

Beasts Like Us

(Male!) Rock Hyrax Recursion?

Syntacticians, the *Proceedings B* of the Royal Society may not be your regular number one source of edification, but don't miss this piece of 18 April 2012 because it's right up your alley:

Arik Kershenbaum, Amiyaal Ilany, Leon Blaustein, & Eli Geffen: Syntactic structure and geographical dialects in the songs of male rock hyraxes.
<http://rspb.royalsocietypublishing.org/content/early/2012/04/15/rspb.2012.0322>

It's about a creature you may not have had on your evolutionary radar, the rock hyrax (*Procavia capensis*, German Klippschliefer), but rock hyrax grammar has theoretical implications which will dwarf apes, songbirds, whales, and ourselves too – a realisation from which the Royal Society authors themselves understandably recoiled.

The rock hyrax inhabits the rockier parts of Africa and the Middle East, shown on this map in green; its overlap with Niger–Congo, Nilo–Saharan, and Khoisan, though remarkably close, appears to be coincidental.



Reassuringly, the IUCN's conservation status of rock hyrax is "Least Concern".

Visual and acoustic appearances are misleading: our furry little buggers (top left) are next of kin of elephants (bottom left) and sea cows (bottom right), and are no relation of the "whistling hare" (Ochotonidae ochotona; top right).



Now, if you eavesdrop on rock hyrax conversations and ask an expert to help you with the analysis of what you overhear, you'll be surprised who you're reminded of. I doubt it will be sea cows!

To summarise for you what has been reported in the Royal Society's pages:

- Rock hyraxes (males only, naturally) speak in BOUTS, which consist of SYLLABLES, which can be of five types: WAIL (W), CHUCK (C), SNORT (S), SQUEAK (Q), TWEET (T).
- Bouts can be stunningly diverse, mixing aforesaid syllable types and stringing them out at any length the rock hyrax desires.

This is fine and dandy, and the clientele of the *Proceedings B* has probably been stunned by the news of such syllabic dexterity – but there is a big question left unasked here: **Can this be all? Are bouts really lacking RECURSION?** No bouts within bouts, wails within wails, etc., no sign that *unendlicher Gebrauch* is being made of *endliche Mittel* among the rock hyrax, to famously quote Humboldt?

Kershenbaum et al. are evidently no linguists, or they'd have asked that key question! As it is, lending their title modelled after Chomsky 1957 a touch of irony, what they are digging up is the one creditable linguistic concept they could probably remember from their school days, syllables – and no wonder syllables is all they hear from the rock hyrax.

But syllables ain't what they used to be. They have been knocked down a peg or two when it transpired (has the Royal Society been apprised yet?) that not everybody among us human talkers has much use for them, and that some of us – the Gokana spring to mind – appear not to need any. From the Gokana kingdom in the Niger delta, saunter but a stone's throw into the desert and you're in rock hyrax territory: Is barren land the fertile soil for syllables that the estuary isn't? It isn't for tones. But I must not get sidetracked: how climate shapes talk is another issue. Just let it be stated (i) that syllables are not the one and all of language, and (ii) that syllables, where in evidence, on their own and grouped into larger chunks, are phonology, while (iii) syntax is syntax. If the rock hyrax really held forth in bouts of syllables and nothing but syllables, however diverse, Kershenbaum et al. would have been guilty of a category mistake in their title, which credits the woolly warblers with "syntax".

Make no mistake, though: syntax is what it would be very harsh to deny them.

Take the bout QSQSQS, for a start. Monotonous as it may sound, such perfect parallelism of conjuncts – at least two, but there is no upper limit (other than one set by the mortality of the coordinator) – is the hallmark of the syntax of coordination. Coordination here is asyndetic (no linker: remember Caesar, *veni, vidi, vici?*); the conjuncts are [QS]; and I admit I speculate when I hear their squeak-part rather than the snort-part as playing first fiddle – hence my analysis:

[[QS]q [QS]q [QS]q]q

Squeaks within squeaks, the whole (Q) a thing of the same kind as a part

(Q): this is what is called recursion.

Another bout enjoys rare popularity among the rock hyrax: WQSQSQS.
We analyse it along the same lines, only with one bit tagged on in front:

[[W] [[QS]q [QS]q [QS]q]q

We can't of course be sure a squeak will still be a squeak once it gets prefaced by a wail; but anything else would go against the spirit of rock hyrax grammar, as you'll have to concede presently.

The following lengthy bout, the most sophisticated that the north-eastern fringe population under study have been able to bring off, has some hierarchical syntactic structure, too, but it's not easy to figure out when you're a naïve listener (it takes the female of the species ages!):

TCQQQSCQCSCSC.

Its complexity is impossible to unravel if you're focused on syllables, because what we hear here is recursive syntax in full swing! Taking a stab, I'd say an analysis such as this accounts for it – and I hope you follow me even if I'm not drawing a tree:

[[TC]τ [[[QQQQ]q [SC]s]q [[QC]q [[SC]s [SC]s]s]q]q]q

In prose, and no doubt simplifying – and remember we're only talking about the Modern Israeli dialect of *Procavia capensis*:

- The chuck (C) is a post-modifier of T, S, as well as Q (not of W); modifiers don't change the profile of the construction as defined by their dominant partner (recursion!).
- The snort (S) can be repeated, but only if post-modified, another instance of asyndetic coordination (recursion!).
- Squeaks (Q) are the pivots of rock hyrax grammar: more flexible than any other "syllable", they can be repeated (perhaps indefinitely: recursion!); they can be post-modified by C or by S, on its own or when itself post-modified; when post-modified by S, they can probably be pre-modified by W (see above); when complex in one way or another they can follow upon [TC]τ, probably giving you an even more complex Q.
- Least flexible are wails (W): W only combines with [QS]q.
- Tweets (T) are rather limited, too: T combines with the versatile post-modifier C, and such a [TC]τ can then combine with a complex Q.

Endliche Mittel, namely W, T, S, C, and outstandingly Q – *unendlicher Gebrauch!* Q. E. D.

If you're now asking how does one know that a bout is a bout and not two bouts or more, the honest answer is: one doesn't, because bout boundary signals remain to be studied. At this stage, and diagnosing from a distance, I wouldn't rule out that, like several bout-parts in their own right, bouts can consist of bouts and can thus themselves be recursive.

There is of course something else, something even deeper, that tickles curiosity, too: What are bouts **about**? What does it all **mean**? Why would the rock hyraxes – instead of putting up their feet and rest content with occasionally voicing syllables like their next of kin do, the elephants and sea cows – struggle with complex syntax, if they were but playful whistlers and idle snorters and had nothing to say? About each other, about rocks, whatever.

Listen here, for *nullius in verbis* (take nobody's verb for it!, which is the Royal Society's motto):

<http://www.youtube.com/watch?v=Hv5hFjxU7Hs>

For the syntax gene that *Procuria capensis* must be sharing with *Homo sapiens*, search here:

http://www.ensembl.org/Procuria_capensis/Info/Index/

Food for thought:

Which language does this bout come from?

Schlippkliefer Klippschliefer kippen schiefe Klippen

Analyse (i) phonologically (with particular reference to syllables) and (ii) syntactically. This will teach you the difference, if you continue to doubt there is one!