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Grounding Cognition: The Role of Language in Thinking¹

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Abstract

In this paper, I investigate the relationship between natural language and thinking. Specifically, I adopt the view that thinking operates, by and large, according to associationistic rules and argue that natural language plays a crucial role in thinking, but not a constitutive one, as many have argued. I propose that the suggested view enjoys significant empirical support, mainly from work done with aphasic subjects. The major challenges that all associationistic views of thinking face are the problems of propositional thinking and compositionality of thought. I briefly suggest how these challenges could be met in the light of the suggested view regarding thought production.

Keywords: Language; Cognition; Associationism; Aphasia; Concept Empiricism

1 Introduction

The relationship between language and cognition is a much-debated one and widely varying notions of this relationship have been produced over the last few decades in fields as varied and diverse as psychology, linguistics and philosophy. The main dialectic of this debate is centred on the issue of the significance of natural language in cognition. It is worth clarifying at this point that there is the issue of ‘whether thought happens in language’ and secondly ‘whether the language in which thought happens, if it does, is natural language’. The problem is that certain thinkers, Fodor for instance (see below), answer the first question emphatically ‘yes’ (language of thought), and others with an emphatic ‘no’. As a result, their answer to the question ‘how important is the role of language to thought?’ is potentially ambiguous. In the following, when talking about language I will be referring to natural language unless stated otherwise.

The main strands in this debate can be briefly classified as follows. I start from views that bestow the least significant role to language in the production of thought,

¹ This paper is an early draft of Tillas, A. (forthcoming 2015). Language as Grist to the Mill of Cognition. Cognitive Processing.

and continue by examining views that ascribe language a greater role. Grice (1957; 1968; 1969; 1989) treats language as independent to thought and as merely being used to express non-linguistic thoughts. Linguistic communication is seen as primarily a matter of a speaker changing a hearer's mental states, e.g. getting them to form a certain belief, through recognition of the contents of their thoughts. (The hearer recognises the thoughts of the speaker on the basis of the latter's usage of words). Elsewhere, Grice (1982) speculates that language may have evolved in order to facilitate correspondences in psychological states between one creature and another. Proponents of similar views argue for a reductive account of linguistic meaning to thought meaning. In this sense, language is independent from thinking. A second view can be found in Fodor's (1978; 1983; 1987) Language of Thought Hypothesis (LOTH). For Fodor, thinking occurs in an inner sub-personal code which he calls 'Mentalese'. Mentalese is distinct from natural language and hence the role of natural language in thought is also limited. Language is mainly used for expressing the underlying thoughts in public form. Proponents of similar views, at least according to Carruthers (2005), include Chomsky (1988), Levelt (1989) and Pinker (1994), amongst others. Another view is that of Carruthers (1998; 2005; 2008) according to which the language of thought is actually natural language. In this sense, natural language plays a greater role in thinking than merely communicating thoughts from an unconscious to a conscious level. Carruthers holds that language is constitutively involved in thinking and inner thinking occurs as a form of inner speech.

Further views that bestow a significant role to language in thinking can be found in the works of thinkers like Davidson and Brandom who see thinking as secondary to language. More specifically, for Davidson (1975) thoughts are only attributable to creatures that are interpretable. A creature that we cannot interpret as capable of meaningful speech is a creature that we cannot interpret as capable of possessing contentful attitudes². For Brandom (1994), thought does not take place in language but thought can only be attributed to linguistic agents. Thought and language acquire content through their mutual interrelations. But despite this mutual interrelation, Brandom promotes the significance of language over that of thought since he argues that the objectivity of conceptual norms derives from public linguistic practice.

There are also views that could be seen as somehow equidistant from the two extremes of the above continuum. The view suggested here also lies at the middle of the continuum, and in this section I clarify how it differs from competing views.

² See also Malpas (2009).

The beginnings of supra-communicative views of language can be traced in William James' (1890/1996) idea that language, and words in particular, allow for a clearer distinction between different concepts³. Vygotsky (trans. 1962) further analyses this idea and argues for the influences of natural language on cognitive development and its scaffolding role in guiding behaviour and directing our attention.

This Vygotskian scaffolding idea enjoys support from the work of Berk and Garvin (1984) who show that language (in the form of self-directed vocal or silent speech) guides the actions of children of 5–10 years of age. They found that silent speech is more frequent in cases where the child is alone and when she is engaged in more sophisticated tasks. Bivens and Berk (1990) and Berk (1994) found that increased incidence of silent speech strongly correlated with higher levels of mastering the task in question. From this evidence, Berk draws the conclusion that self-directed speech is a crucial cognitive tool that allows us to direct our attention to specific aspects of a new situation and direct problem-solving actions.

Gauker (1990) also suggests a view of language as a tool for affecting changes in the subject's environment (as opposed to a tool used in representing the world or to publicly express one's thoughts). Language plays the role of a medium through which subjects can grasp the causal relations into which linguistic signs may enter.

For Jackendoff (1996), linguistic formulation allows us a 'handle' for attention and with it the possibility to attend to relational and abstract aspects of thought and thus puts us in a position to scrutinise those aspects.

One of the most prominent views that fall under the 'middle-of-the-continuum' umbrella is that of Clark (1998), and Clark and Chalmers (1998) who argue for the causal potencies of language and suggest that language complements our thoughts. Here, the mind is seen as using external props to reduce the cognitive costs of thinking and enhance performance, especially in regards to formation of structurally highly sophisticated thoughts. Even though thinking can be purely internal, it often relies on available external resources and uses them in a constitutive way. Language is not coincidentally available, but it rather exists to have the function of a prop for thought. Focusing on a connectionist view of the mind, Rumelhart et al. (1986) also treat language as a crucial element for various environmentally extended computational processes.

