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# Mindreading: evidence for both innate and acquired factors

(Commentary to Jill Byrnie: Primate theory of mind: A state-of-the-art review)

Byrnie's target article (this issue) is an impressive and scholarly review of the field of theory of mind in primate development, both human and non-human. However, the question of whether mindreading as a cognitive capacity (or set of mechanisms) is innate or subject to enculturation is surely a straw man. Whilst my 1995 theory is presented as the representative of the strong nativist modularity view, it is easy to misrepresent or even caricature this position. In this commentary, I repeat ideas presented elsewhere, but which appear to still need re-stating: namely, that mindreading may have *some* innate component, insofar as the genetic condition of autism entails a specific phenotype of mindblindness (to varying degrees), but that this in no way excludes the important role of experience being necessary in the typical development of mindreading.

In my article in 1999 I argued not for strong nativist modularity but for "minimalist innate modularity". I did this because the fact that blind children may be delayed in the theory of mind development (Brown, Hobson, Lee & Stevenson, 1997), or that there are birth-order effects in this domain (Perner, Ruffman & Leekam, 1994) suggests environmental input is important.

Specifying the minimal nature of the innate hardware for mindreading remains a topic of debate, and I argued for lower level perceptual mechanisms extract relevant social information, which provide critical inputs to developing a ToM. These mechanisms include an Eye Direction Detector (or EDD) which grabs the infant's attention to the eye region of faces and thus provides opportunities for the infant to learn the significance of gaze as a clue to a person's mental states; an Intentionality Detector (or ID) which grabs the infant's attention to animate actions, providing opportunities for the infant to learn about goal-directedness; and a Shared Attention Mechanism (or SAM), which takes inputs from the previous two mechanisms to enable the infant to work out if s/he and another person are attending to the same thing, thus ensuring that shared foci or common topics are a central experience for the developing infant. ToMM, in this model, is conceived of either being a more mature development of SAM, or is triggered by SAM. Rather than having to postulate ToMM coming fully prepackaged as an innate module, this minimalist alternative specifies less that is innate - but still specifies some innate social-information mechanisms.

Aside from the evidence from the congenitally blind, or the evidence of birth-order effects, there is a third important

body of evidence that shows mindreading must be partly environmental. This comes from studies of children who did not experience secure attachment relationships with their caregiver in infancy or early childhood but instead were neglected or even abused. Such children have a high risk of developing personality disorders of one kind or another, the best studied of these being borderline personality disorder (Fonagy 1989; Bowlby, 1969). The implication of this is that the minimalist modules that will later allow for the development of mindreading must require the relevant kind of input to function normally.

The analogy might be with language: to the extent that there are minimalist innate language acquisition mechanisms, a language environment of some kind is still essential to give such mechanisms something to work on. Just as absence of the right emotional input to mindreading mechanisms can lead to distorted mindreading (Dodge, 2004; Happe et al, 1996), so absence of the right linguistic input to language acquisition mechanisms can lead to language delay (Pinker, 1994).

The hope is that those scientists who study the role of genetics in mindreading (Chakrabarti et al, 2006; Kent et al, in press) will be recognized not as naive nativists who deny the role of the environment, but simply as moderate in arguing for gene-environment interactions (Kent and Baron-Cohen, in press).

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