

# Putting apes (body and language) together again

A review article of:

Clark, A. *Being there, putting world, body and mind together again*

Savage-Rumbaugh, S., Shanker, S. & Taylor, T.J. *Apes, language and the human mind*

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# Putting apes (body and language) together again<sup>1</sup>

Clark, A. *Being there, putting world, body and mind together again*

Savage-Rumbaugh, S. , Shanker, S. & Taylor, T.J. *Apes, language and the human mind*

## Introduction

In *Apes, Language and Human Mind* the achievements of Kanzi, a bonobo chimpanzee, are used to re-evaluate the language abilities of non-human primates. The book's authors, Savage-Rumbaugh, Shanker and Taylor, (S-RST) contend that the language achievements of non-humans are made needlessly difficult to evaluate by the anthropocentrism of traditional views of mind. A major part of S-RST's argument takes the form of a critique of what they see as the obstacles to understanding Kanzi's significance. Andy Clark's (AC) *Being there: putting mind, world and body together again* is equally opposed to traditional conceptions of mind, but his main thrust is positive. Although also generally opposed to anthropocentrism, Clark is primarily concerned to develop an empirical and theoretical case for the view that cognition is not handled exclusively by brains, but should instead be seen as 'distributed' in a range of ways between brains, bodies and world.

Our motivation for discussing the two works together is, in a nutshell, that we think Clark's theoretical approach is a better way of thinking about Kanzi than anything S-RST offer. That is to say that while we share S-RST's view that Kanzi's story is important, we end up disappointed with their proposed interpretation of his achievements. Although Clark makes no mention of nonhuman language in *Being There*, we think Kanzi's achievements are appropriately understood in terms of distributed cognition. Indeed, not only do they support Clark's view of how mind, bodies and brains interact, but they also count as good evidence that human language is an example of distributed cognition.

Both works, as we see them, have a common critical foil in the view that cognitive capacities, including those relevant to language, are entirely dependent on localised or specialised capabilities of the brain. Commitment to this type of 'cognitive internalism', we argue, hampers empirical understanding of how minded beings deal with world. Similarly, it hinders thinking about how apes exploit human language. Thus, by defending the view that cognition is distributed, we aim to promote new understanding of language, including ape language. Clark's distributed view was anticipated in phenomenology, and has come to be important across behavioural ecology, neurophysiology, robotics, psychology, and cognitive anthropology. To our knowledge, as yet, it has made no significant impression in the language sciences. In seeking to alter this state of affairs, we argue that it is precisely because linguistic cognition is distributed that Kanzi is able to reach across the evolutionary divide.

As noted both Clark and S-RST develop their ideas by disputing traditional conceptions of cognition and language. Since their critical targets have much in common, the next section of this paper details central features of what we call the epistemological conception of mind, or ECM. Having set out the ECM's main features, we survey some important aspects of Kanzi's life. Next, we consider how a sceptic about ape language might react to Kanzi's activities. Even if S-RST are correct that the ECM fuels scepticism about ape

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language research (ALR), we contend that their negative argument will do little to undermine such scepticism here. Accordingly, we complement a case against cognitive internalism with an argument *for* a distributed view of mind. From this perspective, Kanzi's exploits not only offer a serious challenge to the ECM but also, as detailed in the final sections, ground a first sketch of how language appears from a distributed point of view.

### **The epistemological conception of mind**

We dub the view that all cognition is grounded in specialised, internal capacities of brains 'cognitive internalism'. With respect to language, a cognitive internalist position would hypothesise particular brain capacities relevant to language processing. Such positions are taken in theories associated with, for example, Fodor (e.g. 1975), Chomsky (e.g. 1986), and Pinker (1994, 1997). Furthermore, cognitive internalism is also assumed by linguists who contend that while language is essentially social, human brains become capable of exploiting the 'systemic' properties of its various forms (e.g. Halliday & Matthiesson 1999). For the language sciences, then, debates about cognitive internalism are of fundamental importance.

Clark's aim is to overthrow the view that minds are 'disembodied logical reasoning devices' (AC: 1) and to argue instead that brains are 'controllers for embodied activity' (AC: xii). This involves showing that effective cognition in humans, animals and robots exploits environmental and bodily resources in concert with the processing powers of the brain. This approach, as shown below, results in solutions to cognitive problems quite unlike those anticipated on the view that *all* cognition takes place in the brain. What we call the ECM is, therefore, a fairly direct target for much of what Clark has to say.

It is not that clear that S-RST have a direct critical target in this way. A major goal of their work, though, is to argue that Kanzi, to a significant degree, displays competence with language. In pursuit of this goal they attack a wide range of positions which are not theoretically unified even though they do share scepticism about the nature or degree of Kanzi's competence. This explains S-RST's interest in the philosophical roots of various views holding that apes are incapable of 'true' language. Thus, although not using the term, Shanker's chapter in S-RST (77-138) shows that ALR-scepticism is supported by cognitive internalism. In his view, however, what must be overthrown is a form of Cartesianism that complements a variety of anthropocentrist views that have 'gripped the Western mind from at least the time of Aristotle' (S-RST: 137-8). One defect of his argument is that cognitive internalism was never the sole property of Descartes, or the 'rationalist' philosophers. Rather, it was common coin for thinkers of many metaphysical and epistemological persuasions. While true that some 'Cartesian' assumptions have been held true over significant periods in history, internalist views were also accepted by, for example, Hume and other 'empiricist' thinkers. By casting stones against Cartesianism, Shanker is obliged to treat deeply anti-Cartesian positions as mutant strains of Descartes's theory. Besides being historically misleading, this attenuated approach leads Shanker to make heavy going of points that can be argued more simply and directly.

Shanker's awkward strategy may be part of the reason why he does not really give a definite formulation of the main features of the view which he rejects, but instead engages in reflections ranging over various aspects of several partly connected positions. His starting point is a claim to the effect that Descartes' main significance is as opponent and destroyer of views which stressed continuity and gradual differences between things in the world. Through Cartesianism, he claims, the 'Great Chain of Being' (S-RST: 79f) view, which stressed continuity between a presumed God and inanimate matter, was replaced by a thesis of 'radical bifurcation' that declared humans to be an entirely different kind of being from any animal. It is of particular

interest to Shanker that Descartes' reasons for this claim have partly to do with the ways in which humans exploit language. In the present context, the issue is significant because similar arguments arise in debates over ape language. Shanker contends that radical bifurcationism is bolstered by claims that only humans exercise judgement, or can be persons. He further maintains that additional views, examples of which he calls 'moderate bifurcationism,' form a set of intermediate positions between the Great Chain of Being view and radical bifurcationism. While those adopting a moderate bifurcationist position may grant mental states to some animals, they would deny that animals had any meta-cognitive concepts, or a 'theory of mind' and therefore any grasp of language (S-RST: 101f). Where the radical bifurcationist denies both thought and language to animals, his moderate counterpart allows that animals can at least think.

In partial agreement with Shanker, Taylor gives a specific name to a view he sees, in his chapter (S-RST 139-180), as underwriting ALR scepticism. He calls this the 'epistemological conception' of how to evaluate metalinguistic claims, such as that Kanzi 'understands' a given utterance. In different ways both Shanker and Taylor point out that inferences to the claim that any being (besides oneself) understands anything, must always be underdetermined, on a telementational view of language (see Harris 1980; 1996, and S-RST: 109, 157f). In Shanker's words 'the essence of language, in Cartesianism, is that it is a representational system enabling the transmission of thoughts from the mind of one agent to that of another' (S-RST: 100). Consequently, to establish with certainty whether or not attempted communication 'worked', one must have access to the contents of another's mind.

Although there are differences between the positions opposed by Clark, Shanker and Taylor, much common ground lies between them. Accordingly, taking and modifying Taylor's label, we refer to the underlying view as the epistemological conception of mind, or ECM. In general terms, its features are as follows.

First, there is a strict distinction and boundary between aspects of reality which think, and aspects which do not think. This requirement that thought be 'internal', is the demand for cognitive internalism. This first feature of the ECM is typically associated with the view that thoughts, or mental states, must be the states of some specific individual. Insofar as they belong privately to this individual, they are, qua thoughts, inaccessible to direct perception by any other individual. The philosophical 'problem' of justifying the belief that other individuals in the world are minded arises precisely from this premise (e.g. Ayer, 1956, Strawson 1959). If individuals 'have' private minds, or if mental states are radically private, then manifest behaviour necessarily underdetermines inferences to the conclusion that observers and observed are similarly minded. More plainly, if minds are private then no behaviour could entail that any entity is minded. As Chalmers (1996) argues, the same behaviour might just as well be produced by an automaton, or zombie acting entirely without a mental life.

This first element of the ECM is the target of Clark's insistence that cognition is not confined within the skull (AC: 69). As noted both Shanker and Taylor stress the difficulties raised for defenders of ape language research by the alleged privacy of mental states. Chief among these is that, because of the above-mentioned underdetermination, there is always and necessarily room to argue that ape behaviour is something *other* than language; it can be maintained that what the animal does must, self-evidently, be explained in species-specific ways.

