Human Language and Sensorimotor Contingency

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"L'enfer, c'est les autres" J.P. Sartre (1945)

1 Introduction

Using the monumental work of figures like Bloomfield (1933), Harris (1951) and
Chomsky (1965), scientific linguistics has often been centrally concerned with verbal
patterns. Yet such views have even older roots. Ever since writing systems first arose
in Sumeria, what people do as they talk has gradually been standardised in ways that
eventually gave rise to the electronic use of artificial codes. First, iconic signs became
ideographic or alphabetic. Then, in Europe, mediaeval scribes introduced spaces
between units (and written words) and, in the aftermath of new technologies, there
came dictionaries, grammars, printing and, yesterday, computers. As a result, written
language bias (Linell, 2005) has dominated philosophy, linguistics and classic
cognitive science. Languages are seen as verbal systems whose words and rules are,
in some sense, *separate* from people. Even talk is often modelled around
transcriptions that invite comparison with ways of construing verbal sequences. This
can be highly misleading. In fact, while ideographic and alphabetic symbols are
unsponsored, speech and hearing *are* coordinated human activity. Language is
intrinsic to action and thus partly constitutive of experience: for Sartre (1945), self
must be mirrored by others. Although this is a commonplace, many explanatory
models reduce doing things with language to how linguistic forms are 'used' and/or
'represented'. In what follows, I adopt the distributed perspective (see, Cowley,
2011b), to offer an alternative.

Language can be seen as a cultural and historical extension of how we exploit our
embodiment. On this view, verbal patterns are a small part of language. As argued by
Heidegger (1971), Wittgenstein (1958; 1980), Merleau-Ponty (1996) and Gibson
(1966; 1979), language is inseparable from action and perception. In cognitive science
the view can be traced to Maturana (1978) and, in linguistics, to Lakoff and Johnson
(1980). In ecological psychology, speech perception was shown to track phonetic
gesture (Browman and Goldstein, 1986) and, elsewhere, language was found to be
inseparable from visible gesture (McNeill, 1992). Today, weight falls on
coordination, joint activity and acts of meaning (Raczaszek-Leonardi & Kelso 2008;
Fusaroli & Tylén, 2012); language needs, not a mental lexicon, but rich phonetic
memory (Port & Leary, 2005). Even when alone, the use of vocal and other gestures

link experience with events in an excitable medium.[1] While conservatives resist, this is increasingly known as *languaging* or, more formally, human activity in which wordings play a part.[2] The terminological shift makes it harder to unzip language from lived experience. In seeking to counter verbal bias, a case study is used to how, as in seeing, languaging depends on sensorimotor contingencies (O'Regan and Noë, 2001). However, that is not the paper's focus. Rather, it aims to show that, while languaging extends embodiment, it relies on skilled action-perception. People set up synergies by fusing cultural patterns with individual history –action sets off both imagination and social perception.[3]

2   Moving Forwards Gingerly

The paper begins by considering how mind and language extend human embodiment. Using the work of O'Regan and Noë, it focuses on what it is like to have phenomenal experiences. These are traced to, not just linguistic perception, but also how language functions as what Hodges (2007) calls an action system.[4] Specifically, the paper focuses on how a person languages as, in the presence of another, he tackles a problem solving task. In a few minutes, the young man exploits languaging to shift the locus of agency between various cultural projections and his own embodiment. As in watching video, events are perceived as like a flow of pixels that *also* depicts a situation. Since this is experiential, only sensorimotor contingencies can ground what happens. Yet, unlike seeing, languaging is minded activity that prompts an actor to use *other* people's experience. As an action-system, languaging is neither organism-centred nor organism-bound. Unlike perception-systems associated with, for example, the use of seeing, hearing and touching, languaging is always under some degree of collective control. While lacking space for full discussion, the process begins as cultural values shape infant attitudes to people, events and the world's aspects (see, Cowley et al., 2004). Human use of sensorimotor contingency is normative and, strikingly, socially derived preferences arise even before birth.[5] Language skills arise

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[1] Even in reading saccading prompts anticipatory action, construal and monitoring of what is seen (Järvilehto, et al., 2011). Reading too is languaging or 'activity in which wordings play a part'.

[2] Maturana applied the term to the sense-making of all species; in Becker's work, echoing Heidegger, it highlights the particular sense of utterance-acts. Human activity is thus continuous with that of other species while also associated with verbal patterns or wordings. The terminological shift is discussed by, among others, Linell (2009) and Cowley (2011b).

