MORPHO(?)PHONO(?)*LOGICAL* FUZZY EDGES: THE CASE OF {-/I/-}/{-/U/-} SEMANTIC(?) CONTRAST IN SHONA

K. G. MKANGANWI

Department of Linguistics, University of Zimbabwe

Abstract

Although the Western world of science continues to be dominated by the black-and-white (or 'binary') laws of logic, the binary faith has always faced doubt. (Un)fortunately, logical positivism has remained the working philosophy of linguistic science. This article argues that Linguistics needs to consider going 'fuzzy' in its logic to handle the fuzzy edges of languages like Shona. The argument of the article (which is an observation in search of a 'fuzzy' theory) takes the form of a brief consideration of {-/i/-}/{-/u/-} as an example of linguistic phenomena which clearly defy the application of phonological, morphological, or semantic theories as autonomous components.

To illustrate a point I have not yet made, let me quote a dialogue between Richard Lower (British English) and Marco da Cola (Venetian Italian), in *An Instance of the Fingerpost*, an historical mystery story (set in 1663) by Iain Pears (London, Jonathan Cape, 1997). The exchanges capture what I have always seen as the philosophical difference in scientific method between British (European?) and American (Descriptivist/ Chomskyan) linguists.

1] 'You have fallen under the influence of Monsieur Descartes, have you not?' he asked eventually.
'Why do you say that?'
'You have constructed a theory, and that leads you to recommend a practice. You have no evidence that it would work. And, if I may say so, your theory is confused.'
'Though not disputed even by yourself.'
'No. That is true.'
'Do you dispute my theory, though?'
'No.'
'And is there any way of finding out whether I am correct except by testing it against result. That is surely the basis of experimental philosophy?'
'That is Monsieur Descartes's basis', he said, 'if I understand him correctly. To frame a hypothesis, and then amass evidence to see if it is correct. The alternative, proposed by my Lord Bacon, is to amass evidence, and then to frame an explanation which takes into account all that is known.'

George Fortune (or 'my Lord Bacon') is very definitely NOT Cartesian in his 'scientific' study of Shona. Why do I involve Fortune here? He indirectly inspires (or is it 'provokes'?) this article. His scientific approach seems to me to be very definitely Baconian in the sense that he sets out to 'amass evidence, and then to frame an explanation which takes into account all that is known'. Unfortunately, he does not seem to have had the time to 'take into account all that is known' — i.e. the Shona language.

It is not only Fortune that is the problem. Logic, too, is grappling with a related problem. As long ago as the early stages of Jakobson's parametric approaches to phonology, which I suspect lies at the root of Chomskyan (or Cartesian) linguistics (philosophically), when he (Jakobson) argued for a small group of parameters intrinsically fit to play a linguistically distinctive role, saying that despite surface appearances (i.e. phonetics), each of the parameters forms a fixed hierarchy of precedence. Jakobson's hypothesis was that all parameters are *binary*, supported by the mathematical notion that a transmission code is more efficient when it uses only independent *binary* choices (cornerstone of computer technology) — psychologically/accoustically even if it is continuous in articulatory terms. This was argued for at the time when Descriptivists emphasized that languages differ unpredictably in the particular phonetic parameters (which are physically continuous) which they utilised distinctively. Let us say that the Jakobsonian, as well as mainstream computer technology, position is philosophically governed by what we may call 'binary logic'.[1]

On the other hand, however, (back to my quote) 'an explanation which takes into account all that is known' inevitably runs into what the title of this article calls the 'fuzzy edges' of things. Philosophically, we are pushed to invoke 'fuzzy logic'. (The way forward in linguistics seems to have been — and to continue — to pretend that certain things are not known).[2] Why can't linguistics also adopt the philosophy which is now

---

[1] Historically, according to Bart Kosko (1994), this bivalence reaches back in the West to at least the ancient Greeks, namely Democritus, Plato, and Aristotle whose black-and-white laws of logic scientists and mathematicians still use to describe and discuss the gray universe. Fortunately, the binary faith has always faced doubt. Philosophically, although every philosopher one asks attacks logical positivism, it remains the working philosophy of modern science (including linguistics), medicine and engineering.

[2] Peter W. Cullicover (1997), on the methodological foundations of linguistic science, writes:

> The very richness of linguistic experience requires that we idealize, in the sense that we ignore certain facts at certain times in the interest of articulating the theory . . . One strategy for idealization is to ignore certain facts that do not naturally fit. Another, more refined, approach is to decompose phenomena into components such that it is (potentially) more feasible to come up with simple theories of the parts than to come up with a theory of the undifferentiated whole (p. 10).