Second is the view that the paradigmatic thinking activity is knowing, or coming to know. This should not be surprising, since a crucial goal for any radically private mind is likely to be that of knowing truly (or usefully) how things are in the world beyond. Informally, the challenge is to ensure that information about

the 'outside' can be properly contained on the 'inside'. A highly separated mind can reasonably be expected to know in a representational way, or 'have in mind' a state which, as a stand-in for a state of the world, has the property of mapping accurately onto at least some aspects of the world. There are various ways in which this view has been articulated philosophically. In Hume's case, while simple ideas were regarded as copies, which 'exactly represent' (1975: 4) simple impressions, complex mental representations were thought of as made out of elements which individually had the required property for accurate mapping. Descartes, by comparison, proposed a model of how, without being essentially coloured, different spatial arrangements in the brain could stand for different colours (1985: 71-76). Crucially, both are examples of ECM views in that 'knowing' is taken to imply being in the state of 'having' a private mental state that, somehow, accurately represents features of the non-private world.

It is important to see how the first two commitments of the ECM strongly support the traditional division of cognitive powers into specialised faculties such as perception (the process by which the world impinges on our senses, and by which the senses transmit some of the effects of that to the mind), memory (the ability to re-invoke previous perceptions), imagination (the capacity to manipulate and combine elements of perceptions), reason (the internal process of manipulating mental states to determine truth and falsehood) and so forth. While the precise list, and number of faculties, varies from thinker to thinker, the underlying notion that cognition is tightly bounded from the world, and that there are specific limitations on the types and directions of traffic across the boundary, is widely shared. This general commitment also lends support to a strict distinction between cognition and action, where action (unless reflex) must take place at the conclusion of a cognitive process.

Third, and following largely from the first two features, is the view of language suggested by the ECM. Given that mental states are seen as essentially private, language is naturally thought of along the lines of a semiotic postal service. In other words, it is taken for granted that it is a system by means of which private mental states are encoded in a form suitable for transmission into the public world, where the transmissions can then be received, and decoded. Successful communication then becomes the non-distorting transfer of mental states by means of a medium that is not itself cognitively empowered. This, given the restrictions of the first elements of the ECM, is more or less what language has to be: a means by which the private is coded for public transmission, whence it can in principle be picked up and decoded by another. Complementary to the public means by which mental states are transmitted is a private process whereby the same states are organised and managed, so that it is common for classical modern thinkers to maintain that words are, in some sense, the names of ideas or concepts (e.g. Locke 1975). Once this view is in place, it follows naturally enough that connections between words and thoughts are established in an arbitrary and conventional manner. In contemporary work, it is common to suppose that the condition is implemented by a specialised brain capacity.

These then, are the three canonical features of the epistemological conception of mind. For our purposes, it is not critical that any thinker stand as a single representative of the core of the ECM. The commitments we have indicated are sufficiently general to embrace a fairly wide range of differing positions. This is deliberate: the ECM represents a cluster of commitments which have influenced thinking about cognition and language for some time and which, we think, are broadly, comprehensively incorrect. As we have painted it, this view is not narrowly associated with Descartes. Adherents of the ECM include dualists, idealists and materialists, rationalists, empiricists and transcendental idealists. In other words, it is home to many vigorous anti-Cartesians notably including Hume (1975), and Kant (1929). It is also, we hope, clear that the ECM entails no commitment to a view that only humans can be minded, have knowledge, or use language. The

reason for this is simple: the ECM is a view about minds rather than about humans. It follows that to have consequences for the distinction between humans and non-humans the ECM has to be coupled with additional views. So, to give a single example, a thinker who held with Descartes that mind was an immaterial substance joined to body, would need, besides those views, some additional reason to think that mental substances were not joined to the physical parts of apes, goldfish or pebbles. What both Shanker and Taylor are correct about is that the ECM poses a solipsistic obstacle to the claim that anyone, human, ape or otherwise thinks. Shanker responds by holding out for some kind of ‘paradigm revolution that leads us beyond Cartesianism’ (S-RST: 138) and indicates that he thinks this revolution could be precipitated by Kanzi. Taylor, radically, urges us to stop demanding knowledge of mind at all, and sees the problem as lying in epistemology *per se* (S-RST: 171-180). We take the contrary view that the problem lies with cognitive internalist assumptions characteristic of the ECM. Taylor’s proposal, in our view, misses the possibility that a *different* approach to knowing that, and how, and in what ways, a being is minded can meet demands for understanding and knowledge. In what follows we aim to set out the broad features of what such an approach would be like. Shanker, we suggest, does not realise that the ‘revolution’ has already begun. Before going further with our argument, however, we need to look at Kanzi whose lexigram activity is independently interesting, even if it is not immediately clear why his use of these external signs is so significant.

### The life of Kanzi

Kanzi, a laboratory-born bonobo chimpanzee was adopted as a new-born male by a wild-born female known as Matata. The latter was a subject in a programme in which Savage-Rumbaugh used boards of ‘lexigrams’<sup>2</sup> to research the language capabilities of chimpanzees. While Matata battled to learn from systematic training, learning only 6 symbols in 30 000 trials over 2 years (S-RST: 17), the infant Kanzi was present with her. Remarkably, when Matata was taken away to be rebred, Kanzi showed he had been ‘keeping a secret’ (S-RST: 22). In prior trials with the lexigram boards Kanzi had shown little evidence of progress. On the day before Matata’s departure, Kanzi used the lexigram board on 21 occasions to ask for 3 foods: on the following day, he produced 120 lexigram-acts exploiting 12 different symbols (S-RST: 22). Further, in so doing, he made combinations like SWEET-POTATO TICKLE<sup>3</sup> which, for his trainers, suggested he wanted to eat the vegetable while being tickled. Savage-Rumbaugh notes that the sudden change indicated that ‘his previous performance had been a reflection not of his knowledge but of his motivation’ (S-RST: 22).

No-one disputes that, in some way, Kanzi understands spoken English at the level of a two-and-a-half year old human. This has been established by requiring him, for example, to show understanding of simple, novel requests. Prompted by the words, “Would you put some grapes in the swimming pool” he got out of the pool, walked over to where various foods were placed on a towel, selected the grapes and tossed them into the water (S-RST, p. 67). This is not an isolated feat. His abilities to grasp utterances have been tested by comparing his skills at 9 with those of Savage-Rumbaugh’s two-and-a-half year old daughter. In understanding utterances like “Go get the balloon from the microwave”, his scores (72% correct) were higher than the girl’s (66%). In some trials his abilities were tested by means of English requests communicated via

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<sup>2</sup> The lexigram symbols are visually distinct and non-representational. In some cases lexigram symbols were presented to ape subjects on computer keyboards (such that pressing the symbol caused it to light up, have the sound of a corresponding English word played, and perhaps control the computer in some way) and in others they appeared on portable boards. The principle rationale for the use of lexigrams was that they held out the prospect of side-stepping the limitations, compared to humans, of ape vocal anatomy (see S-RST: 13-16).

<sup>3</sup> Lexigram combinations are rendered in block capitals.

a speaker system, to eliminate additional cues such as gesture. In these trials he successfully dealt with such requests as “Can you put the ball on the pine needles?” (S-RST: 60) and “Can you go scare Matata with the mask?” In the latter case he put on the mask, made for the room where Matata was located, waited outside the locked door (having removed his mask) until someone opened it, then replaced the mask and paraded up and down outside Matata’s cage (S-RST: 61-2). Further, his understanding is not restricted to what might be termed ‘the obvious’. For example, asked to “Put some water on the vacuum cleaner”, he gave initial signs which could be taken to show misunderstanding: his first reaction was to drink from a glass. To the experimenter’s surprise, though, he followed this by walking over to the vacuum cleaner and dribbling the water through a hole in the machine (S-RST, p. 71). For reasons developed below, we believe it matters that this understanding gave rise – not to a predictable grasp of basic meaning – but to a singular construal of the request. Finally, in carrying out such tests, it is significant that Kanzi copes with constructions that exploit the kinds of complexity found, for example, in subordination. When asked to “get the ball that’s in the cereal” he could select the correct ball from several options more reliably than his two-and-a-half year old human counterpart (77% compared to 52%) (S-RST, p. 72).

Similar claims are to be found in Savage-Rumbaugh’s previous work (e.g. Savage-Rumbaugh & Lewin, 1994; Savage-Rumbaugh et al., 1993) and the more recent book does not present a new theory about how apes including Kanzi develop skills in linguistic communication. Nonetheless, the discovery of Kanzi’s ‘secret’ was the beginning of an unexpected and rich period of research. With no way of accounting for Kanzi’s learning of lexigrams or English (given that he had not been the ‘subject’ of the painstakingly recorded trials with Matata, and hence that there was almost no data about Kanzi’s behaviour during those trials), Savage-Rumbaugh had to change her research strategy. Instead of continuing with training, she accepted that “Only Kanzi knew what he was ready to learn and what he wanted to learn” (S-RST: 26). Accordingly, she decided to “focus attention on what was *said to Kanzi* rather than on what we could teach him to say” (S-RST: 27, emphasis in original).

