
Human foraging strategies flexibly adapt to resource distribution and time constraints

Valeria Simonelli^{*1,2}, Davide Nuzzi¹, Gian Luca Lancia¹, and Giovanni Pezzulo¹

¹Istituto di Scienze e Tecnologie della Cognizione – Italie

²Department of Psychology [University of Roma "La Sapienza"] – Italie

Résumé

Foraging is a crucial activity, yet the extent to which humans employ flexible versus rigid strategies remains unclear. This study investigates how individuals adapt their foraging strategies in response to resource distribution and foraging time constraints. For this, we designed a video-game-like foraging task that requires participants to navigate a four-areas environment to collect coins from treasure boxes within a limited time. This task engages multiple cognitive abilities, such as navigation, learning, and memorization of treasure box locations. Findings indicate that participants adjust their foraging strategies – encompassing both stay-or-leave decisions, such as the number of boxes opened in initial areas and behavioral aspects, such as the time to navigate from box to box – depending on both resource distribution and foraging time. Additionally, they improved their performance over time as an effect of both enhanced navigation skills and adaptation of foraging strategies. Finally, participants' performance was initially distant from the reward-maximizing performance of optimal agents due to the learning process humans undergo; however, it approximated the optimal agent's performance towards the end of the task, without fully reaching it. These results highlight the flexibility of human foraging behavior and underscore the importance of employing optimality models and ecologically rich scenarios to study foraging.

*Intervenant