Dennett (1991) ascribes a more 'extreme' role to language and argues that the advanced cognitive skills that the human mind exhibits are the effects of culture and lan-

³ Here I follow Clark's (1998) terminology for views that ascribe more than a communicative role to language. Most view presented here are reported in Clark (*ibid.*)

guage. In this sense, the main cognitive differences between the human mind and that of primates like chimpanzees cannot be captured in terms of our initial hardwiring. An even stronger view comes from Whorf (1956) who famously suggests that linguistic differences in grammar and usage shape and alter the ways in which we come to conceptualise and experience the world⁴.

Finally, the language of associationistic thinking hypothesis (LOATH) – the view suggested here – also lies somewhere at the middle of the aforementioned continuum. By and large, LOATH is a view that builds upon associationism and ascribes a significant role to natural language in terms of its contribution to thinking but crucially it is not a constitutive one.

Before starting an elaboration on LOATH, I clarify a number of preliminary issues such as what thinking amounts to, at which point we get conscious access to our thoughts, and what it is for a subject to have endogenous control over her thoughts. Continuing, I present my views on the role of natural language in thinking and provide empirical evidence, mostly from work done with aphasic subjects, in support of my claims. Finally, I assess the consequences of my account by evaluating whether a bigger role should be ascribed to language. In doing so, I examine Carruthers's argument, given that he treats language as constitutively involved in thinking.

2 Elaborating on LOATH: thinking is analogous to perceiving

Despite the fact that the role of language in thinking is often subject to a lively debate, few things are settled in regards to what thinking amounts to. For proponents of the view that thinking occurs in language, thinking occurs either in a Mentalese sub-personal code or in the form of inner speech; but as explained above not everyone believes that thinking does in fact happen in the form of language. In the view I suggest here, thinking is analogous to perceiving to the extent that the same representations that were produced during perception of a given object get reactivated when thinking about this object, (e. g. Barsalou 1999; Damasio 1989). That is, on recalling a given concept, e. g. DOG, the brain simulates, to use Barsalou's term, the perceptual experience of a dog. That is, the same neuronal configurations that were active while perceiving a dog would also be activated when thinking of a dog; (see also Barsalou 1999; and Prinz

⁴ But see Patterson and Fushimi (2006) for evidence that the brain's organisation of language is in fact the same regardless of the language the subject speaks.

2002: esp. chap. three). At the same time, thinking is different from perceiving since the phenomenology of thinking is different for obvious reasons.

Fleshing out the notion of simulation further, consider Damasio's (1989) 'convergence zones' hypothesis. During perception of a given object, different groups of neurons underlie perception of different parts/properties of the object in question. Further down the line of interneural signalling, the output of the neurons that underlie perception of a dog's head, for instance, converge with the output of the neurons that underlie perception of the dog's bark, legs, fur, etc. In this way, these different neuronal ensembles interact in a way that they did not before. And they did not interact before because they are dedicated to the perception of different kinds of stimuli. Convergence zones register combinations of components in terms of coincidence or sequence in space and time (co-occurrence). Representations of the parts of the perceived object are re-constructed by time-locked retro-activation of fragmented records in multiple cortical regions. This is the result of feedback activity from convergence zones. That is, the groups of neurons that fired in a specific way during the sensory experience with the given object are re-activated simultaneously and in exactly the same way that they were activated during the initial perception of the object in question. In this way, a given object is not only perceived as a whole but is crucially also represented in memory (and later on reactivated) as a whole precisely. For what actually gets stored are the simultaneous activation patterns that underlie perception of that object. A key point here is that we only have conscious access at the level of a convergence zone and not at the level of the fragmented representations of an object in geographically spread neuronal groups. It is for this reason that we perceive objects as wholes and not as conjunctions of different features and properties. This claim will play a significant role in the second part of the paper where I reply to Carruthers's claims about the relation between language and thinking.

2.1 Endogenously controlled thinking

LOATH is based on a view of concepts according to which a concept is a structured entity comprised of a set of representations. These representations are formed during perceptual experiences with instances of a given kind. What is also included in this set is the perceptual representation of the appropriate word, e.g. (Barsalou 1999). For instance, the concept DOG is comprised of a set of perceptual representations built out

of experiences with instances of dogs, together with the perceptual representations of the word 'Dog'. These representations get associated on the basis of co-occurrence.

To have the ability to endogenously control the tokening of a given concept, and thus to endogenously control thinking, is to be in a position to activate a given concept in the absence of its referents, i. e. to token a thought on the basis of processes of thinking. In my view, endogenously controlled thinking is merely associative thinking, i. e. current thinking caused by earlier thinking. Here, I am committed to a view of internal thinking which is imagistic, to the extent that conceptual thoughts are built out of concepts, which are in turn built out of perceptual representations. In the suggested view, concepts are associationistic in their causal patterns. That is, every concept is associated with other concepts. Once activated, concepts associated to it to get also activated⁵. For example, consider someone uttering the word 'Trip' and another agent mistakenly hearing the word 'Grip' and as a result starting to think about friction and laws of physics instead of travelling. This is a case where an agent is forming a thought in the absence of an appropriate stimulus, seemingly in a spontaneous but actually in an associative manner. In the previous example, the subject in question forms a thought without being confronted with an instance of the kind in question, in this case the word 'Grip'.

