When I grow up I want to be a...

INTERVENTIONS to promote children's exposure to both male and female role models across a range of occupations are well documented. One concern is that children's occupational choices remain vulnerable to the influence of sex stereotypes because the language form associated with job titles influences children's beliefs about the gender of occupations.

USA-based researchers Lynne Liben, Rebecca Bigler and Holleen Krogh asked 6- to- 11- year-old children to rate job titles according to whether they perceived them as jobs for men or women. Job titles with no linguistic sex-specific marking, like *psychologist*, *scientist* and *banker*, were compared with those with such markings, like *chairman*, *webmaster* and *stewardess*.

A key finding was that children did not interpret neutral job titles as applying equally to both men and women. A possible influence of child-based sex stereotyping could have explained this finding. Once the authors individually assessed children in the study according to whether they were either low or high stereotypers, even a quarter of responses from children classified as low stereotypers were found to attribute neutral job titles as only being attributable to men or women and not both sexes.

The authors also put the spotlight on children's interpretations of job titles associated with the sex-related suffixes like *master* and *mistress*. Counter-intuitively, *master* was rated as more applicable to both sexes than any feminine suffix or other suffix types (e.g. *chairman* or *firewoman*).

Liben, L.S., Bigler, R.S. & Krogh, H.R. (2002). Language at work: Children's gendered interpretations of occupational titles. *Child Development, 73*, 810–828.

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Signposts for language

The first neuroimaging study of British Sign Language reveals neural basis of gestural language. **NEIL MARTIN**

THE origin of language probably lies in the motor system of our brain. Gesturing preceded the sophisticated vocal communication of evolutionary modern times, and visuo-spatial communication is still used. Deaf people, for example, use American or British Sign Language. But to what extent does the brain have different systems for understanding the different types of communication – those that rely on our ability to hear and those that rely on our ability to decipher visual symbols or actions?

Mairead MacSweeney (University College London) and her colleagues have carried out the first brain-imaging study of the perception of British Sign Language, comparing the brain's response to this with its response to audio-visual English in hearing individuals. Native deaf or hearing signers who had learnt BSL from their deaf parents had their brain activity measured by fMRI during the perception of sentences presented in BSL. Non-signing, hearing individuals watched and heard a video of the same sentences being spoken in English.

Regardless of the modality of communication, there was activation in Broca's area and in Wernicke's area – both bilaterally – during the language perception tasks. However, differences did emerge between tasks in temporal and occipital areas. The auditory task in hearing individuals was associated with increased activity in the auditory cortices, whereas the BSL task was associated with activity in an area called V5 at the junction of the temporal and occipital cortex. V5 is the region of the visual cortex that responds to movement; so activation here is consistent with what we know of the neurology of visual perception.

The experimenters then separated the influence of BSL knowledge from hearing status by comparing deaf and hearing signers' responses to BSL. Deaf signers showed greater activation in the left superior temporal cortex than did hearing signers. This result is intriguing because its suggests that in deaf people auditory regions can be 'taken over' to some extent to respond to visual input, whereas in hearing individuals with the same language experience these regions remain primarily dedicated to auditory processing.

MacSweeney, M., Woll, B., Campbell, R., McGuire, P.K., David, A.S., Williams, S.C.R. *et al.* (2002). Neural systems underlying British Sign Language and audio-visual English processing in native users. *Brain, 125*, 1583–1593.

Mental rotation – Still going round in circles?

Two explanations fail to account for sex difference in spatial ability. **NEIL MARTIN**

ONE of the most consistent sex differences in cognition is that men are better than women at mentally rotating objects in three-dimensional space. One explanation for the difference is that spatial ability depends on the presence of sex steroids such as testosterone. Another is that it is the result of men and women adopting stereotypical sex roles; people who demonstrate masculine traits are better at tests of spatial ability than are those femininely disposed. Both hypotheses have been tested in two recent studies. Both, however, draw negative conclusions.

Lynn Liben and researchers at Pennsylvania State University measured spatial ability in a group of children who showed delayed puberty. They gave 35 boys and 14 girls (average age 13 years 7 months) either sex steroids or a placebo over 21 months. Spatial ability, which included mental rotation and three-dimensional mental manipulation of objects, was measured every three months.

The researchers found that the sex steroids had no effect on spatial performance, despite finding the traditional sex difference. This may not mean that steroids are not involved. 'It may be', the authors caution, 'that such effects do occur but only under some as yet unidentified additional setting conditions (be they biological or experiential).'

One experiential condition might be sex roles. A group of researchers at the Universities of Toronto and Saskatchewan investigated whether spatial test performance was influenced by the degree to which men and women internalise their sexual identity and behave in a stereotypically male or female way. Deborah Saucier and her Canadian colleagues found that when spatial ability was correlated with sex role, a very weak relationship emerged, although a sex difference in ability still emerged as it did in the Liben *et al*. study.

Research is no clearer, therefore, in providing an answer to the question of why sex differences are seen for specific ability.

