Mouselab-MDP: A new paradigm for tracing how people plan

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Motivation

Planning is a latent cognitive process that cannot be observed directly. This makes it difficult to study how people plan. To address this problem, we propose a new paradigm for studying planning that provides experimenters with a time-course of participant attention to information in the task environment.

Background

Planning is a fundamental aspect of higher-order cognition, and it has accordingly received much attention in cognitive psychology. Research on planning is complicated by the fact that we cannot directly observe the cognitive processes of planning. One approach to this problem is to design *process tracing* paradigms that externalize some aspect of the cognitive process. Payne, Bettman, and Johnson (1988) developed one such methodology for studying multi-alternative risky choice: the "Mouselab" paradigm. Thus, to apply the Mouselab process tracing method to planning, we simply replace the single decision with a Markov Decision Process (MDP), in which a participant must make a sequence of choices, each one affecting the choices that will be available in the future. Something about pruning?

Usage

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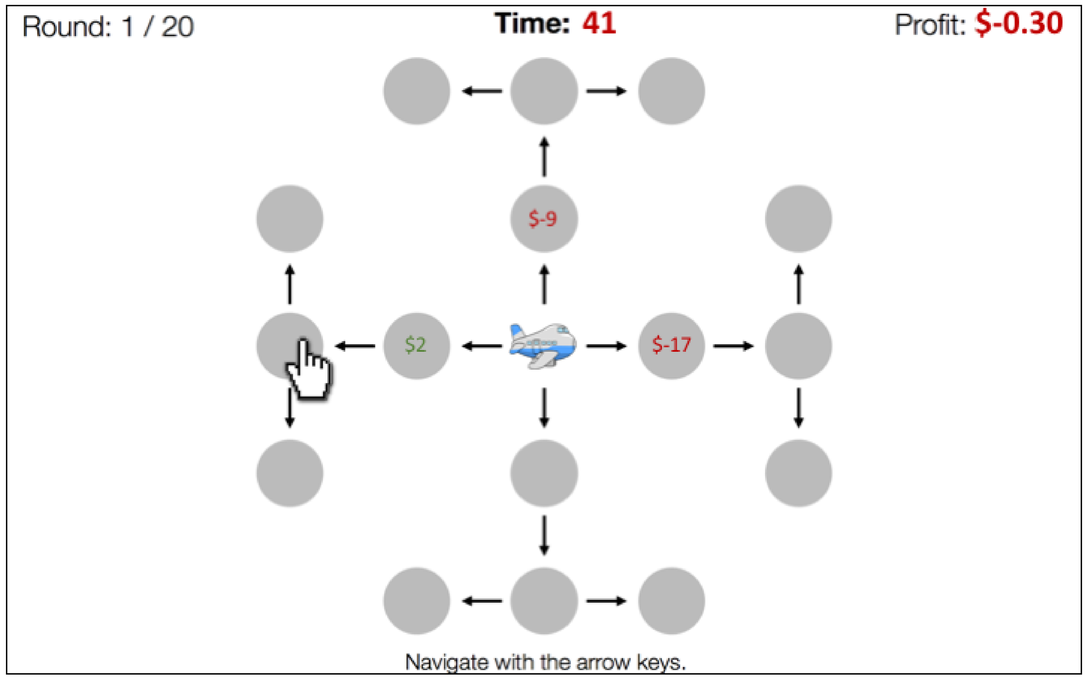
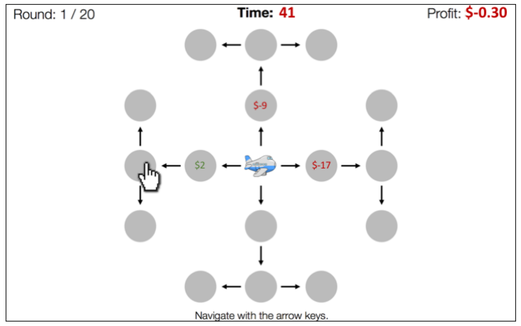
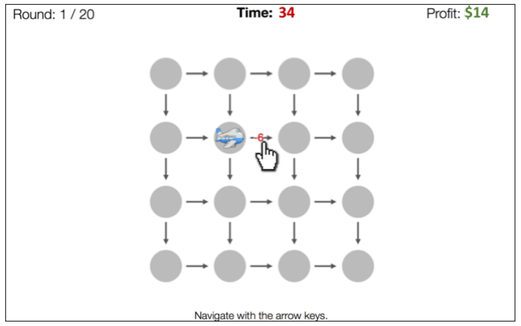
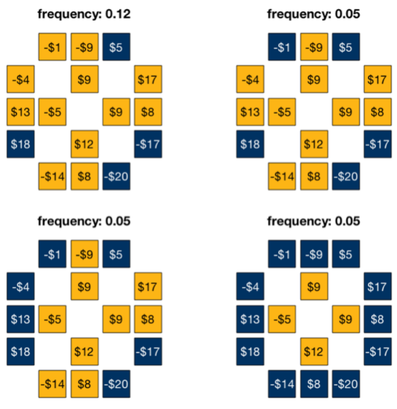
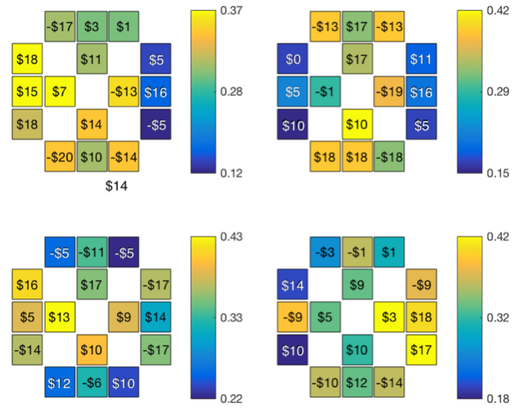








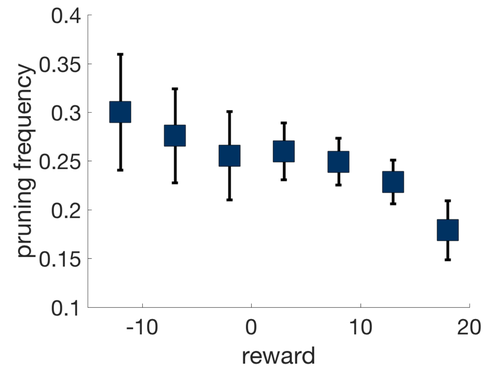


Experiment

We used the Mouselab-MDP plugin for JsPsych. In each trial participants route an airplane from the center of the screen to one of eight final destinations via two intermediate locations (see Figure **??**a). We specified `stateLabels` as the rewards associated with the edge leading to each state. We set `stateDisplay` to 'click' and 'stateClickCost' to 0.10; thus participants could click on a state to reveal the reward for traveling to that state, at the price of $0.10. Participants were required to spend at least 45 seconds on every trial to prevent time cost from discouraging participants from clicking and planning.

Results

- Something about pruning.



References

Payne, J. W., Bettman, J. R., & Johnson, E. J. (1988). Adaptive strategy selection in decision making. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *14*(3), 534.

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