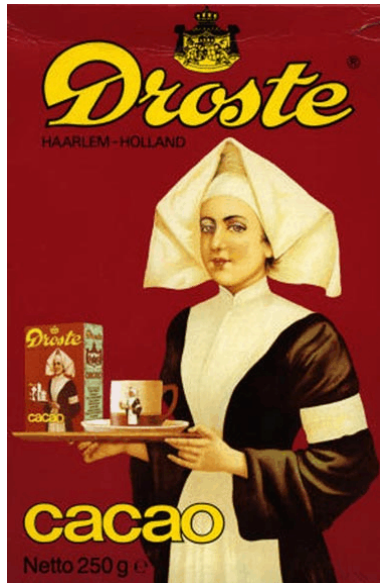# Recursion in language: a new approach
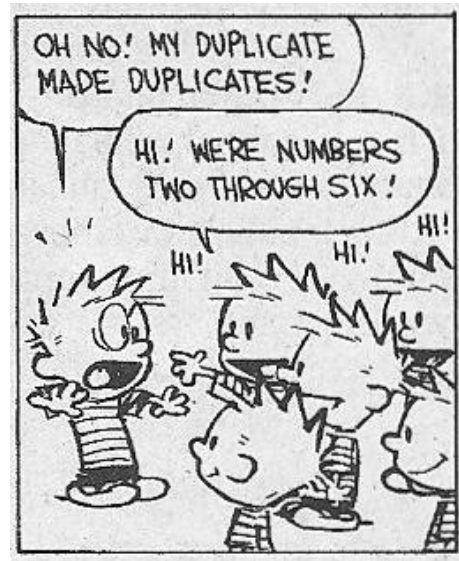
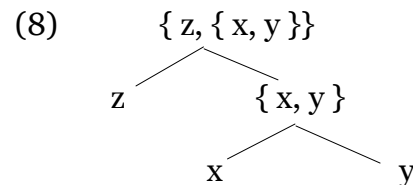## Jan-Wouter Zwart

## TIN-dag, February 6, 2010

(1) 

(2) 

(3)  a. John thinks that Mary said that it was raining
     b. the height of the letters on the cover of reports from the government

(4)  a. clause = subject + predicate
     b. predicate = verb + clause

(5)  a. determiner phrase = determiner + noun phrase
     b. noun phrase = noun + preposition phrase
     c. preposition phrase = preposition + determiner phrase

(6) Merge
    a. select $x$
    b. select $y$
    c. create $\{\, x, y \,\}$

(7) Merge
    $x, y \;=\; \{\, x, y \,\}$

(8)
$$\{\, z, \{\, x, y \,\} \,\}$$

z        $\{\, x, y \,\}$

x            y

(9) Transfer
    a. Move $y$ yielding $\{\, y \,\}$
    b. Move $x$ yielding $\{\, x, y \,\}$
    c. Move $z$ yielding $\{\, z \,\{\, x, y \,\}\,\}$

(10) Numeration = $\{\, x, y, z \,\}$

(11) Transfer
    a. split off $z$ yielding $\langle\, z, \{\, x, y \,\} \,\rangle$
    b. split off $x$ yielding $\langle\, z, \langle\, x, \{\, y \,\} \,\rangle\,\rangle$
    c. split off $y$ yielding $\langle\, z, \langle\, x, \langle\, y, \{\, \varnothing \,\} \,\rangle\,\rangle\,\rangle$

(12) Numeration = { John, thinks, that, Mary, said, that, it, was, raining }

(13)  The man kicked the ball
(14)  The man said he would kick the ball, and KICK THE BALL he did
(15)  He kicked the ball, THE MAN

(16)  Numeration = { the, man, kicked, the ball }
(17)  Transfer
    a.  split off *the* yielding ⟨ the, { man, kicked, the ball } ⟩

(18)  Numeration = { [the man], kicked, the ball }
(19)  Transfer
    a.  split off *the man* yielding ⟨ [the man], { kicked, the, ball } ⟩

(20)  Numeration = { the, man }
(21)  Transfer
    a.  split off *the* yielding ⟨ the, {man } ⟩
    b.  split off *man* yielding ⟨ the, ⟨ man, { ∅ } ⟩⟩

(22)  the dog the cat bit barked
(23)  [ [ the dog [ the cat bit ] ] barked ]
(24)  [ [ the dog [ the cat [ the man kicked ]  bit ] ] barked ]
(25)  the dog that the cat bit that the man kicked barked
(26)  the dog that bit the man that kicked the cat barked

(27)  Interface effects between derivation layers
    a.  morphological effects (incorporation, conflation, fusion)
    b.  atomization (opacity)
    c.  idiosyncratic meaning (idioms)
    d.  linearization effects (idiosyncratic order, template effects)
    e.  categorization effects (reanalysis)

(28)  Lexical
$x$ is a lexical item for derivation D of numeration N if $x$ is included in N as a single item