Note here that endogenous control over concepts (i. e. the ability to activate a concept in the absence of its referents) could also be acquired in different ways to the one suggested here. For instance, non-linguistic animals might acquire endogenous control over their concepts by associating a given set of representations to some sort of non-linguistic action, e. g. goal-directed actions over which they do have endogenous control. This might also be the case with human subjects at early developmental stages. The suggested hypothesis then is that when a subject finally does acquire a certain degree of linguistic sophistication, the process of activating a concept in a top-down manner is achieved by virtue of associated linguistic symbols being activated. Note also that there are cases when we form a thought 'on the fly' by activating a set of images in a top-down manner and consciously manipulating those images. For instance, consider being in a store and trying to think whether a particular sofa would fit in your living room. This is a clear case when a thought is formed by virtue of images being consciously manipulated. Clearly, the activated images/representations of the inner space

⁵ Evidence in support of the suggested associationistic view of thinking can be found in the work of Elman et al. (1996), amongst others, who argue that artificial neural networks can be highly constrained by the network's current weight assignment.

of one's living room do not have to be constitutive parts of the concept LIVING ROOM. What is important here though, is that these representations are only activated in virtue of their associations to certain concepts, which in turn are also activated either during or (right) before the activation of the imagistic thought in question.

In a nutshell, endogenous control over thoughts is acquired by associating concepts with linguistic symbols. My hypothesis here is that we have endogenous control over our production of linguistic items, given that we are able to produce linguistic utterances at will (or silent talking to ourselves). It is this executive control over linguistic utterances that gives us endogenous control over our thoughts.

2.2 Associationist accounts and propositional thoughts

On the previous pages, I presented LOATH, an associationistic view of thinking in which language plays a significant but not a constitutive role in thinking. As such, LOATH might be subject to the objection that it cannot account either for propositional thinking or for compositionality of thought. However, I suggest that those problems could be solved by appealing to natural language. Let me elaborate.

The reason why it is not obvious how LOATH could account for propositional thinking is that it at best describes how interconnected concepts get activated but does not explain the propositional-syntactic properties that thoughts, in the form of inner speech, actually have. In a sense, propositional thoughts somehow involve or are about a number of different items for which we have individual concepts. In a propositional thought, those individual concepts are structured together. The way that individual concepts are structured is important, since the same concepts can be structured in different ways. For instance, there is a clear structural difference between the thought 'John loves Mary' and the thought 'Mary loves John' (cf. Fodor & Pylyshyn 1988). The difference between propositional and non-propositional thoughts is that propositional thoughts are complex structured entities that are true or false. In this sense, some thoughts seem to have a unified coherent propositional structure and content⁶ whereas individual representations seem to lack these features. The question then is how is it that we can move from the individual representations to having mental representations that have this kind of propositional content?

In reply, a single thought gets to be propositional in structure and content by piggybacking on language. My starting point is that sentences are syntactically structured.

⁶ Structure and content are different since there could be mental atoms that have propositional content.

Sentences are unified structured entities and they unify and structure the concepts associated with the components into a propositional thought in a way that mirrors the unity and structure of the sentence. A thought gets to have propositional content by virtue of concepts (for objects or features) being associated with individual words or phrases; the sentence provides a kind of unity. In this sense, it is the conventional grammatical unity and structure of the sentence that unifies those concepts and orders them in a certain way. It is by virtue of this, that thoughts have particular propositional content. Furthermore, the external linguistic item orders and, in a sense, binds the different constitutive-to-the-proposition parts together and unifies thoughts.

As it happens, most of those raising the objection of propositional thinking against associationist accounts seem to find a better alternative in LOTH. What is appealing about LOTH here is that Mentalese is structurally(/grammatically) analogous to natural language. In this way, a thought is tokened as propositional. As explained in Section 4 below, Carruthers also objects to associationistic accounts and he favours a view in which natural language is constitutively involved in thinking, i. e. natural language *becomes* a language of thought. Thus, for Carruthers, thoughts do not occur in Mentalese, but rather natural language is itself the medium through which conscious thinking is conducted. In this sense, thoughts are propositional in terms of natural language, which of course is propositional, being constitutively involved in thinking. Both of the above theses can account for propositional thoughts while it is claimed that associationist accounts cannot.

As shown above, representing linguistic items allows an agent to escape from the patterns of association that they would have been locked into had it not been for the conventional structure of sentences and their conventional patterns of implications. In this way, an agent can extent the repertoire of these associations beyond the actual inductive pattern of objects as she has encountered them. For instance, one can think of black swans even though one has only seen white ones. This is possible because some of the patterns of associations that one can fall into using by the concept SWAN are underpinned by and arise from the conventional structure of language. So, the (version of the) problem of propositional thinking (that I focus on here) is solved by latching onto the external artefacts of public language.

In a nutshell, I claim that an agent could extend the repertoire of associations beyond a) their hardware endowment and b) the patterns of experiences that their history has given him/her by forming associations with linguistic items. These latter associations are much less constrained by the agent's individual experience history and much more

constrained in other ways, i. e. the rules of grammar, the norms of epistemology and so forth. It is in this way that thinking in a more flexible and open-ended way is achieved. Clearly the suggested view bears enough similarities to the Extended Mind Hypothesis (briefly examined above) and Clark's (2005) suggestions. The main difference between the two is that my focus is at a more general level. In particular, I do not focus on specific cognitive tasks that might be propped up by language or how specific processes, like those involved in perceptual categorisation, are facilitated or influenced by language. Instead, my focus here is on how language affects thought formation.

