Contributions wanted

If you read a paper published in a peer-reviewed journal (or at proof stage) and think it would be of relevance and interest to our wide audience, send a lively and informative review (up to 400 words) to Tom Stafford on tom@idiolect.org.uk.

Little grey area for smokers

FIONA LYDDY *reports on a study finding reduced grey matter in smokers.*

THE health consequences of cigarette smoking are well documented, and in recent years awareness of the ill-effects has been extended to include direct effects on brain structure and function. Recent magnetic resonance imaging (MRI) studies have revealed significant structural abnormalities attributed to long-term smoking, for example ventricular and white matter irregularities. Now a study has, for the first time, documented effects on grey matter volumes and densities, comparing 19 otherwise healthy smokers with 17 non-smoking controls.

Smokers were defined as those who smoked 20 cigarettes or more a day and who met DSM-IV criteria for nicotine dependence. Non-smokers had smoked no more than five cigarettes in their lifetime. The groups were similar on average age (39.5 and 37.9 years), ethnicity, handedness, and depression and anxiety scores. The smokers consumed on average 26 cigarettes a day (range 20–40). They had a mean average 31 pack-year smoking history (range 9–70). (The pack-year refers to time measured as a pack a day; for example someone who smoked one pack a day for 20 years would have a 20 pack-year history, as would someone who smoked two packs a day for 10 years.)

Exclusion criteria included any medical or psychiatric history, substance use or prescribed medication known to affect brain structure. Depression and anxiety ratings and handedness measures were obtained.

Brainstorm in a teacup

MARYANNE GARRY *and* **ELIZABETH F. LOFTUS** *delve into repression.*

FREUD: He was right. So suggested a *Daily Telegraph* article (7 March 2004) describing recent memory research by Michael Anderson (University of Oregon) and colleagues. But what did that research, published in *Science* this year, really show?

In a three-stage experiment, participants learned 40 word pairs (e.g. *ordeal*, *roach*). In phase two, they were either (a) cued with one member (*ordeal*) and asked to remember its mate (*roach*); (b) cued and asked to suppress it; or (c) not cued. There were 16 'remember' trials and 16 'suppression' trials, and in these two conditions an fMRI measured brain activity. In phase three, memory was tested with the old cue (ordeal), and with a new cue related to its former mate (e.g. insect).

For 'remember' trials, recall was higher than baseline; for 'suppression' trials, sometimes it was lower. Old and new cue tests showed similar patterns. However, what got the media excited was the fMRI data: the remember and suppress instructions produced different patterns of brain activity.

What does the research really tell us about repression? Anderson *et al.* say their results fit with a Freudian 'mechanism that pushes unwanted memories out of awareness'. But a closer look shows there was not much suppression going on. Participants still remembered about 80 per cent after 16 suppression attempts vs. about 87 per cent at baseline. The effect might be delicate: some cannot replicate it (e.g. Bulevich *et al.*, 2003). In short, this is not exactly the massive protective mechanism Freud had in mind.

What do the fMRI scans tell us? Because Anderson *et al.* could not measure brain activity for baseline words, they could only compare 'remember' and 'suppress' conditions. They also did not compare brain activity for successful and unsuccessful suppression. Thus we do not know what might be unusual about the 7 per cent of cases in which suppression 'worked'.

These missing measures mean we can't assume that suppressing activity is somehow different from baseline. Even if it is, what does the difference mean? Perhaps, as Squire was reported as suggesting in the *New York Times* in January, people try to suppress something by distracting themselves. Say they distract themselves by imagining disgusting scenarios. Would that activate some neural disgust centre? Would we then conclude that suppression and disgust were similar?

Some of the findings of Anderson *et al.* fit what we already know about memory. For example, 'remember' participants showed more hippocampal activity. That's not surprising: they remembered more words in that condition. And even though the concept of repression itself does not square with what we know about memory, is it surprising that asking people to do

Exhaled carbon monoxide levels were measured as a rough index of recent cigarette smoking. An MRI scan was then taken for each participant. Scans were performed at 7am, and participants did not smoke that morning before the scan was taken.

Compared with non-smokers, smokers were found to have smaller relative cortical grey matter volumes and lower grey matter densities in the prefrontal cortices bilaterally, smaller left dorsal anterior cingulate cortical volumes and lower right cerebellar grey matter densities. Greater pack-year history was also found to be associated with lower prefrontal cortical grey matter density. These brain areas have been linked with nicotine dependence, as well as cognitive and personality variables, such as the poorer working memory performance and higher impulsivity in smokers. The pattern of abnormality observed here may be linked to the effects of smoking, a predisposition towards smoking or related factors.