In this way, the life of Kanzi is unlike that of other primate research subjects who exploit a human environment to develop their cognitive capacities. Rather than experiencing symbols as regulating his wants, Kanzi uses them in relationships with trainers who, typically, do what they think he wishes. Given that the trainers had oriented themselves to seeing how Kanzi reacted to what they said and did, and did himself, rather than to trying to get his actions to fit a given framework, Kanzi was able to exploit lexigrams to afford goals that can be reached by clever interpretation, on his part, of trainer behaviour. He also vocalised and gestured, for example pointing to places where he wanted to go or be carried (e.g. S-RST:30). In illustration of what types of event took place in his rich environment, consider the following account of how Kanzi interacted around beds and sleeping behaviour.

For Matata, like other bonobos, nesting behaviour is very significant. Thus, long after having left the forest, she continued to work at building a bed out of blankets. Interestingly, her young charge also took pleasure in ‘play bed-making’. Often he would end up with, say, blankets on his head and, when his foster mother could not stand it, she would take mild biting action. In this area of bonobo life, there appear, then, to be what resemble ‘right’ and ‘wrong’ ways of acting. This makes Kanzi’s use of the lexigrams for ‘good’ and ‘bad’ particularly interesting when it comes to nest-making. Savage-Rumbaugh notes that the GOOD and BAD lexigrams were originally added to the board to provide a way of indicating approval or disapproval of Kanzi’s actions, but also that Kanzi was ‘intrigued’ by both symbols (S-RST: 52). So he would lexigram BAD, BAD, BAD before doing something which he knew he was not supposed to, and also used the BAD lexigram in ‘commenting’ on what he was about to do and on what he had done:

“One day, when Kanzi was supposed to be taking a nap with Liz, who was exhausted and went to sleep, Kanzi refused to lie down. After she had been asleep for about fifteen minutes, she suddenly realised that the blanket she was using as a pillow had been rudely jerked out from under her head. She sat up to look over at Kanzi who commented on his action saying, “bad surprise” (S-RST, pp. 52-53).

While not backed up by fine description, the sense ascribed to Kanzi’s action suggests that Liz (and not just the authors) acted as if Kanzi was commenting on his behaviour. Interestingly, S-RST cite another incident in which bonobo bed-making comes to the fore. On that occasion, since Kanzi looked ‘almost depressed’, he was asked what had happened. Thus prompted, he signalled MATATA BITE (S-RST: 53). Further investigation showed that, on this occasion too, he had been guilty of removing blankets. However, instead of reacting with her usual mock biting, Matata had bitten his hand hard enough to break the skin. Finally, it is of interest to contrast the lexigram use on the occasions when Kanzi violated expectations by removing blankets. In both cases, it shows a close fit to circumstances. In his relationship with Liz, his self-focus brings out *how he relates to her*. With his foster mother, behaviour of the same ‘content’ brings out *how she relates to him*. Lexigram use, it seems, is separable neither from what happens nor Kanzi’s relationship to other individuals who take part in events.

For those familiar with human children it is tempting to ascribe Kanzi with wants, needs and fears and, indeed, to see his doings as ‘like’ those of a naughty boy. For their part S-RST capitalise on the predictability of such responses but, to our judgement, descriptions of Kanzi’s doings will, in themselves, deliver us neither from the ECM nor ECM-inspired scepticism about ape language research. Despite Kanzi’s impressive achievements, we find that S-RST make a poor job of using them to bring out what is most significant about ape language.

### **Kanzi and the Sceptics**

The hold of the ECM, together with related views on differences between humans and other apes, is likely to fuel controversy in interpreting the following facts, and facts they are, about Kanzi:

- He can understand a great deal of English
- He learned to do so without training
- He can exploit lexigrams in ways that both tell us about his lifeworld and are transparent to his trainers.

Whatever philosophical inclination a sceptic about ape language research may have, evidence like that briefly surveyed above is likely to be bewildering. To convince the sceptic that Kanzi has significant language ability takes more than saying *what* he does: it requires some kind of theoretical argument. Even if the facts about Kanzi’s behaviour are beyond dispute, S-RST do not use them to substantiate a well articulated case. Indeed, given their somewhat unstructured presentation, and the range of theoretical suggestions they entertain, it is not clear whether the three authors share any major theoretical commitments at all. We think many will feel S-RST are evading the issue of whether Kanzi has ‘really’ acquired significant aspects of language. However, on our reading, it would be a mistake to portray S-RST as claiming Kanzi ‘really’ acquires the rudiments of linguistic form. While not explicitly argued, we think S-RST use Kanzi’s story to demythologize (see Harris, 1981) the view that language knowledge is identical to any form-based or determinate ‘reality’. S-RST, though, do not make this case; nor do they clearly say that Savage-Rumbaugh’s



empirical work points in this direction. In consequence their attempt to defeat the sceptic is largely unsuccessful.

Unless the sceptic is willing to consider S-RST's view that language is a 'funny form of behaviour' (S-RST: 226), he or she will rile at the stories unsupported by argument. The sceptic will instead find grounds for claiming that the book is negative, makes overstated claims and, gravely, that S-RST fail to spell out what they believe. Sceptics will object that the authors do not come clean on whether they think Kanzi has acquired any grammar or whether he uses lexigrams that 'refer'. Linguists committed to various versions of the ECM will see the book as, at best, obscure and, at worst, demanding inquisition. Anyone sharing Pinker's (1994; 1997) belief that we acquire language thanks to innate knowledge of X bars and other formal paraphernalia (for critique, see Cowley, 2001), will judge the authors to have missed the point that syntax is irreducible to behaviour. Indeed, they may take S-RST to misunderstand the nature of explanation and be unfamiliar with Pinker's striking view that genes 'solve grammatical problems'. Further, those with a social view of language will be surprised that Kanzi neither develops his own functional system nor learns the conventional 'use' of function-based units. S-RST, though, cite no evidence that Kanzi exploits the conventions of a social semiotic. Not only are they silent about any normative basis to Kanzi's behaviour, but they make few comments about his experience of the laboratory world. Instead, their argument is abstract and, though some space is given to neurophysiology, few connections are made to work on either culture or evolution.

S-RST's strategy is, rather, to rile against the philosophical and rhetorical roots of cognitive psychology. Without explicit argument, we are nudged towards seeing language as, in Wittgenstein's phrase, embedded in forms of life. Far from using an innate syntactic endowment, language is learned not through speaking, but by coming to understand what others say to us (S-RST: 74). Rejecting the view of understanding as an inner process, language is presented as arising from acting as if we grasped what others meant. Ceasing to be internal, language is an adjunct to our brains' main powers. Kanzi, they suggest, has developed a capacity to lift language 'out' of the behaviour flow and, in special ways, re-embed it to serve his ends. Like Kanzi, it seems, we vary in mastery of a funny form of behaviour whose basis lies in skills for social interpretation. Like a child, Kanzi exploits what we hear as language (and see as lexigrams) to influence people in line with a cultural style. This shows S-RST "irrefutably", that "animals are capable of satisfying a vast range of the criteria we ordinarily apply when speaking of the cognitive and linguistic abilities of young children" (S-RST: 136).

S-RST's claims are likely to raise more objections and questions than they answer. It is, for instance, not clear what their treatment has to do with debates on language origins. Nor is there any good justification for not spelling out their positive claims in any detail. In fact they say surprisingly little on what Kanzi's behaviour means for, say, the nature of reason, language, or hybrid human-ape societies. S-RST do assert the 'enormity' (S-RST: 26) of Kanzi's achievements and suggest that his story points the way to new approaches, but little detail is offered. What, for example, is meant by saying that Kanzi, like a child, has learned 'the formal, nonstated and unconscious ways of [his] society' (S-RST: 191) and captured an 'abstract portion of a culture' in his behaviour? The nearest we come an explanation are brief references to how the plasticity of his brain may help him lift language out of the here and now and thus obtain "some sort of independent or metalevel of existence". In conclusion, we are urged to accept that Kanzi shows that there is "nothing special about language, other than what it makes of itself" (S-RST: 226). What is signally missing among these varied hints and suggestions, is any real attempt at offering or developing a *replacement* for the ECM. Without such a replacement the very problems Shanker and Taylor diagnose are likely to remain as

obstacles to the interpretation of Savage-Rumbaugh's important and careful research. Shanker, as noted, holds out for the prospect that Kanzi will somehow precipitate a 'paradigm revolution that leads us beyond Cartesianism' (S-RST: 138). It is far from clear what Shanker has in mind, though. At times it seems as though he is genuinely nostalgic for the 'Great Chain of Being' view allegedly demolished by Descartes, but it is far from clear that a return to that is either possible or desirable. Nor is it clear how whatever Shanker's positive proposal might be could square with Taylor's already noted hostility to the demand for knowledge about cognition. It is with respect to just these failings that we think Clark's work is particularly pertinent, and before proceeding to our own examination of Kanzi's achievements, we show how Clark's sets about rejecting cognitive internalism.