[3] A referee points out that this can be theorized in terms of representation. This is true. However, rather than address that view, I stress that languaging is made possible by the skilled perception of events and situations: it is akin to seeing videos as depicting episodes of life.

[4] For Hodges (and the current author), language is also a perception system and a caring system.

[5] Babies are born with preferences for the mother's voice, languages with a specific rhythmic feel and even prosodic patterns (see, Spurrett, & Cowley, 2010)

from using circumstances to manufacture and construe social affordances or, in other terms, from what Everett (2012) calls dark cultural and cognitive matter. It is important to consider how selves, or persons connect likely outcomes with self-experience. As further explained below, human actors use a language stance (Cowley, 2011a) as they play out roles in socially constituted organizations. Thus just as we are able to see films as more than changing patterns, we hear speech as less, and more, than verbal flow.[6]

3   Mind: Not Disembodied

Thirty years ago many took mind and language to be computational. Reacting against this view, the trend is to focus on embodiment. Indeed, it can be hard to understand why there was such a fuss. Rather than focus on how to explain functions (see Shapiro, 2010), I therefore make a case against reification. If not wary, like behaviourists and cognitivists, embodiment theorists may be trapped by success. In approaching constructs as hazy as 'mind' or 'experience', it is all too easy to identify the object of interest (behavior, mind) with a method for studying, say learning or cognition. This leads to muddle. Once, *behavior* was confused with what learning theory describes; later, *cognition* was ascribed to minds that compute. In embodied cognition, there is a risk of overplaying work on how bodies (and brains) regulate activity/ system-states. In O'Regan and Noë (2001), for example, perceptual modalities are said to exist 'only in the context of the interacting organism' (959). As is shown in the case study, this does *not* apply to language. Although languaging serves as a perceptual system that prompts people to heed world-side resources, it also has life-altering functions. As an action-system, languaging influences other people, one's own perception and, hence, the world perceived. In emphasising its transformative power, I highlight linguistic experience. Like a TVSS, language depends on how cultural history is keyed to cognitive biology. Just as vocalisation uses cultural patterns ('words'), the TVSS depends on manufactured parts. Both demand modes of description that capture how dynamics co-occur with phenomenal experience. By acknowledging the complexity of how language or a TVSS contribute to action, one discovers the importance of cognitive dynamics. It becomes possible to deflate verbal patterns by looking beyond both 1st person accounts and 3rd person language models. While concerted by living bodies, language is always based in social practices.

Linguistic tradition has long emphasised how language appears. The idea was formalized by Ferdinand de Saussure's evocation of a synchronic object. Language thus came to be seen as an abstract system or set of structures that, from a lay person's perspective, can be observed, but not grasped. This set an explanatory agenda for linguistics: taking word-forms for granted, the scientific challenge was to model how people (or their brains) come to identify and compose utterance-types

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[6] One referee objects that, on some philosophical views, perception is not skilled. I do not claim that *all* perception by *all* species is skilled: it is enough that, say hearing Danish as Danish depends on skills in attuning to Danish ways of speaking.

from linguistic atoms (or their putative neural correlates). Such approaches draw on what can be transcribed, structure, and, having done so, covertly emphasise analogies with the seeable. Language is taken to centre on an organism, mind or brain that processes and produces speech (that is allegedly akin to its inscriptional counterparts). As in philosophy, language is separate from so-called 'language users', experience and action-perception. Opposing such views, Chomsky (1965) sought to naturalise language by appeal to mind/brain systems. It was ascribed to, not action, perception or communication, but, rather, a modular faculty that parses and constitutes strings: in later versions of his theory, the brain houses an I- language system. Language is anomalous –it uses a biological mutation or, perhaps, a spandrel.

To build an alternative based in sensorimotor contingency one has to specify language as something other than sentence-like output. The point is pressing because even challengers to classic cognitive science treat language as essentially verbal. For example, language has been traced to encodings extended by metaphor (Lakoff & Johnson, 1980), a brain that installs a serial virtual machine (Dennett, 1991) and material symbols (Clark, 2008). Often, motor experience is taken to encode verbal units in action-relevant areas of the cortex: agents are said to 'use' language because they (or brains) possess a language-system. Neural resources produce and parse –like a Latin teacher. By contrast, a view based on sensorimotor contingency rejects Chomsky's question: what do we know when we know a language? Instead, it seeks to address how languaging extends the scope of human agency. Below, this is ascribed to imagination and social perception. These link vocalization, affect, tone and bodily movement to influence thinking. By acknowledging its partly public nature, one abandons the language myth (Harris, 1981): people neither understand because they 'know' a language and nor do they 'use' utterance acts as a conduit between minds and bodies. Rather, experience of language contrasts with our many ways of using of proposition-like entities (texts). Visible wordings are merely emblems –stylised prompts. People language as they link social action to perceiving through vocal and visible gesture. Yet, as shown below, no enactive view captures the multi-scalar complexity of language. While based in the sensorimotor, agents also draw on history to treat language as picture-like.

