Reduplication as intensification
Evidence from French Sign Language

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Outline

1. **Reduplication in French Sign Language**
2. Morpho-phonology and distribution of RED
3. RED as grammatical number
4. Proposal: RED as an intensifier
5. Conclusion and open issues

Reduplication in LSF

- Like most sign languages, French Sign Language (LSF) makes a productive use of **reduplication**.
- In (1), the noun CHILD is repeated sidewards to indicate a plurality of children:

(1) IX_1 HAVE MANY CHILD>+>+ 6/7
'I have many children.'

- Reduplication is also found in spoken languages (Hurch, 2005), illustrated below with Zamboangueno Philippine Creole Spanish (Rubino 2005, 24):

(2) a. kyère
'desire'
b. kyère-kyère
'desire intensely'

(3) a. birá
'return'
b. birá-birá
'keep returning'

Roadmap

- Present the morpho-phonology and distribution of RED in LSF;
- Present the main theoretical accounts of RED; introduce a number of puzzles left unnacounted for by such accounts.
- Introduce our analysis of RED as an intensifier.

Main idea

Provide evidence that the reduplication morpheme RED is **not** a morphological exponent of Number (Pizzuto and Corazza 1996, Pfau and Steinbach 2006 i.a.), but an **intensifier**, whose meaning is akin to *many/very*.

Elicitation methods

- The data in this work was collected using the **playback method** described in Schlenker et al. 2013, 2014
- The data was elicited with the help of two native LSF signers (ages 55 and 22).
- The sentences were graded using a 7-point likert scale and then resubmitted on different occasions to the same signers and re-graded, ensuring relative additional stability across judgments.
- Each example discussed here can be directly accessed through links to the videos; an OSF repository will host the complete data set.

Glossing conventions

- +: reduplication of sign
- >+: sideward movement in space followed by reduplication of sign
- a, b, c (subscripted): individual *loci*
- IX_1: first person
- IX_2: second person

Outline

Morpho-phonological constraints on RED

- Across SLs, reduplication is **morphologically constrained** (Pizzuto and Corazza 1996 for LIS; Sutton-Spence and Woll 1999 for BSL; Pfau and Steinbach 2006 for DGS; van Boven 2021,2024 for NGT).
- Two parameters: the **location** of the sign, as well as the **type of movement** it encodes (simple vs. complex). This is summarized in table 1.

Morpho-phonological constraints on RED

non-body-anchored			body-anchored
simple movement		complex movement	(with or without movement)
lateral noun (L-noun)	midsagittal noun (M-noun)	(C-noun)	(B-noun)
sideward reduplication (hyperdetermination)	simple reduplication (overdetermination)	zero marking (underdetermination)	

Reduplication strategies in DGS (Pfau and Steinbach, 2006, 159)

Morpho-phonological constraints on RED

- Although there is variation (c.f. van Boven 2024), reduplication is generally not available for **body-anchored** or **complex-movement** signs.
- LSF patterns with DGS and NGT in this respect: it seems that reduplication (RED) is only a possibility for nouns involving a simple movement, either in front of the signer (M-noun) or on the side (S-noun).

(4) **RED possible**

a. BOOK (M)

b. CHILD (S)

c. LEAF (S)

d. PERSON (S)

(5) **RED not possible**

a. MOM (B)

b. FISH (C)

c. WATER (C)

The distribution of RED in LSF

- In LSF, RED can be observed across grammatical categories.

(6) **Nouns**

a. BOOK
b. CHILD
c. LEAF
d. PERSON
e. EVENT
f. ...

(7) **Verbs**

a. SEND
b. ASK-QUESTION
c. GIVE
d. PICK-OUT
e. ...

(8) **Adjectives**

a. HARD
b. TRUE
c. RIGHT
d. ...

- At this stage, we found no RED-modified adverbs, but there might be.

RED and mass nouns

- In LSF, RED systematically occurs in mass nouns, which usually do not bear plural morphology cross-linguistically (Doetjes, 1997)

(9)
a. WATER
b. SAND
c. RICE
d. SHIT
e. FLOUR

RED and quantity words

- RED can co-occur with quantity adjectives such as *many*:

(10) PI$_a$ TREE$_a$ LEAF$>+_a$ MANY 6/7
‘This tree has a lot of leaves-RED.’

(11) IX$_1$ MESSAGE SEND$>+>+$ MANY . 6/7
‘I sent many messages.’

