Mundurucu Number Words as a Window on Short-Term Memory

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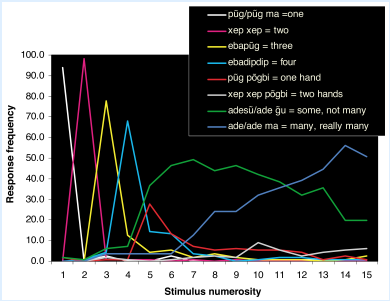
1. Properties of Mundurucu number words

In Mundurucu, each number word is one syllable longer than the previous one. Moreover, they seem articulated in two distinct parts, expressing a **set** and the *successor function*, respectively (*Pica, 2016*).

Table 1

Word	Gloss	Reference	Syllables
Pûg	"One"	One	One
Xep*xep*	"Fat–redup"	Two	Two
Eba*pûg*	"Your arm(s) and one"	About three	Three
Ebadip*dip*	"Your parent(s)–redup"	About four	Four

Figure 1 from *Pica et al., 2004*

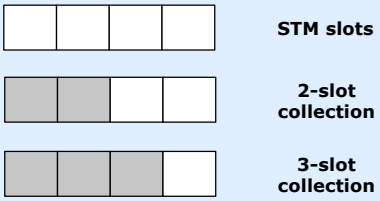


2. Classifier words and STM collections

Interestingly, Mundurucu number words are made out of **classifiers**, which are traditionally viewed in linguistics as elements making reference to specific geometrical features of an object.

ako-**ba** = "Banana fruit"
ako-**dip** = "Field of banana trees"
waje-**ba** = "Cocoa fruit"
waje-**dip** = "Field of cocoa trees"

Short-term memory (STM) is organized in collections of concepts that have strong association with one another and much weaker associations to chunks already in use. There is strong evidence that STM has a limit of 4 slots that can store information (*Cowan, 2001*).



Could characteristics of Mundurucu number words be related to properties of working memory?

3. Evidence

We observe that Mundurucu classifiers express iconic properties of working memory, such as grouping and serial ordering.

Classifiers can also combine to increase the size of the magnitude they express (e.g. **badip** = **ba** + **dip**).

In general, it seems that
xep < **ba** <**dip** < **badip**

Even though Mundurucu number words do not possess an exact cardinality, they still feature a number of syllables that corresponds to the number of STM slots used to store that many objects.

The Mundurucu linguistic system seems to indicate that objects are perceived mainly with respect to their spatiotemporal characteristics, somewhat ignoring the full identity of the object. This is coherent with observations on STM and its relation to object file, from which it emerges that object file representation can only make reference to spatiotemporal features.

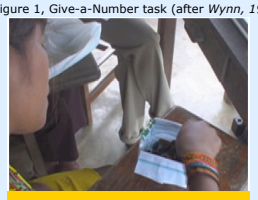
4. Conclusions

Mundurucu speakers are limited in the expression of numbers because they somehow only use working memory.

If Mundurucu number words reflect the organization of working memory, and they show a specific ordering, this perceived ordering can also be a property of working memory, as some works on subitizing seem to suggest (see for example von Szeliski, 1924 and Garner, 1948).

The remaining question is: how does the representation of working memory properties relate to the properties of the Approximate Number System?

Figure 1, Give-a-Number task (after *Wynn, 1990*)



« Give me three seeds! »
Stimuli: pûg ,xep xep, ebapûg, ebadipdip, pûg pôgbi, etc
(from *Izard et al., 2008*)

For further information:
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