4   From Language to Languaging

Emphasis on the cognitive dynamics of language is emerging everywhere. In ways brought home clearly by Paul Thibault (2011), there is no neat divide between the linguistic and the nonlinguistic. Just as the verbal fails to reduce to the sensorimotor, the sensorimotor is quite insufficient to explain the verbal. Languaging is something that we do: like film-making it depends on complex activity that is designed to favour perception. In films, as in languaging, the traces are multimodal, evanescent and designed for human perception. Lacking space to review this distributed perspective (see, Cowley, 2011b), I focus on the danger of separating linguistic units from action, perception and experience. For ease of exposition, I do so in Maturanian terms. While only a beginning, this biologically based approach has the merit of offering a robust

challenge to word-based views of language so blithely adopted by philosophers, linguists and computationalists.

While language is seen as essentially verbal, people are separated from what they say, do and understand: often, emphasis shifts to an individual, mind or brain. Oddly, linguistic autonomy is often taken for granted. Yet, in other species, the coordination of wolves, birds, fish and bacteria is *not* due to organism centred coding (Rendall et al., 2009). Like animal communication, linguistics can be rethought (see, Love, 2004; Kravchenko, 2007). With remarkable prescience, Maturana (1978) replaced code-views by appeal to structural coupling. Precursors to language dominate the natural world: In tracing language to sensorimotor contingency, prominence falls on a history of coordinating. In humans, languaging is traced to caregiver-infant interaction that, while normative, gradually self-organises around gestural patterns (both vocal and visible). Language thus centres on communities of practice. Skillful activity, including perception, is augmented as, in Maturana and Varela's (1998) terms, people orient to the orienting of others. People draw on abstract constraints: before mastering wordings, babies learn when to fall silent, how to use a spoon and what to make of social referencing. Thus, as languaging takes on a verbal aspect, it is already anchored in a baby's experience of human ways of life.[7] A history of couplings-in-a-community prompt individuals to develop dialogical minds and brains (Linell, 2007). Given repetition with variation, agents develop what Maturana calls a consensual domain. Accordingly, other people influence how they behave and, as a result, how they individuate as persons. Though a community make and hear utterances in similar ways (using the 'same' phonetic gestures), meanings are always connotational (see, Kravchenko, 2007). The interplay of languaging is directed –not just by manifest intentions –but also by the alternation of more and less deliberate ways of pursuing outcomes. The multi-scalar nature of language enables people to engage with each other while using community-based traditions. Since human dynamics are normative they ground complex, emotion-ridden sense making; everything that we do with languaging is highly skilled.

If sensorimotor contingencies offer anything to the language sciences, it will challenge the view that writing/speaking is a matter of intentionally putting meanings into words or, indeed, using material vehicles to grasp verbal content. In Maturana's (1978) terms, speaking and writing belong to different cognitive domains. However, it is important not to overstate: experience with these domains contributes not only to new kinds of skill but also to the development of artifacts, institutions and community based modes of life.

5   A Case of Problem Solving

In tracing languaging to sensorimotor contingencies, I focus on a case where it serves to explore the world. My exposition aims to shows that, while the young man's

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[7] The enactivist faces the 'problem of organizational closure'. On this view, the world is only be a source of perturbations –nothing new can enter into the world of a coupled system.

thinking is based in sensorimotor activity, his actions reach into a social domain that lies beyond body-world interaction. Just as in, say, watching a film, the air cadet draws on what he remembers, feels and imagines. At certain moments, he depends on speaking aloud while using a model to address a well-defined problem. He links what is, at any moment, being perceived with what is –and has just been –said and done. In offering a description, I return to a case study (see Cowley and Nash, 2013) of how 'Billy' solves the river problem

