

Cambridge University Press

978-0-521-45949-5 - Social Intelligence and Interaction: Expressions and implications of the social bias in human intelligence

Edited by Esther N. Goody

Excerpt

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Introduction: Some implications of a social origin of intelligence

Recent work in ethology persuasively argues that the striking advance in primate intelligence over that of lower mammals is a product of social interdependence. This finding raises two kinds of questions for students of human society. In the first place, if the constraints of social interaction generated primate intelligence, what was the ratchet that led to the emergence of incomparably greater hominid intelligence, that is to *Homo sapiens sapiens*? For reasons outlined below, this stimulus seems likely to have been closely related to the gradual emergence of spoken language. Although discussion of the role of language in human evolution can, for the present at least, be only speculative, the problem has a fascination which justifies such exploratory thinking. We need to ask how language might have altered primate social life in ways that demanded, and rewarded, more complex intelligence.

A second question looks forward, not back; it concerns the contemporary nature of human intelligence. If human intelligence evolved in response to the challenges of social living, what are the implications for understanding thought, interaction and social forms? This introduction outlines some of the dynamics likely to be related to both questions in a way that is intended to raise problems for further analysis and research.

Themes from Working Papers

1. *Primate intelligence as a response to social interdependence*

In a seminal paper, 'The social function of intellect', Nicholas Humphrey (1976) has argued for a social origin of primate intelligence. He begins by noting that the higher primates, and particularly chimpanzees, are on many measures highly intelligent. Yet there is nothing in their life as foraging animals which demands such a level of intelligence. In this, he says, they are comparable to what we know of early man from studies of hunter-gatherer society. For both species, foraging follows customary patterns and the use of tools is very limited, both being based on imitation of others, or trial and error. Innovation requiring 'higher-order' or

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‘creative’ intelligence – that is, the ability to make inferences from novel conjunctions of events, is rare. The stone tools of *Homo erectus* appear to have hardly changed at all over one million years. This is a problem for ethologists because it is inconceivable that a creature would develop skills that are seldom or never used. Indeed, their assumption is the opposite: that skills only develop in response to pressures from the environment, such that the emergent skill makes a significant contribution to improved chances of reproductive survival. So what use is higher-order intelligence to anthropoid apes and stone-age man, if it doesn’t provide an advantage in dealing with the natural environment?

Humphrey suggests that the most difficult problems facing chimpanzees are other chimpanzees; that it was in dealing with the social environment that creative intelligence evolved. This suggestion makes sense once one recognizes the peculiar situation of interdependence that characterizes both ape and human society. Both live in groups. And living in groups requires being able to pursue individual goals effectively without alienating one’s fellows, breaking up the group, or creating a situation of conflict within the group so that it becomes vulnerable to outside attack.

Thus social primates are required by the very nature of the system they create and maintain to be calculating beings; they must be able to calculate the consequences of their own behaviour, to calculate the likely behaviour of others, to calculate the balance of advantage and loss – and all this in a context where the evidence on which their calculations are based is ephemeral, ambiguous and liable to change, not least as a consequence of their own actions (Humphrey 1988:19).

Acting on such models of the behaviour of others involves social transactions; there is a constant trading off between partners. If one animal or person wishes to change the behaviour of another he must take into account the other’s goals and tactics. So in addition to the cognitive skills required to perceive the current state of play (low-level intelligence), the social gamesman, like the chess player, must be capable of a special kind of forward planning. As each move may call forth several alternative responses, and ego’s own response choice must vary accordingly, this situation generates a decision-tree model.

In short, effective social living requires anticipation of the actions of others, calculation of short- and long-term costs and gains, and close attention to signals about the consequences of one’s own behaviour. The higher primates, and man, have the ability to model this interdependence of one’s own and others’ behaviour at the cognitive level.¹ In order to facilitate thinking about this kind of thought it is useful to give it some kind of representation; for convenience it might be termed *anticipatory interactive planning*, or AIP.

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Anticipatory interactive planning was a response to social living among primates. In turn, AIP set challenges which generated progressively increasing intelligence in the hominid line (Jolly 1966a; Humphrey 1976; papers in Byrne and Whiten 1988).

