



Special issue: Editorial

Tribute to Glyn W. Humphreys, 1954–2016

Martin Edwards^a, Monika Harvey^b and Julie Snowden^{c,d,*}^a Psychological Sciences Research Institute, Université Catholique de Louvain, Belgium^b School of Psychology, University of Glasgow, UK^c Cerebral Function Unit, Neuroscience Centre, Salford Royal NHS Foundation Trust, UK^d Division of Neuroscience and Experimental Psychology, University of Manchester, UK

ARTICLE INFO

Article history:

Received 3 July 2018

Accepted 4 July 2018

Published online 26 July 2018



As one of the greatest, most influential and generous psychologists of our time, Glyn Humphreys made huge scientific contributions in cognitive and neuropsychology. He published over 700 articles and 16 books, and he and his group gave countless presentations, not only to the international academic community, but also to allied healthcare professionals, industry, numerous charitable partners and public audiences. In recognition of these achievements, Glyn was awarded the Spearman Medal, the President's Award and the Prize for Cognitive Psychology from the British Psychological Society, the Donald Broadbent Prize from the European Society for Cognitive Psychology, a Humboldt Fellowship, a Leibniz Professorship and a Special Professorship of the Chinese Academy of Sciences. His tragic early death in January 2016

(obituary *Cortex* 2016; 75: A1–A2) is a profound loss to cognitive neuroscience.

It is fitting that a Special Issue dedicated to Glyn's memory should be published in *Cortex*, whose stated remit is “the study of cognition and the relationship between the nervous system and mental processes”. The description encapsulates Glyn's work. Glyn started his career at the University of Bristol in the 1970s. His PhD involved letter and word perceptual recognition, using state-of-the-art technology of the time, combined with clever priming experimental design (Humphreys, 1978). His scientific aptitude and creativity were early indicators of what was to come. In 1979, Glyn moved to Birbeck College, where he met his wife and scientific partner, Jane Riddoch. Together, they formed a team, located at the University of Birmingham in 1989 and at the University of Oxford in 2011, that changed the face of cognitive neuropsychology. Their meticulous studies of patients with brain disorders are a model *par excellence* of how neuropsychological investigation can inform understanding of brain function. Perhaps best known is the intensive study of a single patient HJA, who developed visual agnosia following stroke (Humphreys & Riddoch, 1987; Riddoch & Humphreys, 1987). This collaborative work on visual processing was far-reaching, informing our understanding of the distinct processes involved in object recognition (Humphreys & Riddoch, 2006) and having implications for phenomena such as category specificity (Humphreys & Forde, 2001; Humphreys & Riddoch, 2003). Glyn's research had practical merit too. He was not only interested in theoretical underpinnings. He was also interested in the ways that theoretical knowledge could be harnessed to improve clinical assessment, treatment and management of patients. The development of the Birmingham Object Recognition Battery (BORB), a battery of neuropsychological tests for the systematic assessment of the visual processes involved in object recognition, is an early practical example of Glyn's endeavour to link

* Corresponding author. Cerebral Function Unit, Manchester Centre for Clinical Neurosciences, Salford Royal NHS Foundation Trust, Salford M6 8HD, UK.

E-mail addresses: martin.edwards@uclouvain.be (M. Edwards), monika.harvey@glasgow.ac.uk (M. Harvey), julie.snowden@manchester.ac.uk (J. Snowden).

<https://doi.org/10.1016/j.cortex.2018.07.005>

0010-9452/© 2018 Elsevier Ltd. All rights reserved.

theory to practice. The battery has long been in widespread use in clinics specialising in neuropsychological diagnosis and management.

A running theme underlying Glyn's research is the interactive nature of cognitive processes: between action and perception (Humphreys & Riddoch, 2001; Humphreys et al., 2010; Riddoch, Humphreys, Edwards, Baker, & Willson, 2003), attention and perception (Duncan & Humphreys, 1989) and working memory and visual selection (Soto, Humphreys, & Rothstein, 2007). Glyn's research interests extended to executive functions and social cognition (Rumiati & Humphreys, 2015), the neuropsychology of theory of mind (Samson, Apperley, Chiavarino, & Humphreys, 2004) and self versus other cognition (Sui, He, & Humphreys, 2012).

The theme of interactive processes greatly influenced Glyn's views about neuropsychology in clinical practice. He saw the importance of assessments that encompassed multiple cognitive domains, and his experience told him that many patients are unable to tolerate prolonged cognitive assessments. His development of the Birmingham Cognitive Screen (BCoS) (Bickerton et al., 2012), and Oxford Cognitive Screen (OCS) (Demeyere, Riddoch, Slavkova, Bickerton, & Humphreys, 2015) was motivated by the desire to provide a brief practical assessment for evaluating cognition in brain-damaged patients across multiple domains. Increasingly, Glyn was concerned that his theoretical knowledge should have practical benefit for patients. Therefore, aside from his many achievements and accolades as a leading scientist, Glyn worked tirelessly to promote the discipline to society. He played an essential role in the Stroke Association and NIHR to drive policy for neuropsychology, coining the slogan "Cognition Matters".