The problem has been studied under names such a missionaries and cannibals as well as hobbits and orcs (e.g. Jeffries et al., 1977; Knowles and Delaney, 2005). Participants are responsible for 6 parties who want to use a raft to cross a river. In approaching the task, only two parties can be placed on the raft at once. Further, in each crossing, one of the parties must row. This sets up a logical puzzle arises in that, if 'bad' guys (Ps) outnumber 'good' ones (As), they attack. For participant and psychologist alike, this constitutes failure. In the study sketched below, air-cadets chose to label the 'bad' guys pongos. The version allows an 11 move solution (1) send over A&P; (2) leave P (bring back A); (3) send over P&P; (4) bring back P; (5) send over A&A, (6) bring back A&P; (7) send A&A; (8) bring back P (9) send over P&P, (10) Bring back P; (11) Send over P&P. Any other move (or pair of moves) is banned. Participants worked under an officer's watchful eye and, in the relevant condition, used a paper maché model, raft and toy-soldiers (see Figure 1). They were told that they would receive no help and, beyond that, given no instructions about how to proceed. Next, therefore, I focus on Billy's performance. The particular case was chosen for two main reasons: (a) the cadet was one of few solvers; (b) he chose to speak about what he was doing.

Fig. 1. Billy with the model

OFFICER: "Good"	
1. Erm	
2. so we need to send the guy (P1)	1. send over P&A;
3. my guy comes back	2. bring A back;
4. And I get another pongo erm here	
5. No	3. send over P&P;
6. So this guy over there (P2)	
7. Leave him there erh	4. bring back P;
8. And then if I take #	
9. This guy (P3) over there	Tries impossible move 1
10. I'll be attacked	
11. Should I divide my forces	
12. Or keep them together	
13. Erm # eh	
14. Second trip I'll be adding reinforcements	
15. Uhm so	
16. Keep this guy here, move the pongo (P3) over, and	Repeats impossible move 1
OFFICER: "Can't do that, cos when you get to the other bank your'e outnumbered"	
17. And uh on there	Sees impossible move 2
18. He's outnumbered	
19. Start again	Starts again
20. OK one pongo (p1)	1. send over P&A ;
21. Guy come back	2. bring A back;
22. Equal	
23. I count them equal	Impossible move 3 ??
OFFICER: Yeah you have them equal but it's not equal is it? (i.e. if you send A C)	
24. Hmmm # Ok # So	
25. If I get	
26. The pongo to drive the raft	
27. And this guy over there (P2)	3. send over P&P;
28. Equal	
29. And come back	4. bring back P;
30. And then this guy (AC1) over here	impossible move 1
31. Pongo come back	
32. This guy's outnumbered Let's back…back a step	

33. I have one pongo there	Back to 4 (leave P)
34. Which is equal	
35. Back a step	
36. It's hard eh	
OFFICER: "Two minutes left"	
37. So if I take a cadet over	
38. This guy's outnumbered	
39. If I take a pongo over	
40. my guy there's outnumbered	
######	
41. If I take my two air cadets across	
42. Then he's outnumbered there	
######	
43. Cadet goes over	
44. And he comes back, he's outnumbered	
45. Pongo come back	
46. So if I take my two air cadets over	5. send over AA
47. And I change them	6. send back AP;
48. this guy for a pongo	
49. Who gets back	
50. Take this guy over	7. send over AA;
51. Drop him off	8. Bring back P;
52. Take him back	9. Send over PP.
53. And then	10. Bring back P
54. Over there	11. Send over PP

During the first three minutes (lines 1-37) Billy is primarily concerned with practical understanding of the constraints. Then, hearing that time is getting short, he verbalizes his grasp of the situation (38-41). Having done so, he repeats himself (42-45) and, in 46, has a quasi-insight. The task is then completed in the time it takes to say 47-54 as he enacts what was meant by *Pongo come back*.

The reader is now advised to consult the transcript (see Box A). Billy continuously talks as he addresses the logical structure of the puzzle that can be traced to 11 moves. However, as the record of speech shows, he does not experience its logic. Initially, the puzzle seems straightforward: he gets two pongos to the far bank, leaving 3 cadets and one pongo on the near one. After move 4, things get hard. To capture this experience, it is called reality checkpoint (RC). Unlike many, Billy does not give up at this point. But, when he sees moves 5-6, he experiences what feels like an insight; the problem becomes easy. Billy's progress is shown on the time-chart of Figure 2 below. Having seen move 6 after 230 seconds, he then solves in only 20 seconds (making 7 moves). As explained below, special weight is given to periods marked by

