

When Does the Aardvark Move to the Next Anthill? Foraging search with moving targets

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A longstanding question in visual search is when to stop searching in one display and move to the next one. This complex question becomes more complex as the number of potential targets increases, and the task begins to resemble the ecological problem of foraging (Cain, Vul, Clark, & Mitroff, 2012; Wolfe, 2013). Work to date has involved static images, like schematic berry bushes. In humans, such displays encourage systematic strategies such as 'reading' the display left-right, top-bottom. To thwart systematicity, we had all the items on the screen move continuously, like schematic anthills. This successfully induced participants to use color-guided search rather than systematic spatial search. The value of 'ants' varied with their color; the greener the better. In one block, all ants had positive value. In another block, the worst ants had negative value, while the expected value of the entire patch remained the same across conditions. Overall, searchers started by clicking on the greenest, most valuable targets and clicked on less-green items as the trial progressed. Consequently, the rate of return dropped as observers picked ants in one anthill. On average, participants clicked on just under half the items in each display, in line with the predictions of optimal foraging theory that searchers should maximize their rate of point accumulation rather than exhaustively collecting all the target ants, even when all ants had positive value. Participants clicked on fewer and greener items when losses were possible than when only gains were available. This pattern became more pronounced with increasing set sizes. This more conservative, loss-averse strategy leads to an overall reduction in the efficiency of point accumulation that may not be predicted by standard optimal foraging models. Overall, these anthill findings suggest that the previously-described patterns of human foraging behavior are not by-products of a spatial foraging strategy.