2. *Hominids, or at least Homo sapiens, were able to utilize spoken language in the representation of their own and others' contingent responses. Language clearly facilitates AIP in several ways, and must have made it very much more powerful. The emergence of language, then, may have been critical in the generation of hominid intelligence*

Social intelligence itself cannot account for the emergence of *Homo sapiens*, since it is shared with many higher primates. If spoken language is found only in humans, how is this related to the emergence of our species? How might social intelligence have led to, and been enhanced by, the development of language?

Progressive increase in cranial capacity through the *Homo* species to *Homo sapiens* suggests a continuing increase in intelligence during hominid evolution. This accelerates markedly with *H. erectus* and early *sapiens*.² Until recently it had been thought that language occurred suddenly through a mutation ('a unique genetic event') in which grammar and syntax were 'wired in' (Chomsky 1968, 1980; Premack 1986). However, several authorities have recently argued that language must have appeared in two stages: Lyons suggests that a gestural language preceded the emergence of human spoken language (1988). Recently Donald has proposed a protolanguage based on gesture and mime related to a mimetic form of cognition (1991). He sees both this protolanguage and cognition as distinct from spoken language and its related cognitive structures. Bickerton (1990) proposes a spoken protolanguage consisting essentially of a simple lexicon, perhaps later augmented by grammatical elements which were, however, quite independent of the grammar and syntax of 'true language' that appeared only with a genetic mutation. Thus these authorities retain the Chomskian premise that 'true language' was the result of a unique genetic event rather than developing gradually on the classic Darwinian model. This position makes it difficult to view early protolanguage as preadaptive for more complex forms since it is the disjunction between them that is stressed. In Bickerton's case this difficulty is ironic, since his insightful discussion of the emergence of grammatical elements in response to challenges for more clarity and specificity of reference is a model for an adaptationist account of the emergence of grammar and syntax.

Other scholars are beginning to pursue an adaptationist model that seeks to relate the initial emergence of spoken language to such primate features as the evolution of hemispheric specialization for both manual function

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and language, bipedal posture and tool use.³ In such a view early protolanguage could have been extremely crude permitting only simple reference, with phonemes, grammar and syntax very gradually emerging as particular responses to specific problems of using spoken language (e.g. tense, negation, thematic roles). In their several papers and joint book (forthcoming) Lindblom, MacNeilage and Studdert-Kennedy persuasively argue the general case for a Darwinian view of gradual emergence of spoken language, laying out in detail how phonemes fit such a pattern, and addressing the critical issue of the structural and behavioural acquisition of the ability to produce speech. Based on his studies of primate and human structures Lieberman has long argued that spoken language must have evolved through progressive modification of the vocal tract and associated cognitive specialization (1968, 1991). The current picture suggests that early *Homo erectus* already had a vocal tract differing significantly from the apes and *Australopithecus* species. As there would be no reason for such modification without the advantage of spoken language,⁴ the clear implication is that hominids have been using some sort of spoken language for over one million years.⁵

Robin Dunbar (1993) proposes another, very persuasive link between hominid intelligence and spoken language. He argues that primate group size and intelligence can be shown to increase in parallel, supporting the Humphrey, Jolly, Byrne and Whiten view that social living was the critical challenge; as primate groups got larger, demands of cognitive representation multiplied. But Dunbar points out that many sub-human primates rely on mutual grooming for the servicing of social relationships, and that for large groups this mechanism ceases to be effective, since it is time-consuming and a one-to-one interaction. Even a simple language, on the other hand, would have permitted the 'servicing' of many social relationships – simultaneously, and at a distance. Indeed, he suggests that initially instrumentally focused information may have been of secondary importance.

In accounting for the emergence of early language, Dunbar retains the premise that ecological constraints were primary in hominid evolution. He suggests that conditions for securing subsistence required early hominids to live in groups too large to be socially maintained through grooming. Thus, being forced to live in large groups, early hominids evolved 'gossip' to service social relationships. The argument for a social facilitation function of early language is very strong. Anthropologists since Malinowski (1927) have recognized its continuing significance.⁶ However there is no real argument made for ecological constraints as the initiating factor, and it is in any case superfluous. We know that some primates use complex vocal signals (e.g. Cheney and Seyforth 1990). It seems quite probable that human protolanguage developed from such a base. An alternative hypothesis would be that some early hominid

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group(s) began to elaborate vocal signals in a way that facilitated the servicing of social relations in groups larger than those possible using grooming alone. The challenge of using protolanguage in larger groups may well have driven the first simple regularities of usage, precursors of grammar and syntax.

