What drives the search slope in the dynamic search?

Preliminar results

Background

Using dynamic search display (i.e., display items reshuffle every 110 ms), Horowitz & Wolfe (1998) found search efficiency, measured by the search slope (ms/item), did not changed from the static to the dynamic display. The slopes were similar in both conditions. There was only an overall shift in RTs. Horowitz & Wolfe (1998) did not provide any account for this mysterious behavior findings.

Here we aim to examine what drives this 'unchanged' slope in the dynamic displays. We hypothesized that participants tried to optimze their search strategy such that the total completion time is optimal respect to their search time cost effect.

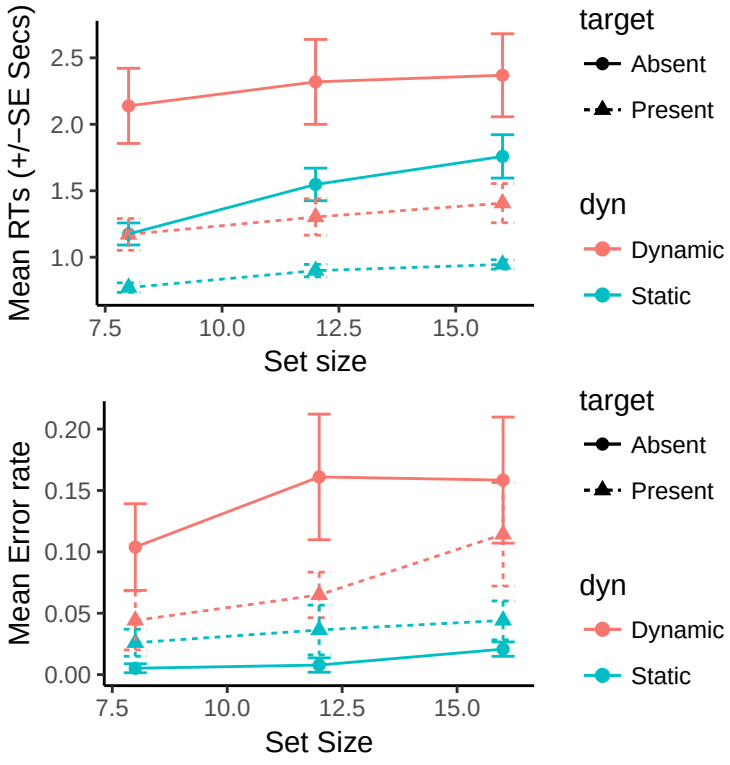
Experiment 1 we tried to replicate the findings of Horowitz & Wolfe (1998). Experiment 2 we gave reward to the target 'presence' or 'absence' trials in separate sessions to examine if the reward would alter the search slope. Experiment 3 we tried to keep the display density to the same across different set sizes.

Preliminary findings

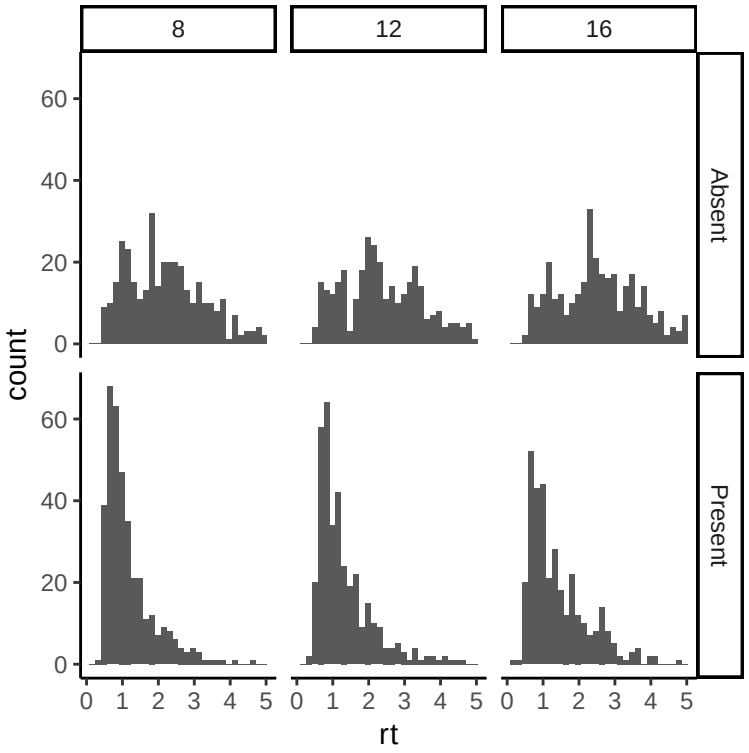
Experiment 1

- Setup: Target Present / Absent, Dynamic/Static displays, Display set size 8, 12, 16.

