Language Under Discussion http://www.ludjournal.org ISSN: 2329-583x

# Some thoughts on lexemes, the dome, and inner speech

**William Benzon**[a]

[a] Independent scholar, bbenzon@mindspring.com.

*Paper received: 31 July 2017*
DOI: 10.31885/lud.4.1.233 *Published online: 15 March 2018*

**Abstract.** Sydney Lamb's model focuses our attention on the physicality of language, of the signs themselves as objects in the external world and the neural systems the support them. By means of the metaphor of a cognitive dome, he demonstrates that there is no firm line between linguistic and cognitive structure. In this context, I offer physically grounded accounts of Jakobson's *metalingual* and *emotive* functions. Drawing on Vygotsky's account of language development, I point out that *inner speech*, corresponding to the common sense notion of *thought*, originates in a circuit that goes through the external world and is then internalized.

**Keywords:** Lev Vygotsky, Roman Jakobson, Sydney Lamb, inner speech, relational networks, language, linguistics, psycholinguistics, neurolinguistics, thought

## 1. Introduction: The physicality of language

For the past half century, Sydney Lamb has been arguing for an account of language that makes a clear and firm separation between language strings and the system that produces and comprehends them. Lamb is interested in that underlying system and has argued that it is best represented by a relational network where the nodes are logical operators. In reading his most recent exposition of his model, "Linguistic structure: A plausible theory" (Lamb 2016), I was drawn to his relatively informal metaphor of the cognitive dome, which he introduces about half-way through his exposition (Lamb 2016: 16).

Thinking about those topics led me in turn to ideas about inner speech advanced by the great Russian psychologist, Lev Vygotsky (1962). On the way there I offer some observations about Roman Jakobson's functions of language (Jakobson 1960) in relation to the cognitive dome.

*Language Under Discussion*, Vol. 4, Issue 1 (June 2016), pp. 73–77
Published by the Language Under Discussion Society

## 2. The dome and the word

Let us start with the cognitive dome. Here is Lamb's figure:

(Figure from Wikipedia: https://commons.wikimedia.org/wiki/File:Haengekuppel.png)

**Figure 1.** The cognitive dome

Lamb (2016: 16) asks us to imagine the legs as: (1) speech input, (2) speech output, (3) extra-linguistic perception, and (4) extra-linguistic motor activity. That is, the legs connect the cognitive system to the external world. The surface of the dome is the cognitive system itself. Lamb's point, with which I concur, is that nowhere on that surface do we find a clean boundary between language, which is the focus of Lamb's attention, on the one hand, and general cognition and action on the other.

As I thought about this metaphor it seemed to me that, to a first approximation, *that's just about everything*. Yes, as Lamb himself acknowledges, we perceive the world though multiple channels, and language is written as well as spoken, not to mention signed, whistled, and even drummed as well. But still, as a crude conceptual instrument, that dome is not bad.

In that spirit, let us ask a simple question: where do we find words in that model? The concept of *word* is not, of course, a technical concept. We may think informally of words as (more or less compact) things, but when you try to explicate the concept in the technical terms of Lamb's theory it becomes a complex network of entities. The most tangible aspect of a word would be a lexeme, whether spoken or written. Lexemes are external to the dome. Everything else about words, their meanings and syntactic affordances and the relations between those things and the lexemes, is distributed across the surface of the dome.

Since Lamb's theory is ultimately a neural theory, the dome requires a neural interpretation. Roughly speaking, the dome is the cerebral cortex. While the brain has a complex 3-dimensional structure, the cortex is basically a sheet that is crumpled up to fit inside the skull. The minicolumns Lamb (2016: 23–24) discusses run perpendicular to the sheet while cortico-cortical connections run beneath the dome from one area to another.

What, then, happens during conversation as one word follows another? There will necessarily be activation across the dome for the relational net associated with each word. The activity closest to the periphery will be tightly time-bound to the (physically external) lexeme.