2.3 Associationism and compositionality

Another problem that associationistic accounts of thinking face is the problem of compositionality. One of the characteristics of concepts is that they can combine compositionally. The problem for associationistic accounts is that it is not clear how they can give an account of the ways in which concepts, the ingredients of thoughts, can be put together to produce something where the meaning of the whole depends on the meanings of the parts and the ways in which they are put together. The problem of compositionality is particularly vivid for prototypes. For instance, the conjunction of PET and FISH gives PET FISH. However, the prototypical pet is something like a cat or a dog; the prototypical fish is something like a trout while the prototypical pet fish is rather a goldfish (cf. Fodor and LePore 1996). If thoughts are formed in an associationistic manner, how is it that concepts can combine compositionally?

This is a very interesting problem which, however, lies beyond the scope of this paper. That said, a solution can be suggested; one that can be seen as another way in which language influences thinking. My main claim is that since thinking piggybacks on language, the solution to the problem of how thinking is compositional piggybacks on the solution of how language is compositional. Admittedly, this is a different problem, and one on which I do not further elaborate here since it lies in the realm of philosophy of language.

Returning to the problem of compositionality of thought and assuming that language is compositional, according to LOATH the concept PET FISH is a folder that contains perceptual representations. At this point, I align myself with Prinz's semantic account (2002), according to which, in order for C to refer to X, the following two conditions, (a) & (b), have to be fulfilled:

- (a) Xs nomologically covary with tokens of C

(b) An X was the (actual) incipient cause of C

In this sense, the incipient causes of PET FISH can either be instances of pet fish or representations of pets and representations of fish. What is important, in terms of the semantics, is that PET FISH has to nomologically covary with pet fish rather than a disjunction of pet and fish. In other words, that PET FISH will be activated every time the subject is confronted with or thinking of an instance of pet fish. This is a nomic or counterfactually supporting relation. The reason why PET FISH nomologically covaries with pet fish is that the concept's functional role is constrained by the constraints on the uses of the word that are set by the agent's locking into the conventions of how conjunctions are formed. In this sense, an agent is a participant in a convention and it is via the association between the word and the concept that the functional role of the conjunctive concept is constrained. Taking a closer look at the constitutive representations of PET FISH now, these representations can be representations of pets like cats and dogs as well as representations of fish. Note that those representations are idle in the functional role of the concept. The latter is more constrained by its link to the words.

I do not further elaborate on the problem of compositionality here. However, it should be clear that even though proponents of associationist accounts of thinking do not have a fully fleshed out solution, they can tack the solution that philosophers of language will offer to the problem of how language can be compositional onto their claims about thinking.

3 LOATH and empirical evidence: thoughts, language, and the evidence from aphasia.

In the following sections, my target is to examine LOATH against empirical evidence. I do that by arguing that it is not clear how proponents of the communicative conception of language could account for evidence gathered from work done with aphasic subjects, which shows that aphasics cannot form endogenously controlled thoughts. The reason why this is useful for my purposes is that aphasia is generally understood as a language disorder. Admittedly, there are different kinds of aphasia and each kind can affect linguistic comprehension and communication to different degrees. Furthermore, several brain regions are affected in cases of aphasia. By and large though, aphasic subjects are unable to understand and use spoken or written language due to brain lesions. To

this extent, I focus on the linguistic aspects of aphasia⁷. Furthermore, even though – as mentioned already – language plays a key role in the acquisition of endogenously controlled thought, stimulus driven thought might not necessarily involve language. For instance, it might be that a stimulus produces a perception, which in turn causes activation of concepts by associationistic links that are piggybacking on language. In this sense, a fair quantity of stimulus-driven, yet fairly complex, cognitive processing can occur in aphasics. However, the suggested account predicts that there will be a dramatic drop in performance amongst aphasics executing sequential and reasonably difficult tasks and more specifically in performance of tasks in which endogenous control of thought is required. This is because, as previously explained, a key claim of LOATH is that endogenous control is acquired on the basis of language, and aphasics are by and large subjects with ‘compromised linguistic systems’.

In order for proponents of the view that language is not involved in endogenous control of thinking to accommodate evidence similar to this presented below, they need to establish a double dissociation between language and endogenous control. That is, they have to show that aphasic subjects – who are linguistically impaired – can nevertheless activate concepts in a top-down manner and also that (at least in some cases) subjects who are linguistically unimpaired cannot activate concepts in a top-down manner.

In general terms, the empirical evidence presented here shows that there is a correlation between linguistic impairments and endogenously controllable thinking. Thus, the option available to proponents of views contrasting the one suggested here is the following: First of all, they need to adopt a *massively* modular view of the mind. In this case, it can be claimed that a distinct module governs activation of concepts in a top-down manner, and perhaps a separate module (or modules) governs all other linguistic functions. It can then be claimed that in the cases presented below, both the language module and the top-down-activation-of-concepts module are impaired. Nevertheless, those two modules are distinct from each other⁸. If a massively modular view of the

⁷ Section §3 has been significantly revised after publication of this volume. The main reason for this is that aphasia is not an absolute language deficit, as it is implied here, and more relevant and recent empirical evidence has been considered. However, in later drafts it is shown that the suggested view still enjoys significant empirical support from work done in perceptual processing and categorisation tasks.

