

Two New AZee Production Rules

Refining Multiplicity in French Sign Language

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Multiplicity Issue

- Challant and Filhol (2022): **multiplicity** used in AZee expressions

- Problem:**
- Meaning: OK

Plurality (Pfau and Steinbach 2006, Kuhn 2015, van Boven 2021, Sallandre et al. 2021)

- but Form: **problematic** (Fig. 1 & 2)

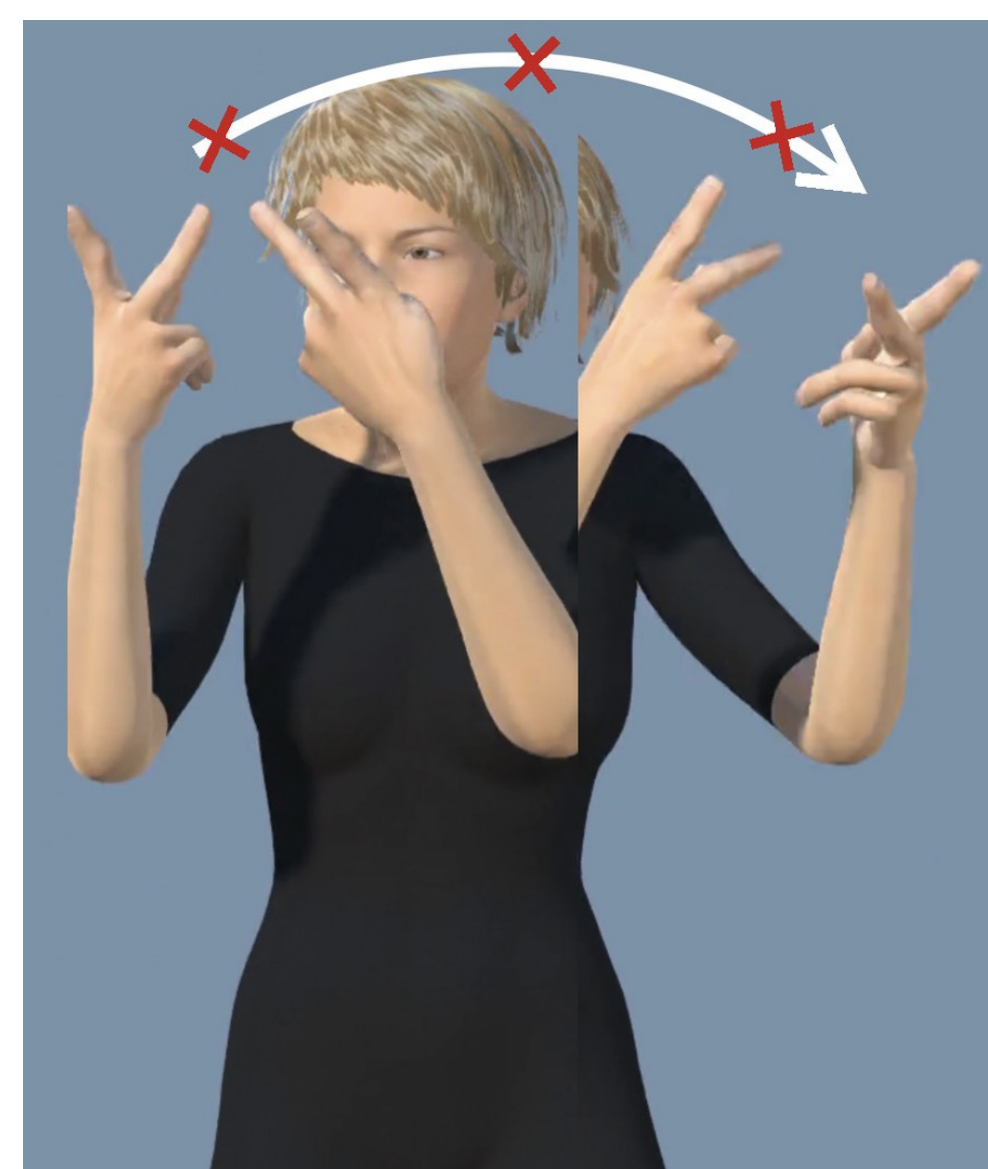


Fig. 1 "towns"



Fig. 2 "poles"

AZee

- A formal approach to represent SL utterances by constructing recursive expressions that combine production rules applied to arguments
- Production rules:** systematic links between observable forms and semantic functions
 e.g.: **town**, **all-of**

