

# Change Detection for Shadows and Colours in Artists and Non-Artists

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## Introduction

- Shadows provide us with important perceptual information such as depth, lighting, and scene layout, nevertheless they often go unnoticed and are rarely remembered (Casati & Cavanagh, 2019).
- Previous studies have shown that shadow changes are less noticeable than other changes (e.g., colour) in natural and artificial scenes (e.g., Ehinger, Allen, & Wolfe, 2016).

- Are there differences in perception and noticeability of shadows between visual artists and non-artists?

- A higher level of artistic skill and training led to better performance on visual tasks, such as integration of object information (Perdreau & Cavanagh, 2013a).
- Participating in an intensive drawing training course improves several aspects of visuospatial skill such as mental rotation and attention switching (Chamberlain, Kozbelt, Drake, & Wagemans, 2021).

- Since artists often perform better on visual tasks, they may perform better on change detection compared to non-artists.
- Artists may be particularly attentive to shadows because they often reproduce them in their art.

## Method

### Participants

- Participants were students at Glendon College from psychology and visual arts courses.

Each participant was asked if they create visual artwork (ex. paint, draw, graphic design)?

“YES”= ARTISTS  
N = 22  
(19 women, 3 men)

“NO”= NON-ARTISTS  
N = 19  
(16 women, 1 man, 2 other)

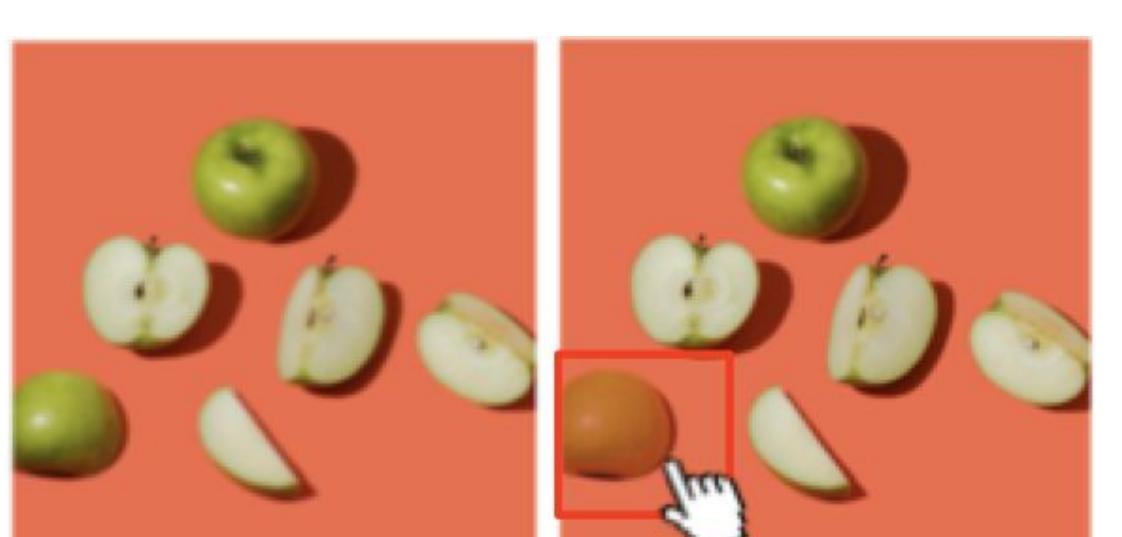
## Task & Procedure

### Change Detection Task

Compare the two side-by-side images and click on the difference on the image on the right asap

