29/09/2006

Dear Martin,

I really like 'The Development of Mentalistic Gaze Following'. I've been thinking about this and wanted to pick your brain about a few things. The bit that excites me most is your claim that "two systems may be in operation" (184) because I'm collecting a range of cases that seem to involve two systems in the hope of being able to say something about distinctions between practical and reflective understanding (or implicit and explicit knowledge).

If I've understood the basic picture, development involves three stages: pre-18-months when "gaze following may be a conditioned response (Moore, 1999)"; 18-months to 3–4 years (plus chimps) when infants can follow another person's gaze through apertures, around barriers and into the space behind them; and 3–4 years onwards when children can make explicit judgements about gaze, eye direction and whether someone is looking at them. Theorists have ignored the important distinction between the second and third stages, seeing gaze tracking behaviour as evidence of a full understanding of gaze.

How can we characterise the differences between the 18-month-old infants and the 3–4 year old children? If I have followed you correctly, there is a subtle shift between Doherty and Anderson (1999) and Doherty (2006). In the former paper the favoured explication is that only 3–4-year-olds "represent the gaze relation" (569). In Doherty (2006) you allow that infants "can represent a spatial relationship between the eyes and an object" (183) and the favoured explication is that only 3–4-year-olds understand this relation "in any mentalistic way" (183). In both papers you mention a challenge from someone who says that infants do represent gaze as a mentalistic relation but only implicitly, where implictness is supposed to explain children's inability to make judgements about where someone is looking.

What does it mean to understand gaze as a mentalistic rather than as a merely spatial relation? What you say about chimps is very helpful: "another's gaze is not simply directing their attention; it is creating an expectation of visual experience in a specific direction"—so we have to suppose that they understand gaze as a relation between a person and an object: but they fail to "adapt their behaviour based on what the experimenter can see or is looking at"—so we should not suppose that they understand this relation as mentalistic (181). As I read this, you are suggesting that chimp's and infants' understanding of gaze is not integrated with whatever understand of the mind they have. So infants do not, for example, think of gaze as implying engagement; they would not infer from the fact that someone is looking at an object that they are engaged with it (cf. Moll & Tomasello's 2006 where infants infer engagement from an adult's jointly attending to an object but not merely observing it; and Dunham et al 2000 where 2-year-olds seem not to fully understand the relation between engagement now and having your eyes open now). I recall being sceptical about mental–nonmental distinctions in London but I find this a very useful way to think about the contrast between infants and children.

Now I have a small suggestion. As I read Doherty (2006) there is an opposition between two ways of elucidating how infants' and children's gaze-related capacities differ: (i) by appeal to a nonmentalistic–mentalistic distinction and (ii) by appeal to an implicit–explicit distinction. There is also the "two systems" idea. I want to suggest that if we properly understand the implicit–explicit distinction, then (i) and (ii) are complementary rather than opposing, and also that the "two systems" idea is in fact the best way to explicate the sense in which infants' understanding is implicit. In other words, we only properly understand any of the three contrasts (nonmentalistic–mentalistic, implicit–explicit and "two systems") if we understand how it relates to the other two.

The easiest way to explain this suggestion is by comparison with understanding phonemes. From 4 months or earlier infants enjoy categorical perception of phonemes (Eimas, Siqueland, et al. 1971).

This capacity is standardly explained as due to a speech-processing module which identifies phonemic structure in sounds and on lips by attempting to use speech-production mechanisms to reproduce those sounds and movements (Liberman & Mattingly 1985). But despite having categorical perception of phonemes, children perform very poorly on tests for "phoneme awareness" which require them to recognise, distinguish or manipulate phonemes. To illustrate, in a standard test for phoneme identity (used e.g. by Treiman et al 1998) children are told that a puppet likes words beginning with /d/ and hates words beginning with /t/ and asked to sort words accordingly. Unlike their phoneme perception, children's "phoneme awareness" develops slowly over several years, varies systematically depending on their oral language (e.g. Turkish vs. French), and is facilitated by learning a writing system (and some types of writing system help more than others, e.g. syllabaries vs. alphabets). Furthermore, children find certain types of phonemes harder to distinguish than others (e.g. those that differ only with respect to voicing are harder to distinguish than those that differ only with respect to articulation), whereas they have no corresponding difficulties *perceiving* distinctions between phonemes. All of this suggests that categorical perception of phonemes and "phoneme awareness" involve two independent systems which each involve quite different techniques for tackling similar problems. I mention this because it seems that the distinction between perceiving phonemes and being able to make judgements about phonemes may parallel your distinction between non-mentalistic representations of gaze and being able to make judgements about gaze. We might almost say that infants can represent phonemes but not in any linguistic way.

If the parallel between gaze and phonemes is half-way correct, it isn't a genuine alternative to your view to suppose that infants have merely implicit knowledge of gaze. Characterising the content of what infants understand (e.g. whether they think of gaze as merely spatial or mentalistic) should go together with characterising the type of understanding they have (e.g. whether it's implicit or explicit, perceptual or reflective). I think it doesn't really make

sense to suppose that infants might have an implicit understanding of gaze as mentalistic, just as someone couldn't plausibly say that infants' perception of phonemes might amount to understanding them as linguistic. After all, understanding something as having psychological or linguistic significance is surely related to being able to exploit its significance.

The analogy between gaze and phonemes suggests more questions about your "two mechanisms" idea. For example, in the phoneme case, the perceptual phoneme mechanism has a fairly clear, quite narrowly constrained purpose (decode speech) which is reasonably clearly distinct from kinds of purposes for which "phoneme awareness" is needed (most obviously, literacy). Is there a comparable distinction of purposes in the mechanisms you postulate? In particular, what are infants' and chimps' gaze abilities for? Another question (very close to my own heart) is whether you think the modular–nonmodular distinction applies to the gaze case, as it seems to do to the phoneme case?

I'm sorry to have waffled on so long. In short, I'm protesting against characterising infants' understanding of gaze by saying that it is (i) nonmentalistic, (ii) innate, (iii) involves a special-purpose mechanism, and (iv) implicit rather than explicit. I wouldn't argue that any of these are false (except perhaps innate), but I think that to properly understand infants' conception of gaze we need to understand how these claims relate to each other—they need to come as a package rather than as four separate claims.

I've really learnt a lot from these papers on gaze (or I hope you'll correct me if I've misunderstood a lot). Talking to you about engagement in London was also extremely useful, and I'm reading and thinking about that as well and eager for more discussion. In any case, it will be great to see you in Stirling in November.

I've also read your Leslie paper ('Core Problems …') but I want to read the original Leslie paper before I get back to you about that (term starts Monday so it might take me a little while). There is

one very small thing: on page 11 you say "desire can be seen more simply as a relationship between an agent and an object or location". Although purely formally this would solve the problem, I think it's very strange to think of desire as a relation to a location.

Best wishes,
Steve

PS: One nice feature of your gaze papers (and also of the phoneme case) is that it may challenge the idea that implicit–explicit type distinctions involve non-conscious–conscious representations (as e.g. Dienes and Perner 1999 claim). Since infants can presumably *see* where someone is looking but not judge it (just as they can *hear* phonemes without being able to make judgements about which phonemes they are hearing), there is presumably at least one good sense of 'conscious' in which they are conscious of where someone is looking.