If, as it seems probable, the long-term intimacy of mother–infant–child–sibling communication is central to the transfer of language skills between generations, then this posed the problem for early hominids of how children of different mothers (and different matriline) understood each other. Mothers who were themselves matri-siblings might transmit the same language usages to their children, but there must be a point at which the group becomes too large for this to balance changes of usage. Perhaps initially protolanguages were shared only within small groups. Larger groups of the sort Dunbar identifies as truly depending on spoken language for maintaining social relationships might then have been possible only after rudimentary grammars emerged which could cross boundaries of domestic bands.

The invisibility of social behaviour, especially spoken language, in the archaeological record has inevitably led to a focus on ‘bones and stones’, skeletal fossils and tools. Clearly both indirectly reflect social forms, but not without conjecture. If sociality does prove to be central to hominid cognition, then an evolutionary account must also give it a key role. A parallel development of hominid intelligence and of language invites us to ask in what ways early language might have facilitated social intelligence. Among the most obvious effects would be:

- (a) Reference by name to things and actions permits joint attention, and thus coordination of complex activities.
 - (i) This reference would then have to be mentally represented.
 - (ii) The processes of coordinating joint activity would also have to be mentally represented.
- (b) The emerging structures of grammar and syntax permit much more complex and more rapid conversation.⁷
 - (i) These grammar and syntax structures have to be cognitively represented.
 - (ii) Grammar and syntax processes have presumably become standardized, then routinized and finally automatized,⁸ as has the motor control of speaking. We are not aware of how we articulate and produce the sounds in our speech (How *do* you say ‘feather’?) Nor are we conscious of whether we put subject or verb first in a sentence. Automatization appears to free many complex processes from awareness, as car drivers are often startled to realize (see Velmans 1991 and comments).

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(c) Bickerton argues that a major vector of animal evolution is the complexity of representational system. He distinguishes between Primary Representational Systems (PRS), based on processing and representation of sensory input, and Secondary Representational Systems (SRS) in which the output of the PRS is mapped onto an externalized language. Species having only a PRS still respond to their environment in systematic ways which show they have ‘tacit concepts’ – like a frog’s response to a fly. But a SRS permits the *labelling* of tacit concepts so that they become explicit (1990).

What difference does it make that concepts are labelled? There are important processes nested within the use of reference in spoken language. Reference (by name or words) permits classification of things, actions, feelings, events, etc. by making it possible to be explicit about the categories to which they belong. Such classification is built into languages so that we use it automatically (animal > dog > terrier > my terrier Spot). Cognitive psychology suggests that this must have had important consequences for the organization of perception and memory. If we can process, organize and recall categories then we can handle hugely more information than if we must deal with particular instances. This must have represented a major advance in human cognition.⁹

The very process of establishing common meanings for lexical items places them in the domain of shared knowledge, as a part of what Hutchins and others have called distributed intelligence (see Hutchins and Hazlehurst, Chapter 2, this volume). A shared lexicon represents the coordination of *meanings* which makes the coordination of actions possible on a quite new level compared with what is possible on the basis of private inference.¹⁰ Another way of putting this social reality of language is to note that a Secondary Representational System does far more than multiply the power of the individual’s primary representational system; it gives every individual the power to enter into the linguistic representations of others, and to use these shared secondary representations to model cognitively the understandings as well as the intentions of others. And of course the fact that we use language to influence others means that we can move from cognitive AIP models incorporating reference to using these categories in speech to seek to implement AIP strategies. Language as a SRS bridges individual cognitions through cognitive modelling using shared meanings. At the same time it makes possible the coordination of joint action between individuals by speaking about common goals, instrumental means etc. using these shared meanings.

(d) Classification in turn is a prerequisite for the emergence of social roles (see below) and social rules (see below) which were necessary tools for the construction of even the simplest institutions of human social living. Both roles and rules now become elements in AIP representations,

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simplifying them in some ways, but also making them more powerful. At the same time roles and rules constrain the behaviour of others, making it more predictable.

