Susanna Millar, B.A, M.A, Ph.D, Hon.D.Lit. AFBsPs

Department of Experimental Psychology

Oxford University Research Lecturer, (retired from teaching)
Senior Research Fellow, St Hugh's College, & Director of Psychological studies. (retired).
Contact: e-mail: susanna.millar@psy.ox.ac.uk; **Tel.: U.K. (01865) 2-71385**:

Main Research Interests**:**

Spatial processes and the relation of sensory inputs to 'higher' order interactions.

My research has centred on the question of how we make sense of the space(s) around us, and how sensory inputs relate to that and to other 'higher' processes. Active touch – often deemed most unlike vision – was used as an instructive foil to vision in experiments on spatial perception and memory. Criteria for what counts as specifically 'spatial' were based on the crucial role of reference cues in spatial tasks. Spatial processing is characterised as **integrating diverse inputs in relational forms which afford reference cues that specify the location**, **distance or direction of objects that spatial tasks demand**.

One of the exciting outcomes in this area is the increasingly complex, even paradoxical, nature of findings that cannot be tested by 'either-or' hypotheses. My initial experiments in the 1970s, for instance, suggested that the relation of crossmodal to intramodal visual and haptic (active touch) perception differs between shape and length tasks. We found later that shapes which produce the same perceptual 'illusion' in vision and touch show some input effects, but they share the discrepant shape features that produce the illusion, Short-term memory for haptic lengths was disrupted by interpolated kinaesthetic cues, as had long been suggested, but also by spatial distractors, showing that both were factors.

A series of experiments on how vision affects forms of spatial reference showed that congenitally totally blind children rely on 'egocentric' (body-centred) reference in spatial tasks. They did not differ from blindfolded sighted cohorts on haptic recognition, or on reproduction of object locations, or on line orientations that could be related reliably to body-centred reference cues. But their egocentric errors were highly significant in relocation and rotation tasks that disrupt body-centred reference relations.

Nevertheless, vision is not necessary for spatial inference or mental rotation, since at least some people who have never had any sight can solve such problems.

Findings which link touch to body-centred reference relations, and vision with experience of externally based reference cues are not in doubt. But the links are not exclusive. Spatial vision involves body-centred posture and gravitational cues. External cues can be related to each other and to external surrounds also in active touch. We found that bi-manual instructions in the use of external reference cues improved purely haptic memory for object locations as much as intact body-centred reference cues. Together, the two forms of reference were more accurate than either alone.

My further question is how we can apply Occam's razor to the multiple task effects, the differences and overlaps in inputs and in reference relations that recent brain and neural network studies make even more evident. The findings suggest a more complex picture than either 'modular' or 'unitary' models warrant. The principle of parsimony may apply best to future findings of the rules that govern the interactions, which are necessary if specific inputs evolved to help rather than to hobble spatial understanding.

Books by Susanna Millar:

Space and Sense. (2008) The Psychology Press ISBN 978-1-84169-525-9

Reading by Touch. **(1997**). Routledge. ISBN 0-415-06837-1; 0-415-06837-x

Understanding and Representing Space: **Theory and evidence from studies with blind and sighted children**. **(1994)** Oxford Science Publications. O.U.P. ISBN 0 19 852142 1; Spanish translation (1997) by S. Ballesteros, ONCE, ISBN, 84=484-0089-5.

The Psychology of Play (1968). Penguin Books (Nine other European and Japanese editions). The review partly led to the interest in testing crossmodal effects of vision, touch and movement.

Selected Journal Articles:

Millar, S. & Al-Attar, Z. **(2005**). What aspects of vision facilitate haptic processing? Brain and Cognition, 59, 258-268.

Millar, S. (2005). Network Models for Haptic Perception. Infant Behav. and Developm. 28, 250-265.

Millar, S. & Al-Attar, Z. (2004).External and body-centred frames of reference in spatial memory: Evidence from touch. Perception & Psychophysics, 66, (1) 51-59.

CONTD.

Selected Journal Articles contd

Millar, S. & Al-Attar, Z. (2003). Spatial reference and scanning with the left and right hand. Perception, 32, 1499-1511.

Millar S. & Al-Attar, Z. (2003). How do people remember spatial information from tactile maps? British Journal of Visual Impairment. 21, (2), 64-72.

Millar, S. & Al-Attar, Z. (2002). Müller-Lyer illusions in touch and vision: Implications for multisensory processes. Perception & Psychophysics, 64, (3), 353-365.

Millar, S. & Al-Attar, Z. (2001). Illusions in reading maps by touch: Reducing distance errors. British Journal of Psychology, 92, 643-657.

Millar, S. & Al-Attar, Z. (2000). Vertical & bisection bias in active touch. Perception, 29, 481-500
;
Millar, S. (1999). Veering revisited: Noise and posture cues in walking without sight. Perception, 28, 765-780.

Ballesteros, S., Millar, S. & Reales, S. **(1998**). Symmetry in haptic and in visual perception. Perception & Psychophysics, 60, 389-404

Millar, S. & Ittyerah, M. (1992). Mental practice without visuo-spatial information. International Journal of Behavioral Development, 15, 125-146.

Henry, L. & Millar, S. (1991) : Memory span increase with age: A test of two hypotheses. Journal of Experimental Child Psychology. 51, 458-484.

Millar, S. (1988). Prose reading by touch: The role of stimulus quality, orthography and context. British Journal of Psychology, 79, 87 - 103.

Millar, S. (1985). Movement cues and body orientation in recall of location by blind and sighted children. Quarterly Journal of Experimental Psychology, 1985, 37, 257 - 279.

Millar, S. (1981). Self-referent and movement cues in coding spatial location by blind and sighted children. Perception, 10, 255 - 264.

Millar, S. (1979). Utilization of shape and movement cues in simple spatial tasks by blind and sighted children. Perception, 8, 11 - 20.

Millar, S., (1974). Tactile short-term memory by blind and sighted children. British Journal of Psychology, 65, 253-263.

Millar, S, (1971).Visual and haptic cue utilization by preschool children: The recognition of visual and haptic stimuli presented separately and together. Journal of Experimental Child Psychology, 12, 88 - 94.

Filename: Paris B
Directory: F:\ParisTlk
Template: C:\Documents and Settings\smillar\Application Data\Microsoft\Templates\Normal.dot
Title: Department of Experimental Psychology
Subject:
Author: smillar
Keywords:
Comments:
Creation Date: 20/05/2009 15:40:00
Change Number: 2
Last Saved On: 20/05/2009 15:40:00
Last Saved By: smillar
Total Editing Time: 4 Minutes
Last Printed On: 20/05/2009 15:43:00
As of Last Complete Printing
Number of Pages: 3
Number of Words: 1,049 (approx.)
Number of Characters: 5,981 (approx.)