RED and numerals

- RED-N is degraded with a numeral:

(12) a. IX$_1$ HAVE 3 CHILD 6/7
'I have three children.'

b. IX$_1$ HAVE 3 CHILD>+>+ 3/4
'I have three children-RED.'

	Q-adjective + RED	Num + RED	
LSF	✓	✗	
ÖGS	✓	✓	Skant et al. (2002)
LIS	✓	✓	Pizzuto and Corazza (1996)
NGT	✓	✓	Harder (2003), van Boven (2024)
Hausa SL	✓	✓	Schmaling (2000)
DGS	✗	✗	Pfau and Steinbach (2006)
ASL	✗	✗	Wilbur (1987), Neidle and Nash (2012)
ISL	✗	✗	Stavans (1996)

Table: Distribution of RED across SLs

Outline

The meanings of RED

- Plurality (Pizzuto and Corazza 1996; Pfau and Steinbach 2006; Kuhn and Aristodemo 2017; van Boven 2024 i.a.)
- Aspect (Fischer 1973; Klima and Bellugi 1979; Sandler 2011; Wilbur 2005 i.a.)
- Reciprocity (Pfau and Steinbach, 2003)
- Intensity (Quer 2019; Putri 2019)

RED as grammatical number

- It is standard in the literature to analyze RED as an exponent of grammatical plural number (Wilbur 1987, 2005; Pizzuto and Corazza 1996; Pfau and Steinbach 2006; Steinbach 2012; Neidle and Nash 2012; Koulidobrova 2018, 2021; van Boven 2021, 2024; van Boven et al. 2023 i.a.)
- RED is conceived as a form of **optional number inflection** (e.g., Pfau and Steinbach 2006)
- Supported by the fact that, across SLs, unreduplicated (bare) nouns can denote pluralities.

RED as grammatical number

- This also holds for LSF; the two sentences (13a) and (13b) can both be used to denote a plurality of children.

(13) a. PI$_a$ SHOP$_a$ CHILD$_b$ LIKE.A.LOT$_b$. 5/6
‘Children like this shop a lot.’

b. PI$_a$ SHOP$_a$ CHILD$>+>+>+_b$ LIKE$_b$. 6/7
‘Children-RED like this shop a lot.’

RED as grammatical number

- However, RED-N cannot be used to denote non-plural entities:

(14) *Context: there is just one child in the school.*
TEACHER$_a$ WELCOME CHILD>+$_a$ SCHOOL . 2/3
'The teachers welcomed the child-RED at school.'

- A similar pattern can be found in ASL (Koulidobrova 2018; Schlenker and Lamberton 2019), suggesting that plural is 'strong' in these languages, i.e. encode a 'more than one' meaning:

(15) A: $\overline{\text{HAVE TREE+>+>+> HERE}}^{\text{y/n}}$.
'Do you have trees / Are there trees there?'
B: #YES, HAVE ONE PINE .
'Yes, I have one pine.'
B': NO, ONLY ONE .
'No, only one.'
[ASL, Koulidobrova 2018, (31)]

Is RED licensed by a plurality inference?

- The LSF and ASL patterns thus contrast with languages such as English, in which the plural is *weak* and can range over non-pluralities in DE-contexts:

(16) a. The homework contains difficult problems.
$\rightsquigarrow$ *The homework contains more than one problem.*

b. The homework does not contain difficult problems.
$\rightsquigarrow$ *The homework does not contain any problem.*
(Spector, 2007, (1))

c. If the homework contains difficult problems, I will help.
$\rightsquigarrow$ *I will help even if the homework contains a single difficult problem.*

- This suggests that the strong plural reading is derived via an implicature (Spector 2006, 2007; Zweig 2009; Ivlieva 2013 i.a.)

RED in DE-contexts

- However, in LSF, too, N-RED is degraded in DE-contexts:

(17) a. PI$_a$ TREE$_a$ LEAF NONE 6/7
'This tree has no leaves.'

b. PI$_a$ TREE$_a$ LEAF>+ NONE 5/4
'This tree has no leaves-RED.'

(18) a. IF STUDENT$_a$ ALL READ BOOK, TEACHER$_b$ HAPPY 5/6
'If all the students read books, the teacher will be happy.'

b. IF ALL STUDENT$_a$ READ BOOK>+>+, TEACHER$_b$ HAPPY
5/6
'If all the students read books-RED, the teacher will be happy.'

