

- 1 Garrard, P. & Forsyth, R. (2010). Abnormal discourse in semantic dementia: a data-driven approach. *Neurocase*, 16, 520-528.  
Notes: Structural and content-related deficits occur in connected discourse of patients with semantic dementia (SD). We used principal components analysis (PCA) to characterise the sources of variation in word usage during picture description by controls and SD patients. This data-driven approach allowed: comparison of the distance between individuals in the two-dimensional space; correlational analyses between principal component (PC) values and performance on other tests; identification of words whose variance contributed most to the definition of the PCs. Transcripts of Cookie Theft picture descriptions from 21 patients with SD and 21 controls were used to generate frequencies of all word types (n = 557) across participants. Frequency values of words with  $\geq 10$  occurrences (n= 81) were entered into a PCA. Values of emergent dimensions were correlated with performance on tests of single word meaning. The first PC accounted for 59% of the variance, the second for a further 10%. Patients and controls showed good separation within the resulting space. Factor loading scores indicated that control performance was characterised by function (factor 1) and content (factor 2) word usage, while patients showed a greater tendency to use pronouns, deictic and generic words. Knowledge of single word meaning correlated with factor 1 but not with factor 2. Differences in word usage can differentiate connected speech of SD patients from controls using a rapid, automated, data-driven algorithm. The distinction between groups, loadings on the two components, and their differential correlations with semantic tasks raise the possibility of independent differences in syntax and lexical content  
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- 2 Garrard, P. (2008). Differential diagnosis in dementia. In S.F.Cappa, J. Abutalebi, J.-F. Démonet, P. C. Fletcher, & P. Garrard (Eds.), *Cognitive neurology: a clinical textbook* (pp. 185-198). Oxford: Oxford University Press.
- 3 Garrard, P. & Carroll, E. (2006). Lost in semantic space: a multi-modal, non-verbal assessment of feature knowledge in semantic dementia. *Brain*, 129, 1152-1163.  
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A novel, non-verbal test of semantic feature knowledge is introduced, enabling subordinate knowledge of four important concept attributes--colour, sound, environmental context and motion--to be individually probed. This methodology provides more specific information than existing non-verbal semantic tests about the status of attribute knowledge relating to individual concept representations. Performance on this test of a group of 12 patients with semantic dementia (10 male, mean age: 64.4 years) correlated strongly with their scores on more conventional tests of semantic memory, such as naming and word-to-picture matching. The test's overlapping structure, in which individual concepts were probed in two, three or all four modalities, provided evidence of performance consistency on individual items between feature conditions. Group and individual analyses revealed little evidence for differential performance across the four feature conditions, though sound and colour correlated most strongly, and motion least strongly, with other semantic tasks, and patients were less accurate on the motion features of living than non-living concepts (with no such conceptual domain differences in the other conditions). The results are discussed in the context of their implications for the place of semantic dementia within the classification of progressive aphasic syndromes, and for contemporary models of semantic representation and organization
- 4 Garrard, P., Lambon-Ralph, M. A., Patterson, K., Pratt, K. H., & Hodges, J. R. (2005). Semantic feature knowledge and picture naming in dementia of Alzheimer's type: a new approach. *Brain and Language*, 93, 79-94.  
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This study addresses continuing controversies concerning the nature of semantic impairment in early dementia of the Alzheimer type (DAT), and the relationship between conceptual knowledge and picture naming. A series of analyses of fine-grained feature knowledge data show that: (1) distinctive features of concepts were more vulnerable than shared; (2) the amount of attribute knowledge about a concept was associated reliably, and in a graded fashion, with the ability to name a picture of that item; (3) sensory features were differentially important in naming; and (4) the degree of disruption to different types of attribute knowledge did not vary between items from living and nonliving domains. These findings are discussed in the context of contemporary cognitive and computational models of semantic memory organisation

- 5 Garrard, P., Maloney, L. M., Hodges, J. R., & Patterson, K. (2005). The effects of very early Alzheimer's disease on the characteristics of writing by a renowned author. *Brain*, 128, 250-260.

Notes: Institute of Cognitive Neuroscience, 17 Queen Square, London WC1N 3AR. UK. Iris Murdoch (I.M.) was among the most celebrated British writers of the post-war era. Her final novel, however, received a less than enthusiastic critical response on its publication in 1995. Not long afterwards, I.M. began to show signs of insidious cognitive decline, and received a diagnosis of Alzheimer's disease, which was confirmed histologically after her death in 1999. Anecdotal evidence, as well as the natural history of the condition, would suggest that the changes of Alzheimer's disease were already established in I.M. while she was writing her final work. The end product was unlikely, however, to have been influenced by the compensatory use of dictionaries or thesauri, let alone by later editorial interference. These facts present a unique opportunity to examine the effects of the early stages of Alzheimer's disease on spontaneous written output from an individual with exceptional expertise in this area. Techniques of automated textual analysis were used to obtain detailed comparisons among three of her novels: her first published work, a work written during the prime of her creative life and the final novel. Whilst there were few disparities at the levels of overall structure and syntax, measures of lexical diversity and the lexical characteristics of these three texts varied markedly and in a consistent fashion. This unique set of findings is discussed in the context of the debate as to whether syntax and semantics decline separately or in parallel in patients with Alzheimer's disease

- 6 Garrard, P., Patterson, K., & Hodges, J. R. (2004). Semantic processing in Alzheimer's disease. In R.G.Morris & J. T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (2 ed., pp. 179-196). Oxford: Oxford University Press.

- 7 Garrard, P., Patterson, K., Watson, P. C., & Hodges, J. R. (1998). Category specific semantic loss in dementia of Alzheimer's type. Functional-anatomical correlations from cross-sectional analyses. *Brain*, 121, 633-646.

Notes: University Neurology Unit, Addenbrooke's Hospital, Cambridge, UK ; ABSTRACT: In the context of focal brain injury, selective loss of semantic knowledge in the domain of either natural kinds or artefacts is usually considered to reflect the differential importance of temporal and frontoparietal regions to the representations of perceptual and functional attributes, respectively. It is harder to account for as a feature of a more diffuse process, and previous cross-sectional analyses of patients with dementia of Alzheimer's type (DAT) have differed over whether category effects occur. In our series of 58 patients with probable DAT, we demonstrated a significant group advantage for artefacts, and explored possible reasons for the inconsistency of this finding in other studies. A multiple single- case strategy revealed not only individuals with consistent advantages for artefacts but also individuals with consistent advantages for natural kinds. By ranking the individuals according to measures of naming performance and global intellectual ability, we showed that the strength of the group advantage for artefacts was dependent on the former but not the latter variable. The findings are discussed in the context of two competing theories of semantic breakdown in DAT. One differentiates between domains of knowledge in terms of the structure of semantic representations within a single distributed network; the other emphasizes the importance of

different brain regions in the category distinction. We conclude that our findings are in keeping with the predictions of the latter hypothesis