Fitting two target templates into the focus of attention in a hybrid foraging task

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In hybrid foraging, observers search visual arrays for multiple instances of multiple target types held in memory. Previous experiments have demonstrated that observers tend to pick items in "runs", repeatedly clicking on instances of one target instead of randomly searching amongst target types (Wolfe, et al., submitted). Switching between target types takes longer than selecting the same type again. Favoring runs is consistent with a model that maintains that multiple targets can be held in Activated Long Term Memory while a single item has special status as the current focus of attention in Working Memory. This WM template representation preferentially guides attention to more examples of its type (e.g., Wolfe, 2007; van Moorselaar, Theeuwes, & Olivers, 2014). To disrupt this single-item preferential guidance, we ran a hybrid foraging task with four target types where observers were required to pick a different target type on each selection. I.e., we forbade runs. This Forced Switch condition significantly slowed target collection (1563 msec/item) compared to a Forced Run condition (1151 msec/item) where observers were required to pick the same target type as the previous target selected whenever possible, (t(11)=11.60, p< 0.0001). Interestingly, observers in the Forced Switch condition adopted an "alternating run" strategy, switching between two targets more often than would be predicted by chance. This strategy improved efficiency: Alternating sequences (ABABAB) averaged 1269 msec/item, while mixed sequences (ABCBAD) averaged 1766 msec/item, (t(11)=11.48, p< 0.0001). This result suggests that it is either possible to maintain two items in the focus of attention, or to flexibly alternate between two items in the focus of attention. That is, in addition to the focus of attention and the list of target types in ALTM, another item can have a special, intermediate status as an "accessory" item that can be preferentially inserted into the focus of attention.

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