How autistics see the world

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In their stimulating discussion of monkey communication and socialisation, Cheney & Seyfarth (C & S) mention autism as an example of the dissociation possible between social and non-social intelligence (p. 270). We would like to suggest that autism is also an important example for many of the other points raised in this excellent book. Although the authors suggest a parallel between vervet and normal human infant communication (p. 173), an even more informative analogy can be made with the abilities and handicaps of people with autism. These individuals suffer from a circumscribed brain abnormality (from a variety of biological causes) that affects development from birth. The basis of their handicap is a specific cognitive disorder that results in the absence of theory of mind. This in turn leads to specific impairments in imagination, socialisation, and communication (Frith 1989). We raise only a few points here that arise from our explanation of the three core features of autism and relate to issues in primate research.

Pretence. One area where monkeys are more like autistic children than like normal infants, or Down syndrome children, is pretence. C & S conclude that there is little good evidence of pretence in monkeys. Autistic people – unlike normal two-year-olds – also fail to show pretend play (Wulff 1985). It was this observation that was crucial in suggesting that autistic people might also lack a theory of mind, because both require the ability to represent mental states (Leslie 1987).

Socialisation. The hypothesis that autistic people – like C & S's vervets – lack a theory of mind, can account well for the core handicaps of autism. Like monkeys, however, autistic people *are* capable of social skills that do *not* involve a theory of mind. So, for example, autistic children can use sabotage (manipulation of behavior) to achieve a desired end, although they cannot use deception (manipulation of beliefs, Russell et al. 1991; Sodian & Frith, in press). Primates, too, probably manipulate behaviour rather than mental states. Sabotage is seen, for example, in the bonobos who removed the means of escape from the moat to leave individuals below stranded (p. 211). Such behaviour seems to indicate an understanding of goal-directedness, and a parallel, rudimentary understanding of desires as drives seems to be present in autism (Baron-Cohen 1991a; Tan & Harris 1990). Autistic people can also understand and manipulate seeing (Hobson 1984; Leslie & Frith 1988) in much the same way a monkey or ape may be able to conceal information, for example, by hiding from dominant males behind a rock before grooming a subordinate male (p. 191).

Communication. C & S make a distinction between "calls that provide information only about the signaller's emotional state or subsequent behaviour . . . and calls that denote a specific external referent" (p. 104). This is clearly a useful distinction when the signaller's intention to signal is in question, but it may be that the distinction becomes less useful when dealing with deliberate communication – such as the vervets' vocalisations. Here a distinction between internal (as cognitively simple) and external (as more complex) referents could be misleading. Confusion could arise because the two categories above overlap with two very different categories that have been found to be useful in looking at the quality of autistic communication.

Expressive versus instrumental communication. In autistic people it has been fruitful to examine whether the gestures and speech produced are protodeclarative or protoimperative. Protodeclarative gestures indicate an external referent to communicate something about the signaller's internal state ("Look at that bird; I'm interested in it!"). Protoimperatives, on the other hand, indicate an external referent to achieve a behavioural end ("Look at that bird; give it to me!"). The cognitive and social sophistication underlying these two categories, however, is precisely the reverse of that ascribed to C & S's classes – protodeclaratives are more advanced because they require a theory of mind. Not surprisingly, then, protoimperative pointing is understood and used by autistic children, but protodeclarative pointing is not (Baron-Cohen 1989b). Similarly, autistic children use instrumental gestures but not expressive gestures (Attwood et al. 1988).

Ostensive versus coded communication. The protodeclarative/protoimperative distinction is also related to the distinction between ostensive-inferential communication and coded com-

munication (Sperber & Wilson 1986; see also multiple book review of *"Relevance" BBS* 10(4) 1987). Ostention is behaviour that alerts others to and makes clear the actor's *intention* to convey some piece of information. We would predict that neither the autistic person nor the monkey would be capable of ostensive-inferential communication – because neither has a theory of mind capable of systematically representing and manipulating intentions. On the other hand, communication in autistics and monkeys can still be achieved by means of coded communication. Unfortunately, coded communication is relatively inflexible, because signals have a set meaning that is not dependent on contextual factors or the signaller's intention. In autism, the single-word instrumental speech and echolalia commonly seen (Paul 1987) may be a form of coded communication (i.e., "apple" always means, "Give me apple!").

No!" In monkeys the availability of coded communication and the lack of ostensive-inferential communication may explain the absence of an equivalent for the word "No!" in vervet vocalisations (p. 226). Humans use the word "no" in a flexible way; its precise meaning varies with context, because we understand this "vocalisation" in terms of a speaker's intention rather than as a code. Such flexible "loose usage" would seem to be impossible without an understanding of mental states (Happé 1991). It is not yet known how flexibly autistic people use this term, but we would predict that they use "No!" as a code with a set meaning (such as "Go away!").

Pedagogy. The presence of ostensive behaviour would greatly increase the likelihood of pedagogy. Unless individuals pay attention preferentially to ostensive versus nonostensive behaviour the opportunity for teaching is severely restricted. Ostention should receive preferential attention because it carries a guarantee of relevance (see Sperber & Wilson 1986).

Social and nonsocial intelligence. C & S claim that "a crucial distinction between humans and other primates may be that humans are better able to generalise, or extend, skills used in social interactions to nonsocial domains" (p. 262). It seems a plausible and exciting possibility that awareness of mental representations preceded and provoked the use of other representations, such as notational systems, in evolution. Within the individual and on the developmental time-scale, however, there seems to be relatively little proof of generalisation of social skills to nonsocial domains. In normal children, for example, social skills are relatively independent of other abilities (Nunez & Riviere 1990). Similarly, there are autistic people who have an above average IQ despite their handicaps in imagination, socialisation and communication (Gillberg 1991). In contrast, some high-functioning autistic people may be able to use their nonsocial intelligence to unravel the mysteries of social situations. These people seem able to solve social problems only by using their general intellectual capacities, or perhaps by reversing the evolutionary story and using such nonmental representations as pictures as a model for understanding mental states. Close connections between social and nonsocial intelligence in humans may therefore be a feature of abnormal rather than normal development.

We would like to suggest that some light might be thrown on the question of why social and nonsocial intelligence are so distinct in primates by studying their understanding of such nonmental representations as maps and photographs. The understanding of nonmental representations may tell us whether monkeys are more like young (pre-theory-of-mind) normals or more like autistic individuals. While autistic children seem to understand the representational nature of photographs (Leekam & Perner, in press; Leslie & Thaiss, in press), normal 3-year-olds do not understand "false" photographs (Zaitchik 1990) and have difficulty using a model as a map (DeLoache 1987). If primates can understand the representational nature of maps, models, and photographs, could they perhaps be taught to use such nonmental representations as models for understanding their own thoughts?