Is Language a Tool?

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Carruthers (1996) describes two opposing approaches to the nature and function of language: (a) the *communicative conception*, according to which thought is independent of language, and language itself becomes only a medium for the communication of thoughts, and (b) the *cognitive conception*, which holds that thinking is essentially linguistic. Clark (1997) argues for a position which does not fit easily into either of these categories. For according to him language is a tool, an invention like the slide rule or the sextant, which allows us to both accomplish tasks more efficiently and to achieve otherwise unattainable goals. Thus language is used for more than just communication, it is implicated in our cognitive activities also. Nevertheless, language is:

> an external artifact designed to complement rather than transfigure the basic processing profile we share with other animals. . . Whether it depicts inner linguistic rehearsal as a times literally constitutive of specific human cognizings (as Carruthers claims) is moot.[1]

The interesting question which arises from this view of language as a cognitive tool is whether it *can* be fleshed out in a way that does not collapse into the cognitive conception, as Carruthers envisages it. With this in mind I will first describe the ways in which Clark thinks that language aids various aspects of cognition. This will lead into an examination of whether these ways presuppose any particular theory of mental representation in order to account for the cognitive benefits accrued from language use, and if so whether it would be sentential in nature. For if language is to be counted as a tool it must genuinely be an "external artifact"; to relax this constraint would be to allow the human hand, or heart, to be considered a tool, and surely any such notion would not be a philosophically interesting one.

The Ways in which Language Functions as a Tool

1. Memory Augmentation

The most obvious way in which language aids cognition is in allowing us to use the environment as an extra-cranial memory store. Here we "simply use the artifactual world of texts, diaries, notebooks, and the like as a means of systematically storing large and often complex bodies of data".[2] Physical objects can also be utilised as cues for information that is stored in our brains, and in such cases the use of linguistic markers is continuous with the use of other salient and appropriate physical objects.

2. Environmental Simplification

Linguistic labels can be used to simplify the human environment. Such labels are easily recognised, and once learned they reduce the cognitive effort involved in negotiating ones way in the world. Further, linguistic labels simplify the actual task of learning itself, marking objects as of the same type, and thus allowing the perceptual commonalties between them to be extracted

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[1] Clark, A. (1997) p. 200.
[2] Ibid. p. 201.

3. Co-ordination and the Reduction of On-Line Deliberation

Language allows us to form explicit plans which can aid in the co-ordination of action. With increasing complexity the possibility of external representation in the form of words allows for more efficient organisation and reduced memory load. On a smaller time frame language can also help to focus, monitor, and control behaviour. This can take the form of a note, creating an externalised control loop for future behaviour, or of the mental rehearsal of linguistic instructions for an activity as one carries it out, e.g. "Left over right, then under. Right over left, then under." (the instructions for a reef knot).

4. Avoidance of Path Dependence

Path dependence is a characteristic of neural networks (both artificial and biological) whereby they are strongly dependent on their learning history, and initial starting point, in attaining a desirable solution to a problem. The starting point for a particular problem is determined by the systems previous experience. Metaphorically speaking, the further away a solution is from the starting point in problem hyper-space, the more difficult it will be to find. Language, through the possibility of communication, allows this difficulty to be avoided by making the experience of a successful individual available to others; it points the way, as it were, to the solution in the problem space. By the same token language also allows problem solving to become a communal, and cumulative, activity.

5. Data Manipulation

The physical properties of a written text allows for methods of organisation and emendation which are simply not available to the un-augmented mind. Pieces of text can be juxtaposed, then rearranged. The fact that they have an external and stable form allows such comparisons to take place with minimal strain on memory. Ideas which have been crystallised into texts at different times, under the influence of different intellectual concerns can be brought side by side in a way that would not otherwise be possible. All this means that written language acts as a considerable crutch for the mind in the course of intellectual endeavour.

6. The Mangrove Effect

Whilst one might assume that an island had to exist before a mangrove forest could be established upon it, the reality in some cases is to the contrary. The mangrove grows from a floating seed which roots itself in shallow mud flats, creating a tangled mass of roots which then trap drifting detritus, which accumulates until eventually an island is formed. Clark uses this as a metaphor for what has happened in the case of humans and language:

> Perhaps it is public language that is responsible for a complex of rather distinctive features of human thought—viz., the ability to display *second-order cognitive dynamics*. By second-order cognitive dynamics I mean a cluster of powerful capacities involving self-evaluation, self-criticism, and finely honed remedial responses.[3]

So on this model the possibility of second-order thought - of thinking about thinking - is dependent upon our having developed language. Thus the mangrove effect is the most important aspect of Clark's claims about the capacity of language to aid cognition, in that some much of what we consider to be quintessentially human is dependent on this ability to engage in second-order thought.

