Title: Winter is coming: How humans forage in a temporally structured environment

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Much is known about how individuals search visual displays for targets, but relatively little about how they find multiple targets across multiple displays (foraging tasks). How long should you spend at each raspberry bush before moving in order to collect as many berries as possible? Classic optimal foraging theories suggest that an observer leaves when current intake drops below the average rate. This theory is typically tested in random or uniform environments. However, the real world has structure—events close in time are likely to be similar. Here we explored whether temporal structure influences foraging behavior by creating 'seasons'. Does it matter if winter is coming and the next bush is reliably worse than the last?

In our task, 35 participants were asked to pick “good” berries from bushes. Bush quality varied from 8-32 good berries out of 40. Good berries could be defined by color (redder-better) or only by auditory feedback after picking. Participants were asked to pick a fixed number of berries (1500 with color cue; 1000 without color cue). Bush quality could be *structured* - rising and falling systematically or *random*. Participants were informed about color but not about temporal structure.

In the structured condition, observers picked more berries from the current bush when quality was falling ($p<.001$ with color cue; $p<0.005$ without color cue) showing that foraging behavior is affected by temporal context. We replicated these results in an unguided letter search task with displays having 0-10 Ts among 54-64 Ls. If the number of Ts varied systematically, observers again stayed longer when patch quality was falling ($p<.001$); stocking up for winter or enjoying the last of summer. Taken together, these results show that human foragers make use of more information about the structure of the world than expected by classical “optimal” foraging models.