(29)  Complex subjects in Pirahã (not including nominalizations/compounds)
a.  **xipoógi hoáoíi**  hi xaagá                              (Everett 1986, (22))
    Xipoógi  shotgun  3  be
    'That is Xipoógi's shotgun.'

b.  **xoogiái hi xapisí**  biga  aí big-á                              (43)
    Xoogiái  3  arm      thick  be thick-EMPH
    'Xoogiái's arm is thick (i.e. strong), very strong.'

c.  **giopaí  gáihi** kapióxio  xigiábií                              (85)
    dog      that  other      like
    'That dog looks like another (dog).'

d. **ti xahaigí** gáihi      e.      **kaoí xahaigí** gáihi      (196)
1 brother that          who brother that
'That (one) is my brother.'        'Whose brother is that?'

f. **baaí**    **xaíbaí**   pii   ap-ái-p-i          pii   bo-ó
wild pig   many    water   enter-ATELIC-IMPF-PROX    water   up-LOC

    gai    kob-á                                (277)
    DEM    see-REM

    'A herd of pigs is entering the water upriver, look!'

g. **xoogiái hi go-ó**     **hoasígikoí bíib-i**      **híx**   hoasígikoí
Xoogiái   3   WH-OBL   lead shot      send-PROX   C      lead shot

    koab-áo-b-í-i                                     (282)
    run out-TELIC-PERF-PROX-EVID

    'The lead shot which Xoogiái sent ran out.'

(30)   a.   me, brother, that         b.   [my brother], that

(31)   Pirahã verbal template (all following the root)

| | | |
|---|---|---|
| 1. incorporation | 7. continuative | 13. frustrative |
| 2. duration | 8. interrogative | 14. intensive |
| 3. telicity | 9. ingressive | 15. emphatic |
| 4. perfectivity | 10. deictic | 16. complementizer/nominalizer |
| 5. desiderative | 11. iterative | 17. evidential |
| 6. negation | 12. certainty | 18. result |

(32)   Pirahã incorporation                                          (388)
a.    xab   op       b.    xiga   hoag       c.    xig   ab    op
     turn   go            take   come            take   turn   go
     'return, arrive'        'bring'                'bring back'

(33)   *-xáagahá*    <    *xaagá*    +    *-há*
     OBSERVATION     be              COMPLETE CERTAINTY

(34)   ti gái-sai    kó'oí   hi kaháp-ií                   (Everett 2005:629)
     1   say-NOM   Kó'oi   3   leave-INTENTION
     'I said that Kó'oí intends to leave.'

(35)   Pirahã nominalization
a.   kahaí kai-sai                                       (80b)
    arrow make-NOM          'arrow making, arrow maker'

b.   **xií**    **kai-sai**    hiaba                           (200)
    thing   make-NOM    NEG    'this is not a factory'

c.      agaoa  kait-i-sai                                     (243)
canoe  bore-LINK-NOM     'canoe-boring-thing'

d.      **tiobáhai**    **hóoi ai-sai**     xabahíoxoi                   (262)
child           bow   make-NOM   incorrect
'Children's bow making is incorrect.'

e.      **ko**     **kab-i-si**       baósaápisi   bag-áo-b-á-há          (280)
eye   NEG-LINK-NOM   hammock    sell-TELIC-PERF-DIST-EVID
'The man without eyes (blind one) sold the hammock.'

f.      gahió    **pi-ó**         **xabaip-i-sai**                   (288)
airplane  water-LOC    sit-LINK-NOM     'hydroplane'

(36)   "All names for people are derived from verbal constructions, animal names, nominal phrases, etc. In about 90% of these cases, *-si* occurs optionally in morpheme final position, as though marking a change in the basic reference or function." (Everett 1986: 279-280)

(37)   "If there were compounding in Pirahã, this would be clear evidence for recursion." (Everett 2009:423)

(38)   Compounds in Pirahã
a.      **xagí gahióo**  xogií  ái-xi-xi         pii    xigiábií        (86)
path  airplane  big   be-EMPH-EMPH  water like
'The **airstrip** is big, like a river.'
b.      xogaogií  <  xogaí  +  ogií                 (389)
big field     field      big
c.      xabagisoixaoxoisai  <  xabagi   +  soixaoxoisai     (477)
saw                   toucan      beak
d.      xapaítoii  <  xapaí  +  toii                 (478)
ladder       foot      handle
e.      pigáía    <  pi +  gáía                   (481)
scissors      thorn  crooked
f.      kaogiái       <  kao  +  ogiái                (482)
[kind of bass]      mouth    big

(39)   "The criterion to classify the examples to follow as compound words rather than merely phrasal constructions is semantic." (Everett 1986:322)

(40)   Complex locatives in Pirahã
a.      xoí   'jungle'  b. xo-ó  'in the jungle'   c. xo-ó-xio  'into the jungle'  (326)

(41)   If recursion = derivation layering, Pirahã is recursive
Evidence: complex subject, complex 'lexical' items