black bars. However, the reader should also note both errors made (bars crossing the X axis) and moves associated with numbered arrows (below the time-line). Where labeled 'co', the officer makes a correction; in 'see' cases Billy notices his own mistake (A 'planned' error is shown with a dotted line). It is striking that, after about 120 seconds, Billy chooses to restart. The last point to note is that he completes after attaining a quasi-insight –he 'sees' a solution after more than three minutes. Having seen what is the solution (without knowing that it is), he completes the task in a matter of a few seconds.
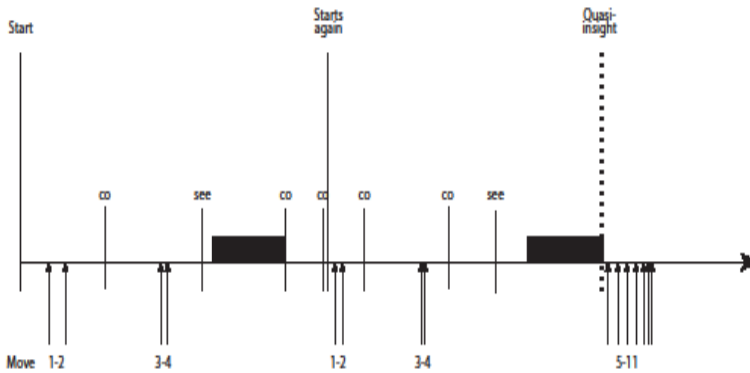

Fig. 2. Time chart showing Billy's progress across the 11 moves

6   Decisions, Decisions

Problem solving research typically focuses on how subjects find their way through an abstract problem space. However, placed in a concrete and imaginable setting, one can scrutinise what happens (see, Cowley & Nash, 2013). In Billy's case, having been presented with the puzzle, he takes 210 seconds to grasp the problem. In so doing he comes twice to reality checkpoint (RC) and, having recognized the challenge (by making the same error twice and then testing it), he is spurred to think hypothetically. On the first occasion, he follows procedure (utterances 11-16 as shown in the first black bar). When he later returns to RC, he again addresses it in a procedural way (as shown on a black bar before the quasi-insight). However, this time, he frames the setting by opening up action-perception accompanied by utterances 43- 44 (### is a long silence):

43. Cadet goes over
44. Comes back he's out numbered
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   As Billy has has just said the same thing (viz. So if I take a cadet over/ This guy's outnumbered), these utterances are repetitive. What he has just said anticipates movements and active perception. In other words, having come up with a frame

(i.e. by vocalising that he cannot send a cadet over), he tests out what he has just heard (he cannot take a cadet over).

> "Instead of being overwhelmed (or starting over), Billy faces up to reality-checkpoint. He puckers his lips and places his tongue in front of his lower teeth in a display (and, perhaps, a reminder) of motivation. Billy looks at the bank on his left and moves his hand away from where the raft is. As nothing new is visible, he seeks affordance potential in the 2 visible pongos. Next, his gaze returns to the raft as he falls motionless. Having remained still, during the silence, he then looks back across the river, stops, and then back at the raft. As he does so, he readies his hand to take up a toy soldier: however, he does not. Rather, saying, "Cadet goes over" his hand serves a proxy for acting in synchrony with, "comes back, he's outnumbered". As he does so, he shows a hint of a smile– as if having saved the cadet from the pongos. While a repetition of [41-42] (as suggested by the abbreviated form of "cadet goes over"), he checks that the situation is as verbalised. This repetition is […] contextualized by actively perceiving the world. Without being explicit, he grasps that has to do something different with the two cadets … (i.e. take one man over and bring a pongo back). Knowing that there is something more gives rise to silence and stillness (for 1600 ms) as he gazes at the two pongos on the far bank… (Cowley & Nash, 2013).

What Billy *does* constitutes the thinking. Conscious experience arises in using the model while imagining what seems impossible. The language is dominated by the said –phonetic gestures –and, thus, a fact (viz. if I take a cadet over/ This guy's outnumbered). While largely constituted by sensorimotor activity, Billy's thinking is irreducible to contingent movement. Rather, he relies on what he had said to imagine the situation and, by enacting it, explores its apparent impossibility. As so often in problem finding, he relies on stress in complex sense-making that culminates in motionless silence. Thus, after (44), Billy spends 1600 milliseconds staring at the pongos. Suddenly, a a striking gesture is integrated with saying:

45. Pongo come back

Although showing no sign of recognising this as the solution, it *sounds* like an insight (for detail, see Cowley and Nash, 2013). Billy uses a rapid hand-movement that is synchronized with 'pongo come back' (with a high pitched head).[8] While the tone is notable what is more striking is the prosodic echo of 'cadet goes over' (also spoken with a high head). He has the correct way of going on. Though he has taken

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[8] In other words, the first syllable of 'pongo' is given some prominence by a rise in pitch; it is, however, not the nucleus of the syllable. Phonetically, this is highly marked.

