4th October 2006

Dear Steve,

Thanks for the letter, which is helping sharpen my ideas. Here is a more immediate reaction. Apologies if it rambles.

Psychologists have a habit of using 'implicit' as a way of avoiding being explicit themselves. The typical case is when an ability is (supposedly) measured by two types of test. The tests are passed at different ages, so the ability at age 1 is 'implicit', where 'implicit' is operationally defined as 'not measurable by test 2'. Test 2 typically requires judgement, and often verbal ability. The ability is otherwise tacitly assumed to be just the same (in basic character, at least).

This is the sort of counterargument I was anticipating to my gaze review. Although not a very satisfying explanation, it is also difficult to argue against. It is impossible to prove children do not have an ability that they cannot demonstrate.

I think your summing up of the implicit-explicit and mentalistic-nonmentalistic distinctions is correct (p. 2 para 2). By 'mentalistic' I had in mind representational mental states. Presumably one might want to consider (otherwise intangible) spatial relations between people and objects as basically mentalistic. However, I don't claim that this spatial relational understanding is "not integrated with whatever understanding of mind" children have (p.2, para 1). Rather, I think that infants' understanding of mind is all like this: in terms of relations between people and things/situations. They recognise different kinds of relations (gaze, engagement, desire, intention),

differentiated by the kind of behaviour associated with them. Gaze may be an interesting case because it serves as a cue to indicating engagement, desire and intention. Engagement I see as a general involvement with an object, situation, or activity. There are a number of cues that indicate it: general demeanour, proximity, body posture, head-direction, eye-direction, vocalisations, and so on. As adults we might see eye-direction as the critical indicator of visual attention, but it's a fairly poor indicator of engagement (since it is more transitory and less easy to detect than several of the other cues).

What I would want to claim:

1. Before 3 years, children's could be said to have an implicit mentalistic understanding of gaze in the following sense. Our gaze and our behaviour are mediated by the mind. This fact leads to regularities in the relationship between spatial configurations of eyes and objects and behaviour. Children do not understand the mediating factor, but pick up on some of the regularities. A potentially sophisticated understanding of behaviour could be built on this foundation.
2. After 3 years, children begin to understand the mind and become increasingly interested in eye-direction as the critical determiner of the current contents of attention. (The precise direction of causality is open to debate.)

The two systems idea is in some sense coincidental. Children might, for example, have very good geometrical gaze detection ability from infancy, but not understand the significance of gaze. The only reason to think that two systems might be involved is our data (not yet published) showing that accuracy of explicit judgement is poor at 3 years (chance) and improves in a fairly linear fashion up to about 7 years (oldest tested) where it is close to but does not match adult level. This suggests a novel skill, and

therefore that gaze following etc. is based on a different 'system' to later explicit judgement. Mapping this onto luminance and geometrical systems is very speculative.

To try to answer your protest (p. 4): i) I've characterised children's early gaze understanding as non-mentalistic because they cannot make judgements about it (despite good judgements based on head direction), and the lack of evidence suggesting any more profound understanding. The fact that judgements arise close to other theory of mind milestones is at least suggestive, but requires more attention. ii) A luminance system may be innate. I don't think much hangs on this. iii), iv) See above. I would say innate only in a very limited sense.

I'm unsure about the phoneme analogy for several reasons. I thought that the consensus was that categorical perception of speech sounds was shared with (e.g.) chinchillas, and therefore most likely not due to a speech-processing module. Phonemes are something that we impose onto sounds as a consequence of our alphabetic script. You might think that 'cat' is comprised of the phonemes 'cu' 'a' and 'tu', but however fast you say these in sequence, it won't sound right. You cannot look at the sound profile of the word and carve it neatly into phonemes, unless you have a syllabic script. Read et al. (1986) had a nice experiment where they found that Chinese people who had received even minimal training in western script (briefly, years previously) could perform phoneme deletion tasks, whereas those who had received no training could not. So I'm concerned that categorical perception of phonemes and phonemic awareness may be fundamentally dealing with different things. Phoneme deletion seems to be a skill that is only meaningful within the very artificial system of alphabetic literacy.

On the other hand, this doesn't necessarily make it a bad analogy.

Another issue though is about learning. I'd like to allow that a lot of learning about gaze behaviour goes on in the pre-mentalistic child, but that they lack some of the relevant theory of mind concepts to make adequate sense of it. The phoneme example doesn't allow for much learning betwee children being able to distinguish different sounds (an apparently innate ability) and beginning to learn the alphabet (by being taught it). I think a problem with theory of mind observations is that young children are trying very hard to make sense of the social world, and they may often come up with very good (but fundamentally flawed) approximations. Josef Perner's idea of prelief is a good example. It works, more or less, except in a small number of situations.

Anyway, that's a somewhat unstructured attempt at a response to your letter. It's been term-time here for 3 weeks already….

Martin.