The classical components are *phonology, morphology, syntax* and *semantics*.

operating in the technology of those robots that are meant to work the way the Shona language (or mind) works — *fuzzy logic*?

That was the conclusion to my article. Now the reasons for the conclusion. Consider first the standard practice in linguistics (see Footnote 2 above). In its approach to the 'fuzzy' nature of language (generally known as the immense complexity of language) linguistics has over the years been generally binary, in the sense of dealing with particular data in the context of phonology *or* morphology *or* semantics. But when Shona contributes something as fuzzy as the data we shall examine shortly, then the case for a fuzzy approach (or logic) strengthens.

Now back to Fortune, and a slice of 'all that is (not?) known'. I repeat that Fortune is certainly not Cartesian. His explanations tend to try and take into account all that was known (by him). After throwing in all the bits and pieces he goes back and attempts to identify and label[3] the pieces as being from the tail, foot or ear. Unfortunately, from this type of effort, we are not able to see exactly what type of animal it is — cat, dog or human. His logic seems quite fuzzy in the non-technical sense. The identity of the animal is obscured by the other fact that his approach is also 'binary' — i.e. morphology *or* phonology. For example, in his *Grammatical Constructions*[4] Fortune would make the following observation, among numerous others, that Shona verb radicals can be extended in a variety of ways, one of which he would call the 'reversive'[5] extension, as the following examples illustrate:

2]	(a)	-sim-	(plant)
		-sim-ur-	(pull out)
	(b)	-sung-	(tie)
		-sung-unur	- (untie)
	(c)	-pomb-	(wind round)
		-pomb-onor-	(unwind)

Fortune's analysis here is quite obviously morphological. The segmentation into radical and extension is very clear, though, of course, /-ur-/, /-unur-/, and /-onor-/ are all treated as the same morpheme which

---

[3] The Procrustean 'curse'! In his review of Kosko (1994) in the *Sunday Times*, Gilbert Adair writes:

> The best defense of fuzzy logic is that it works . . . Its fundamental breakthrough is to have shown how it is possible to emancipate logical thought from the Procrustean bed of the mathematical or scientific model . . .

[4] I assume that the reader is familiar with Fortune's work.

[5] Fortune appears to have gone silent on the 'reversive' extension. I wonder why. I, however, vividly recall what he used to say when he taught us Shona grammatical constructions many years ago.

'has the meaning' 'reversive'. The other complication we shall also not go into is illustrated by the following example:

3] -ching-   (receive, meet, e.g. baby, *roora*)
  -ching-ur-   (receive, meet, e.g. visitor, someone arriving).

There is a sense in which we may say there is no difference between the 'meaning' of the simple radical and the extended one. This, however, may not be seen as being so 'fuzzy'. But in this context of the 'reversive' morphological analysis, Fortune makes one of the most curious observations ever seen in linguistics. He includes what seems to be a clear case of a semantic (sense) relationship between pairs of Shona words under his clearly morphological analysis of the reversive extension. Consider the following pairs of examples:

4] (a) -zarir-   (close)
     -zarur-   (open)
  (b) -warir-   (spread, e.g. sleeping mat)
     -warur-   (fold up, remove, e.g. sleeping mat)
  (c) -nam-(ir-)   (stick on, seal)
     -nam-ur-   (unseal)

There seems to be a clear 'semantic' sense relationship between the above pairs of words, which is one of 'oppositeness' of meaning, or what Fortune prefers to call 'reversive'. What is curious about Fortune's observation is that he sees the (reversive) contrast or opposition between the morphemes /-ur-/ and /-ir-/. Unfortunately, examples in 4](a) and 4](b) cannot be morphologically segmented, and while 4](c) examples can be segmented, /-ir-/ does not 'have meaning'. Without /-ir-/ in 4](c), the example is exactly the same type as those under 2] and means exactly the same as it does with /-ir-/. If we exclude 4](c) from Fortune's observation, it seems clear that what we have is a 'semantic' issue rather than a morphological one, a sense relationship of oppositeness of meaning between pairs of lexical items.

The matter is, however, not quite as simple as my comments so far would suggest. The pairs concerned display a 'minimal' phonological difference — that between /i/ and /u/. With a little imagination, more examples can be lined up to reinforce the semantico-phonological feature of pairs of Shona words, e.g.