⁸ Evidence in support of this claim can be found in (Pinker 1994), (Brock 2007) and (Mervis and Beccera 2007). The latter demonstrate that language abilities in Williams Syndrome are no more than would be predicted by non-linguistic abilities. Furthermore there is evidence suggesting that specific language impairments (SLI) related to use of language might be of a more general cognitive nature (Norbury, Bishop & Briscoe 2001); (Bishop 1994); (Kail 1994), amongst others). I do not further elaborate on this issue here.

mind is adopted, the aforementioned double dissociation can be achieved since there might be cases where only one of the above (two) modules is impaired while the other is spared. Note here that a Fodorian view of the mind as *merely* modular cannot account for this evidence since, in that view, there is only one language module responsible for all linguistic functions. There are various reasons why a massively modular view of the mind is problematic, even though I do not further elaborate on this issue here⁹. Having dealt with the negative argument supporting the suggested view, I now turn to positive considerations.

3.1 Drawing and recollection in aphasic patients

Gainotti et al. (1983) systematically examined the effects of aphasia on drawing from memory. Furthermore, they investigated the relationship between the performance of subjects and the clinical form of aphasia, the severity of language impairment at the semantic level of language integration¹⁰. They also investigated whether aphasics were more impaired than subjects with right-brain and left-brain injuries but without any aphasia. All of these results were compared to the results from a control group of normal subjects of the same mental age, and comparisons were drawn between performances of the impaired and control subjects.

During these experiments, subjects were briefly shown drawings of simple objects with a characteristic shape (a nail, a pear, a key, a comb, a cluster of grapes, a table, a hand and an umbrella). The experimenters made sure that the subjects had analysed the details of the object in question and recognised it, by asking them to name the object in question. The experimenter then hid the object away and the subject was asked to draw the same object from memory. It should be noted that the instructor asked the subject to draw the object by naming it, i. e.: “Could you please draw the comb that you just saw?” This process was repeated for the ten above objects. Finally, two independent judges evaluated the drawings. Two points were given to drawings that contain most of the object’s characteristic features and thus could be easily recognised. One point was given

⁹ For instance, evidence from (Gregory 1970) and (Barnes, Bloor and Henry 1996) could be used to counter the cognitive impenetrability thesis. The cited evidence shows that cognition seems to penetrate perception. This in turn counters one of the main characteristics of modules, namely informational encapsulation. I do not further elaborate on this here. See also (Prinz 2006) for an extended attack on the modular view of the mind on different grounds.

¹⁰ An impairment at the semantic level of language integration can be detected by asking patients to discriminate the meaning of a given word by choosing from an array of semantically similar alternatives the object corresponding to the stimulus word. This tests the semantic level of language integration (*ibid.* 616).

to drawings that contained some of the characteristic features of the object and could still be recognised. Zero points were given when the drawn object was unrecognisable. The points given by the two judges were added and thus each subject could score a maximum possible score of forty.

At a different stage of the test, subjects were tested for constructional apraxia and were given models and figures, ten in total, to copy. Once again, two independent judges evaluated the drawings (copies) on the basis of a rating system similar to the one described above.

On the basis of their symptoms, aphasic subjects were divided into four major aphasic syndromes (Broca's, Wernicke's, anomia and conduction aphasia). I will not further examine the different types of aphasia since, as shown from the results, such a classification is not central for my present purposes.

3.1.1 Results

The mean scores obtained by aphasic subjects from the Drawing from Memory Test and Copying Drawing Tests are presented in table 1, and are compared to the average scores of normal controls and nonaphasic subjects with right- and left-brain lesions. As shown in the first column, aphasic subjects scored the lowest means in the drawing from memory test while the difference in the copying drawing test was not as dramatic. As a matter of fact, aphasics performed slightly better in the latter test in comparison to subjects with right-brain damage, which are considered by the examiners as the most appropriate control group, given the damaged brain areas in aphasic subjects.

Mean scores	Aphasic patients (n = 57)	R. brain- damaged (n = 67)	Nonaphasic L. brain-damaged (n = 44)	Normal controls (n = 23)
Drawing from Memory	21.59	28.08	31.16	33.78
Copying Drawings	33.83	33.53	37.70	37.04

Table 1: Results obtained by aphasics, normal controls, and non-aphasic right and left brain-damaged patients on the tasks of drawing from memory and of copying geometrical drawings (adapted from Gainotti et al., 1983).

On commenting on the obtained results, Gainotti et al. remark that aphasics are significantly more impaired than any other group on the 'drawing objects from memory' test, but not on the test for the 'copying drawing' tests. On these grounds, they argue that

poor performance of aphasic subjects at the drawing from memory test is a symptom that cannot be considered as a particular aspect of a generic visuo-constructive disorder.

On testing subjects with different aphasic syndromes and different levels of severity, the obtained results showed that the performance of the subjects was not influenced, at least not to a significant degree, by the type of aphasic syndrome or the severity of the damage. Based on these results, Gainotti et al. claim neither the type of aphasic syndrome nor the severity of the damage seem to be crucial with regards to the deficit in drawing from memory of aphasic patients.

The most striking result for my present purposes from the Copying from Memory test is that aphasic subjects with semantic-lexical impairments performed systematically poorly. At the same time, aphasic subjects with no such semantic-lexical impairments performed significantly better. In this sense, there is a strong correlation between aphasic subjects with semantic-lexical impairments and incompetence in the drawing from memory test. These results are illustrated in table 2.