Glyn was renowned for the opportunities that he provided, and the support that he gave to enhance the development of the careers of young future leaders. His lab always buzzed with activity, with many PhDs, postdocs and visiting researchers driving high-quality research, yet doing so within a calm-friendly-social atmosphere. With time, his group grew exponentially. People who worked with Glyn never left him; a connection always remained, and he became tied to many offspring research groups all over the world. The same was true for the patients who worked with Glyn and Jane. They all dedicated their time willingly, often for several years, and Glyn and Jane delivered a new fundamental understanding of patients' conditions and cognitive functions.

Glyn's wide-ranging scientific interests are reflected in the breadth of topics covered in this Special Issue, ranging from visual attention, memory, executive function and social cognition to cognitive rehabilitation and cognitive/neuropsychological models of brain function. In keeping with Glyn's life-long emphasis, the papers encompass studies involving both clinical populations and healthy volunteers. Many of the contributors to the Special Issue are former members of Glyn's research group, who now run successful research groups of their own. Other authors have been research collaborators of Glyn at some stage during his career and have been inspired by him. All authors have been influenced by his work.

Some of the studies presented here follow very directly from Glyn's work. For example, the starting point for the line bisection study by McIntosh (2018) is a study by Riddoch and Humphreys (1983) that showed that the extent of deviation demonstrated on line bisection by patients with left-sided neglect can be reduced when patients are asked to report symbols placed at the left end of the line before they bisect. Riddoch and Humphreys's conclusion that neglect results from a failure in the automatic orienting of

attention has provided a testable hypothesis for this and many other subsequent studies on visual attention.

The theme of interactive cognitive processes, prominent in Glyn's work, is addressed by Shalev (2018), who investigate the interaction between sustained and selective spatial attention, by Farooqui and Manly (2018), who investigate the role of frontal-parietal regions in the interaction between goal processing and selective attention, and by Fallon et al. (2018) who explore relationship between aspects of attention and working memory. Ward et al. (2018) report the intriguing relationship of autistic traits of sensory sensitivity and attention-to-detail to synaesthesia. The parietal lobes were an important focus of Glyn's work, and Rugg and King (2018) review their role in episodic memory retrieval. Lenoble et al. (2018) explore attentional factors in visual search in Alzheimer's disease.

A central feature of Glyn's work on visual processing was the distinction between semantic and pre-semantic levels of processing. The studies by Snowden et al. (2018) and Woollams and Patterson (2018) both focus on semantic dementia, a disorder that affects the ability to understand words and to recognize objects that are perceived normally. Following Glyn's work on category specificity, Aiello et al. (2018) explore memory for sub-categories of information: natural and transformed foods, and Romero et al. (2018) investigate the practical effects of willingness-to-pay on 2D versus real foods of different calorific content.

Several articles focus on executive functions. The interference effects (capture errors) in working memory tasks reported by Roca et al. (2018) are reminiscent of the repetitions/intrusions of actions described by Glyn in patients with frontal lobe pathology (Humphreys & Forde, 1998; Riddoch, Edwards, Humphreys, West, & Heafied, 1998). Varjadic et al. (2018), examine the anatomical basis for executive set shifting using an analogue of the Trail Making test drawn from the OCS battery developed by Glyn's research group. Wu et al. (2018) test predictions about gambling behaviour in high-level autism. Soto et al. (2018) describe an fMRI study of metacognitive processing. Giorgio et al. (2018) also present an fMRI study, which examines the neural networks involved in learning predictive statistics.

Glyn's interest in the practical implications of his research for the assessment and management of patients is reflected by the rehabilitation studies of Alsamour et al. (2018), and Wang et al. (2018).

Glyn had strong views on the importance of neuropsychology and its future role in driving our understanding of brain-behaviour relationships. Price (2018) provides an historical and future perspective on how cognitive models of human brain function can be derived from neuropsychology and neuroimaging research. Corbetta et al. (2018) show that large-scale studies of stroke patients provide little evidence for the modularity of brain function that is implied by much neuropsychological research, but instead emphasise the role of distributed networks underpinning behaviour. Both review articles cause us to reflect on cognitive models and traditional approaches to neuropsychology, and as such, are very much in the Humphreys tradition.