## 3. Beyond the dome, and the internal milieu

Let us now look at the extra-linguistic aspect of the dome. That is where we find the world at large. The world at large contains other people. In particular, it contains the people one

interacts with in conversation along with their gestures and postures, which are important for the conversation.

Though it may seem a bit strange to say so, the external world also contains one's own body. We can see much, though not all, of our body; it is there, in the world, like the bodies of others, though it is always with us, and closer in space to us. We can thus compare our body with others; and we can imitate their actions with our body.

The external world also contains texts, written or spoken. The speech of people conversing in Mandarin, a language I do not know, is not inaudible to me. I can hear it just like I can hear any other sound, whether a thunderclap, the squeal of a tire, a cat's meow, or the tick of a clock. But because my phonological system has not been trained on the sounds of Mandarin, I cannot hear it *as language*. Yes, I may *recognize* those sounds as language because I observe individuals in conversation. The noises they make at one another, what else can they be *but* language? That's different, however, from *hearing* them as language. My ear doesn't recognize the phonemes and morphemes, much less connect them with meaning. We can tell a similar story about written language. I'm willing to grant that Chinese characters are language because someone has told me that that's what those marks are and this disposition of sheets of paper suggests as much. But I cannot read or write those marks.

I would like to suggest that the fact that we can hear speech sounds, as sounds, is responsible for what Roman Jakobson (1960) called the *metalingual function* of language, the use of language to describe and discuss language itself. While the brain-based machinery of language is inaccessible to perception, lexemes are not. Lexemes may only be the external husk, as it were, of language, but their physical accessibility is the means by which the rest of language becomes accessible to perception and cognition. How much of philosophy is bootstrapped by means of that simple capacity?

Now consider Figure 2, which depicts the fact that the nervous system interacts with the worlds that are external to it:

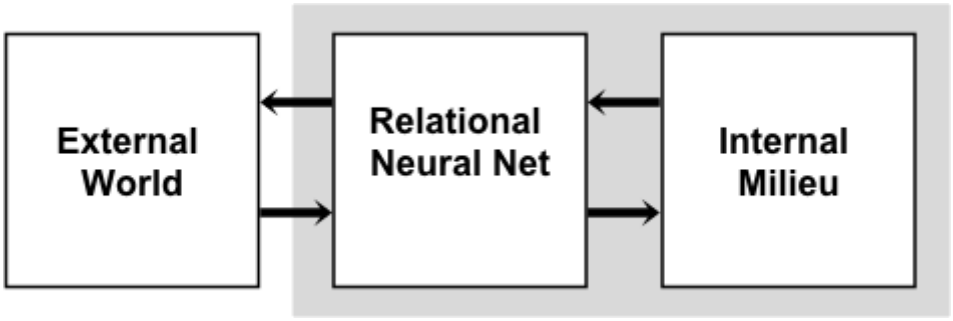


**Figure 2.** Interaction with Two Worlds

At the left we have the external world. At the center and right we've got the human organism. The *Relational Neural* net is Lamb's cognitive dome while the *Internal Milieu* is just that, the internal world of muscles and organs. The brain interacts with it through the autonomic nervous system and the endocrine system (cf. e.g. Panksepp 1998). This is the seat of motivation and emotion; to a first approximation, we act in the external world to keep harmony in the internal milieu. The vocal cry system operates through the same vocal system as the speech system and the ears that hear speech sounds also hear laugher and shouts of

anger. Insofar as the internal milieu is expressed in language, we have Jakobson's emotive function.

Lamb's simple visual metaphor of the cognitive dome needs to be augmented to accommodate these facts. You can imagine this however you will. I wish only to make the point that it is this connectivity to the inner milieu that anchors the cognitive dome in an individual's life, in the hopes, dreams, desires, and actions of a person.

## 4. Thought as Inner Speech

This brings us to Lev Vygotsky's conception of thought as inner speech. The general idea is that as others direct the child's actions and perceptions through language, so the child learns to use language in controlling herself (Vygotsky 1962, Luria 1959). In effect, the child populates her brain with an other and uses that other as a mechanism to control her own mind.