Methodology to find production rules

Let X be the starting form or meaning criterion for this iteration

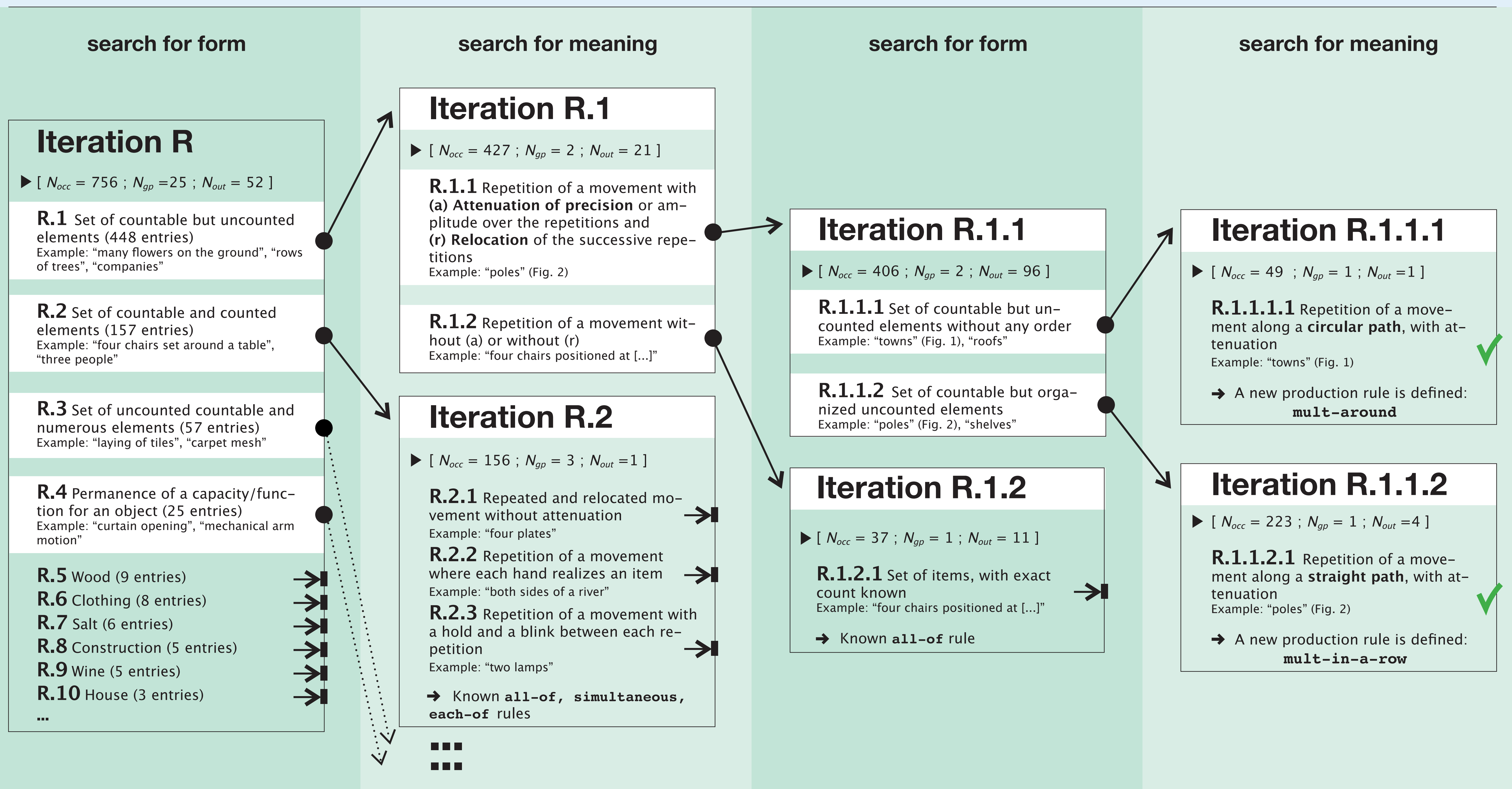
- Locate and list all occurrences of X in a selected corpus
 - N_{occ} = number of occurrences
- For each listed occurrence of X, describe:
 - elements of interpretation if X is a form criterion
 - elements of form if X is a meaning criterion
- Identify groups of occurrences with identical description elements
 - groups are numbered 1, 2, ..., N_{gp} respectively defined by description set D_i
 - N_{out} = number of occurrences not included in any group
- If [X is a meaning criterion] and [$N_{gp} = 1$] and [$N_{out} < 15\%$ of N_{occ}] **then** new production rule found: $X \rightarrow D_i$ (Stop) ✓
- For each group i:
 - If already known production rule **then** Stop →
 - Else recursively apply this methodology, starting with criterion $X_i = D_i$ →

