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TITLE: Team Decision Problems with Classical and Quantum Signals (with Adam Brandenburger)

We study team decision problems where communication is not possible, but coordination among team members can be realized via signals in a shared environment. We consider a variety of decision problems that differ in what team members know about one another's actions and knowledge. For each type of decision problem, we investigate how different assumptions on the available signals affect team performance. Specifically, we consider the cases of perfectly correlated, i.i.d., and exchangeable classical signals, as well as the case of quantum signals. We find that, whereas in perfect-recall trees (Kuhn [PNAS, 1950], [Contributions to the Theory of Games, Vol. II , 1953]) no type of signal improves performance, in imperfect-recall trees quantum signals may bring an improvement. Isbell [Contributions to the Theory of Games, Vol. III, 1957] proved that in non-Kuhn trees, i.i.d. classical signals may improve performance. We show that further improvement may be possible by use of exchangeable classical or quantum signals. We include an example of the effect of quantum signals in the context of high-frequency trading.