Liben, L.S., Susman, E.J., Finkelstein, J.W., Chinchilli, V.M., Kunselman, S., Schwab, J. *et al*. (2002). The effects of sex steroids on spatial performance: A review and an experimental clinical investigation. *Developmental Psychology, 38*, 236–253.

Saucier, D.M., McCreary, D.R. & Saxberg, J.K.L. (2002). Does gender role socialization mediate sex differences in mental rotations? *Personality and Individual Differences, 32*, 1101–1111.

Budding sensation-seekers

Sensation seeking at age three predicts intellect. **NEIL MARTIN**

PSYCHOLOGISTS have delved into infancy and childhood to trace the development of a number of personality traits. Intelligence, psychopathology and antisocial personality are some of the more obvious ones. New research from the University of Southern California now suggests that sensation-seeking behaviour seen in three-year-old children predicts their intellectual ability at age eleven.

Adrian Raine and colleagues reasoned that children who are curious and enthusiastic about exploring their environment should develop into more intellectually robust individuals. Measures of stimulation seeking taken from 1765 three-year-old Mauritian children were correlated with cognitive ability scores when they had reached eleven years of age.

Children who scored very highly on the stimulation-seeking measure at three years of age scored an average of 12 IQ points more at eleven than did children described as low sensation-seekers. The sensation-seekers also had better school reports and greater reading ability, regardless of sex or ethnic background (Indian or Creole).

The findings, Raine *et al*. suggest, show that sensation-seeking children 'may provide for themselves a more potent and continuous environmental enrichment than traditional educational enrichment can provide, and in contrast to such enrichment programs, can produce long-term IQ changes that last throughout adulthood'.

Raine, A., Reynolds, C., Venables, P.H. & Mednick, S.A. (2002). Stimulation seeking and intelligence: A prospective longitudinal study. *Journal of Personality and Social Psychology, 82*, 663–674.

Sensation-seekers get better reports

Associate Editor: G. NEIL MARTIN
Please send reviews (up to 400 words) of papers published in peer-reviewed journals (or at proof stage) – including a copy of the paper – to: Dr G. Neil Martin, School of Health and Social Science, Middlesex University, Queensway, Enfield EN3 4SF. Fax: 020 8362 5343; e-mail: n.martin@mdx.ac.uk.

Further submission details are on p.495.

Don't strain yourself

How imagination will help you pull your weight. **NEIL MARTIN**

EMPLOYING a psychologist is de rigueur for the serious athlete nowadays. No top-flight master of the track, pitch or field can do without the tools of psychology's trade. Often, these tools involve using imagery or role-playing. But does it work?

Joshua Landau and colleagues at York College of Pennsylvania had 87 undergraduates either simulate (imagine) lifting a fridge, or not simulate. They then asked the participants to estimate the amount of weight they could lift. Those people who simulated lifting gave significantly higher estimates for weightlifting, compared with those who did not simulate. Even when the experimenters mentally manipulated the weight of the object whose lifting was simulated (by telling the participants that the object weighed a particular amount), the simulators still reported being able to sustain heavier weight subsequently.

Is mental simulation the key?

'Our results are important,' the authors say, 'because they provide evidence that physical ability judgements are constructed much like our recollections of the past and that they are similarly malleable following a brief mental simulation exercise.' A sentiment you might like to pass on to your removals firm the next time they are tardy in shifting your Queen Anne.

Landau, J.D., Libkuman, T.M. & Wildman, J.C. (2002). Mental simulation inflates performance estimates for physical abilities. *Memory and Cognition, 30*, 372–379.

Deceitful memory

More evidence of how your mind plays tricks. **NEIL MARTIN**

A LARGE body of research suggests that we claim to remember things we were not exposed to. Since the early experiments of Bartlett and, later, Elizabeth Loftus and her accident-prone cars, the fallibility of memory appears to be a constant in cognitive psychology. We can even report remembering imagining or making a familiar action when we actually did not, according to a recent study by Ayanna Thomas and Elizabeth Loftus at the University of Washington.

They asked participants to imagine performing, or to perform, bizarre and familiar actions. Familiar actions were those such as flipping a coin; bizarre actions were those such as sitting on a die. Twenty-four hours later, participants imagined performing actions, some of which they had been presented with in the earlier testing session and some of which were new. Two weeks later, participants were presented with a list of actions and asked whether (i) these actions had been presented in the original session and (ii) whether they had been imagined or performed.

Not only did people report remembering that bizarre actions had been presented to them in the original session (when they had not been presented), but they also reported remembering performing those actions (when they had not performed them). There was a greater tendency to 'remember' having performed familiar actions than bizarre actions.

The researchers suggest that the repeated attempts at imagination may have misled participants into believing they had made an action when they had not, or that participants confused the source of the imagined with the actual act. 'It is possible', suggest the authors, 'that repeated imagination led participants to develop false contextual cues to support their false memories of performance.'

Thomas, A.K. & Loftus, E.F. (2002). Creating bizarre false memories through imagination. *Memory and Cognition, 30*, 423–431.