The impetus for this Special Issue came from the British Neuropsychological Society. Glyn was an active member of the society, served as President between 2012 and 2014, and organised the 25th Anniversary meeting in Oxford in 2014. He was a theoretical scientist, committed to the practical implementation of knowledge to improve the lives of people with brain damage: a true neuropsychologist. In the words of Glyn, cognition matters.

REFERENCES

- Alsamour, Marie, Gilliaux, Maxime, Renders, Anne, Lejeune, Thierry, Stoquart, Gaëtan, & Edwards, Martin Gareth (2018). Does observation of a disabled child's action moderate action execution? Implication for the use of Action Observation Therapy for patient rehabilitation. *Cortex*, 107, 102–109.
- Aiello, Marilena, Vignando, Miriam, Foroni, Francesco, Pergola, Giulio, Rossi, Paola, Silveri, Maria Caterina, & Rumiati, Raffaella I. (2018). Episodic memory for natural and transformed food. *Cortex*, 107, 13–20.
- Bickerton, W., Riddoch, M. J., Samson, D., Balani, A. B., Mistry, B., & Humphreys, G. W. (2012). Systematic assessment of apraxia and functional predictions from the Birmingham cognitive screen. *Journal of Neurology Neurosurgery and Psychiatry*, 83(5), 513–521. <https://doi.org/10.1136/jnnp-2011-300968> (Epub 2012 Mar. 1).
- Corbetta, Maurizio, Siegel, Joshua S., & Shulman, Gordon L. (2018). On the low dimensionality of behavioral deficits and alterations of brain network connectivity after focal injury. *Cortex*, 107, 229–237.
- Demeyere, N., Riddoch, M. J., Slavkova, E. D., Bickerton, W. L., & Humphreys, G. W. (2015). The Oxford Cognitive Screen (OCS): Validation of a stroke-specific short cognitive screening tool. *Psychological Assessment*, 27(3), 883–894. <https://doi.org/10.1037/pas0000082> (Epub 2015 Mar. 2).
- Duncan, J., & Humphreys, G. W. (1989). Visual search and stimulus similarity. *Psychological Review*, 96(3), 433–458.
- Fallon, Sean J., Mattiesing, Rozemarijn M., Dolfen, Nina, Manohar, Sanjay G., & Husain, Masud (2018). Ignoring versus updating in working memory reveal differential roles of attention and feature binding. *Cortex*, 107, 50–63.
- Farooqui, Ausaf Ahmed, & Manly, Tom (2018). When attended and conscious perception deactivates fronto-parietal regions. *Cortex*, 107, 166–179.
- Giorgio, Joseph, Karlaftis, Vasilis M., Wang, Rui, Shen, Yuan, Tino, Peter, Welchman, Andrew, & Kourtzi, Zoe (2018). Functional brain networks for learning predictive statistics. *Cortex*, 107, 204–219.
- Humphreys, G. W. (1978). The use of category information in perception. *Perception*, 7(5), 589–604.
- Humphreys, G. W., & Forde, E. M. E. (1998). Disordered action schema and action disorganisation syndrome. *Cognitive Neuropsychology*, 15(6), 771–812.
- Humphreys, G. W., & Forde, M. J. (2001). Hierarchies, similarity, and interactivity in object recognition: «Category specific» neuropsychological deficits. *Behavioral and Brain Sciences*, 24(3), 453–476.
- Humphreys, G. W., & Riddoch, M. J. (1987). *To see but not to see. A case study of visual agnosia*. London: Lawrence Erlbaum Associates.
- Humphreys, G. W., & Riddoch, M. J. (2001). Detection by action: Neuropsychological evidence for action-defined templates in search. *Nature Neuroscience*, 4(1), 84–88.
- Humphreys, G. W., & Riddoch, M. (2003). A case series of 'category-specific' deficits of living things: The HIT account. *Cognitive Neuropsychology*, 20, 263–306.
- Humphreys, G. W., & Riddoch, M. J. (2006). Features, objects, action: The cognitive neuropsychology of visual object processing 1984–2004. *Cognitive Neuropsychology*, 23, 156–183.
- Humphreys, G. W., Yoon, E. Y., Kumar, S., Lestou, V., Kitadono, K., Roberts, K. L., et al. (2010). The interaction of attention and action: From seeing action to acting on perception. *British Journal of Psychology*, 101(2), 185–206. <https://doi.org/10.1348/000712609X458927>.
- Lenoble, Quentin, Corveleyn, Xavier, Szafrarczyk, Sébastien, Pasquier, Florence, & Boucart, Muriel (2018). Attentional capture by incongruent object/background scenes in patients with Alzheimer disease. *Cortex*, 107, 4–12.