(e) Language permits the individual to act much more effectively on his social world in two modes: information and control.

(i) The cognitive modelling of the contingent actions of others, anticipatory interactive planning, depends on information about how others will act. While past experience may give clues for inferring responses, this process is obviously limited. Language permits the explicit exchange of information. (If I want another to help me get food it is useful to know whether he is hungry. He may have mentioned this, or I can ask him. Or I can ask someone else if he is hungry, or . . .)

This raises the issue of distortion of information as one AIP strategy. Ethologists have seen deception as the key to primate social intelligence, as suggested in the title of a recent important book *Machiavellian Intelligence* (Byrne and Whiten 1988) and further discussed in Byrne's contribution to the present volume. Barnes's study of lying (1994) pursues this theme in human social life. The linguist Grice proposes that effective use of language depends on our being able to assume that others speak truthfully. Indeed deception is powerful precisely because we are so dependent on correct information for modelling our own and others' actions. AIP models of others' intentions can include the intention to deceive, their perception of our awareness of this deception, and our own counter deception, and so on. In Chapter 6, Good suggests that the ambiguity of conversational exchange may be one way of preserving the freedom to respond appropriately to deception.

(ii) However, AIP is not an end in itself but a means towards reaching our goals. AIP strategies must be implemented. The other mode of acting upon the world which language profoundly enhances is that of control. The use of language to manage relationships with others is extremely powerful, and dauntingly complex. On the simplest level commands both organize action and express dominance. Successful commands are probably the most effective AIP strategy of all, since they secure direct compliance with one's own goals without the need for calculating alternative strategies or engaging in negotiation. But of course language also permits social cooperation and negotiation of joint strategies. Conversational analysis reveals, on a less explicit level, the subtle nature of the cooperative negotiation of meanings in ordinary daily life. And the identification and analysis of speech acts has led to the recognition that speech often conveys several kinds of message simultaneously. The contributions of Streeck, Drew and Good in Part II of this volume present current thinking on key aspects of interactive negotiation in conversation.¹¹

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It is clear that information and control tend to be merged in most use of spoken language; language is used to manage social relations at the same time that it conveys information. However, management of relationships is probably the single most central use of language. Malinowski noted its importance long ago when he pointed out that communication apparently carrying no content whatever (which he termed 'phatic'¹²) was still important for maintenance of social life. Greeting forms are the most familiar example (see E. Goody 1972). Indeed Dunbar suggests that spoken language may have begun as companionable chatter with minimal referential content ('gossip') which served to maintain social integration (1992a). The formal constraints on use of language represented by institutionalized avoidance and joking relations (E. Goody 1978b), and by the universal politeness forms (Brown and Levinson 1978, 1987) reflect points where social relationships can be threatened by casual use of language. Garfinkel's experiments (1967) with altering expected responses in interactions between associates show again how fragile are the routines we construct to give meaning to our normal use of language, and how threatening is any deviation from what we expect. We depend on customary use of language to give constant evidence of the social validity of our relationships.

(f) Finally, language makes possible the objectification of belief (Rappaport 1988; Goodenough 1990). With language we construct social worlds that have ultimate reality. The totemic world of the Australian Aborigines, the layered world of Hindu reincarnations, the medieval realms of heaven and hell – these exist only through the complex representations made possible by language. It is the *sharing* of these beliefs, impossible without language, which makes them real.¹³ And it is this reality which in turn sets premises for shared goals which make possible joint social action at least part of the time.

Language and AIP together generated the complexity of mental representations which characterize the cognition of *Homo sapiens*.

3. *Language was essential to the awareness of the embedding of intentionality which distinguishes Homo sapiens (Dennett 1983, 1987)*

The awareness of the self as both actor and object is probably dependent on language. Mead has given a brilliant account of how hearing ourselves speak brings about this recognition. Among the higher primates only chimpanzees have been shown to recognize themselves in a mirror, but mirrors are not a part of the natural chimpanzee world. Even if they occasionally catch sight of themselves in a pool of water, chimpanzees cannot represent this 'self' to others in speech; it cannot be objectified. If primate creative intelligence is based on the capacity to represent mentally the reciprocal contingency of one's own and others'