230 seconds, he can now solve in 20. The utterance-act anticipates what he is about to do. Though compressed, it amounts to saying: "If I take a cadet over and swap him with a pongo who comes back, I might be able to solve the puzzle". However, while phonetic gesture meshes with visible movement, both seem to come from nowhere. How does staring at pongos prompt this act? The question can only be understood by tracking back to what Billy had previously done.

The steps which prompt his to imagine the solution are no mystery. In brief, almost three minutes earlier (210 secs), Billy had been stuck at reality checkpoint. Having made the error shown before the black block before restart (Figure 2), Billy faced up to problem. He 'saw' that if he took a cadet to the other bank he would be attacked. So, detaching himself from events, he echoes his own training:

11. Should I divide my forces
12. Or keep them together
13. Erm # eh
14. Second trip I'll be adding reinforcements
15. Uhm so
16. Keep this guy here, move the pongo over, and
    OFFICER: "Can't do that, cos when you get to the other bank your'e outnumbered"

Repeated blindly, his training leads him to 'forget' his practical lesson. In spite of having just seen that he could not take over another pongo (or 'divide his forces'), his utterance induces him to repeat his error. No doubt, this compounds the stress. This too shapes the solution-probing that arises when Billy returns to reality checkpoint (RT). For a cognitive psychologist, the situation is identical (he is in the same abstract problem space). However, this is not Billy's experience. What he does is fuelled by feeling as, once again, he distances himself from the task by rehearsing his experience so far.

37. So if I take a cadet over
38. This guy's outnumbered
39. If I take a pongo over
40. my guy there's outnumbered ######
41. If I take my two air cadets across
42. Then he's outnumbered there ######

Using working memory (or similar) Billy keeps the facts in mind. As he now knows (as long as he thinks one step ahead), he cannot take a single cadet over. Further, he cannot take a pongo over and nor can two cadets go across the river. Languaging makes Billy's experience picture-like: holding 'facts' in mind, he can imagine or hypothesize 'impossible' solutions. These, of course, *cannot* be reduced to the sensorimotor. Thus, while overlooking the rider (viz. what he says applies if, and only if, he chooses not to think 2 moves ahead), he pinpoints the issues by narrowing the problem space to a single option. Just as with syllogistic logic, he reframes.

Without being explicit, *what is said* becomes a proxy for the world.[9] As shown by the quasi-insight, he prompts himself to see that, using the move after next (pongo come back), the problem can be solved. He *can* take two cadets across –if and only if, in bringing the raft back, he swaps one with a pongo. This is the core point: the duality of languaging (and language) depends on using sensorimotor activity as a normative resource that contributes to an individual history of perceiving acts as wordings.

7   Languaging and Sensorimotor Contingency

The case study's first lesson is that neither problem-solving, action, nor language rely exclusively on intracranial events. Much depends on what Billy does and says: in other words, there is reason *not* to conceptualise language as based on putting (inner) meanings into words. Even in this situation, like structural coupling, utterance-acts alter perception. Specifically, they prompt Billy to reframe experience by articulating what he believes cannot be done. This is other-oriented: first, to a remarkable extent, both the officer and an analyst can track how he feels, thinks and acts. Second, Billy himself uses what he says to reformat his experience. Third, and most crucially, Billy uses languaging as a mode of action. By performing as a well-trained air cadet, he exploits the non-present. He draws effectively on the picture-function of language: while, at times, he is fully absorbed (especially during 43-45) this does not apply during periods shown in black (in Figure 2). When at reality checkpoint, he twice takes his distance by using (among other things), training, logic, distaste for pongos and a desire to succeed. He links the event flow with *imagining*. He shifts his agency (and attention) between involved and detached engagement with the situation.

While a philosopher might offer an explanation, my aim is descriptive. For my purposes it is enough that, just as we see pictures as pictures of something, Billy hears languaging as languaging about something. As a trained and educated air cadet, he uses wordings to unearth complexity. Though based in social contingency, movement of the articulators gives rise to imaginative experience. This connects speech to 'rule-based' knowledge or, in other terms, allows self-display to be used in construing what can be perceived. Although wordings are *abstracta* with a cultural history, they need not be 'realised'. While an attempt at explanation might invoke 'mental representations', this would be like arguing that the dark side of the moon is made of blue cheese. Indeed, most of Billy's thinking–including generating a quasi-insight – *is* sensorimotor activity. No representational model can explain, for example, how HIS tongue movements can sustain attention. However, Billy also uses languaging in its picture-function. He takes a language stance (see, Cowley, 2011a) by regarding his