### Clark vs. the ECM

Clark's book, *Being There: Putting Brain, Body, and World Together Again*, is a sustained attack on disembodied conceptions of cognition. In the course of this each of the three major elements of the ECM identified above are subject to energetic criticism. Clark's resources range from analyses of the performance of a variety of robots, computational simulations and studies of human cognitive practices, as well as data on a variety of living entities from slime moulds and cockroaches to human writers.

The first major feature of the ECM as set out above is its commitment to cognitive internalism, the view that there is a strict distinction between aspects of reality which think, and aspects which do not think. Were this view of cognition correct, cognitive processes would be isolated on the thinking side of the divide. So, for example, were the ECM correct, one might expect that a reasonable way to complete a jigsaw puzzle would be to inspect the individual pieces and, by brute manipulation of internal representations, establish how each piece would have to be oriented in relation to the others. Once this process was concluded, it would be a trivial matter to take each piece and place it where it should be.<sup>4</sup> Nobody completes jigsaw puzzles in this way, of course. Rather, a typical strategy involves completing the perimeter first, and then picking up individual pieces, rotating them by hand, and finding – or failing to find – a fit in each case.

Clark points out that these features of our actual practices with jig-saw puzzles are significant clues to how cognitive labour is divided. Rotating a piece by hand simplifies the problem of detecting a fit, by obviating the need for rotations to be processed in the brain (AC: 36, 63f). By moving a piece close to where we suspect there may be a fit, we simplify the task of determining whether or not the boundaries do indeed match. In this way we turn what could be a problem of matching representations into one a simpler one depending on visual inspection. By exploiting our bodies and the physical environment, that is, complex computations are replaced with relatively simple and fast visual inferences. It is clear that successful cognition in the jigsaw puzzle case is not isolated 'in' the head, but that, in Clark's idiom, it 'leaks' beyond the brain. Some of this leakiness involves using the structure and arrangement of the physical environment to reduce the computational burden of a task. An example of this might be arranging the jigsaw pieces into broad categories such as 'sky', 'mountain', 'building' to simplify searching for pieces of particular types. Clark, following Vygotsky (AC: 45, Vygotsky 1986), refers to these types of environmental support for cognition as 'scaffolding'.

Clark argues, furthermore, that leaky and scaffolded brains make sense from an evolutionary perspective. For a start, solutions to cognitive problems that exploit the environment or body are typically 'cheaper' than

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<sup>4</sup> This is not a caricature. See, for example, Kirsh and Maglio (1994) for an account, and critique, of a classical planning model for playing the TETRIS computer game.

those which don't, for the simple reason that they are less reliant on representational duplication in the brain. An additional consideration is that the distinction between thinking and unthinking parts of the world which is important for many traditional views, is invisible from the perspective of the process of evolution. In a given environment, natural selection can proceed only by eliminating variations associated with different sorts of failure (AC: 88).

The second feature of the ECM is its commitment to the view that the paradigmatic thinking activity is knowing, or coming to know, in an essentially representational way. Minded and embodied beings do not only have interests in knowing about the world, though, they must act in line with what they know. Private representational knowledge is not, by itself, a resource for controlling action in the world. This means that under the ECM the problem of controlling action is radically separate from, even if dependent on, the problem of knowing. Classically it was thought that the central, executive knower would take some collection of representations, and manipulate them so as to establish what it was optimal to do, and only then (except in the case of reflexes) do anything.

In opposition to this conception, Clark points out that representations as traditionally conceived are unlikely to be favoured in evolved solutions to cognitive problems. One reason for this is that passive representational stand-ins require interpretation in order to be used, whereas evolution can be expected to favour more direct methods. For his part, Clark thinks of representations (he is still willing to use the term) as controllers, or states of a system, that function partly as stand-ins, but which can directly guide action, without the need for intermediate interpretation from an executive cognitive centre.

As an example of this idea of representations as controllers, he discusses the 'map' of a maze built up by a neurobiologically inspired robot rat (AC: 47f, 163). From a traditional perspective, we might expect the map to take the form of a neural representation of the physical space of the maze which can be consulted both to establish location and in guiding navigation. The actual, and highly efficient solution, does nothing of the sort. Rather in keeping with the image of the leaky, scaffolded brain, it stores integrated visual, motor and other information, from a robot rat perspective. Thus, for example, a corridor is 'remembered' as a mixture of forward motion and relative proximity to boundaries on each side. Sites in the maze are stored as a 'network of landmarks' that combine sensory and motor information. In such a system the 'goal' of being at some site in the maze associates with specific patterns of excitation in the network of landmarks, and the landmarks themselves are stored partly as patterns of activity. As a result of this, the state of 'seeking to be at the end of the current corridor', for example, needs no further interpretation or central processing in order to control motion towards that goal.

A related feature of Clark's approach is his rejection of the view that cognition requires centralised executive control. He approvingly refers to Brook's (e.g. 1991) view that such approaches would tend, albeit not always, to create a 'representational bottleneck' (AC: 21) and as a result be inefficient and easily overloaded. As an alternative he suggests an approach where several 'quasi-independent' systems deal with different problems so that they are 'soft-assembled' (the term is due to Thelen and Smith 1994) into a network where no one system is in permanent control. Depending on the particular situation and the overall state of the network, different sub-systems will be relatively dominant. The resulting behaviour is not 'mediated by any integrated knowledge base depicting the current state of the overall environment' (AC: 22). For our purposes, the point of this is that as well as representations being controllers, not mirror images, there are cases where control is best achieved with no representations at all.

Third, and finally, is the implied ‘semiotic postal-service’ view of language arising in the ECM. Given what has been said about scaffolded brains which use, if any, non-traditional representations, it is unsurprising that Clark’s position is unsympathetic to the ECM view of language. The reasons should be clear enough. If, firstly, cognition is ‘bounded by neither skin nor skull’ (AC: 69) and, secondly, minded creatures don’t typically ‘have’ inert representational states, there is little reason to think that language serves to ship such states from one private mental world to another (See Cowley 1997). Unless inert representations exist, and need, somehow, to bridge the divide between private minds, why hold such a view? Before extending Clark’s remarks about language, we return to S-RST’s view of Kanzi’s exploits.

### **Kanzi challenges the ECM**

We argue that Kanzi’s achievements challenge any strong anthropocentrist position on language. For this to be the case, there is no need to think that he is capable of exploiting language as well as most humans. He plainly isn’t: the point is that he can do enough to create difficulties for those who regard the foundations of language as uniquely human. S-RST defend an anti-anthropocentrist approach to language when they suggest, in various ways, that Kanzi’s achievements undermine the philosophical and rhetorical views sustaining orthodox linguistic theory. Their argument, though, does not quite get them to the conclusion they want. The orthodox views, which we group under the ECM, are not, as we stress, intrinsically anthropocentric. Nothing in the account of the ECM developed above states that only humans can be minded, engage in language activity, or think about the world. Nonetheless, if one uses the ECM to account for human cognition or ‘language’, then the sceptical argument against Kanzi’s credentials as a user of language might run like this:

- (a) We [humans] know how to think about what we do, and that is by means of the ECM.
- (b) Whatever Kanzi does, it is incredible that he is an instance of a private mind having representational knowledge which ‘communicates’ with conventional signs.

Therefore:

- (c) We know that he doesn’t do anything which is importantly similar to what we do, and should seek ways to classify it as some other kind of behaviour.

S-RST never make their position quite that explicit, although something like this argument makes sense in how they deploy Kanzi in the ape language debates. We find, however, that there are weaknesses in their approach. The most notable is that, while showing how premises (a) and (b) run into difficulties, they don’t realise that Kanzi’s story can do so much towards suggesting an alternative theory. Given that Savage-Rumbaugh makes it abundantly clear that Kanzi has remarkable facility with language, the same argument can, in fact, readily be turned back on the sceptic. The fact that Kanzi and his trainers make so much sense together, and of each other, has to count against any attempt to insist on radical cognitive discontinuity. But that is just a starting point – to press home the temporary advantage what is needed is at least a sketch of a theory which promises to account for all this sense making, and also do justice to the differences between Kanzi’s achievements and those of human infants and adults. In this section, therefore, we attempt to make more clear how exactly Kanzi’s lived story challenges the ECM.

In a significant episode between Kanzi and Liz (S-RST, p. 52-53) Kanzi lexigrams BAD SURPRISE just after pulling a blanket (being used as a pillow) from under the head of the sleeping Liz. S-RST note that nest-disrupting activity was regarded in a poor light by Matata, and that Kanzi both recognised this, and that, on other occasions, he used blanket-pulling as a tactic to get attention. One way of seeing just how badly an

ECM account of Kanzi's activities fares is to examine how it would 'explain' the 'Bad Surprise' incident. For S-RST, thanks to his mastery of lexigrams Kanzi 'comments' on pulling the blanket from under Liz's head. Let us suppose that Liz indeed takes the lexigramming as a comment or, in other words, that she acted as if she had analyzed Kanzi's BAD SURPRISE as:

(a) *"(I caused you to have a) bad surprise."*

Although neither agent, predicator, nor object is identified, English speakers act as if they make this kind of (radically underdetermined) abductive jump (see Levinson 1995). Further, regardless of Liz's personal beliefs, she reacts consistently with 'theory of mind' (Discussed in S-RST: 101-108). Thus, her behaviour invites an interpretation formalised as follows:

(b) *His acting is like my thinking, "(Kanzi caused) Liz (to have a) bad surprise"*.

