Titi monkey formal linguistics: a revised theory

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**Abstract**

Methods from formal semantics have recently been used to analyse the meaning of two soft alarm calls of Titi monkeys. Authors suggested that A-calls refer to "serious non-ground threat". We argue that this specification is redundant and suggest simplifying the meaning of A-calls to "serious threats".

**Main text**

Methods from formal semantics have recently been used to analyse the behaviour of several monkey species, including Titi monkeys (*Callicebus nigrifrons*) (Schlenker et al. 2016a, b, c). The latter can combine two calls (A and B-calls) to encode information about predator type and location, as shown in (1) (Cäsar et al. 2013):

(1)a. A raptor in a non-ground position elicits a sequence of A-calls, (hereafter A+)

b. A raptor on the ground elicits a sequence of A-calls followed by B-calls (A+B+)

c. A cat in the canopy elicits a sequence a single A-call followed by B-calls (AB+)

d. A cat on the ground /A non-predatory context elicits a sequence of B-calls only (B+)

Schlenker et al. (2016a) proposed that (i) an A-call refers to a serious non-ground alarm; (ii) a B-call is given to noteworthy events; (iii) an Informativity Principle mandates that the more informative A-call should be used whenever possible. Importantly, each call constitutes an independent utterance and reflects the state of the environment at the exact time of production, suggesting no sophisticated syntax/semantics interface. Schlenker et al. (2016a) derive the generalizations in (1) as follows:

(2)a. A+ is given to a serious non-ground threat

b. a raptor on the ground attacks by flying, hence it is a non-ground threat (A+) that stops being serious at some point because it is not in a hunting position (hence B+)

c. a cat in the canopy is a serious non-ground threat (hence A), which stops being serious once spotted (hence A cannot be used any more, and B+ is used)

d. in ground or non-serious alerts only B can be used.

We propose a simplification of the meaning of the A-call. Since Cäsar (2011) argued that aerial predators represent the major danger to Titi monkeys, we believe that “serious non-ground threat” is redundant, and that the specification of the location can be eliminated. Thus, A-calls may refer to “serious threat”, which derives the generalizations in (1) as follows:

(3)a. A+ is given to a serious threat

b. A raptor on the ground is still a dangerous threat (A+) but stops being serious at some point because it is not in a hunting position (hence B+)

c. a cat in the canopy is a serious threat (A) that stops being serious once spotted (B+)

d. B are used in non-serious alerts

When hearing A-calls, titi monkey look upwards (Cäsar et al. 2012). While Schlenker et al suggested that semantics of A-calls comprised a “non-ground” component, we propose that environmental knowledge better explains this reaction: if serious threats usually come from above, then the best reaction when hearing “serious alert” is to look upwards.

Our analysis is more parsimonious that Schlenker et al’s, and yet still relevant in the field of animal communication, where urgency-based vocal systems are commonly observed (e.g. Rauber and Manser 2017). Field experiments are now necessary to conclude on the meaning of A-calls.

**References**

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