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[9] Language enables us to do something like looking at a picture: it prompts us to perceive arrangements between entities or, in Gibson's (1979) terms, to attend to not only the invariants *of* the picture but also invariants *in* the picture (see Cowley, 2011a). While this can be theorized in terms of representations, there is no need to do so. Indeed, Wittgenstein's reaction to the Tractatus can be read as seeking to clarify this 'picture-function' (one that arises, roughly, when a person chooses to perceive languaging, or its traces, as about relations between entities/classes of entity).

utterance acts *as* 'about the situation (i.e. as words with meanings). He depends on the talk of those who came before and is, in this sense, his act is irreducible to the sensorimotor (or phonetic gestures). Of course, to show that there are bursts of speech that involve hypothetical thinking –and the use of procedures –does not show that language lacks a sensorimotor grounding. What it brings to the fore is that so-called 'use' or 'knowledge' of language is intrinsic to bodily activity: languaging is no more explained by representations than bursts of utterance-activity reduce to the sensorimotor. Since language serves action and perception (not to mention other functions), Billy need not attend to how exactly he moves and articulates as he probes the model. Rather, sensorimotor experience informs how he lives the moment. In Everett's (2012) terms, he draws on dark cognition as circumstances suffuse the utterances with what he experiences as the particular sense of the events.

Close up, there are major contrasts between languaging and seeing. Whereas utterances 43-44 are perception-like in giving actions transparency, this observation lacks general application. Language is no modality that 'exists only in the context of an interacting organism' (O'Regan and Noë, 2001: 959). Rather, while having a sensorimotor basis, it also allows people to use languaging as an action system that re-evokes cultural resources. It depends on virtual patterns or future attractors that influence the play of phonetic gestures. This, indeed, shapes Billy's quasi-insight. Quite literally, he uses 1600 ms of intensive looking to go beyond the information given. Drawing on frustrations, he sees that he can take two cadets across –provided that he swaps one with a pongo. However, this is *not* what he says (he says 'pongo come back'): he is not bound by the denotations of word-forms. Rather, striking formatting marks an (unspoken) 'idea'. While less dramatic, the other cases also show that languaging can alter a perceived (social) situation. In 11-16 and 37-42, Billy actively distances himself from events or, in the haunting phrase, uses dark cultural matter. He draws on procedures –one from air-force logic and one based on skills in reasoning. Skilled linguistic action gives him distance from what he sees. Other peoples' language prompt the cadet's affordance-making. In other words, Billy also acts to create a lived situation. Although seeing affects external memory, skilled languaging reshapes a perceived world. This arises since, as Bakhtin (1984) emphasised, languaging fuses peoples' experience. Thus while verbal patterns can be said to evoke a consensual domain, the case study shows that the concept stands in need of very substantial development.

8   Languaging, Contingency and Verbal Patterns

In objecting that linguistics has been transfixed by verbal bias, I used Maturana's work as an antidote. As far as it goes, it is good enough: not only can languaging be traced to biology but what he deems 'structural coupling' engenders perceptual experience. In this sense, language is rightly compared with seeing. As applied to the case study, the view helps clarify how language contributes to testing the 'truth' of utterances 43-44. However, as an action system, languaging is *more than* structural coupling. Billy uses learned procedures to bring forth a new perspective. He conducts

himself as an air-cadet who seeks to solve a psychological problem. Not only is this irreducible to a history of structural couplings but, just as clearly, it is irreducible to an organism-constructed consensual domain.[10] Although akin to seeing in that language alters our grasp of circumstances, language also has the power to transform what the world affords. In saying 'pongo come back' (or 11-16; 37-42), Billy's speaking prompts him to discover a viable solution. While based in individual history, the act of utterance is conceptually constrained. Both languaging and language combine properties of a sensory modality with the heuristic use of conceptual resources.

Linguistic coupling functions in different time-scales. In drawing the analogy with seeing, in viewing language as a perceptual system, the focus falls on the specious present. If we attend to acts of utterance, language has transparency. However, Billy is not wholly dependent on real-time dynamics. In seeking a solution, he skillfully makes reciprocal connections between experience and the said. Just as in O'Regan and Noë's (2001) account, in language too, there are degrees of awareness. At times, people speak in idiosyncratic ways (e.g. pongo come back) and, at others, they rely on conventions and modes of life. Used as an action-system, what is said takes on a striking prominence: thus, in 11-16, Billy uses it to re-evoke his training (with some accuracy) and, in 37-42, he adeptly summarises his understanding of the task. Most strikingly, in 45, he correctly anticipates the solution. In all such cases, he treats his utterances as utterances of something or, in other terms, he uses skills with taking a language stance. At such times, like a TVSS, language is at once both a cultural product and an action-perception system. While drawing on sensorimotor contingencies, people use history of exploiting language about language (and social 'reality'). Linguistic reflexivity permeates the specious present. Billy uses this when, in 37-42, he renders nonce experience explicit; using the language stance, he imperfectly grasps the puzzle's logical constraints. While lacking space to pursue the view, the language stance undergirds much languaging in children over the age of about 2 and, later, is enhanced by experience of literacy. Other perceptual systems lack any clear parallel (one cannot see about seeing).