	Presence of semantic-lexical impairment (n=30)	Absence of semantic-lexical impairment (n = 27)
Copying Drawings	33.54	35.62
Drawing from Memory	17.52	26.33

Table 2: Mean scores obtained by aphasic patients with and without semantic-lexical impairment (adapted from Gainotti et al., 1983)

In a nutshell, the results that Gainotti et al. obtained from the aforementioned experiments show that: first of all, aphasic subjects were significantly poorer than control groups at the drawing from memory test. Secondly, the examiners did not detect any significant correlation between the type of aphasia and severity of the impairment in the results of the drawing from memory task. Most importantly though, a significant correlation was detected between poor performance at the drawing from memory task and disruption at the semantic-lexical level of language integration.

The importance of these findings, for my purposes, stems from the fact that they explicitly show that aphasic subjects have compromised abilities with regards to accessing representations and activating concepts stored in their memory, mainly in the absence of the referent of the concept in question. This claim gathers pace from the following facts: a) the participating aphasic subject did not suffer from any form of visuo-constructive disabilities; b) a significant correlation between impaired drawing

from memory and disruption at the semantic-lexical level of language integration was detected; c) aphasic subjects suffer from inability to use and/or understand spoken or written language. In this sense, the above results are suggestive of the claim that language renders possible, or in any case facilitates, the ability to endogenously control stored representations. I will try to build a stronger case for this claim by appealing to further empirical evidence in the following paragraphs. Before that though, allow me to briefly discuss a methodological issue.

A possible argument against the methodology or the design of these experiments is that the subjects were not asked to draw anything from memory (but a given object). In this sense, Gainotti et al. cannot securely eliminate the possibility that the poor performance of the subjects was influenced by a short-term memory defect and not because of a conceptual inability to reproduce from memory the form of objects that have a characteristic shape¹¹. In reply, Gainotti et al., claim that this objection is unsound since the examiners did not ask the subjects to reproduce from memory a more or less meaningful object but rather tried to raise in the subject the concept of the object, by naming it, and then asked the subject to draw the named object. Furthermore, they claim, by reference to the work of Faglioni and Spinnler (1969), that it is right-brain-damaged patients, and not aphasics, who are particularly impaired in tasks of immediate and delayed memory of meaningless visual patterns.

Gainotti et al.'s results enjoy support from Bay's (1962) claims that aphasics are unable to reproduce from memory the crucial characteristics of a given object due to a basic conceptual disorder.

In an attempt to focus only on the conceptual (as distinct from linguistic) competences of aphasics, Bay (1962) conducted a different series of experiments. Aphasic subjects were given an incomplete drawing, e.g. a cup without a handle, and were asked to complete the drawing, i.e. to draw the missing part. Originally, this test was conducted by Meili who asked subjects to name the missing part. Meili's target was to give instructions without using any verbal elements and hence to focus on the conceptual abilities of aphasics. Bay went a step further by asking subjects not to name but to draw from memory the missing part. Bay reports that not a single subject was able to draw the missing part unless she was unable to name it. (At a later stage, they asked subjects to model from memory objects of their choice in plastic material in order to eliminate possible errors arising from the transformation from a three-dimensional to a two-dimensional object. For this transformation presupposes a knowledge of rules, such as of perspective, which in turn cannot be presumed in all subjects. The results were similar to the ones from drawing).

¹¹ Conceptual inability is an inability to reproduce (for instance, when drawing a given object) the basic characteristics of the object in question.

Based on the results of their experiments, Gainotti et al. suggest that Bay's suggestions could be made more specific by claiming that there is a strong correlation between conceptual and semantic-lexical disintegration. By stressing this relation, findings about aphasics who demonstrated excellent capabilities in drawing from memory can be accommodated by claiming that language disturbances in those subjects were due to phonological and/or phonetic disorders and not due to a semantic-lexical impairment. Had it been the case that subjects were able to think of the right answer to the examiner's question but were not in a position to utter the relevant words, then the obtained results would not have shown anything significant about the workings of the cognitive system of aphasic subjects and hence could not be used in favour of the view presented here.

Semantic-lexical impairments in aphasic subjects are also significantly related to their inability to understand the meaning of symbolic gestures (evidence reviewed in Gainotti, 1983). In a similar fashion, Gainotti et al. (1979) showed that there is a relation between semantic-lexical disturbances and the inability of the aphasic subject to appreciate relationships between pictured objects which have different levels of conceptual similarity, e. g. chair and stool, bowl and cup, etc.

3.1.2 Interpreting the results

From the results of the above experiments it is shown that there is a significant correlation between semantic-lexical impairments and particular deficiencies such as an inability to appreciate conceptual similarities between objects or understanding simple gesturing. The most interesting result for my present purposes is the correlation between semantic lexical impairments and inability of aphasics to draw from memory. The reason is that recalling is a characteristic case of endogenously controlled thinking. Given that aphasics have severe linguistic impairments, it might now be claimed that their inability to endogenously activate a concept or a thought is down to their linguistic impairments. This is especially the case given the characteristic relation between semantic-lexical impairments. Here is what I mean by this. First of all, subjects were able to copy the perceived object and hence there were no signs of constructional apraxia. Also, the instructor asked the subject to draw the object in question by using its 'name' (e. g. "draw the comb that you just saw"). In this way, the instructor was in a position to target the subject's linguistic competences. On these grounds, any inability to draw the object in question was due to the subject's inability to think of a comb, to continue with the same example, or to activate their concept COMB. Had it been the

case that subjects were able to activate their concept COMB then perceptual representations of combs would have also been activated and they would be able to ‘copy’ them from memory onto the piece of paper in front of them. From the above I suggest that we are able to activate a concept or form a specific thought on the basis of linguistic labels that we have for the concept in question. Further generalising from that, I suggest that a subject’s linguistic capacity is what provides endogenous control over their concepts.

