that different from each other. On the other hand, from patient studies it is clear that there are several functional specializations within the two streams. Based on the studies in this thesis, and supported by previous literature, I can state that there is no absolute functional distinction between the two streams. Other, ‘milder’ forms of the TVSH, or the existence of a common representation for perception and action, are, however, difficult—if not impossible—to proof or disproof. Namely, interactions between the two streams can be interpreted as a falsification of the TVSH, but they can also be interpreted as an extension of the TVSH. However, from our research and that of many other researchers it has become clear that the predictions of the TVSH concerning the effects of visual contextual illusions cannot be validated. As shown in this thesis, visually-guided movements, memory-guided movements, and perceptual judgments can all be influenced by illusions. I must also note that this does not necessarily mean that other functional distinctions between the two streams are false. For example, it may be valid that the ventral stream uses allocentric coding whereas the dorsal stream uses egocentric coding. In any case, as argued by other researchers (e.g., Schenk and McIntosh, 2010), functional specializations of the dorsal and ventral visual stream are relative rather than absolute.

Conclusions

The research presented in this thesis has provided more insight into the effects of visual contextual illusions on visuomotor processing by showing that:

• Our visual representation is dynamic: it becomes more accurate when we look at an object for a longer time before we act on it.
• Visually-guided and memory-guided saccades are likely based on a common visual representation.
• In addition to single saccades, visuomotor updating is also affected by visual context in the form of the Müller-Lyer illusion.
• Areas in the dorsal visual stream are sensitive to visual context: they represent perceived rather than physical target locations.
• Gaze-centred information is dominant over allocentric information in visuomotor updating.


Byrne PA, Henriques DY (2013) When more is less: increasing allocentric visual information can switch visual-proprioceptive combination from an optimal to sub-optimal process. Neuropsychologia 51:26–37.


About the author
Anouk Johanna de Brouwer (1987) became interested in scientific research during her study Human Movement Sciences from 2005 to 2011 at the University of Groningen. During the Bachelor’s programme, she got involved in competitive rowing, which raised her enthusiasm about the science behind sports performance. At the same time, she became fascinated by how the brain works through classes in neuropsychology. After receiving her Bachelor’s Degree in 2008, Anouk started the Master’s programme in Human Movement Sciences with a specialization in ‘Sports, Learning and Performance’. She did her master research project on ‘The effects of antiphase crew rowing on rowing performance’ supervised by Harjo de Poel (University of Groningen) and Mathijs Hofmijster (Vrije Universiteit Amsterdam). Anouk obtained her Master’s Degree in February 2011.

In August 2011, she started a PhD project entitled ‘Illusions in the brain: a new approach to visual information processing’, supervised by Jeroen Smeets (Vrije Universiteit Amsterdam) and Pieter Medendorp (Radboud University Nijmegen). During this collaborative project, she performed behavioural research in Amsterdam and neuroimaging research in Nijmegen, which resulted in this thesis.

In October 2015, Anouk moved to Canada to take up a postdoctoral position in the research group of Randy Flanagan at Queen’s University in Kingston, Ontario. She is currently investigating the planning and execution of reaching movements.
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List of publications

Articles in international journals


Book chapters


Conference abstracts


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