Variable Viewpoint Hybrid Search: Searching for the Object or the Image?

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In hybrid search, observers search visual arrays for any of several target types held in memory. Items in the visual display must be matched to some internal representation or 'template'. Previous experiments have shown that searching for specific targets is more efficient than searching for categories of targets (Cunningham & Wolfe, 2014). Between search for this exact image of this exact chair and search for the category "chairs", is search for a specific object that can be viewed from multiple positions. Such search for targets that appear under different viewpoints is closer to real world search. We conducted a hybrid search experiment using specific target objects that could be rendered in multiple viewpoints. We compare this varied viewpoint condition to a specific viewpoint condition, in which each target appeared in only a single viewpoint. Is varied viewpoint hybrid search similar to single viewpoint search, suggesting that search templates are independent of viewpoint? Or, is varied viewpoint search like a category search where multiple views are like multiple instances of a category? When the memory set size is 2-4, searching for varied viewpoint targets (2 targets: 33 msec/item; 4 targets: 82 msec/item) was just as fast as searching for single viewpoint targets (2 targets: 38 msec/item; 4 targets: 69 msec/item), ($t(11)=0.88$, $p=0.40$; $t(11)=1.09$, $p=0.30$). However, when more targets (8-16) are stored in memory, searching for varied viewpoint targets (8 targets: 127 msec/item; 16 targets: 150 msec/item) was less efficient than searching for specific viewpoints (8 targets: 80 msec/item; 16 targets: 103 msec/item) ($t(11)=4.63$, $p< 0.001$, $t(11)=3.36$, $p< 0.01$), more closely resembling a categorical search (8 targets: 125 msec/item). This suggests that a small number of viewpoint independent representations can be activated in hybrid search. For larger memory sets, however, observers might only activate a canonical view, making search harder for other views.