RED in DE-contexts

- But this is surprising: why would RED be degraded in such contexts, since it semantically denotes a plurality and is **not** the result of an implicature, as in English?
- As a consequence, a sentence such as ‘This tree has no leaf-RED’ should be fine with the meaning ‘This tree has only one leaf’.
- However, our informants find these meanings difficult to access for (17b) and (18b).

RED in DE-contexts

- Examples below show that this patterns extends to other DE-contexts, such as the scope of quantifiers *few* or *never*:

(19) a. PI$_a$ TREE$_a$ LEAF FEW 7/6
'This tree has few leaves.'

b. PI$_a$ TREE$_a$ LEAF>+ FEW 5/5
'This tree has few leaves-RED.'

(20) a. PI$_a$ SCHOOL$_a$ IN CHILD$_a$ SEE NEVER 6/7
'In this school, one never sees children.'

b. PI$_a$ SCHOOL$_a$ IN CHILD>+$_a$ SEE NEVER 5/4
'In this school, one never sees children-RED.'

- In this, LSF patterns with ASL, which exhibits similar restrictions (Schlenker and Lamberton 2019, (6b-d)).

V-RED as pluractionals

- As shown by Kuhn and Aristodemo (2017), RED can also be affixed to verbs in order to denote pluralities of events ('pluractionals').
- In Figure 2, the verb FORGET is reduplicated with a single hand, indicating distribution over instances of forgetting.

Figure 2. FORGET-rep in LSF: distribution over time (Kuhn and Aristodemo, 2017, 9)

V-RED as pluractionals

- In Figure 3, the verb FORGET is reduplicated with alternating hands, indicating distribution over participants.

Figure 3. FORGET-alt in LSF: distribution over participants (Kuhn and Aristodemo, 2017, 9)

RED and iconicity: nouns

- Previous studies show that some instances of reduplication have an iconic component (Schlenker and Lamberton 2019, 2022 for ASL; Kuhn and Aristodemo 2017 for LSF).
- Schlenker and Lamberton (2019) show that in ASL, nouns like TROPHY can be reduplicated sidewards, contributing to an iconic plural interpretation in which the trophies are arranged in a row:

(21) MUSEUM HAVE 7 TROPHY>+>+>+$_{\text{HORIZONTAL}}$ 7
'The museum has 7 trophies arranged in a row.'
[ASL; Schlenker and Lamberton 2019, (18)]

RED and iconicity: nouns

- At first sight, the ASL data seem to differ significantly from the LSF one;
- For instance, RED can appear with numerals, and contributes an iconic interpretation about the arrangement of trophies.
- However, we found no evidence for such iconic spatial enrichment for the LSF data involving N-RED.

RED and iconicity: nouns

- But: there are reasons to think that the iconic reduplication investigated by Schlenker and Lamberton 2019, 2022 is different from the RED morpheme observed in LSF.
- For instance, Schlenker and Lamberton (2019) report the following example:

(22) GROW-UP IX_1 WIN TROPHY>+>+
'I won many trophies growing up.'
[ASL; Schlenker and Lamberton 2019, 57]

- Schlenker and Lamberton (2019) remark that the sentence is acceptable with a plural meaning if reduplication is effectuated on the same location, which is otherwise banned from other iconic uses they observe.
- Although further data is required, this suggests that there are actually two distinct phenomena, at least for nouns: iconic reduplication and RED, which seems to be much more grammatically constrained.

RED and iconicity: verbs

- Kuhn and Aristodemo (2017) provide evidence that RED+V has an at-issue iconic component, which contributes information about the speed of the event described:

(23) a. BOOK $_1$GIVE$_a$-RED-SLOW

b. BOOK $_1$GIVE$_a$-RED-FAST BOOK $_1$GIVE$_a$-RED-MEDIUM
'Again and again, I gave a book to him.'

- As for nouns, we did not find any iconicity effects of V-RED within our data.
- Further investigation is needed in order to explore the extent to which V-RED can be interpreted iconically.

Outline

Intensification

- We saw in the introduction that RED is commonly associated with intensification across SLs.
- For instance, Quer (2019) reports that in Catalan Sign Language (LSC), the following sentences convey that Joan ate and drank a lot:

(24) a. SATURDAY NIGHT JOAN DRINK-REP
'Saturday night Joan drank a lot.'

b. RESTAURANT BUFFET JOAN EAT-ALT
'At the restaurant buffet, Joan ate a lot.'