To make such an interpretation, it is sufficient to be an English speaker with a grasp of how we can talk about communication. Acting in this way, that is, requires neither acceptance of the ECM nor, for that matter, of any kind of cognitive internalism. The point is that any sleeping English speaker rudely awoken by a seemingly intelligent agent who signals BAD SURPRISE will find it hard *not* to make such a de facto interpretation.

For those adopting the ECM, however, statements like (a) and (b) are not merely informative. Rather, for anyone with a cognitive internalist view, they should characterise (at some unknown level) how Liz *actually* interprets Kanzi's action. They are equivalent to some functional description of how a brain processes the whole event. Computationally, it may be said, this resembles what supposedly happens when an English speaking person hears, in similar circumstances, "I caused you to have a bad surprise". Our view is that while (a) and (b) function well enough as a basis for accounts of talk, the observed behaviour provides no grounds for supposing that the hypothesised interpretative events *actually* occur. The point here is roughly Dennettian: just because we find some explanatory practice indispensable it does not follow that the practice in question should be treated as a guide to sub-personal psychology (e.g. Dennett 1987). To clarify our challenge to the ECM conviction that such processing takes place, we proceed by breaking the process down into a sequential mental procedure.

In accordance with the first principle of the ECM, Liz has to begin by 'remembering' that Kanzi is an aspect of reality that thinks. Once she has done this, her interpretation (as set out above) will sustain implicatures which, according to a naturalist version of the ECM, are neurally implemented. They can be pictured as unconscious reasoning or, perhaps, hard-wired entailments arising from seeing Kanzi's lexigrams as English words. First:

(1) *When Kanzi signals BAD SURPRISE, he has what we can call a 'bad-surprise thought'.*

And, given the first feature of the ECM,

(2) *Kanzi's thought is a state that is inaccessible to direct perception.*

Thereafter, Liz's brain infers that:

(3) *Since the thought is Kanzi's thought, it has been indirectly communicated.*

To understand Kanzi, Liz must know that, now, telementational communication is occurring. She must act as if Kanzi's brain exploits mechanisms allowing lexigrams to function in a semiotic postal service. Necessarily, then, her brain concludes:

(4) *He encodes his 'bad surprise thought' into BAD SURPRISE, a form suitable for public transmission and adjusted to Liz's decoding requirements.*

Among other things, for Kanzi to have carried out the lexigramming, Liz (or her brain) must hold it true that:

(5) *He knows the/a meaning of BAD, SURPRISE and/or BAD SURPRISE.*

Of course, attaching the 'meaning' of the symbols to the thought is not, in itself, sufficient. In addition, he must treat the 'bad surprise thought' as reason for touching the appropriate symbols. Thus, for Liz, Kanzi must:

(6) *Have come to know (or been born knowing) how to exploit representational knowledge (or, perhaps, to exploit symbols in acts of meaning).*

Necessarily therefore:

(7) *Kanzi must believe that, like Kanzi, Liz has a private mind as well as a theory of mind that enables her to infer what he thinks.*

Interpreted in line with the ECM, Liz's reaction to Kanzi's behaviour is, we think, *prima facie* bizarre. Even those who accept that Kanzi informs Liz of a 'bad surprise thought' probably will wish to deny that (1)-(7) describe functional states and processes, which would seem to massively over-interpret the available facts. If, somehow, Kanzi's brain represents 'thoughts', this does not automatically legitimate the claim that he and Liz implement (1)-(7) by internal processing. While Kanzi certainly exploits lexigrams, this does not mean he possesses a brain mechanism adjusted to the language of a community. After all, we can hardly begin to explain, for example, how Kanzi could learn even *one* meaning for BAD, SURPRISE and/or BAD SURPRISE. Is it that, as (6) suggests, Kanzi has been raised to *develop* internalised lexigram knowledge? We want to reject this view. However, if we accept the ECM, we are obliged to choose between it and the outrageous alternative that bonobos are born knowing how to exploit lexigrams. Unbelievably, it seems to follow for the ECM theorist that, even without lexigrams, bonobos believe that other individuals possess 'minds': their brains embody an elaborate theory of mind.

Entailments (1)-(7) cannot be correct. Instead of following the traditional sceptic by using the ECM to claim that, whatever Kanzi does, he is not exploiting 'language', we turn this scepticism against the ECM. Drawing on Clark's work, we suggest that Kanzi may use his body, the physical environment and human scaffolding to exploit lexigrams and utterances *without* using disembodied representations. In a nutshell, this is how Clark's opposition to cognitive internalism can be used to advance a distributed view as the basis for describing Kanzi's doings. Had S-RST attacked the ECM directly, they could have parried sceptical objections while using Kanzi to force new ways of looking at language. However, before taking up this idea, let us look at how S-RST answer traditional ALR sceptics.

## **Defusing sceptical objections**

Without spelling out the absurdity of applying the ECM to Kanzi's doings, Shanker, as noted, holds out the prospect that the bonobo will precipitate a Kuhnian paradigm revolution (S-RST: 138). Taylor's approach, on the other hand, is to cast epistemology itself as a problem. He suggests that scepticism about ape language is rendered apparently plausible because we demand 'knowledge' regarding the claims made on behalf of ape language research (S-RST: 172-3). To the extent that a sceptic is one who denies some or other knowledge claim, Taylor's point is trivial. Not only that, if we could somehow agree that we just weren't

interested in knowledge claims in any strong sense, it would be easier to defend Kanzi's credentials as minded, language exploiting, etc. But this would be missing the main chance, since weakening our epistemological standards would also be a fine opening move in a defence of astrology or any other scientifically dubious position. That seems like a weak way out of the current situation, where the challenge is, surely, not to defeat the persistent sceptic (whose position is typically unassailable). To our judgement we need a way of thinking that enables us to clarify how Kanzi's trainers might see the bad surprise incident, and which does not commit us to the excesses of the ECM. We don't, and never did, need a scepticism stopper.

From Taylor's perspective certain meta-linguistic views about language are sufficiently uncontroversial as to form a largely indispensable part of how we see the world. These include:

- A. We usually (but not always) understand what we say to one another.
- B. To understand someone's utterance, we must know what it means.
- C. All, or at least most, of the words we speak mean something.
- D. In speaking we often refer to things and/or ideas.
- E. The truth or falsity of what we say depends on how things really are.
- F. There are other people who speak the same language as we do (S-RST: 147).

Calling these and related notions 'rhetorical inclinations', Taylor contends that they would be denied only by a sceptic, and furthermore that, if these inclinations were systematically denied by everyone, 'Everyday communicational interaction - and so, human life as we know it - would collapse' (S-RST: 149). In response to this threat Taylor suggests that we cleave to a different set of rhetorical inclinations. What this amounts to is a suggestion that we give up the demand for knowledge implied by questions such as whether Kanzi *really* understands anything that is said to him (S-RST: 174-5). The roughly therapeutic route (Taylor takes a Wittgensteinian line here) to this position apparently involves locating utterances in a shared lived story, and allowing our sense that understanding has taken place to be all the justification we need (S-RST: 176f).

We find this approach disappointing. Further, as noted, there is another way out of the situation. Where Taylor thinks that the demand for answers to questions about what is really going on should, in the interests of not getting entangled with scepticism, be displaced by attention to lived experience, we suggest that we need better ways of thinking about understanding and language. These can come about, we believe, only if the ECM is abandoned. Until then, little can be said about what is really going on with mindedness or communication in ways that make sense of how much of what *we* do Kanzi can do. Rather than an alternative to epistemology *per se* what we need, in the first place, is a new way of approaching what there is to know about cognition.

With respect to Taylor's list of metalinguistic remarks above, no-one will, presumably, deny that on occasions such as that of the BAD SURPRISE, such remarks can be used to develop an ECM style interpretation of events. Indeed, it is partly because of the power of such remarks that even a cognitive internalist will interpret Kanzi's BAD SURPRISE as, in fact, Liz does. However, since language is embedded in interaction, we can also generate (a large number of) 'common sense' remarks which, while nothing to do with the ECM, also support Liz's *de facto* interpretation. For example:

- A. We often use words to hurt/annoy people.
- B. In understanding someone's words we assume they are goal-directed.

- C. When someone does something nasty and, immediately, ‘talks’, they often comment on the action (or mock the victim).
- D. Comments on such actions typically involve issues of status (they may be playful, mocking, teasing, ironic etc.).
- E. Action (including words) is often relationship based.
- F. Even if people don’t speak the same language, they can still understand much about each other.

