

From the clinic to the lab and back: Fixing the problem of missed “incidental findings”

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For radiologists searching images, “incidental findings” are clinically significant targets that were not the original subject of search (e.g., search a lung for pneumonia, incidentally detect a broken rib). Incidental findings are missed more often than is desirable. How can we reduce those errors? The “mixed hybrid search task” is a model system to study the basis of these errors in the lab. In this task, non-expert observers memorize N specific photorealistic object targets (e.g., this specific cat). They also memorize N broader categorical target types (e.g., “fruit,” “clothing”). In subsequent visual search, they report any specific or categorical targets. Observers show elevated (>30%) miss error rates for categorical targets – our stand-in for incidental findings. Our current goal is to reduce these categorical target miss errors in the hope that a method that works in the lab could be transferred to the clinic. Our first attempts were unsuccessful. Showing observers exemplars from a target category did not improve subsequent detection of other exemplars from that category. Prompting observers on each trial to search separately for specific and categorical targets also left miss errors above 30%. However, error rates dropped by more than 40% when we used a checklist procedure where observers had to confirm whether each target was present or absent on every trial. Unfortunately, this method increased time per trial too much to be desirable for the clinic. Interestingly, we found similar improvement in errors in a task where observers memorized three categorical (incidental) targets and then searched for novel specific targets on each trial. Observers were prompted to respond to all targets on each trial (analogous to “check this x-ray for broken ribs and the next for kidney disease AND look out for incidental findings”). However, even with this improvement, categorical errors remain stubbornly persistent.

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