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[3] Ibid. p. 208.

Is Language Genuinely a Tool, or Merely Tool-like?

If we accept that language does aid cognition in the ways that Clark claims (any denial would have to be based on empirical research, not philosophical argument) then there remains the crucial question of just how this benefit is garnered from language. There are a range of accounts of the relation between thought and language. At one end of the spectrum is Carruthers' account which argues that *conscious* thinking just is constituted by natural language sentences, whether outwardly expressed our inwardly entertained.[4] The semantics of these linguistic items is to be explained by a (limited) functional role semantics theory. Dennett argues that language actually reprograms the brain, installing a virtual serial program on the massively parallel hardware of the brain. In what ways Dennett's account of semantics varies from Carruthers I am unsure, although Dennett's intentional stance would tend to suggest some degree of behaviourism or anti-realism about mental states, leaving the status of linguistic tokens uncertain. Clark seems to think, from what I have read, that we do not need to address such questions in order to see that language bestows cognitive benefits:

> What matters, I think, is not to try to confront the elusive question "Do we actually think in words?" (to which the answer is surely "In a sense yes and in a sense no!"), but try to see just what computational benefits the pattern-completing brain may press from the rich environment of manipulable external symbolic structures.[5]

Whether this is a tenable position remains to be seen. Completing the picture at the other end of the spectrum is P. M. Churchland, who sees cognition as being constituted by transformations between neuronal vectors, the mapping of inputs onto prototypes and other PDP notions. Language is seen as one more development of a sophisticated cognitive system which is otherwise continuous in its basic mode of processing with other animals. If cognition really is like this then it would be correct to describe language as a tool, as the disparity between basic processing and linguistic operations would be enough to ground the externality of language.

Is Clark right, then, to affirm that language is a tool? The first move in assessing this claim is to see if he has provided a genuine explanation of how language does things for us. I shall argue that he has not. The next move is to then see whether the ways in which language aids cognition presuppose any of the various options given above. If they did then this would settle the question, for in each case (apart from Clark's) language is either internal to basic cognition or external to it; in the former case language should not be considered a tool, and in the latter case it should.

In the majority of Clark's examples language acts to crystallise cognitive processes in a stable externalised form. What I have in mind here by using the term "crystallisation" is the creation of a permanent, and unchanging record of a dynamic and constantly changing system. In the cases of memory augmentation and data manipulation what is crucial is the capacity to dump a thought, or cognitive product, in a convenient form onto the environment, where it can remain - if all goes according to plan - until it is required again. In such instances, however, the difficult bit has already been done before the crystallisation takes place. In order to store a linguistic item one must already have produced it, this much goes without saying. It can be admitted that it is a convenient aspect of language that it can be given physical form, but the really important question is how a piece of language gets to be involved in our thoughts in the first place. Why should thought be the sort of phenomenon that can be transmuted into physical form? A similar complaint can be made about

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[4] Consciousness is never very far from the centre of this debate, because of the question of how we are related to other species. We know that *we* have language, and that *they* do not; we know that *we* are conscious, but do not know (supposedly) whether *they* are. This leads to an inevitable linking of these two areas. Whether this is a proper way to think about these issues remains to be seen.

[5] Op. cit. p. 200.

environmental simplification: that we can recognise a label is all very well - for the visual recognition of such items is definitely something which a pattern-completing brain *can* do - but it is the process whereby we come to understand what a label signifies which really needs explaining here.

These points in themselves do not vitiate Clark's claims about the ways in which language aids cognition, they merely make his insights less interesting, reducing them to the status of observations or platitudes about language.

This point is more salient for the remaining examples of cognitive augmentation. That we use language in our plan-formulating behaviour seems correct, but what is its role here? Is it possible to engage in non-linguistic planning, and if not why not? One might propose an account in terms of mental simulation, where one uses an internal model in order to arrive at an effective behavioural strategy before acting. That using language makes planning much less cognitively intensive seems intuitively right, but again, why is this so? On a more immediate scale when we mentally rehearse instructions before or during a task what makes the difference between genuine cases where inner speech acts as "an extra *control loop* capable of modulating the brain's use of its own basic cognitive resources"[6] and those where the words just echo round one's head impotently?