5] (a) -dur-   (confess, pour out)
     -dir-   (pour in)
  (b) -nunur-   (separate)
     -ninir-   (beckon)

The following, which, some analysts may argue, are segmentable morphologically,[6] still display the same semantico-phonological features illustrated by 5] above:

6] (a) -pakur-   (share out, dish out)
        -pakir-   (put into, stuff into container)
    (b) -turur-   (take down)
        -turir-   (place on top, hand over)
    (c) -tungur-   (make a ritual offering to bring out)
        -tungir-   (stick in, thread)
    (d) -dzimur-   (extinguish, control, moderate)
        -dzimir-   (lose sense of direction)
    (e) -kungur-   (regret)
        -kungir-   (prepare headpad — to carry something away)

Linguistic meaning is a relation between words and expressions, with any degree of phonological difference. For example:
(a) Oppositeness of meaning:
7] (a) -vat-   (sleep)
        -muk-   (wake up)
    (b) -sek-   (laugh)
        -chem-   (cry)
    (c) baba   (father)
        mai   (mother)

(b) Sameness of meaning:
8] (a) -w-   (fall)
        -punzik-   (fall
    (b) -dhan-   (be shy)
        -tsveruk-   (be shy)
    (c) godo   (bone)
         pfupa   (bone)

Finally, there seems to be more than a simple phonological contrast between /i/ and /u/ as Shona vowels. When the contrast is simply phonological the difference in meaning is arbitrary and/or unpredictable,[7] for example:

9] (a) -sik-   (create, twirl)
        -suk-   (wash, clean)
    (b) -pir-   (make a ritual offering)
        -pur-   (thresh)
    (c) -kiy-   (lock)
        -kuy-   (grind)

---

[6] Such segmentations seem to be motivated by (non?) proportional analogy.
[7] Looking at *phonology* as an autonomous component (Cullicover, 1997, 11), this is what simple phonological contrast is all about.

The phonemes /i/ and /u/, though meaningful, do not themselves 'have meaning'. In other words, they are not morphemes. When, however, they differ in a predictable way, as illustrated by the examples given earlier, then we have a problem. A further complication lies in the fact that although, with a little imagination, dozens of such minimal pairs differing in a non-arbitrary/predictable way can be cited, they are still a very limited, small set of verbs. To further complicate matters, although /-ur-/ and /-ir-/ can be shown to be morphological extensions (but not in all cases), extensions do not normally have meaning relationships with each other as /-ur-/ and /-ir-/ seem to do as distinct morphemes as well as in cases where they are not segmentable as separate extentions. (When /-ir-/ and /-ur-/ are segmentable as separate extensions, the minimal difference can only be seen between the vowels /i/ and /u/, as in examples 4](a) and 5]). Besides, derivational meanings of extensions are in relation to verb radicals and not to each other. It seems clear, therefore, that Fortune applied a 'binary' solution to a 'fuzzy' situation. He is, however, correct in his observation that there is a 'reversive' relation. The question is whether this so-called reversive relation is phonological, or morphological, or semantic.

I could go on and on making further observations. The point seems clear, that some things defy 'binary' logic, because they are fuzzy. 'My Lord Bacon' (i.e. George Fortune), after amassing a lot of evidence, attempted to frame an explanation (or is it a mere description?) which did not take into account all that is known (i.e. the fuzzy edges), while 'Monsieur Descartes' (i.e. Noam Chomsky, etc.) seems unable to construct a theory which can handle the fuzzy edges. I cannot frame an hypothesis to which the examples cited in this article can be related. Can linguistics go sufficiently 'fuzzy' in its logic to handle the fuzzy edges of languages? Does it need to do that? How, then, should one approach this problem? It also seems clear that as long as the world of linguistic science continues to sheepishly follow the traditional practice of idealisation[8] (whatever the methodological justification and convenience), it remains hard put to account for the real world illustrated by the fuzzy Shona mind and/or language. Corpus linguistics and optimality look better placed to break with the scientific/theoretical tradition that continues to haunt all linguistics paradigms.

---

[8] The question being asked here is: Can the issue of the fuzzy edges have morphological, or phonological, or semantic, solutions? No! Whichever way one tries to go, something gets in the way each time. Perhaps it is time we tried *fuzzy logic*, fumbling along the best we can, since we are much better than Deep Blue.

References

CULLICOVER, PETER W. (1997) *Principles and Parameters: An Introduction to Syntactic Theory* (Oxford University Press, New York).

FORTUNE, GEORGE (1984) *Shona Grammatical Constructions* (Mercury Press, Harare).

HARRIS, RANDY ALLEN (1993) *Linguistics Wars* (Oxford University Press, New York).

HURFORD, JAMES R. and HEASLEY, BRENDON (1983) *Semantics: A Coursework* (Cambridge University Press, Cambridge.)

KOSKO, BART (1994) *Fuzzy Thinking* (Flamingo, London).

PEARS, IAIN (1997) *An Instance of the Fingerpost* (Jonathan Cape, London).

SAMPSON, GEOFFREY (1980) *Schools of Linguistics: Competition and Evolution* (Hutchinson, London).