- McIntosh, Robert D. (2018). The end of the line: Antagonistic attentional weightings in unilateral neglect. *Cortex*, 107, 220–228.
- Price, Cathy J. (2018). The evolution of cognitive models: From neuropsychology to neuroimaging and back. *Cortex*, 107, 37–49.
- Riddoch, M. J., Edwards, M. G., Humphreys, G. W., West, R., & Heafied, T. (1998). Visual affordances direct action: Neuropsychological evidence from manual interference. *Cognitive Neuropsychology*, 15(6–8), 645–683.
- Riddoch, M. J., & Humphreys, G. W. (1983). The effect of cueing on unilateral neglect. *Neuropsychologia*, 21(6), 589–599.
- Riddoch, M. J., & Humphreys, G. W. (1987). A case of integrative agnosia. *Brain*, 110(6), 1431–1462.
- Riddoch, M. J., Humphreys, G. W., Edwards, S., Baker, T., & Willson, K. (2003). Seeing the action: Neuropsychological evidence for action-based effects on object selection. *Nature Neuroscience*, 6(1), 82–89.
- Roca, María, García, Milagros, Torres Ardila, María Juliana, González Gadea, María Luz, Torralva, Teresa, Ferrari, Jessica, Ibáñez, Agustín, Manes, Facundo, & Duncan, John (2018). Rule reactivation and capture errors in goal directed behaviour. *Cortex*, 107, 180–187.
- Romero, Carissa A., Compton, Michael T., Yang, Yueran, & Snow, Jacqueline C. (2018). The real deal: Willingness-to-pay and satiety expectations are greater for real foods versus their images. *Cortex*, 107, 78–91.
- Rugg, Michael D., & King, Danielle R. (2018). Ventral lateral parietal cortex and episodic memory retrieval. *Cortex*, 107, 238–250.
- Rumiati, R. I., & Humphreys, G. W. (2015). Cognitive neuroscience goes social. *Cortex*, 70, 1–4. <https://doi.org/10.1016/j.cortex.2015.07.008> (Epub 2015 Jul. 26).
- Samson, D., Apperley, I. A., Chiavarino, C., & Humphreys, G. W. (2004). Left temporoparietal junction is necessary for representing someone else's belief. *Nature Neuroscience*, 7(5), 499–500 (Epub 2004 Apr. 11).
- Shalev, Nir, De Wandell, Linde, Dockree, Paul, Demeyere, Nele, & Chechlacz, Magdalena (2018). Beyond time and space: The effect of a lateralized sustained attention task and brain stimulation on spatial and selective attention. *Cortex*, 107, 131–147.
- Snowden, Julie S., Harris, Jennifer M., Thompson, Jennifer C., Kobylecki, Christopher, Jones, Matthew, Richardson, Anna M., & Neary, David (2018). Semantic dementia and the left and right temporal lobes. *Cortex*, 107, 188–203.
- Soto, David, Theodoraki, Mona, & Paz-Alonso, Pedro M. (2018). How the human brain introspects about one's own episodes of cognitive control. *Cortex*, 107, 110–120.
- Soto, D., Humphreys, G. W., & Rothstein, P. (2007). Dissociating the neural mechanisms of memory-based guidance of visual selection. *Proceedings of the National Academy of Sciences*, 104(43), 17186–17191.
- Sui, J., He, X., & Humphreys, G. W. (2012). Perceptual effects of social salience: Evidence from self-prioritization effects on perceptual matching. *Journal of Experimental Psychology: Human Perception and Performance*, 38(5), 1105–1117. <https://doi.org/10.1037/a0029792>.
- Varjačić, Andreja, Mantini, Dante, Levenstein, Jacob, Slavkova, Elitsa D., Demeyere, Nele, & Gillebert, Céline R. (2018). The role of left insula in executive set-switching: Lesion evidence from an acute stroke cohort. *Cortex*, 107, 92–101.
- Wang, Tianlu, Mantini, Dante, & Gillebert, Céline R. (2018). The potential of real-time fMRI neurofeedback for stroke rehabilitation: A systematic review. *Cortex*, 107, 148–165.
- Ward, Jamie, Brown, Paris, Sherwood, Jasmine, & Simner, Julia (2018). An autistic-like profile of attention and perception in synaesthesia. *Cortex*, 107, 121–130.
- Woollams, Anna M., & Patterson, Karalyn (2018). Cognitive consequences of the left-right asymmetry of atrophy in semantic dementia. *Cortex*, 107, 64–77.
- Wu, Hsuan-Chen, White, Sarah, Rees, Geraint, & Burgess, Paul W. (2018). Executive function in high-functioning autism: Decision-making consistency as a characteristic gambling behaviour. *Cortex*, 107, 21–36.