compose the panel by selecting experts with specific preferences, which experts should she choose? Should the panel consist of experts with conflicting ideological leanings, or of experts who share the same ideology?

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Common intuition suggests that a panel of experts with opposed preferences is more conducive to information revelation (see, e.g., Milgrom, 2008; Sward, 1989). The perceived benefit of such a panel is that the competing experts may undo each other's attempts to conceal unfavorable information. The literature on persuasion games has also primarily focused on the settings where the preferences of the informed parties are opposed in some sense (notable examples include Milgrom and Roberts, 1986; Lipman and Seppi, 1995; Shin, 1994, 1998; Glazer and Rubinstein, 2001; and Chen and Olszewski, 2014).

In this article, we argue that the above intuition favoring diversity may be misleading and the question of optimal panel design is considerably more nuanced. We compare a panel composed of experts with opposite preferences (which we call the *diverse panel*) with one where experts have identical preferences (the *homogeneous panel*), allowing for correlation in expert types, i.e., whether or not the experts possess the decision-relevant information. Our main result is that the diverse panel is optimal when such correlation is high and a homogeneous panel is optimal when the correlation is low. In particular, when expert types are independent, a homogeneous panel outperforms the diverse panel in a broad range of environments, including ones that are commonly assumed in the literature.

Notice that correlation in expert types may arise from the similarity in information sources accessed by the experts or similarity in methodology used in analyzing the available data. Thus, our result indicates that it is important to distinguish between two kinds of diversity among the experts—diversity in their preferences and diversity in their information sources—and it is typically sub-optimal to seek diversity in both dimensions.

In a related article, Bhattacharya and Mukherjee (2013; henceforth BM) develop a tractable framework to study persuasion with multiple experts. They also present an example where the decision-maker is better off under a homogeneous rather than a diverse panel. The current article attempts to uncover the key drivers behind the optimal panel design and explores conditions under which each type of panel—diverse or homogeneous—may be optimal.

In our model that closely follows BM's framework, a decision-maker has to choose an action in the unit interval $[0, 1]$. The optimal decision from the decision-maker's point of view is denoted as the state of the world. Her objective is to minimize the loss which is an increasing function of the decision error, i.e., the distance between the state and the action. The decision-maker chooses her action based on verifiable reports from the two experts. The experts have state-independent and monotonic preferences over the decision-maker's action. In particular, an expert's preference is identified by his "agenda" or most preferred action (which can be 0 or 1). Each expert is privately informed of the state with a probability which we refer to as his "quality". Expert types (informed or uninformed) may be correlated. We assume that the information is hard in the sense that the state cannot be incorrectly reported. An uninformed expert must admit ignorance while an informed expert has the choice to either report the state or to pretend to be uninformed. The decision-maker takes the action that maximizes her expected payoff, given her posterior belief about the state based on the reports from the two experts.

In this framework, we ask the following question: If the decision-maker could choose the experts (at the beginning of the game) based on their agendas, what factors drive her choice and when is each type of panel—diverse (experts with respective agendas 0 and 1) and homogeneous (both experts with the same agenda)—likely to be optimal?

The equilibrium in the disclosure game is characterized by the decision-maker's "default action", i.e., the action chosen endogenously when neither expert reveals the state. Each informed expert chooses to reveal the state if doing so gives him a payoff higher than the default, but chooses to pool with the uninformed otherwise. Thus, an expert with agenda 0 reports only those states that are smaller than the default while the one with agenda 1 reports only the states that are larger than the default. This characterization gives rise to a tradeoff between the diverse and the homogeneous panels.

We illustrate this tradeoff by comparing the diverse panel with the left-homogeneous panel (where both experts have agenda 0). In the diverse panel, the experts jointly cover the state space, and if both experts are informed, each state is reported by exactly one of the two experts. Thus, each state is reported with a probability that is equal to the quality of an expert. On the other hand, in the left-homogeneous panel, each (informed) expert reports all states that are smaller than the default. Therefore, ex-ante, each state left of the default is reported with the probability that at least one of the two experts is informed, but the states higher than the default are never reported. Moreover, the default action in the left-homogeneous panel is higher than that in the diverse panel: If both experts in a left-homogeneous panel plead ignorance, the decision-maker rationally places more weight on the expert(s) finding the state to be adverse rather than both experts simultaneously failing to observe the state.

Hence, compared to a diverse panel, in a homogeneous panel the decision-maker learns the state with a high probability if the state lies in a larger subset of the state space, but the states outside this subset are never revealed. The homogeneous panel is therefore more likely to be effective if the corresponding default action is sufficiently extreme (i.e., far enough from the common agenda of the two experts) implying that the set of states over which revelation improves (compared to the diverse panel) is large enough.

The optimal panel is ascertained by comparing the observability and associated losses over different parts of the state space, which, in turn, depend on the decision-maker's risk attitudes, the distribution of the state and the experts' types, and the location of the default actions (an equilibrium object in itself) under the two types of panels. We present two key results that highlight the role of these factors in driving the optimal panel choice.

First, we show that (Proposition 2) there is a threshold of correlation between the experts' types above which the diverse panel is optimal and below which one of the two homogeneous panels is optimal. The result follows from the simple observation that with an increase in correlation, the value of having both experts report over the same set of states goes down while the value of both reporting over different sets of states remains unaffected.