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actions, perhaps language has made it possible for *Homo sapiens* to become at least partially aware of this process of representation. In AIP terms, awareness of the 'self' could be seen as the recognition by the 'I' of the planning of interactive strategies in which the self is also one of the actors ('me'). Linguistic representation of intentions may also have been critical in the development of the human skill in pretending. Leslie (1987) has suggested that pretending requires the capacity simultaneously to maintain two levels of belief; one knows the way the world 'really is', and at the same time one posits a different state of the world and manipulates this, for play or fantasy. Children with the mental deficit of autism appear to be unable to sustain such dual levels of representation. Again there is some evidence that chimpanzees engage in pretence in play. But they do not represent this pretence to themselves, or to other chimpanzees, as a basis for alternative hypothetical worlds. Only with language can pretence be socially objectified.

With language, *Homo sapiens* is able to objectify the self as well as others in representation of AIP strategies.

4. *The capacity to learn from others is enhanced by language in several ways. Homo sapiens depends on learning rather than instinct for the transmission of adaptations between generations; effective learning on the scale necessary for the transmission of culturally developed adaptations depends on language*

The Vygotskian view sees learning as based on activity carried out jointly by novice and expert.¹⁴ The novice begins by watching, then joins in with the simplest tasks, then gradually takes responsibility for the whole activity. In carrying out the activity together with the 'expert', the novice establishes routines which form the basis for mental schemata of the activity. These schemata model both the actions of the novice and of the expert. At first the novice need not 'understand' what s/he is doing, since the expert organizes and guides the process. As the novice comes to understand, and to master component skills, s/he is able to take responsibility for parts of the activity, and eventually for the whole. Vygotsky argued that cognitive processes take place first on the social plane, and that these joint processes are internalized to become the individual plane. During the learning process there is a 'space' where the novice is able to cooperate, but not to take responsibility – this has been termed the zone of proximal development (Vygotsky 1978:84–91; Wood, Bruner and Ross 1976; Cole 1985:154–9; Rogoff 1990). This view implies that the novice can jointly perform an activity before s/he is able to do it alone. Some chimpanzee learning is clearly of this sort, as with the use of straws to extract termites. What does language add to this process of social learning?

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(a) When learning is accompanied by speech, the schemata are objectified. The task may be discussed, corrected, elaborated. The activity being learned can become an explicit object for learning. The Utku Inuit have partly verbal routines between parents and infants which act out fearfulness, and the appropriate response of conciliatory dependence. These routines 'teach' the child to control anger at all times, and control of anger is a prerequisite for membership in an Utku community (Briggs 1970).

(b) With language, skills can be explicitly identified with roles, and indeed tend to form a central component of the social definition of roles. The ubiquity of a sexual division of labour as a core premise of every society is a paradigmatic instance of this process. Many authorities have noted that tasks which are culturally specified as gender-specific often lack any features objectively restricting them to that sex (e.g. LaFontaine 1978). It seems likely that once *terms* for gender roles based on physiological differences are in use, activities typical for that gender come to be referred to by these terms and to be regarded as 'naturally' gender-specific in the same way as physiological differences themselves. In this way language enters into the social construction of reality (E. Goody n.d.).

(c) Many simple societies have not institutionalized formal teaching/learning roles beyond the expert/novice distinction integral to cooperative activity between adults and children, and the modelling and control implicit in the relationship of parents to children (E. Goody 1982, 1989, 1993; Rogoff 1990). However with language, teaching roles become possible because learning can be objectified. Many simple societies link teaching with role transitions, usually heavily embedded in ritual, as in 'initiations' at puberty. What is taught, and learned, tends to be a blend of deference to the authority of seniors and the rights and obligations of adult roles (cf. Richards 1956).

(d) With language, culturally developed skills become cultural capital, to be transmitted, shared, or restricted. Skills become objectified.

With language, the schemata on which AIP depends can be more effectively taught through joint activity; culturally developed skills can be transmitted between generations, both through joint activity, and through explicit teaching.

5. The social nature of learning replicates, and objectifies, the social character of AIP in which one's own actions are represented as contingently interdependent on others' responses. With language, AIP representations come to be expressed in internal dialogue.

Vygotsky (1962) argues that thought is internalized speech. Initially