We endorse Taylor’s point that remarks like our (A) - (F) do not form an appropriate basis for theorizing language and mind. However, if distributed mind becomes the basis for theorizing about cognition and communication, these and the above are shown to be accurate, if somewhat uninteresting, remarks that should not be used in defending linguistic orthodoxy. Certainly, any good theory of cognition has to say *something* about how it can be the case that these remarks are useful for making sense of one another. It does not follow, though, that such lists can be taken as a guide to the structure of theory. Thus, with Taylor, we agree that proponents of the ECM give far too much weight to the *de re* processing of word-symbols. At the same time though we find it absurd to think that just because individuals act as if interpretations were similar, we should conclude we have evidence of symbol-processing at a private ‘interface’. While words may be accompanied by images or thoughts, what is of more practical and theoretical importance is how they influence communicative/ cognitive events. At very least, as in ‘getting’ Kanzi’s BAD SURPRISE, they shape how other persons ‘go on’, creating the complementary action or ‘coherency’ (see below) characteristic of episodic speaking and acting.

Rather than regard language as separable from behaviour or reducible to a form-based system, leaky mindedness may be the *sine qua non* of dialogical communication. In these terms, humans (and Kanzi) engage in joint action by exploiting word-based forms in an encultured setting. By so doing, they draw on the reflected patterns of affect in that setting as well as historically based memories of various kinds of episode. To understand what happens between individuals, it is necessary to appeal to ‘language’ as well as history and biology. In short, many philosophical and empirical problems become refocused around an interplay of language, bodies and world. Empirically, what matters is evidence that biological constraints affect language development and, equally, that cultural ways of life are shaped by the expectations a community. It is in raising these questions that we sustain S-RST’s most important claim. As they put it, the work on Kanzi shows, irrefutably, that animals are “capable of satisfying a vast range of the criteria we ordinarily apply when speaking of the cognitive and linguistic abilities of young children.” How do we think about those?

### **Thinking, scaffolding and distributing cognition**

For a cognitive internalist, communication must be a basic function of language. Each of us ‘has’ a collection of thoughts that are radically private but which, given a person’s interests and objectives, require co-ordination with other persons. Language, then, serves as a vehicle for thoughts to traverse the cognitive vacuum which separates individuals. In part because we do use language to communicate, this conception is deceptively compelling: we indeed appraise other beings of matters or states of affairs about which, but for our speaking, they would not know. Were this not so, Savage-Rumbaugh and her team would be unable to ‘communicate’ with Kanzi thus:



When he knew we were playing a game of hiding surprises, and he heard a clue such as “I hid the surprise by my foot” or “Rose hid the surprise under her shirt,” he immediately raced to the correct location and retrieved his surprise. (S-RST: 67)

For the same reasons they would not report that, on another occasion, Kanzi indicated that he wanted some cereal which had been prepared for the chimpanzee, Austin. He was told “you can have some cereal if you give Austin your monster mask to play with”. Savage-Rumbaugh tells us he “immediately found his monster mask and handed it to Austin, then pointed to Austin’s cereal” (S-RST: 67). The fact that we can sometimes tell another being something that it does not already know should not, however, blind us to, on the one hand, non-communicative capabilities of language nor, on the other, should it tempt us to a telemental view. Having a sense of other functional-cognitive aspects of language can loosen the hold of the ECM while helping evaluation of Kanzi’s achievements.

Highlighting the distributed nature of cognition leads to emphasis on how environmental and bodily factors act as cognitive scaffolding. (Taylor also uses the term ‘scaffolding’, for example at S-RST: 199). Clark, to whose views we now return, pictures language as a powerful and interesting network of external resources by means of which cognition is radically distributed in space and time. While this view of scaffolding seems to suggest written language bias, it brings out how textual resources can help solve problems posed in sequential and logical terms by bringing about distinctive effects on our pattern-completing brains. Accordingly, Clark points out, it is ‘subtly misleading’ to see language primarily as a means of communication. Rather, texts function as tools that alter ‘the nature of the computational tasks involved in various kinds of problem solving’ (AC: 193). The cognitive ‘scaffolding’ this reshaping involves is supplemented by social augmentations, as well as their bodily and environmental equivalents noted above (e.g. jigsaw puzzles, the walls of a maze). Referring to Vygotsky’s “zone of proximal development” (AC: 195), Clark suggests that language functions to help others perform tasks and understand conceptions that would otherwise remain opaque.

The work of Berk and Garvin (1984) and others (e.g. Bivens and Berk 1990, see AC: 195f) shows that children who engage in self-directed speech while practising a difficult task often master it better than those who do not. From a semiotic postal service perspective, this behaviour is pointless, and the phenomenon of improved performance can only be mystifying. If speech, like other language, merely transmits something ‘in the head’, talking to oneself can only be redundant, and it can hardly be expected that self-directed speech would increase the efficiency with which cognitive skills already ‘in the head’ are performed.

For Clark, there are at least two ways of rejecting the narrow ‘communicational’ view: one can ‘depict public language as itself the medium of a special kind of thought’ or regard ‘linguaform inputs as having distinctive effects on some inner computational device’ (AC: 196). Whichever option one takes, the point is that language-activity no longer reduces to a medium for transmitting pre-existing thoughts. Rather, speaking, writing and, presumably, lexigrams are resources that both constrain and encourage certain ways of acting and thinking. Verbal forms are external artefacts allowing cognitive tasks to be reworked or modified. What is at stake can be illustrated with a mathematical analogy. Most of us have learned to produce the answers to simple arithmetical operations immediately ( $3 \times 4 = 12$ ). However, operations involving larger numbers we typically do not memorise. Instead we use procedures, such as the rules for long multiplication that enable us to break down the task of finding the product of two large numbers into a sequence of far simpler calculations. Accordingly, we perform these in sequence so that at the end we can read off the value in question.

By doing this we reduce a very abstract conceptual problem into a series of operations that are very concrete and at which we can become very good. Now this applies not only to solving multiplication problems. It applies as well to solving problems in logic (e.g. syllogisms), problems in science, engineering, etc. These dual skills of manipulating the environment and processing the environment we have created allow us to reduce the very complex problems to a series of very simple ones. This allows us to deal with problems that are otherwise impossible. This is real symbol processing and, we are beginning to think, the primary symbol processing that we are able to do. Indeed, on this view, the environment becomes a key extension to our mind (Rumelhart, Smolensky, McClelland, and Hinton, 1986:46)

In short, external resources, including ‘symbolic’ (at least in the mathematical sense) ones, do more than permit existing thoughts to be deployed differently. The claim that external media transform the properties of a cognitive task can be readily grasped by considering how much easier it is to perform long multiplication with a place-value (such as Arabic) as opposed to a constructive (such as Roman) system of numerals. To multiply 326 by 10 is vastly simpler than the (in one sense) equivalent computation CCCXXVI multiplied by X, because of the superior flexibility and power afforded by the Arabic system. On this view, our brains are not intrinsically symbol manipulating engines, but sophisticated opportunists: organs that have evolved to exploit and co-control cognitive resources (hands, pieces of paper, systems of ‘symbols’) that are not necessarily neural.

Far from being a place where language systems are stored or production and processing is managed, the brain is a controlling mechanism that allows Kanzi (or Liz) to exert control over the body’s world. It has evolved to develop in tandem with an agent’s mastery of progressively more demanding ways of meshing biologically constrained capacities with a socio-historically constrained environment. As stressed by Deacon (1997), the brain co-evolved with culture, so that, in ontogeny, it can assist a person (or bonobo) in adapting to local ways of living. From this perspective, linguistic symbols are ‘external’ entities that, in many cultures, have come to be heard not only in sensorimotor driven utterance-activity but also seen as arrangements of spatial entities (written signs). In neither case, however, need we follow Deacon in assuming that they index tokens that correspond to internal events (see, Cowley, in press A). At least in the first instance, what the brain has to do is develop ways of exploiting real-world counterparts of what linguistic theories describe. In performing many cognitive tasks (but, perhaps, not mental arithmetic) one has no need to manipulate internal tokens at all. To the extent that this is so, there is no need to posit such tokens, and ample reason to refrain from doing so.

Returning to self-directed speech, it is clear enough that Kanzi engages in something of this nature. Thus, Savage-Rumbaugh reports that on occasion he takes the lexigram keyboard and removes himself from those present by positioning himself so that the board is not visible to anyone else. He then ‘scans the board and touches particular lexigrams’ (S-RST: 50). In these sessions, he appears to find being disturbed or interrupted unwelcome and will ‘either quit talking to himself or move completely out of sight’. If one is not tied to the presupposition that thinking essentially involves internal manipulation of intrinsically private representational entities, it seems clear enough that what Kanzi is doing at these times is a kind of ‘thinking’.

