Social Search: An Experimental Study[*]

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Extended Abstract

Individuals seldom search in isolation. In contrast, they often rely on others' choices and experiences—social information—when deciding what and how much to search about the available alternatives. In online environments, others' choices are readily available via online social networks, popularity rankings, and search engines. Offline, consumers rely on direct observation of, or communication with, their social connections. When individuals search in the presence of social information, many questions of interest arise. How do others' choices affect what individuals decide to search? Do individuals have the incentive to collect information? Do individuals over-exploit their social information or engage in excessive independent exploration? How do others' choices affect this trade-off?

In this paper, we experimentally investigate the interplay between social information and individual incentives to choose and acquire private information.[1]

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[1]To our knowledge, this is the first paper to experimentally investigate information acquisition and choice in the presence of social learning.

We consider a simple variant of Weitzman (1979)'s sequential search model.[2] There are many agents. Each agent chooses between two actions. Actions' qualities are i.i.d. draws about which agents are initially uninformed. Agents wish to take the action with the highest quality. Agents acquire information about the qualities of the two actions via costly sequential search with recall. Searching for an action reveals its quality, but not the quality of the other action. After searching for the first action, an agent decides whether to search for the second action or not. Finally, the agent takes an action from those he searched.

Agents are matched in pairs. Within each pair, agents act in sequence, and we distinguish between first and second movers. First movers act in isolation, whereas second movers have social information. That is, before starting their search, second movers observe the final choice of the first mover they are matched with. First and second movers have the same preferences and, within each pair, they face the same draw of the two actions' qualities. Second movers do not observe first movers' search costs (which are i.i.d. across agents) and search decisions.

Optimal search decisions of agents with social information (second movers) differ in three respects compared to those of isolated agents (first movers). First, second movers are not indifferent about which action to search first, whereas search movers are. In particular, second movers find it optimal to start searching from the action taken by their matched first movers. Second, the expected gain from the second search (and so the incentive to explore) for second movers is lower than that of first movers. Third, whereas the expected gain from the second search for first movers increases as the quality of the first searched action decrease, this is not the case for second movers. In particular, for second movers, the expected gain from the second search is non-monotone (more precisely, inverted-U shaped) in the quality of the first action searched.

Our experimental design aims at identifying which are, if any, the systematic deviations of agents' actual search behavior from the theoretical benchmark. Do second movers start searching from the action taken by their matched first movers? Do agents engage in too much or too little information acquisition? Do under- or over-eager search always occurs or only with/without social information? Under which conditions is agents' sequential search behavior efficient? What helps agents (to learn) to behave efficiently?

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[2]Formally, the model is a simplified version of those in Mueller-Frank and Pai (2016), Lomys (2020), and Lomys and Tarantino (2021)

The experimental design consists of two parts. During the first part, agents train by playing the game as first movers. We rate each agent's performance (in terms of earned payoffs) in the first part. In the second part, we split the agents into two groups. One group plays as first movers; the other group plays as second movers. We then run four treatments.

- *Benchmark Treatment: No Reputation and Exogenous Matching.* We do not communicate first movers' rating in part 1 to second movers in part 2; agents' matching is exogenous (stranger matching protocol).

- *Treatment 1: No Reputation and Endogenous Matching.* We do not communicate first movers' rating in part 1 to second movers in part 2; agents' matching is endogenous (i.e., second movers can choose which first mover they want to be matched with).

- *Treatment 2: Reputation and Exogenous Matching.* We communicate first movers' rating in part 1 to second movers in part 2; agents' matching is exogenous.

- *Treatment 3: Reputation and Endogenous Matching.* We communicate first movers' rating in part 1 to second movers in part 2; matching is endogenous.

In the treatments with communication of the rating, the goal is to allow second movers to make inferences regarding the first mover's ability. The comparison between Treatment 2 and the Benchmark informs us regarding the impact of the first mover ability on the second mover choice between searching and relying on social information. The comparison between Treatment 3 and the Benchmark, instead, allows us to study segregation, and test for behaviors similar to those operating in a "echo chamber" idea, keeping fixed the channel stemming from the observation of the first mover's ability. The comparison between Treatment 1 and the Benchmark is spurious, but, together with the other treatments, allows us to identify the effects of interest.

References

Lomys, Niccolò (2020), "Collective Search in Networks." *Working Paper.*

Lomys, Niccolò and Emanuele Tarantino (2021), "Identification and Estimation in Search Models with Social Information." *Working Paper.*

Mueller-Frank, Manuel and Mallesh M. Pai (2016), "Social Learning with Costly Search." *American Economic Journal: Microeconomics*, 8, 83–109.

Weitzman, Martin L. (1979), "Optimal Search for the Best Alternative." *Econometrica*, 43, 641–654.