Languaging demands a conception of language (and, indeed, languages). This is because, as people language, rich sensorimotor dynamics come to be heard as iterating verbal patterns. Language is, at once, dynamic and symbolic. Indeed, Billy uses this strange duality to shift between modes of acting. While his doings centre on organism-environment relations (and conscious experience), he also draws on community life. Using procedures, he can think like an air cadet who is on a training exercise or, indeed, like a leader who argues logically. In the puzzle, the leadership role is more effective. Billy combines the sense of utterance events with meaning potential. This enables him, if he chooses, to give them a lasting sense. Moments of languaging come to be treated as indicative (11-16), factual (37-42) or insightful (45). Although derived from a history of contingencies, these hearings echo linguistic

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[10] As Brier (2008) points out, this is usually construed as actualizing meaning that is already there. In fact, people develop conceptual schemes to stabilize self-reference over time; they also use other people's experience to develop action-systems.

coupling in a collective domain. Just as is in experimental work on how conventions arise, the patterns are not semantically neutral (Mills, 2013). They depend on what, in simplified settings, Mills (ibid.) calls the tacit negotiation that shapes joint experience as people adopt increasingly complementary modes of action.

9   Beyond Computer Metaphors

Like seeing, languaging can activate knowing. It is almost certainly grounded in a history of sensorimotor contingencies. Indeed, were this not so, one could not expect language and perception to intermesh in subtle ways. Like movement, the verbal aspect of language serves in directing attention. Its grabbiness influences experience. As a result, people become sensitive to individual and collective influences on how and what they perceive. They draw on communities of practice that influence how they see objects, live situations and experience various kinds of events. We develop, or act as if we possess, perceptual imagination. Perhaps all of this would be obvious – were it not for the verbal focus of linguistic and philosophical tradition. Countering, the case study traces linguistic experience, hearing, and remembering to acting. Billy manufactures ways of thinking and perceiving as he goes beyond the information given. Languaging while looking leads to a quasi-insight: he makes explicit what had been hidden –saying 'pongo come back' is redolent with meaning.

  Perceptual modalities have evolved often and independently in many species. While Maturana is surely right that all languaging has a common history, it also appears to be *sui generis*. Wordings give people actional powers: as the red queen remarked, one can have several impossible thoughts before breakfast. For this reason, language depends on perception: thinking must be constrained by 'reality' (in social and material aspects). Perceptual and actional experience thus drives what Gibson (1979) calls the education of attention. Although we hear every utterance uniquely, action occurs under collective constraints. Not only does this normative dimension emerge from the latter stage of embryonic development but it ensures that human life develops in ways that demand accountability. For this reason, then, linguistic activity is richer than sensorimotor experience (or structural coupling). It is best conceptualized as sense-saturated coordination or *interactivity* (see, Steffensen, 2013; Cowley & Vallée-Tourangeau, 2013). Not only does this link perception, action and experience but it is imbues experience with normative concerns. Much depends on learning to say things and consider things. The taste of wine or one's reaction to quality writings is mediated by sensorimotor knowledge, personal experience and a community's conceptual products. The duality of language give a hearer experience of linking the sensorimotor to community patterns. Wordings carry hidden information or, if one prefers, dark cognitive and cultural matter. Sensing their power, linguists wrongly identified languages with sets of utterance-types (see, Bloomfield, 1933; Harris, 1951). By leaving out sensorimotor dynamics, Chomsky's (1965) return to mentalism was inevitable. Billy's case study thus offers two simple warnings. First, just as language does not reduce to words, it does not reduce to sensorimotor contingency. Languaging is metabolically-based use of pattern that constrains

experience: it grounds skills in engaging with the world. Arguably, the second lesson is even more fundamental. Billy shows that an object of enquiry (whatever we take that to be) must be separate from an investigator's favoured methods. Language extends the sensorimotor: people use training to lock onto community-based procedures. Often these presuppose a language stance or skills based on hearing utterances as utterances of something. In Sartre's (1945) hell, human understanding is largely derived from *other* people.

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