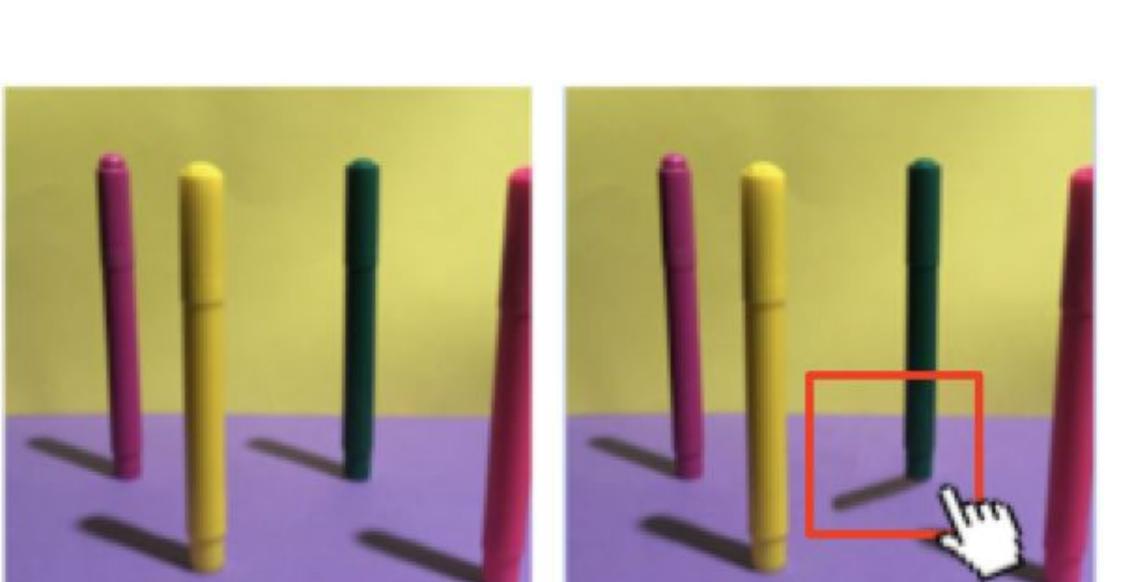
20 pairs of images: 10 with colour changes and 10 with shadow changes  
– all presented in a randomized order for each participant

#### Example of a Colour Change



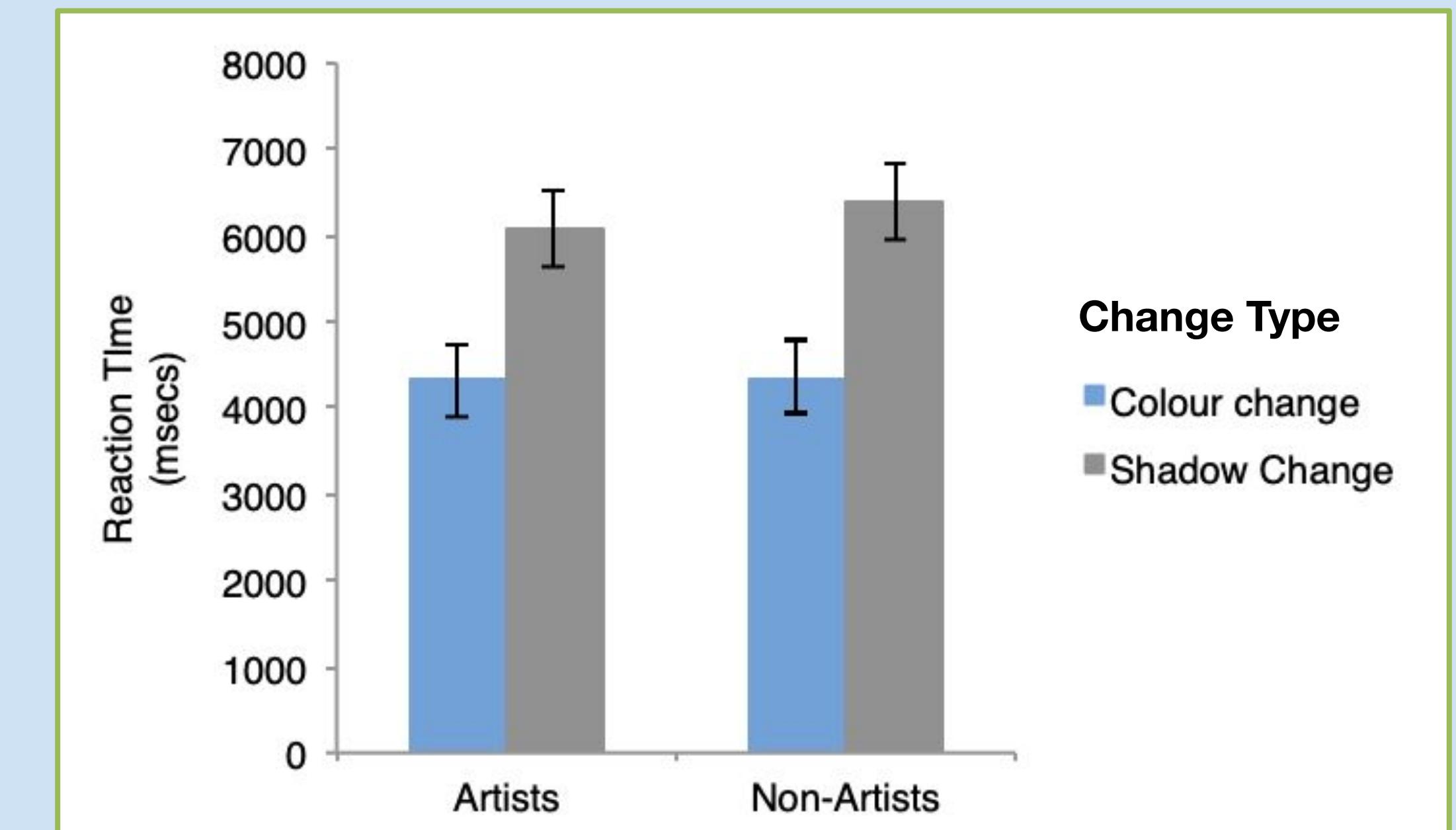
Participants clicked on the location of the change as soon as they detected it.

