Interim Information Acquisition in Bayesian Persuasion

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Abstract

This paper considers a Bayesian persuasion problem with interim information acquisition by an uninformed receiver. That is, the receiver can acquire information at a cost after observing the information structure but before observing the realized signal. Anticipating the receiver's information acquisition, the sender must design an information structure taking into account the receiver's incentive to acquire information. Thus, whether the receiver becomes informed is endogenous. The sender must consider not only how the receiver responds to a posterior belief induced by the realization of the sender's information structure, but also how the information structure affects the receiver's ex ante value of information acquisition.

We characterize the sender's optimal information structure using a belief-based approach. The key insight is that the sender controls the receiver's value of information acquisition by choosing the information structure. In contrast to a situation without the receiver's information-acquisition decisions, as in Kolotilin (2018), the sender must consider the receiver's incentives to acquire information. Therefore, the standard concavification method of the sender's value function over posterior beliefs is not directly applicable.

Moreover, we conduct comparative statics regarding the cost and precision of the receiver's private information technology. We show that under optimal signals, both players' expected payoffs need not be monotonic in the cost and the precision.

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