Experiment on a corpus

- Mocap1**
 - Description task of 25 images
 - 42min 26sec
 - Spatialized elements ++
- Rosetta**
 - LSF rendered with an animated avatar
 - 13min 57sec
 - Conventional use

Initial criterion R

Succession of deliberate motion strokes similar in path and by a same or symmetric body part and with no other significant motion in between



Results

1 mult-around

discovered in iteration R.1.1.1

- Arguments:** signed item, point location loc (default is in front of signer)
- Meaning:** multiple instances of item scattered or spread out on a surface around loc, with the exact count unknown
- Form:** item repeated along an arc trajectory sweeping around loc, with attenuation of the movement

2 mult-in-a-row

discovered in iteration R.1.1.2

- Arguments:** signed item, path
- Meaning:** multiple instances of item aligned along path, with the exact count unknown
- Form:** item repeated along path, with attenuation of the movement

Evaluation of results Test of the two new rules on another corpus: 40 brèves v2. 63.5% of cases previously labeled « multiplicity » are now covered thanks to our two new production rules (see Fig.3 & 4). 96.1% of 40 brèves v2 is now covered with AZee

Discussion Subtle distinctions between form and meaning production rules
 e.g. Form cues and meaning subtlety of **all-of** vs **mult-around** and **mult-in-a-row**

Prospects

- R3 & R4 remain to be explored
- A confirmal experiment focused on the form cues included in the two production rules?
- Application of the same methodology to more LSF data to extend the production set