When a young child is requested to do something, the linguistic channel in the child's brain analyzes the acoustic input and activates the appropriate cognitive and perceptual schemas. The command "come here" will activate a plan for locomotion while the command "look at the bunny" will activate a plan for directing one's gaze. As the content of the utterance is decoded, the motor schema, whether for moving her body or looking in a certain direction, is executed.

Not only can the child listen, she can also speak. If the child's utterance contains a command directed toward herself—and there is evidence on this (Vygotsky 1962 Luria 1959)—then she is using language to direct her activity in the same way that others use language to direct her activity. The route from the acoustic analysis to the execution of the action is the same in both cases, only the utterance's point of origin is different. In one case the utterance originates with an other, in the other case with the child herself.

The next developmental step, so Vygotsky's account goes, is that the child's self-directed speech becomes silent and internal. In a word, it becomes what is ordinarily known as *thinking* (cf. Lamb, 1998, 181–182). Given that this process starts with language which others direct to the growing child and involves mental structures for coordinating language and social interaction, this would make thought, in this sense, an inner dialog between virtual persons.

Some recent neurophysiological research bears on this. It has to do with what are known as efference copies, "internal duplicates of movement-producing neural signals" (Whitford, Jack, Pearson, et al. 2017). The abstract continues:

> Their primary function is to predict, and often suppress, the sensory consequences of willed movements. Efference copies have been almost exclusively investigated in the context of overt movements. The current electrophysiological study employed a novel design to show that inner speech—the silent production of words in one's mind—is also associated with an efference copy. Participants produced an inner phoneme at a precisely specified time, at which an audible phoneme was concurrently presented. The production of the inner phoneme resulted in electrophysiological suppression, but only if the content of the inner phoneme matched the content of the audible phoneme. These results demonstrate that inner speech—a purely mental action—is associated with an efference copy with detailed auditory

properties. These findings suggest that inner speech may ultimately reflect a special type of overt speech.

And inner speech, in Vygotsky's formulation, and Lamb's, corresponds to the common sense notion of thinking.

We must be careful about that idea of *thinking* or *thought*, for it is often used in an open-ended way to indicate a broad range of mental activity. That's not how I have been using the word. Saying that *thought* is *inner speech* is, in some measure, mere semantics, a matter of definition. Granting that inner speech is a real phenomenon, and that it comes about through a process of internalization, as Vygotsky has argued, let also us agree that the common sense notion of thinking seems to derive from it. We may also want to characterize various non-conscious mental activities as thought as well, but that is thought in a different sense. Given these caveats, it nevertheless seems remarkable to me that this most private of activities originates in a circuit of activity that necessarily goes through the external world.

## References

Jakobson, Roman (1960). Linguistics and Poetics. In *Style in Language*. Thomas Sebeok, ed. Cambridge, MA: MIT Press, 350–77.

Lamb, Sydney M. (1998). *Pathways of the Brain*. Amsterdam: John Benjamins.

Lamb, Sydney M. (2016). Linguistic Structure: A Plausible Theory. *Language Under Discussion*, 4(1): 1–37.

Luria, A. R. (1959). The Directive Function of Speech in Development and Dissolution. *Word* 15: 341–352, 453–464, doi: 10.1080/00437956.1959.11659703, 10.1080/00437956.1959.11659709.

Panksepp, Jaak (1998). *Affective Neuroscience*. New York: Oxford University Press.

Vygotsky, L. S. (1962). *Thought and Language*. Cambridge, MA: MIT Press.

Whitford, Thomas J., Bradley N, Jack, Daniel Pearson, Oren Griffiths, David Luque, Anthony W.F. Harris, Kevin M. Spencer, Mike E. Le Pelley (2017). Neurophysiological Evidence of Efference Copies to Inner Speech. *eLife*;6:e28197, doi: 10.7554/eLife.28197.