Brody, A.L., Mandelkern, M.A., Jarvik, M.E., Lee, G.S., Smith, E.C., Huang, J.C. *et al.* (2004). Differences between smokers and non-smokers in regional gray matter volumes and densities. *Biological Psychiatry, 55*, 77–84.

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different things causes activity in different brain regions? After all, in the days before fMRI, did we ever think cognitive activity took place in the pancreas?

Anderson *et al.* have developed an interesting way of studying what happens when people repeatedly try not to think about a word, which will undoubtedly stimulate much additional research. But they are far from having shown a neural mechanism for Freudian repression.

Anderson, M.C., Ochsner, K.N., Kuhl, B., Cooper, J., Robertson, E., Gabrieliu, S.W. *et al.* (2004). Neural systems underlying the suppression of unwanted memories. *Science, 303*, 232–235.

Reference

Bulevich, J.B., Roeidger, H.L. & Balota, D.A. (2003). Can episodic memories be suppressed? Poster presented at the 44th annual meeting of the Psychonomic Society, Vancouver, Canada.

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DON'T LOOK DOWN AND YOU'LL BE OK

Did you know that injury from falling is the most common cause of UK hospital admissions in people over the age of 65? In that context Laurie Swan and his fellow researchers (Central Michigan University) investigated whether, counterintuitively, performing a secondary task might improve people's balance.

Indeed, when they stood blindfolded on a wobbly platform, the balance of 15 older women (average age 64 years) was better when they simultaneously performed a memory task compared with when they didn't. Performing the secondary task brought no benefit under easier balancing conditions involving a fixed platform or when the women's eyes were not blindfolded. The memory task also had no effect on the balance of 18 younger women (average age 21 years), regardless of the balancing conditions.

In the wobbly platform condition, how could the increase in attentional demands caused by the memory task have helped the older participants keep their balance? The authors suggested that 'it is possible that those who have a balance problem may benefit from not paying too much attention to various balance-related sensory cues', which would otherwise cause them to over-respond and possibly to fall.

Swan, L., Otani, H., Loubert, P.V., Sheffert, S.M. & Dunbar, G.L. (2004). Improving balance by performing a secondary cognitive task. *British Journal of Psychology, 95*, 31–40.

Weblink: *www.bps.org.uk/publications/jBP_1.cfm*

Syllabus advice: See traditional models of limited attentional resources (e.g. Norman, D.A. & Bobrow, D.G. (1975). *Cognitive Psychology,* 7, 44–64). This work also complements a study showing that anxiety about falling might lead older people to focus too much attention on walking (Gage, W.H. (2003). *Experimental Brain Research, 3*, 385–394).

MAKING A DIFFERENCE

Starting a new job? Don't be daunted, think of the difference you could make!

Hoon-Seok Choi and John Levine (University of Pittsburgh) allocated 141 undergraduates to 47 groups of three to work on a computer simulation of an air surveillance task that involved allocating threat ratings to enemy aircraft. After completing a 15-minute shift, one member of each team of three was replaced by a confederate (someone working for the researchers) who proposed a new strategy for the second 15-minute shift. The remaining two members of the original team were given the opportunity to discuss by e-mail whether to accept the new team-member's proposal.

The researchers found that teams were more likely to accept a newcomer's proposed strategy if they had had their original strategy imposed on them by the experimenters. By contrast, those teams who had had the opportunity to choose their initial strategy tended to remain committed to it. Teams were also more likely to accept the new proposal if they were told by the experimenters that they had performed below average in the initial shift. Finally, these factors combined, so that the newcomer's strategy proposal was most likely to be accepted if the team had had no choice over their initial strategy and it had appeared to be unsuccessful.

The researchers summed up 'although the mechanisms underlying newcomer innovation need further investigation, results of this study suggest that newcomers can indeed bring about changes in how work groups operate'.

Choi, H. & Levine, J.M. (2004). Minority influence in work teams: The impact of newcomers. *Journal of Experimental Social Psychology, 40*, 273–280.

Weblink: *www.sciencedirect.com/science/journal/00221031*

Syllabus advice: Most relevant to questions of minority and majority influence (specifically covered by AQA spec A and B (AS), by SQA (adv higher) and Edexcel). Also relevant to occupational psychology modules (OCR and Edexcel exam boards).