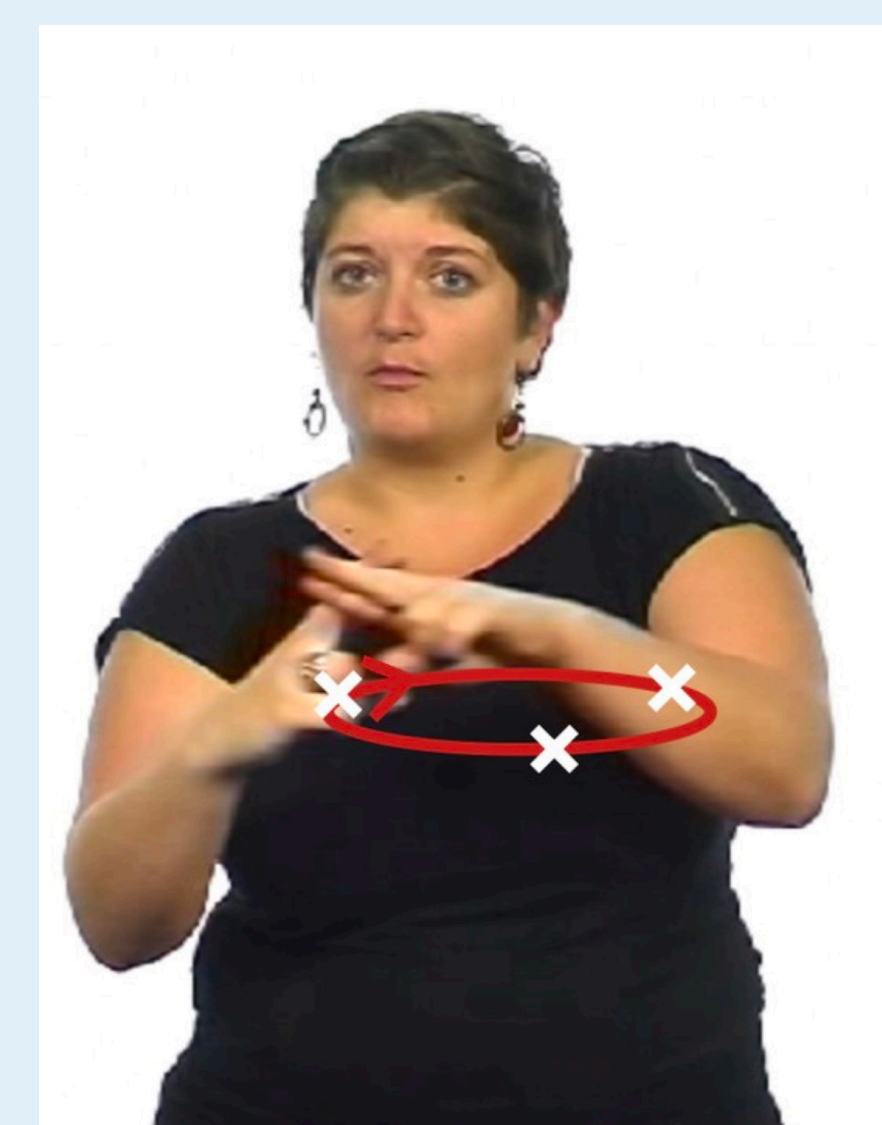


Fig. 3 "dead people" mult-around

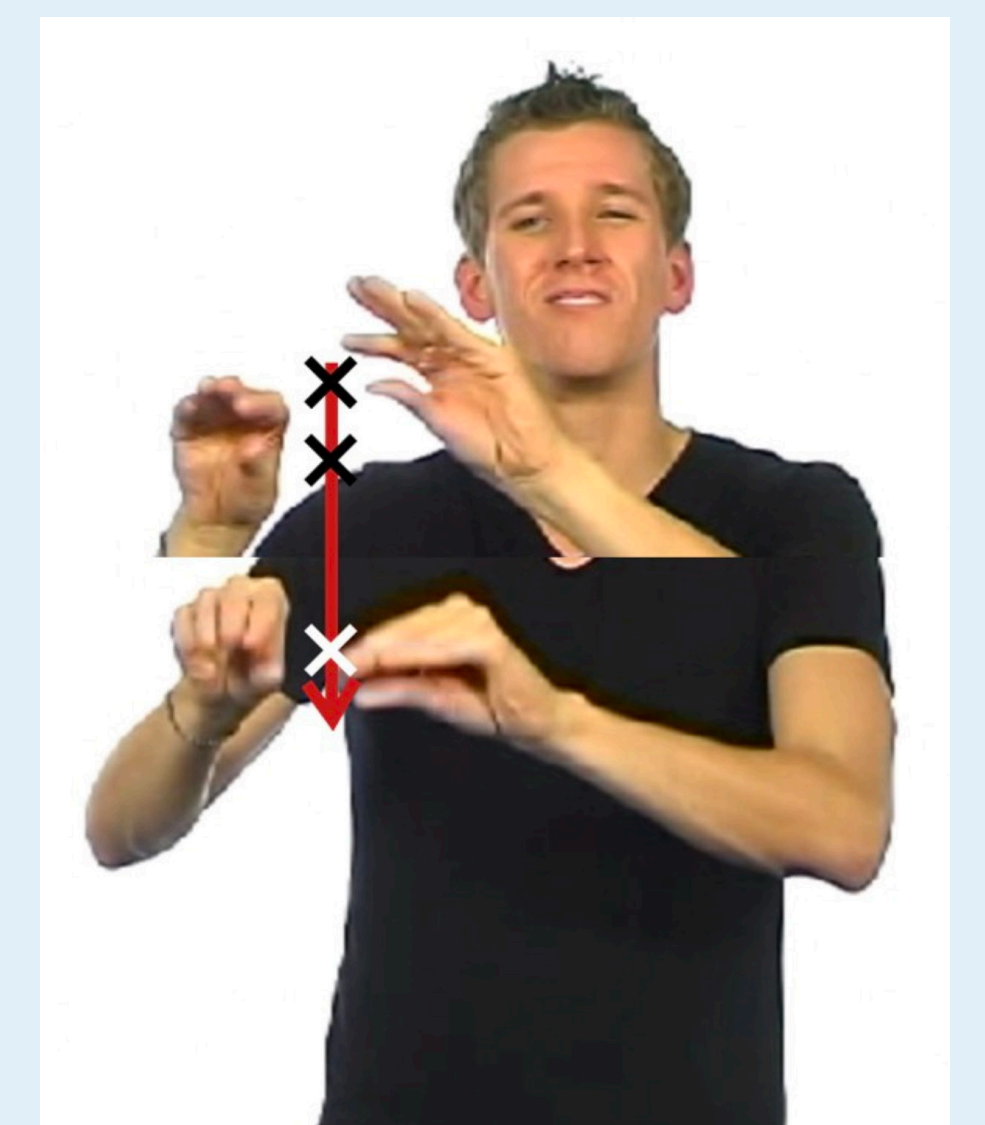


Fig. 4 "living places" mult-in-a-row

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