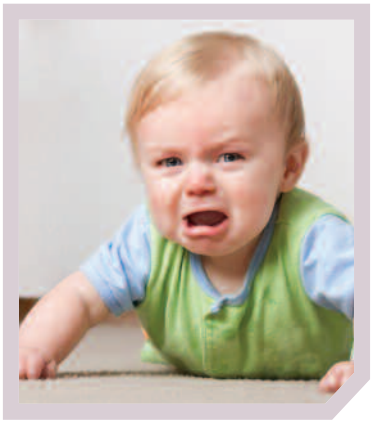
Securely attached to science

I get the impression there is not much that Marinus van IJzendoorn (Leiden University, the Netherlands) wouldn't take on. His title for this keynote – 'Attachment across the lifespan: Neurobiological and developmental perspectives' – certainly suggests a man unfazed by the challenges of a broad theoretical and experimental overview of his subject.

Beginning with Bowlby's definition of attachment as an infant's strong disposition 'to seek proximity to and contact with a specific figure and to do so in certain situations, notably when he is frightened, tired or ill', van IJzendoorn moved to the level of attachment representation in adults. Our conscious and unconscious rules for organising attachment-related information can be assessed via the Adult Attachment Interview: how coherent are the stories we tell about our attachment biographies, and can we back up what we say with specific examples?

Studies show that there is continuity of attachment across the lifespan, and the key for van IJzendoorn is how our own attachment histories might impact upon how we respond to the attachment behaviours of our own infants. Take crying for example: an important and evolutionarily adaptive behaviour, but no doubt an aversive one to most parents! Through a series of ingenious experiments, van IJzendoorn and colleagues (notably Marian Bakermans-Kranenburg) found that insecurely attached adults report more irritation and grip more tightly on a joystick in response to crying, while also displaying more amygdala response (although amygdala hyperactivity was not a significant mediator). There is no single attachment neural construct, van IJzendoorn concluded, and brain connectivity is clearly important.



Oxytocin reduced amygdala activation in response to crying

In fact, van IJzendoorn is keen to focus on oxytocin as a possible 'attachment hormone'. He feels oxytocin experiments might shed light on mechanisms leading to (in-)sensitive parenting, and that it could even play a part in parenting interventions. Although results in studies using oxytocin are notoriously inconsistent, van IJzendoorn has demonstrated some promise – for example, oxytocin reduced amygdala activation in response to infant crying, while increasing insula and inferior frontal gyrus activation. This suggests less anxiety and aversion, and more empathy, according to van IJzendoorn.

So is oxytocin 'mother's little helper', asked van IJzendoorn, ready to be distributed by the truckful? This would be far too simple a conclusion for a man with van IJzendoorn's nuanced approach, and tying it all together he revealed that parental rejection or 'love withdrawal' appear to decrease the impact of oxytocin, perhaps via insecure attachment. This points the way to developmental behavioural epigenetics, an eclectic approach which suits the fascinating van IJzendoorn down to the ground.

An interview with Marinus van IJzendoorn will appear in a forthcoming issue

Walk this way

What can we do about the ageing brain? That was the question occupying Carl-Johan Olsson (Umea University) in convening this symposium. There is longitudinal evidence for diminished frontal cortex function in ageing, he said, and tests of free recall can predict dementia up to 20 years prior to clinical diagnosis. 'We must find ways to preserve our brain structure and function', he challenged.

A healthy diet is thought to be important, but could weight loss actually improve cognitive function? Olsson put 20 post-menopausal women on either the Paleolithic diet (lots of meat and berries) or the Nordic nutrition recommendations. fMRI during a face-name task showed decreased frontal gyrus activity during retrieval, suggesting that the task post-diet is less cognitively demanding. Weight loss may improve brain efficiency during episodic memories, Olsson concluded.

Another target for intervention is a person's social relationships. Hui-Xin Wang (Karolinska Institute, Stockholm) found that those whose level of social engagement decreased were at higher risk of dementia, and that the level of satisfaction with those networks was also important.

Perhaps most persuasive were the University of Illinois' Art Kramer's exhortations to 'go for a walk'. Across international studies with the normal elderly, we find that cognitive 'brain training'-type effects are pretty specific. Not so for physical activity, where we see broad transfer. For an inspirational case study, just Google Olga Kotelko, the incredible flying nonagenarian, who has 26 world records since she reached 75 years of age. Kramer presented evidence of a correlated change in the integrity of the brain's white matter as a function of walking, but not of stretching. Functional connectivity changes in favour of the walking group, mostly in the brain's 'default mode network'. There are still effects with resistance training, but not as great. So start pounding the streets, and start young: Kramer ended with evidence from a creative video simulation study, showing that fitter kids are more able to deal with cognitive challenges such as crossing a street while talking on the phone.