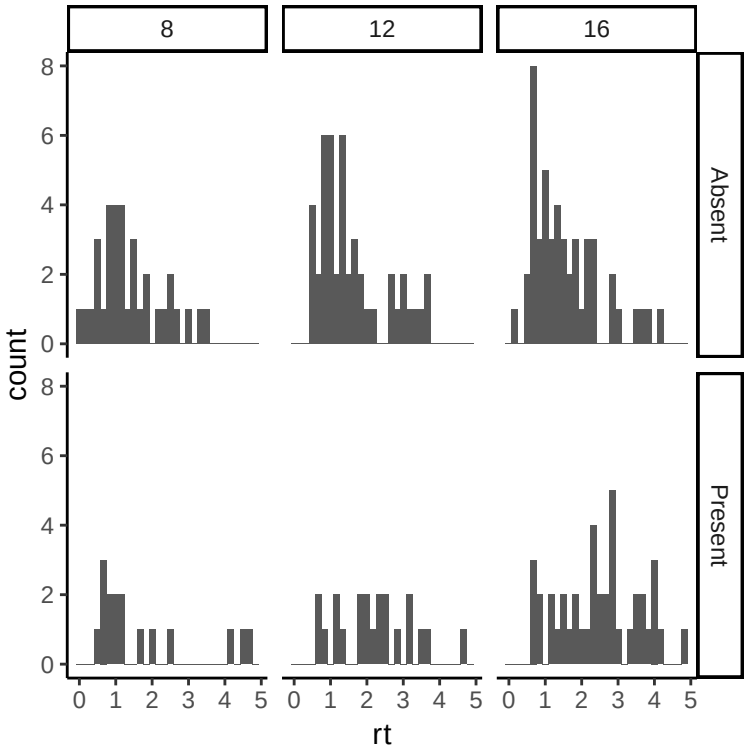
The mean RTs are shown in the following figure. The slopes from the dynamic display (target-present and -absent) did not changed from the static target-present condition. Note, the static target-absent condition has higher slope, suggesting a partial serial search as the total searched items would be larger in the target-absent compared to -present condition.



Reaction times histogratm of the 'correct' responses for the dynamic displays:

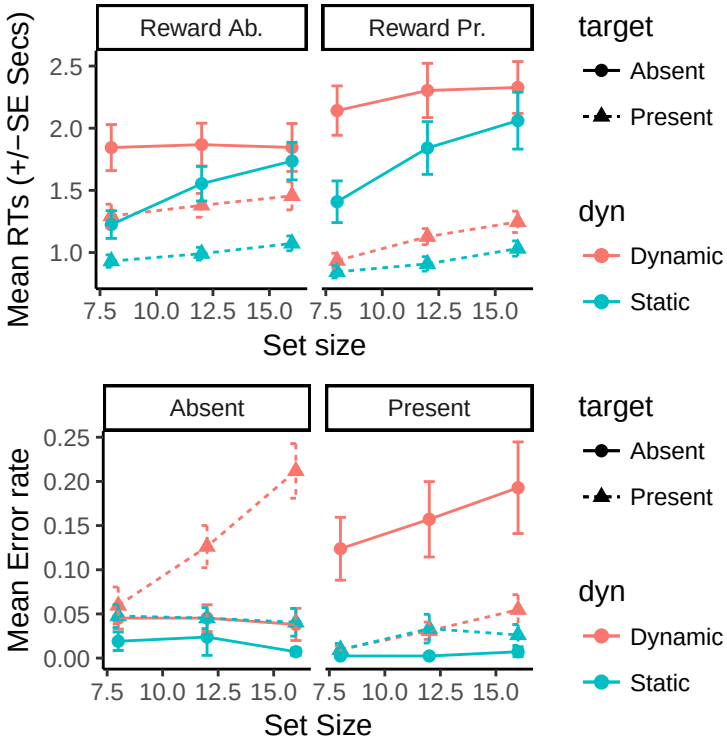


Reaction times histogratm of the 'error' responses for the dynamic displays:



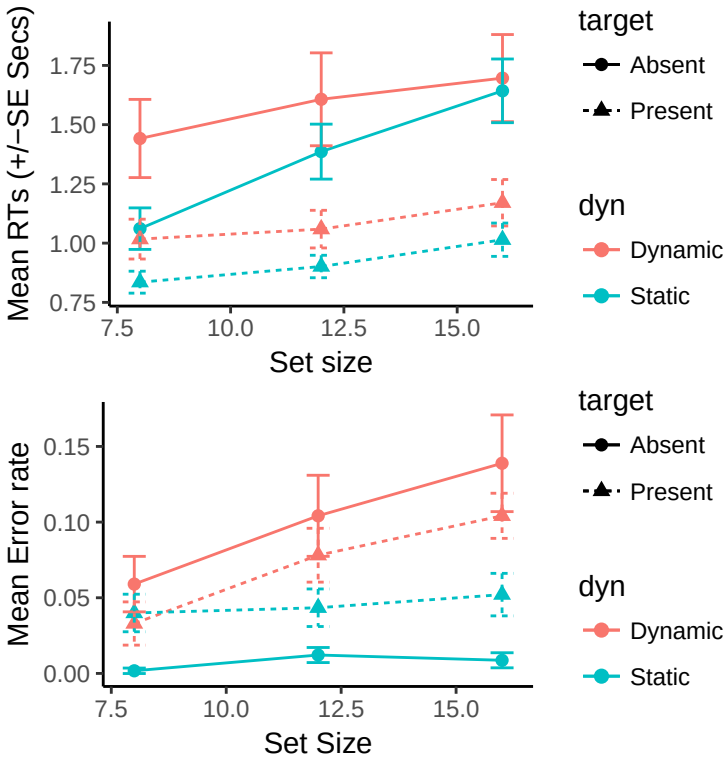
Experiment 2

- Setup: same as in Experiment 1, but in addition we provide monetary reward to 'presence' or 'absence' in separate sessions.
- Results: Reward only shifted RTs, but did not alter the search slope.



Experiment 3

- Setup: Same as in Experiment 1, but with fixed display density across different set size displays.
- Results: Again display density did not change the search slope.


Mean RTs (+/−SE Secs)
1.75
1.50
1.25
1.00
0.75
7.5
10.0
12.5
15.0
Set size
target
Absent
Present
dyn
Dynamic
Static
Mean Error rate
0.15
0.10
0.05
0.00
7.5
10.0
12.5
15.0
Set Size
target
Absent
Present
dyn
Dynamic
Static