Collective search for information

Question:

A product is characterized by two different dimensions that will determine its final value. Lets name them colour and shape. If information on both dimensions exists, the value can be precisely determined. If information on only one of the two dimensions exists, the value might come from a range of [l ; h]. If no information exists, value might come from a range [L ;H] where L<l and h<H.

We imagine a collective information search. Searching information on either dimension is costly for the individual agent, but beneficial for the whole community. Specifically any information discovered by an individual agent will become available to the whole community.

The question is: how do agents coordinate on information search.

Underlying mechanism of the problem:

This type of interaction is characterized by two collective problems.

1. a cooperation problem: i.e. do members of the group contribute to the costly production of the ‘public good’ of information.
2. a coordination problem: i.e. which members of the group will contribute and on which of the dimensions will they focus.

In addition there is uncertainty in the problem, which through risk aversion of the individual, will influence their willingness to search for information.

1. The first problem has been studied earlier in experimental economics by so called ‘step level public-good games’.
In such games, a public good is either produced or not. For the public good to be produced a fixed number of players has to contribute to the public good. In our situation this number would be equal to one.
These kind of games usually lead to higher than ‘efficient’ contributions, since players are risk averse and realize that they might be the ‘pivotal’ player that leads to non production of the public good.

2. The second problem has been studied by coordination games where players have to coordinate without communicating. Coordination without information is impossible. However many types of signals enable humans to achieve coordination (e.g. by focusing on focal points, the first/last row of a table, outliers (if many values are similar and one is different), etc.).

Pour point de départ les instructions dans un jeu de public good game :

Sample instructions for a multi-level public good game (from Hashim et al. (2012), Information Feedback, Targeting, and Coordination: An Experimental Study):

This is an economic experiment about decision making under uncertainty. Listening carefully to these instructions will help you to earn a significant amount of money, which you will receive in cash privately at the end of the experiment. Your earnings in this experiment will depend on your performance in the individual rounds. Your final payout will be determined by three random draws done by the computer at the conclusion of the experiment. The three draws will correspond to three rounds during the experimental session. The total earnings over these three randomly selected rounds will be taken to calculate your final payout. All earnings in this experiment will be presented to you in tokens and converted to US dollars at the conclusion of the experiment. The conversion rate is: 20 tokens per 1 US dollar. The conversion rate is identical for everyone.

You are welcome to ask questions at any time by raising your hand. Please wait for an experimenter to come to your seat before asking your question. While the experiment is in progress, please do not speak or in any other way communicate with other participants. This is important to the validity of the study.

Specific Guidelines:

You will participate in 46 rounds in a group with four other participants. Participants are re-matched randomly at the beginning of each round to a new group of five participants. You will not know who is in your group. In each round you will receive an endowment of 50 tokens. The endowment is identical for everyone. You and every member in your group have to individually decide how much of this endowment to allocate to a group account. This allocation must be a whole number, between 0 and 50 tokens. All decisions are made simultaneously and without communication. No other group member will ever know how much you choose to allocate to the group account.
Your earnings in each round are determined by combining what is left of your endowment after the allocation, plus the consumption of a product. The earnings equation is presented below.

Your earnings = endowment - your allocation + product quality value

The value from the product depends on the total group allocation. If the group allocation is between 0 and 49, the quality of the product is Poor and the product quality value for you is 0 tokens. If the group allocation is between 50 and 99, the quality of the product is Medium and your product quality value is 18.5. If the group allocation is between 100 and 149, the

quality of the product is Good and your product quality value is 45.5. If the group allocation is between 150 and 199, the quality of the product is Very Good and your product quality value is 81. Lastly, if the group allocation is greater than 200, the quality of the product is Excellent and your product quality value is 125.