Thinking need not be the activity of a single individual. Just as distributed and cultural resources like an optimised and simplified number system can reshape cognitive problems, it is possible to use another person’s cognitive resources in what one does. Clark endorses this by referring with approval to Carruthers’s (1996) view that ‘public thinking’ enables language to serve cognitive as well as communicative ends. In this

regard, it is instructive to consider an episode between two chimpanzees, Sherman and Austin. In another of Savage-Rumbaugh's works, she describes an experiment where Sherman and Austin were placed in rooms separated by a glass-screen which had a gap large enough for tools (but not chimpanzees) to pass through. In the room with Sherman were various glass fronted boxes containing various foods, each of which could be opened by a particular tool. Austin's room contained the tools.

Through a window Austin could see all the different foods in the boxes, and he would signal to Sherman which it was that he wanted. Sherman responded by using the lexigram board to tell Austin what tool he wanted to open the box. Austin would select the appropriate tool [...] and pass this through a small hole to Sherman. Sherman would then open the right box and pass the food through to Austin (eating a small portion of it along the way). (S-RST: 121)

A particularly significant episode is the following:

For example, on one trial Sherman erroneously requested a key when he needed a wrench and he watched as Austin searched his tool kit. When Austin started to pick up a key, Sherman looked over his shoulder towards his keyboard. When he saw that he had selected the symbol for "key" (which was still displayed on the projectors) he rushed back to the keyboard, lighted "wrench" instead, and tapped on the projected wrench symbol to draw Austin's attention to the fact that he had just changed his request. Austin looked up, dropped the key, picked up the wrench and handed it to Sherman (Savage-Rumbaugh, 1986: 201-202; quoted in S-RST: 121).

In what way can it a distributed view of cognition help here? It is, in one sense, trivially true that by co-operating Sherman and Austin solve a problem that, given the operant constraints, neither could solve individually. However, the solution also depends on Sherman communicating to Austin which tool he requires. This is achieved thanks to an external resource – the lexigram board – and is subject to many kinds of ongoing co-operation (Austin's compliance in tool delivery would be likely to break down were Sherman to take to eating all the food). However, the lexigram board also seems to function as an external (working) memory. When Austin seems to be about to pick up the key, Sherman looks back at the display board rather than, say, expressing frustration or annoyance. But why look at the lexigram display at all? In so doing, we suggest, Sherman makes two comparisons, one of which will be overlooked by those adopting the ECM, and hence lead to under-recognition of cognitive resources beyond the brain. Firstly, he is, of course, comparing Austin's behaviour with the displayed instruction. However, we hypothesise he is also comparing it with his own thought, checking (so to speak) whether he'd 'asked for what he thought he had'.

Thanks to their use of the lexigram board and experimenters, Sherman and Austin take part in public thinking in ways allowing subtle transformations of their cognitive environment. Close observation of their behaviour provides reason to think that, as predicted on the distributed view, use of external symbols affects inner computational resources. In Kanzi's lifeworld, moreover, an even richer environment can manifest itself in private speaking behaviour that resembles what is observed in young children. Just as in humans, this derives from dialogical experience occurring in a world of culturally organized physical and social scaffolding. It depends not just on language but also on the doings of others, the physical layout of the lexigrams, and the biophysical environment. From this theoretical framework it is of interest to reconsider Kanzi's place in the language that is flowing through and around him.

## Putting apes together

Provided we focus on Kanzi's role in social action, there is no difficulty in taking a distributed perspective on ape language. Instead of highlighting what is said, therefore, we consider what is necessary for Kanzi and the experimenters to successfully conduct joint activity. Accordingly, we examine Kanzi's hearing and lexigramming against circumstances arising in an interplay between speaking people, a bonobo's practical concerns, and their respective abilities to use lexigrams. In sketching how the distributed view applies to Kanzi's achievements, we draw on Harris's (1996) suggestion that communicative behaviour can be thought of as occurring within a set of interacting constraints.

Identifying how biomechanics constrain Kanzi's behaviour can, in the long run, help us towards hypotheses about the mechanisms that underpin the reported events. However, in this context, we are concerned with how proximal aspects of behaviour throw light on his abilities. Specifically, we stress that:

- Kanzi exploits lexigrams in singular ways.
- His fulfills current wants by exploiting mediational means.
- Lexigram use is highly sensitive to communicative asymmetry.

In the 'bad surprise' incident, Kanzi acts unexpectedly. This suggests that his ability to adapt understanding and lexigramming to fit the circumstances may be, at least, as important as a capacity to behave consistently. Indeed, this may be why S-RST insist that Kanzi has the ability to 'lift' forms 'out' of behaviour. Of course, though not said, we believe he manifests an even more remarkable ability to reinsert lexigrams in the flow of events. In so doing, moreover, he acts to ensure that they acquire (what trainers interpret as) a singular sense. Thus, in approaching Kanzi's achievement, rather than emphasise iterative mechanisms (e.g. meanings or internal grammar), we follow Harris (1998) in stressing the uniqueness of his contextualizing. Indeed, how Kanzi uses lexigrams seems, often, to exploit regularities in ways designed to ensure that, together with humans, they jointly construct social activity. Not only is this similar to what occurs in free-flowing human talk (see Cowley 1997; 1998; in press A, B), but it also suggests that Kanzi has a biological capacity to make abductive leaps not dissimilar to those that shape human conversations.

Given that Liz also understands the bad surprise incident, it is important to stress that humans find it easy to make sense of what Kanzi does. Indeed, rather as would be expected from Deacon's (1997) account of brain development, it seems likely that external signs work in concert with neural sculpting to give Kanzi control over salient aspects of his experience. He plainly has some ability not only to re-evoked past events but, at the same time, to use in giving a novel twist to what is currently happening. In other words, just as for humans, his distributed cognitive powers enable him to act at a remove from the world. In Vygotsky's (1978) terms, his control over lexigrams shows that he uses external signs as 'mediational' resources. Further, as we would expect from a brain designed for social interaction, it is clear that this mediating role is based, in part, on interpersonal relationships. Thus, for example, there can be little doubt that Kanzi's BAD SURPRISE lexigramming is not just 'set off' by Liz but motivated by and *meant for* her.

Kanzi does not treat lexigrams as possessing invariant meanings, but uses them with remarkable flexibility. As mediational forms, they are extrinsic to the here and now and, he knows, they can impact on social action in fairly predicatable ways. This is, again, similar to the ways in which aspects of vocalization imbue human utterances with a particular sense (see Cowley 1997). For this reason, moreover, it is unlikely that Kanzi 'uses' either a telementational model of communication or a theory of mind. Far from acting as if wished to set off causal processes leading to shared thoughts in another mind, his actions seem designed,

quite straightforwardly, to achieve self-centred goals. Further, thanks to their relative predictability, they give trainers a basis for making complex interpersonal assessments. Rather than becoming preoccupied with ‘thoughts’, Kanzi wants to take part in interindividual events. Thus, he exploits not just lexigrams and their neural underpinnings but, equally, how his companions show *their* understanding of what happens. Like a human child, his doings are constrained by listening skills that connect phonetic patterns with what he feels and wants. In short, it is perfectly possible to imagine that this joint activity occurs without Kanzi’s brain having come to serve as a locus for a language system.

Given the background of his life situation it is not difficult to sketch why Kanzi acts as he does. Given his interests, it is not surprising if his actions are driven, in part, by asymmetries between what Kanzi wants, what he is able to lexigram, and what he understands of human individuals. Once again, this represents something very similar to the dynamic aspects of dialogue asymmetry (Linell, 1990). In these cross-specific encounters, moreover, not only does each party have a grasp of what the other wants (and means), but the local culture permeates what occurs. Yet, although there is often something ‘American’ in Kanzi’s acting, he remains very much a bonobo. Clearly his behaviour is not fixed by social norms. Thus, whatever the neural basis of the ‘bad surprise’, its interpretations (by Liz, S-RST and ourselves) are unlikely to match Kanzi’s (so to speak) ‘intentions’. Quite the contrary. As in humans, the dynamic power of asymmetries (of knowledge, status, background, capacity and power) derives from a world in which social expectations are not replicated by only *partly* shared.

From a macrosocial perspective, Kanzi’s ability to grasp singular events is crucial. Without it, his sense-making would be subject to habituation and, for this reason, the communication would almost certainly become stereotyped. Secondly, as noted, singularity that exploits asymmetries is likely to play a significant role in ensuring that cognition is distributed. Roughly, while Kanzi behaves somewhat like an American, he can both be himself and get what he wants. In other words, it is the uniqueness of every act that enables both Kanzi and humans to contextualize experience through language-activity (and vice versa). Lexigrams, however, differ from jig-saw pieces, in that they provide no ‘correct’ solution for continuing one’s lived stories. Kanzi surprises the researchers with his freedom of action and ability to invent ways of acting that change the circumstances. As the lexigram-board guides him into a biosocial realm, he uses items designed to reify behaviour as ‘signs’ in ways that allow others to interpret his actions as identifying current wants.

Kanzi’s social circumstances suggest that:

- Successful joint actions manifest ‘coherency’.
- Lexigrams be conceptualised as ‘objects of thought’.

