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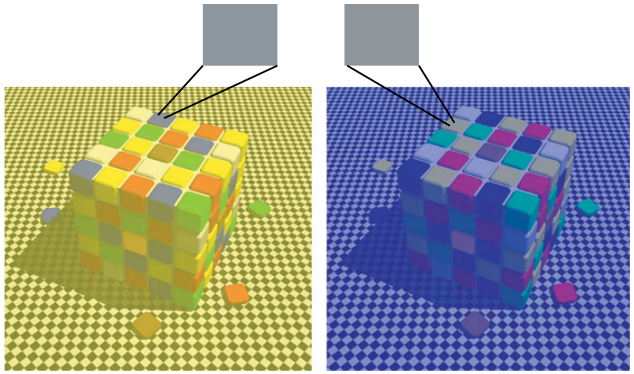
Current research topics

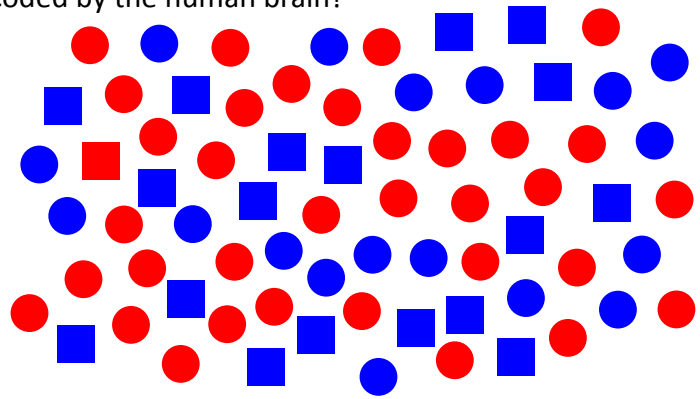
Colour constancy

How do our brains separate raw colour information into different sources? In these images, the blue squares on the left (under a yellow filter) are the same raw colour (grey) as the yellow squares on the right (under a blue filter), but they appear different. What neural processes underlie this perceptual phenomenon?



Feature binding

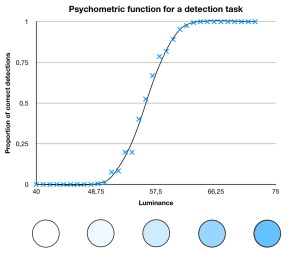
How quickly can you decide if there are any squares in the image below? Or are there any green objects? Now how quickly can you decide whether there are any red squares? Perception of simple features (like colour and shape) is faster than identifying an object defined by a combination of 2 features, thought to reflect an extra computational cost of 'binding' these features together. How are these coded by the human brain?



Research methods

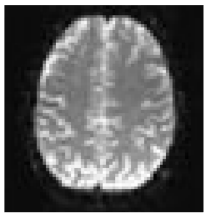
Psychophysics (measuring perception)

We use a range of simple computer-based tasks to measure how perception varies with different stimuli. Precisely controlling the input (stimulus) and measuring the output (perception) lets us test hypotheses about how the brain is transforming visual information.



Neuroimaging

We use a combination of functional MRI, magnetoencephalography (MEG) and electroencephalography (EEG) to measure brain responses to different visual stimuli. We analyse brain activity using techniques from machine learning. Due to the extra time involved in these methods, these are usually best suited to Masters / PhD projects (although if an honours student is particularly keen I'm happy to discuss options).



For further information, please feel free to email me (erin.goddard@unsw.edu.au)