#### Example of a Shadow Change



Measure: Reaction Time for detecting the correct change

## Results



- Artists' RT to detect colour changes was not different to Non-Artists' RT (M: 4315.28, SD: 1955.65 and M: 4340.97, SD: 1663.78, respectively)
- Artists' RT to detect shadow changes was not different to Non-Artists' RT (M: 6084.68, SD: 2085.39 and M: 6399.01, SD: 2325.70, respectively)

- Artists and Non-Artists were faster at detecting colour changes than shadow changes [F(1, 39) = 30.474, p < .001; Eta<sup>2</sup> = .44; Power = 1.00]

## Conclusions

- Shadow change detection is slower than colour change detection.
- Artists and Non-Artists do not differ in their ability to detect colour or shadow changes. Artists' perception is therefore much like that of non-artists, despite many hours of practice in drawing scenes (Perdreau & Cavanagh, 2013b). The artists' advantage is in their ability to extract structure from images (Perdreau & Cavanagh, 2013a).

## References

- Casati, R., & Cavanagh, P. (2019). *The Visual World of Shadows*. The MIT Press.
- Chamberlain, R., Kozbelt, A., Drake, J. E., & Wagemans, J. (2021). Learning to see by learning to draw: A longitudinal analysis of the relationship between representational drawing training and visuospatial skill. *Psychology of Aesthetics, Creativity, and the Arts*, 15(1), 76-90. <http://dx.doi.org/10.1037/aca0000243>
- Ehinger, K. A., Allen, K., & Wolfe, J. M. (2016). Change blindness for cast shadows in natural scenes: Even informative shadow changes are missed. *Attention, Perception, & Psychophysics*, 78(4), 978-987. <http://dx.doi.org/10.3758/s13414-015-1054-7>
- Perdreau, F., & Cavanagh, P. (2013a). The artist's advantage: Better integration of object information across eye movements. *I-Perception*, 4(6), 16. <http://dx.doi.org/10.1088/1464-0748/4/6/16>
- Perdreau, F., & Cavanagh, P. (2013b). Is artists' perception more veridical? *Frontiers in Neuroscience*, 7:6. <https://doi.org/10.3389/fnhum.2011.00171>

Scan this QR code to view a video presentation of this study

## Acknowledgments

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