The social influence on explore-exploit decisions

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The explore-exploit dilemma is a common behavioral dilemma that arises any time we must choose between exploring unknown options for information and exploiting known options for reward. For example, when ordering dinner at a favorite restaurant, do you explore a new item on the menu, or do you exploit the pizza you usually get? While much work has looked at how humans and animals make explore-exploit decisions in isolation, real world explore-exploit decisions are often made in social situations, and whether other people explore or exploit may influence our own choice. Thus, if a table-mate orders the pizza first, you may be more likely to order something else instead.

In this work we investigated the effect of social information on explore-exploit decisions in the lab using a social version of our previously published Horizon Task (Wilson et al. JEP:G 2014). In this task, subjects made a series of decisions between two one-armed bandits that paid out rewards from different Gaussian distributions whose means were initially unknown. To give participants some information about the relative value, at the start of each game, participants saw four examples draws from the bandits (either 2 plays from both, or 3 from one and 1 from the other). We also showed them social information in the form of choices that (we led them to believe) were made by another person faced with the same game.

Given this social information there are three ways for subjects to behave: to copy what the other person did (herding), to do the opposite (diversification), or to ignore the other person’s response completely. Using a model we quantified the strength of these social effects as the social bonus, an extra piece of value given to the other person’s choice. By computing the social bonus in a number of different conditions we found it to depend crucially on the interaction of two factors: the number of choices that subjects would make in the future (the horizon) and whether the outcome of the other person’s choice would ultimately be revealed. When the other person’s outcome would remain hidden, subjects had a higher social bonus in long horizon than short one (more herding) that may reflect the fact that making the right choice is harder in long horizon. When the other person’s outcome would be revealed, subjects had a more negative social bonus in long horizon than short one (more diversification) which means that subjects preferred to get more information by choosing the opposite option when there were future opportunities to use them. These findings, suggest that people use social information in nontrivial ways to facilitate explore-exploit decisions.