structurally anomalous in schizophrenia. By contrast, no significant alterations were found in the GABA system of one sector (CA_1), previously found to be intact in schizophrenia.

These results offer a circuitry-based mechanism through which amygdala dysfunction, plus other potentially dysfunctional components of corticolimbic circuitry, could contribute to hippocampal pathology in schizophrenia. In addition to the importance of this finding for understanding schizophrenia, an even more important contribution is the development of a method allowing for selective, *in vivo*, pharmacological dissections of neuronal interaction. Although Berreta *et al.* emphasized the structural consequences of amygdala hyperactivity on the hippocampus, their future work could address the physiological or behavioral consequences as well. The ability to manipulate one small part of a complex functional neural system in behaving animals has far-reaching applicability to many important questions in cognitive neuroscience.

1 Benes, F. (1999) Evidence for altered trisynaptic circuitry in schizophrenic hippocampus. *Biol. Psychiatry* 46, 589–599
2 Heckers, S. *et al.* (1998) Impaired recruitment of the hippocampus in during conscious recollection in schizophrenia. *Nat. Neurosci.* 1, 318–323
3 Berretta, S. *et al.* (2001) Amygdalar activation alters the hippocampal GABA system: 'partial' modelling for postmortem changes in schizophrenia. *J. Comp. Neurol.* 431, 129–138

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Universal dyslexia?

Estimates of the prevalence of dyslexia in different countries seem to reflect differences in orthographic complexity; dyslexia is more common in countries where the orthography (spelling) is complex (e.g. USA and Britain), compared with those where orthography is transparent (e.g. Italy). A recent study by Paulesu *et al.* has shown that, although the manifestation of dyslexia might differ depending on the precise orthography used, the core cognitive deficit and brain basis is universal[1]. The study compared dyslexic and normal readers from countries with transparent (Italian) and complex (English and French) orthographies. Behaviourally, the dyslexics from each of the three countries showed a similar pattern of results, all performing poorly on subtests that required phonological short-term memory. Italian dyslexics did perform better than either the English or French dyslexics on reading tasks, but comparisons between dyslexic and normal readers from the same country revealed similarly marked differences irrespective of language.

At a neurophysiological level, the story was the same. PET scanning during implicit and explicit reading tasks revealed very similar patterns of brain activity in Italian, French and English dyslexic subjects: reduced activation in left inferior and superior temporal cortex and mid-occipital cortex. This pattern is consistent with previous findings from PET, MRI and magnetoencephalography studies of dyslexia. The marked similarity of brain activity across all three dyslexic groups contrasts with the situation in normal readers. A previous study by the same authors[2] found that Italian readers showed greater activation of left superior temporal regions but English readers showed greater activations of left posterior inferior temporal gyrus and anterior inferior frontal gyrus, differences which are consistent with the idea that Italians might be decoding words phoneme by phoneme whereas English readers require access to whole word information.

These findings suggest that there is a core impairment in phonological processing in dyslexia, regardless of orthography. The degree of orthographic complexity does, however, affect the manifestation of the impairment. In a transparent orthography such as Italian, reading problems will be less severe whereas complex orthographies are likely to magnify the problem. But the similarity in brain activation between the Italian and English dyslexics might also suggest that the dyslexic brain is less able to adapt to the subtle requirements of an orthographic system.

1 Paulesu, E. *et al.* (2001) Dyslexia: cultural diversity and biological unity. *Science* 291, 2165–2167
2 Paulesu, E. *et al.* (2000) A cultural effect on brain function. *Nat. Neurosci.* 3, 91–96

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In Brief

Where the brain gets jokes

"*Why don't sharks bite lawyers? Professional courtesy*" and "*Why did the golfer wear two pairs of pants? He had a hole in one*" are both jokes and make people laugh (well, some people, at least), but the type of humor is quite different in each case. Is there nevertheless a central brain mechanism responsible for finding something funny? It appears so, according to a recent study by Vinod Goel and Ray Dolan [*Nature Neurosci.*(2001) 4, 237–238]. Using single-event fMRI, these authors studied the brain activation of subjects who listened to jokes (but not extremely funny ones, to keep them from moving their heads). Semantic jokes (such as the one about lawyers) and puns (the golfer joke) activate different networks in the brain, but when subjects find either kind of joke genuinely funny, another brain area is activated – the orbital prefrontal cortex, which has been associated with reward – and the funnier the joke (as rated by the subject), the stronger the activation. *MW*

Premotor cortex called to attention

We know that the premotor cortex (PMC) is involved in movement planning. However, a new single-cell recording study suggests that PMC also contains cells with a purely attentional function [Lebedev, M.A. and Wise, S.P. (2001) *Eur. J. Neurosci.* 13, 1002–1008]. In this ingenious experiment, a sophisticated eye-movement tracking system and food-delivering robots were used to allow the researchers to separate out effects of eye