Further evidence in support of the suggested role for language can be found in Farias et al. (2006), who shows that drawing facilitates naming; Swindell and Greenhouse (1988) who study patients with right- and left-brain damage; and (Bay (1962) who shows that aphasics are unable to reproduce from memory the crucial characteristics of a given object due to a basic conceptual disorder.

PART II

4 Shall we give language an even bigger role?

As mentioned above, according to Carruthers (2005), natural language is constitutively involved in specific kinds of human thinking, particularly in conscious propositional thinking. He claims that natural language is not merely a communicative tool of inner thinking. Rather, that natural language is itself the medium through which conscious propositional thinking is conducted, i. e. Mentalese is a natural language. In this sense, for Carruthers everyone’s Mentalese will be one of the natural languages they speak. (For Fodor, on the other hand, Mentalese is distinct from any natural language).

Carruthers has two arguments in support of the claim that language is constitutively involved in thinking. 1) He uses evidence from Hurlburt’s (1990, 1993) work that suggests that thinking happens mostly in language, and 2) he offers a philosophical argument that shows that thinking has to happen in language or otherwise we will be ‘self-alienated’. I examine both in detail below, while my main focus is on Carruthers’s philosophical argument.

In regards to his first argument, Carruthers’s motivation stems from evidence from introspection and in particular from the work of Hurlburt, who famously uses a characteristic method for investigating inner life. Subjects are not brought into the lab and asked to perform some task of introspection. Rather their everyday life is interrupted by randomly occurring beeps and they are interviewed later on to report what was going on in their minds when the interrupting beep happened. Subjects reported that in a

significant majority of the cases, where they introspected, inner thinking occurred in natural language sentences. There were also cases where subjects reported that their thought did not occur in the form of inner speech. For Carruthers these latter cases are instances of a systematic illusion. That is, what we take to be non-inferential thinking is in fact a swift bit of self-interpretation, one that we merely do not realise. Carruthers provides support to his claim by referring to the work of Nisbett and Wilson (1977), who show that there are a number of circumstances in which subjects confabulate self-explanations that are manifestly false, but without realising that this is what they are doing. Given that for Carruthers non-inferential access to a thought means that language is constitutively involved in that thought, Carruthers's claims about agents having a systematic illusion seem to contrast Hurlburt's claims that there are what Hurlburt calls 'amodal' and non-linguistic thoughts. Once a subject reported that they enjoyed a non-linguistic thought, Hurlburt followed this up with questions asking for more details about the thought, and subjects consistently replied that it did not involve any language, or images, that they had no visual phenomenology or anything similar. Note that Carruthers argues that the subjects in question are having a systematic illusion since he only allows non-linguistic thoughts to be of the form of visual or some other sort of images but not amodal. It should be clarified at this point that Carruthers does not claim that all thought is linguistic. He accepts that some conscious thoughts (images of some sort) can be non-propositional. What Carruthers has in mind at this point are exactly the sort of cases in Hurlburt's studies where subjects reported that there were instances when they were not thinking in inner speech. As explained, according to Carruthers these are instances of a systematic illusion, (while for Hurlburt they are amodal thoughts). In line with what has been said in Section 2.1, I suggest that those thoughts might well be conscious manipulations of images which got activated by virtue of their associations to concepts that were activated either simultaneously or right before the imagistic thought in question.

I have been arguing that thinking is imagistic and non-linguistic. In this sense, it might be argued that Carruthers's view and the one suggested here are to a certain extent compatible to each other. Note though that there are crucial differences. For Carruthers, only some thoughts can be non-linguistic while I suggest that all thoughts are imagistic in some way (visual, auditory, somatosensory, emotional, etc.). Clearly, there is a tension between allowing space for non-linguistic thoughts and Carruthers' claim that language is constitutively involved in thinking. Acknowledging this tension, Carruthers restricts his claims about the role of language to conscious propositional

thought. Crucially for present purposes, however, Carruthers asserts that imagistic thoughts (apart from not being fully propositional) have content that can only awkwardly and inaccurately be reported in the form of a 'that' clause, (2005, 117). Carruthers argues that imagistic theories of meaning or imagistic theories of thought are not sound – as the standard arguments against them show¹². On these grounds, Carruthers argues that imagistic thinking cannot colonise the whole domain of conscious thought, unless the images in question are images of natural language sentences. In the latter case, the imaged sentences will have the same causal role as the thought that produced them, and will thus be constitutive of conscious thinking. The view I suggest here is different in that thoughts and linguistic items are associated but are distinct from each other.

Next, I turn to examine Carruthers's philosophical argument in favour of the claim that language is constitutively involved in conscious thought. According to Carruthers, proponents of the communicative conception of language cannot account for the privileged nature of introspection. The reason for this is that if language is seen as not essentially implicated in thinking but rather as a medium that facilitates the communication of thought, then the kind of access an agent has to her own thoughts is analogous to the kind of access she has to the thoughts of a third person. Carruthers admits that an interpretation will have to take place regardless of whether an imaged sentence is constitutive of an occurrent thought or caused by the occurrence of a thought existing independently of it. The difference is that if a communicative conception of language is accepted, then the process of interpretation will occur downstream of the thought, i. e. a thought will be tokened first and then the representation of that thought will be interpreted by the agent herself, in the case of inner speech. On the contrary, in the cognitive conception of language that Carruthers suggests, the causal role of the token thought in question is dependent upon its figuring as an interpreted image. In this case, it is the imaged (and interpreted) natural-language sentence that results in the further cognitive effects characteristic of entertaining a given thought.