For his lexigrams to count as signs, how they are used must coincide, to an extent, with what his human companions expect. Unless this occurred there is no way that, even in an enclutred setting, actions could exhibit coherency. In other words, to take part in a living puzzle, Kanzi’s actions need exploit neither grammatical cohesion nor logical coherence: however, they must be sufficiently well co-ordinated to be interpretable in relation to interpersonal events. In stressing that joint actions manifest coherency, we suggest that, in ways meaningful to all parties, Kanzi’s doings must complement the activity of human companions. Interestingly, given this constraint, Kanzi’s seems to have adopted the strategy of acting consistently but not predictably.

Rather than regard macrosocial constraints as like grammars, they seem to have more in common with what we might call, following Goffman (1983), an ‘interaction order’. Kanzi and his trainers exploit each

other's conduct to their own ends, both sides choose to act as if drawing on each other's expectations. Indeed, this may be why it serves Kanzi to echo North American culture by acting like a boy reared in an entertainment rich environment. If this speculation is correct, it suggests that both Kanzi and his trainers's actions in the living jig-saw are guided by macrosocial patterns, lexigram 'pieces' and, of course, their individual inclinations, wants and fears. Without macrosocial constraints, the humans would not make sense of his actions and, as a result, Kanzi would not get the rewards of joint action.

In principle, it could be argued that Kanzi's brain had internalized enough language to entertain simple propositions. However, a distributed view of mind suggests a simpler solution. Lexigrams are likely to function, at least sometimes, thanks to an ability to bind these entities to neurally realised networks of expectations constraining how, in the setting, complex wants can be fulfilled. In the process, Kanzi's brain almost certainly exploits not only 'representations' of lexigrams but features derived from visual, prosodic, formal, emotive, motor and other ways of experiencing the world. However, before jumping to the conclusion that this suggests Kanzi does not 'really' control language, the reader should consider a sobering thought. Given the mutual understanding between the bonobo and his companions, it seems likely that his neural networking is *similar* to that of humans. Indeed how else can we explain, for example, why we have no difficulty in grasping that Kanzi believes a roof is dangerous, that preventing sleep is wrong, or that there are times to stop misbehaving. Equally, this hypothesis throws light on why we understand that Kanzi finds it harder to understand holes in an electrical socket are 'dangerous' or that people choose to give up televisions, fridges etc to sleep in a tent.

From a distributed view, lexigrams enable Kanzi to solve problems and, perhaps, think the unexpected. In Rumelhart et al.'s sense, Kanzi has obtained minimal access to 'real-symbol processing'. We conclude, then, that a major finding of S-RST's work is that bonobos and humans show massive cognitive continuity. In acting jointly, the two species can grasp each other's goals and, as the cultural colour shows, their 'thinking' extends into the nonconscious lifeworld. Kanzi has been granted a tool so that his leaky mind can establish at least a low level of metacommunication. Importantly, in the 'bad surprise' incident, Kanzi appears to be behaving about his own behaviour. Perhaps this underpins S-RST's claim that what is special about language is 'what it makes of itself.' Indeed, from a distributed perspective, the capacity to turn language on itself, reflexivity (see Taylor, 1997; Harris, 1995), may go far in explaining how bonobos can be permeated by human culture. Further, if inter-specific enculturing occurs, it is likely that similar effects arose in ancient hominid populations. Once human communication is reflexive, it can open brains to cultural penetration and support a co-evolutionary view of how, in prehistoric populations, language emerged.

By way of summary let us revisit the moment in Kanzi's lived puzzle when he was asked to "put some water into the vacuum cleaner". For reasons that will now be clear, Kanzi's understanding was more complex than warranted by the instruction. Far from identifying the 'meaning' of the request, Kanzi contextualized the word-based activity. Further, he acted 'playfully' and by having done so provides warrant for the claim that the request was interpreted in a singular fashion. Treating the instruction as an object of thought, Kanzi used his freedom to give the event unexpected coherency: instead of pouring the water into the vacuum cleaner, he first filled his mouth and then, after a delay, walked over to dribble it through a hole in the machine. His actions not only exploit culturally constrained word-based forms but surpass the experimenter's expectations. As often in primates, *how* behaviour is carried out gives a message about a relationship (Hinde, 1979). Indeed, we can hardly doubt that the experimenters were delighted by the twist he gave events!

## Conclusion

The disappointing parts of S-RST are Shanker and Taylor's tussles with ALR scepticism, perhaps especially Shanker's laboured battle with 'Cartesianism'. The most worthwhile part is Savage-Rumbaugh's often enthralling account of her careful research with Kanzi and her other subjects, work which is not well served by Shanker's and Taylor's contributions. Savage-Rumbaugh's research and Clark's theoretical work deserve to be read together, and illuminate one another.

Kanzi is a bonobo, a member of a species of sophisticated and adaptable social primates who can be expected to show highly developed abilities for social co-ordination. Bonobos are not language using in the wild, so there is no reason at all to expect that their brains are specifically adapted for language in any way. Despite this Kanzi was able to master language at, in some respects, a 'level' akin to that of a two-and-a-half year old human. This achievement is crucially mediated by the device of lexigram boards, which enabled him to transcend the limitations (compared to humans) of his vocal tract, and afforded a structured collection of ways of exerting social leverage on his trainers.

In some ways, furthermore, it is impossible to tell how much Kanzi is capable of. The lexigram-board system which afforded him so much, at the same time makes it difficult to infer anything from some aspects of his lexigramming behaviour. Contingent factors relating to the layout of the boards and the changes of direction needed to touch a sequence of individual lexigrams, for example, mean that we know disappointingly little about how structured his use *could* be. Savage-Rumbaugh's careful research does show that he can be very discriminating with respect to heard structure, as some of the tests discussed above show.

What Kanzi's story tells us is, we suggest, that we should look outside the skull, and beyond the line separating 'humans' from other apes when building an account of our own language exploiting abilities. All too often it is allowed that a promising explanation for the unique sophistication of human language is that there is something uniquely special about human brains. Were that the case, though, Kanzi would be impossible. He doesn't, and this is clear, exploit language as flexibly or powerfully as most humans do, but he nonetheless achieves enough to show, we think conclusively, that what humans require in order to exploit language cannot be reduced to specialised brain capacities geared towards language. Why would we possibly need that, when our nearest evolutionary relations can do so much without such capacities? Why would we possibly need them when the Kanzi shows how much one can do with a distributed mind, opportunistically exploiting available resources in the body, world, and brains of others?

Clark's book helps make sense of this, by making clear in a host of different ways how the brain is best viewed as a shifting collection of opportunistic control systems, ever-ready to reduce its own cognitive load by exploiting structure in the body or world. The types of central, representative, serial processing often thought of as being paradigmatic of human thinking turn out to occur, if ever, as the last resorts of a brain with no other options, and only given plenty of external support.

In her discussion Savage-Rumbaugh points out some of the ways in which bodily factors are important in Kanzi's experience. Where some are limitations, such as his noted vocal capabilities, others offer simple yet rich opportunities. An example of the latter is his typically being carried upright by biped trainers, which freed up his hands for pointing and interacting in ways quite unlike those possible when (in the default bonobo practice) an infant clings to its mother with all four limbs. It should come as no surprise that Kanzi preferred to be carried in this way (S-RST: 28).

Furthermore an environment filled with generally co-operative and helpful trainers and word-based resources is one in which there is plenty to be gained from judicious exploitation of lexigrams and other technologies of interaction. Kanzi shows himself to be an excellent observer and listener, and we believe that his utterance-mediated understanding is evidence both that he uses a medium of public language and that it has effects on the computing powers of his brain. Plainly, Kanzi has achieved control of lexigrams quite independently of a genetically inherited ‘universal grammar’ or the kind of ‘meaning base’ posited in Halliday and Matthiesson’s (1999) recent cognitive theorising. A bonobo brain that attuned to social intents and leaks cognition through its body has sufficient power to master some of language without any such adaptations. Cognition, on this view, has been transformed by what Christiansen (MS) has termed its symbiotic relation with language. Not only does this obviate the need to debate which (if any) aspects of ‘English’ Kanzi has ‘internalized’, but it allows us to elucidate what, in particular circumstances, lexigrams and trainers jointly make possible.

None of this goes to say that brains are irrelevant. Kanzi’s achievements may turn out to be beyond the reach of most bonobos, and it would be ridiculous to suppose that handing out lexigram boards to anything with a central nervous system would lead to comparable results as followed in the case of Kanzi. The important shift which *is* called for here concerns what brains do, and what they are for. Brains are control systems for bodies in environments, and the causal chains which connect action, perception and cognition cut back and forth, sometimes densely, across the boundaries between skin and skull. To understand Kanzi, and ourselves, we need to abandon our ‘intuitions’ about supposed boundaries between thinking and acting, and, instead, follow the causal and explanatory chains wherever they actually lead. The outline of what we’ll discover as far as language is concerned, we wager, will depend more than generally expected on features of the body and environment, and far less on what is in the head. Kanzi’s story tells where to start looking if we want to understand language, Clark’s work tells us how look at what we’ll see.



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