



# Through the Eyes of the Expert

## Evaluating Holistic Processing in Architects Using Gaze-Contingent Viewing

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Is the ability to holistically process an image a characteristic of all visual experts?

### Background

-According to the holistic processing theory, experts have an increased ability to process information from para-foveal regions and are therefore able to see a “whole” of an image from which the important targets “pop-out.”

-Evidence for this can be found in saccadic amplitude and reaction time of eye-tracked experts engaging in target searches.

-We tested this theory with an as-of-yet unstudied group of experts: architects.

-We expected gaze-contingent viewing to negatively impact architects more than the naive group in a target search.

### Discussion

Our perspective search-task is a novel methodological contribution, validated to measure visual expertise by architects’ high degrees of accuracy.

We expected architects to be more negatively impacted by gaze-contingent viewing than the naive control. This was not the case. Why?

### Two Possibilities

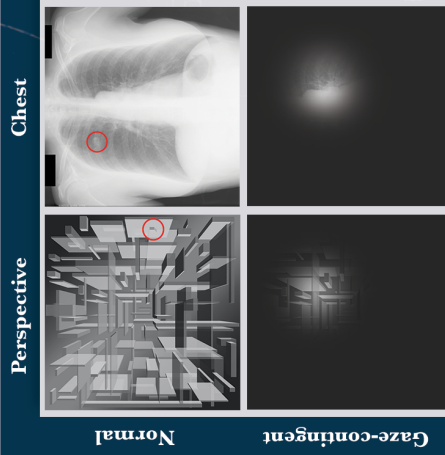
1. Holistic Processing is task specific: It may be the case that holistic processing is possible in radiographs and not in zero-point perspective searches.

2. Holistic processing is domain specific: architects may not utilize holistic processing, although they are visual experts, thus revealing a limitation in the Holistic Processing model as explanatory of all visual expertise.

### Acknowledgments and References

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Koriat, H. L., Nofre, C. E., Conant, E. E., & Weidensaul, S. P. (2007). Holistic component of image perception in mammogram interpretation: Gaze-tracking study. *Radiology*  
Balsford, E. M., & Sheridan, H. (2011). Eye movements and visual expertise in chess and medicine. *Oxford Handbook on Eye Movements*.  
Stokes, D. (2017). *Dustin Stokes: On perceptual expertise*.

### Method



Two image types with two types of viewing conditions (2x2 within subjects design)

-Expert architects, N=24 (avg. 19 years experience)

-Undergraduates, N=24 (naive)

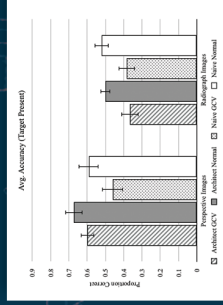
-Half the images were presented in a gaze-contingent view

-Target (circled above) present in half of the trials

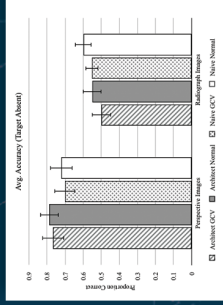
-Click the out-of-perspective box or the cancer nodule

-In the perspective images, all boxes aimed at the horizon point while the target did not, In radiograph images cancer nodules were present as targets for search

### Results

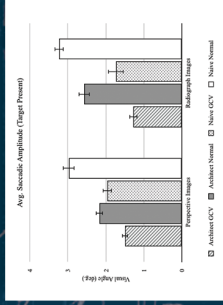


-Architects were more accurate than the naive control group on the perspective task

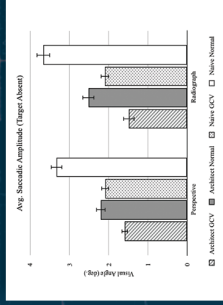


-Architects were not harmed by gaze-contingent viewing more than the naive group

-Saccadic amplitude and reaction time trended in the opposite direction than predicted



-There was no evidence for visual expertise being generalizable across domains



-No evidence for holistic processing in time to first fixation or decision time