Carruthers (2005, 117–8) formulates his argument that language is constitutively involved in conscious thought in the following way:

1. Conscious thinking requires immediate, non-inferential, non-interpretative access to our occurrent thoughts, and that access is distinctively different from that of other people.

¹² What Carruthers has probably in mind here is arguments against verificationism and some sort of verificationist semantics.

2. Occurrent propositional thoughts either get articulated in inner speech or not. In case they do, then inner speech is either constitutive of the thought-tokens in question or not.
3. If the manipulation of natural language sentences in inner speech is not constitutive of propositional thinking, then our access to the thoughts expressed in inner speech is interpretative, and similar to the sort of access to thoughts of others, and hence such thoughts of ours do not count as conscious (by 1).
4. The sort of access that we have to those of our occurrent propositional thoughts that do not get expressed in inner speech also involves self-interpretation. Hence, such thoughts too are not conscious (by 1).
5. So, if we engage in conscious propositional thinking at all, then natural language sentences must be constitutively involved in such thinking (from 1, 2, 3, and 4).
6. But we do sometimes engage in conscious propositional thinking.
7. So, natural language is constitutively involved in conscious thought (from 5 and 6).

It should be clear by this point that I agree with Carruthers that language plays a bigger role than merely communicating our thoughts. I believe that language empowers us not only to gain conscious access to our thoughts but also to shape new thoughts. However, I believe that Carruthers is mistaken in thinking that natural language and Mentalese have to be identified in order for us to be in a position to explain our non-inferential access to our thoughts. In other words, I believe that premise three of the above argument is false and hence that Carruthers's conclusion does not follow.

4.1 Contra Carruthers: distinguishing language from thought

Carruthers argues that in order to have non-inferential access to our thoughts, inner speech needs to be constitutively involved in propositional thinking (P3). Carruthers is mistaken in claiming that this is the only way in which non-inferential thinking can occur. One alternative way to have non-inferential access to our thoughts is associative thinking. For instance, it might be that the transition from the word to the concept that has the very same content that a given word expresses is an associationistic link. In the suggested view, perceptual representations and words are associated in memory. In Damasio's terminology, the realisation of this association occurs at the level of a convergence zone. Note that this is not a case of language being constitutive to thoughts. Rather it is a case of co-activation of a concept's different subparts: perceptual representations of the appropriate word (A) and representations formed during perceptual experiences with instances of a given object (B). This occurs by virtue of an instance

of a word activating A, which in turn activates B resulting in the concept's activation as a whole. Nevertheless, and importantly, this kind of thinking is not interpretative. It is not that an agent hears a word, say 'Cat', and then tries to guess or infer what the word means. Instead, on hearing the word 'Cat' the concept CAT is activated. In this sense, access to thinking is neither interpretative nor constitutive. Next, I flesh out in more detail the way in which non-constitutive non-inferential thinking is realised in the brain. First, I show that language is not constitutively involved in thinking and continue by elaborating how associationistic thinking can be non-inferential, in the way, for instance, Carruthers suggests.

As explained in the first part of the paper, I take concepts to be built out of perceptual representations of instances of a given kind and also perceptual representations of words. In this sense, perceptual representations of objects and words are distinct from each other and are brought together under the process of concept formation. My claim then is that these representations (or rather the neurons that underlie them) are converged together at a level similar to that of a convergence zone. The claim that representations of objects and words are distinct is key here since it is partly on these grounds that I go against Carruthers's claim that language is constitutively involved in thought formation. It is just that we only get to have conscious access at the level where representations of words and objects are converged. In this sense, an agent can only access representations of objects and words simultaneously and treat them as if they were constitutive parts of a concept/thought. It is in this way that I can account for non-inferential access to thinking.

Going back to Carruthers's argument, his claim was that in order to be able to account for the immediate access to our thoughts, imaged words and thoughts would have to be identified – at least in the case of conscious propositional thought. In this section, I have shown that associationism provides an alternative way for achieving non-interpretative thinking without language being constitutively involved. In my view, the relationship between a thought and its representation in self-knowledge is brute causation. The particular transition between a first order thought and a second order thought are causally and not constitutively related. Thus, the relationship between a first order and a second order thought is not constitutive as Carruthers argues for but rather a causal associative one.

On the basis of the claims made in this part of the paper, it is argued that thought and language are not constitutively connected. Because, as shown, thought can occur without language. And when thought does require language it is in order for thought

to have features like propositional form and be endogenously controllable. Given our basic perceptual hardware and associationism as the engines of thinking, our thought would not have these features had it not been for language.

5 Conclusion

In this paper, I have examined the relation between language and cognition. My starting points were that thinking is imagistic, to the extent that conceptual thoughts are built out of concepts, which are in turn built out of perceptual representations; and that concepts – the building blocks of thoughts – are associationistic in their causal patterns. On this basis, I have presented a view of thinking according to which language plays a crucial – but not a constitutive – role in thought production. I suggest that unlike available views, the account presented here enjoys support from independent empirical evidence obtained from work done with aphasic subjects, while at the same time avoids the controversies of views which maintain that inner speech needs to be constitutively involved in propositional thinking in order to have non-inferential access to our thoughts. I also argued that the associationistic account of thought production I presented in this paper could accommodate propositional thinking and compositionality.

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