The same kind of point arises again with path-dependent learning; an explanation is needed of how language makes the experience of one individual available to another. After all, if we are thinking about this problem on the model of learning in connectionist networks it is unclear how the pattern of weights from a successful network can be transferred to another, other than by manipulation of each connection by an outside force. In this case, however, Clark and Karmiloff-Smith (1993) have suggested a solution to this problem, namely the representational redescription (RR) model. They argue that representational redescription is something that genuine thinkers go in for, and that such entities are:

> endowed with an internal organisation which is geared to repeated redescription of [their] own stored knowledge. This organisation is one in which information already stored in an organism's special-purpose responses to the environment is subsequently made available, by the RR process, to serve a much wider variety of ends.[7]

The problem with this response is that RR is little more than a place-holder for future developments in connectionist theory which it is hope would allow a system to meet these requirements. The only possible candidate for actually carrying out RR which Clark and Karmiloff-Smith mention is a technique for the "skeletonisation" of networks proposed by Mozer and Smolensky (1989). This involves an automatic procedure which takes a trained network and computes a "measure of relevance that identifies which input or hidden units are most critical to performance"[8] and then deletes the least relevant units to leave a network which can generalise more successfully and learn more rapidly. Clark and Karmiloff-Smith suggest that if such a process left the original network intact whilst producing the skeleton network, this might provide a mechanism whereby RR could take place. Whether our brains really do operate using RR, and whether this is actually the way in which they do it are empirical questions. The important point to note in the present context is that the proposed method does not make any mention of language at all, and so it cannot explain how language allows us to overcome path-dependence.

One might hope to find the solution to these problems in the Mangrove effect, in our capacity to engage in second-order cognitive dynamics. For once we can objectify our own

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[6] Ibid. p. 202.
[7] Clark, A. and Karmiloff-Smith, A. (1993) pp. 487-8.
[8] Mozer, M. and Smolensky, P. (1989) pp. 4-5.

thoughts this opens the way for the sort of manipulations that have been discussed above, and with which pattern-completing brains might be comfortable. To this end Clark asks:

> What fits internal sentence-based rehearsal to play such an unusual role? The answer, I suggest, must lie in the more mundane (and temporally antecedent) role of language as an instrument of communication. In order to function as an effective instrument of communication, public language will have been moulded into a code well suited to the kinds of interpersonal exchange in which ideas are presented, inspected, and subsequently criticised. And this, in turn, involves the development of a type of code that minimises contextuality (most words retain essentially the same meanings in the different sentences in which they occur), is effectively modality-neutral (an idea may be prompted by visual, auditory, or tactile input and yet be preserved using the same verbal formula), and allows easy rote memorisation of simple strings.[9]

This isn't so much an answer, as a set of criteria which a proposed answer should meet. This begins to make Clark's argument look like the following: anything that meets the criteria for inter-personal communication must have the set of properties, P, and serendipitously, anything which has P (in the human context) is also fit to produce the set of cognitive benefits, B. To put things in this way is not to denigrate them; to show that language does much more than allow inter-personal communication is a substantive and interesting accomplishment. However, to summarise this by saying that language is a tool is contentious. For this is to suggest a stronger claim about a mismatch between language and the underlying cognitive system which utilises it. It is clear from the rest of what Clark has to say, both in the work cited and others, that he is of this opinion, and it is one with which I whole-heartedly agree. Despite this, the observations which Clark makes about the ways that language augments cognition cannot be used to fully justify the claim that language is a tool. For I cannot see anything in Clark's examples that could not be interpreted so as to be consistent with any of the positions canvassed above, and if it turns out that Carruthers is right in claiming that language is basic, then it would be wrong to say that language is a tool. For if thought is constituted by sentences in natural languages then it is just obvious how it can be crystallised into an external representation which can then play a rich role in cognition, because on this account it is of the essence of thought that it is made up of discrete elements (words) arranged according to syntax into finite strings (sentences) and these are already crystalline in nature - that is to say they are not dynamic and constantly changing. This account gives an easy explanation of how our thoughts can be expressible in natural language, at the price of making it hard to see how they can be representational.

Thus in order to settle the question of whether language is a tool one must look elsewhere for evidence that would decide amongst the competing theories about the relationship between language and thought. To show that language is tool-*like* is not enough to have proved that it *is* a tool.

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[9] Op. cit. p. 209-10.