

## **How NOT to cure the incidental finding problem in radiology: Experience with “mixed hybrid” visual and memory search**

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A radiologist searching for something specific (e.g. lung cancer) is also responsible for reporting any “incidental findings” (e.g. pneumonia) that could be clinically significant. Incidental findings are frequently missed, posing a problem for radiologists, their patients, and their lawyers. In 2017, Wolfe et al. proposed ‘mixed hybrid search’ as a model system for incidental findings. Non-expert observers memorized a set of three specific, photorealistic object targets (analogous to the primary goal of search). They also memorized three target categories, such as “animals” or “hats” (analogous to the less well-specified, incidental findings). They then searched displays for any instance of any of the specific or categorical targets held in memory. Since incidental findings are relatively rare, categorical targets were presented on 20% of target-present trials. Observers missed 5% of specific targets but fully 38% of categorical targets, mirroring the high error rate for incidental findings. We tested two strategies intended to reduce the number of missed categorical targets. In Experiment 1, we reminded observers about the categorical targets via non-search trials in which categorical targets were clearly marked. In Experiment 2, we forced observers to respond twice on each trial: Once to confirm the presence or absence of specific targets, and once to confirm the presence or absence of categorical targets. Both of these interventions failed. Even when observers had to explicitly state that there were no categorical targets, categorical miss error rates remained over 30%. Like the real incidental finding problem, these are stubborn errors. It is possible that a more rigorous checklist procedure might help, but radiologists will not thank us if we vastly increase the time per case.

Wolfe, J. M., Alaoui-Soce, A., & Schill, H. (2017). Cognitive Research: Principles and Implications (CRPI), 2, #35. doi:10.1186/s41235-017-0072-5.