[LSC, Quer 2019, (15-16)]

RED as an intensifier

- The solution we are proposing is to analyze RED as a quantifier over degrees (Klein 1982; Schwarzschild 2002, 2005; Rett 2008, Rett 2014 i.a.).
- In what follows, we introduce degree semantics briefly and then expose our account.

Degree semantics

- Natural language has many expressions that range over degrees or intervals.
- Adjectives such as e.g. *tall* or *heavy* are degree-dependent to some extent.
- Following Cresswell (1976), we assume that they take an additional argument ranging over degrees *d*, as in (25):

(25) $[\![\text{tall}]\!] = \lambda d.\lambda x.\text{tall}(x)$.

- Type *d* is a shorthand for a triple $\langle D, >_o, \psi \rangle$, where *D* is a set of points, $>_o$ a total ordering on *D*, and ψ a dimension of measurement (Bartsch and Vennemann 1972; Bierwisch and Lang 1989).

Degree semantics

- Although it is less obvious, NPs usually analyzed as ranging over individuals also have degree readings (Rett 2014, (20)-(22)):

(26) *Numerals*

a. Four pizzas are vegetarian/were eaten by the senators. *individual*

b. Four pizzas is enough/is more than what Bill asked for. *degree*

(27) *Quantity words*

a. Many guest are drunk/were arrested after the party. *individual*

b. Many guest is more than Bill had anticipated. *degree*

(28) *Anaphoric dependencies*

a. John bought four pizzas. **They** were delicious. *individual*

b. John bought four pizzas. **It** was more than we needed. *degree*

Degree semantics

- A null type-shifter from individuals to their corresponding degrees allows us to compose nouns with quantity adjectives or measure phrases (Bartsch and Vennemann 1972; Cresswell 1976; Nerbonne 1995; Villalba 2003; Schwarzschild 2002, 2005 i.a.)
- Following Rett 2008, 2014, we call this operator MEAS, for 'measure':

The individual measurement operator MEAS

(29) $[\![\text{MEAS}]\!] = \lambda P_{\langle e,t\rangle}.\lambda d.\lambda x.P(x) \wedge \mu(x) = d$

- MEAS applies to plural individuals and returns a degree that corresponds to the quantity (cardinality) of individuals in the set.

(30) a. Ten votes have been counted.

b. $[\![\textsc{meas}]\!]([\![\text{votes}]\!]) = \lambda d \lambda x.[P(x) \wedge \mu(x) = d](\lambda x.\text{vote}(x)) = \lambda d \lambda x.\text{vote}(x) \wedge \mu(x) = d$

c. $[\![\text{ten}]\!]([\![\textsc{meas}\text{ votes}]\!]) = [\lambda d \lambda x.\text{vote}(x) \wedge \mu(x) = d](10) = \lambda x.vote(x) \wedge \mu(x) = 10$

d. $[\![\text{ten } \textsc{meas} \text{ votes have been counted}]\!] = \lambda x.\text{vote}(x) \wedge \text{count}(x) \wedge \mu(x) = 10$

e. $=_{EC} \exists x.\text{vote}(x) \wedge \text{count}(x) \wedge \mu(x) = 10$

Degree semantics

- Degree readings are derived via application of another operator, D-MEAS, which quantifies over an interval/set of degrees D, with μ_d the measure of D (Rett 2014, 2018; Solt 2015).

The degree measurement operator D-MEAS

(31) $[\![\text{D-MEAS}_{\langle\langle d,t\rangle,\langle d,t\rangle\rangle}]\!] = \lambda D_{\langle d,t\rangle}.\lambda d.\mu_d(D) = d$

- The domain of D-MEAS/MEAS are plural entities:
  - Sets of individuals/events for MEAS
  - Sets of degrees for D-MEAS

Degree semantics

(32) a. Ten votes is enough to win.

b. $[\![\textsc{meas}\ \text{votes}]\!] = \lambda d.\lambda x.\text{vote}(x) \wedge \mu(x) = d$

c. $=_{EC} \lambda d.\exists x.\text{vote}(x) \wedge \mu(x) = d$

d. $[\![\textsc{d-meas}]\!]([\![\textsc{meas}\ \text{votes}]\!]) = [\lambda D_{\langle d,t\rangle}.\lambda d.\mu_d(D) = d](\lambda d.\exists x.\text{vote}(x) \wedge \mu(x) = d) = \lambda d'.\mu_d(\lambda d.\exists x.\text{vote}(x) \wedge \mu(x) = d) = d'$

e. $[\![\text{is enough to win}]\!] = \lambda d.\text{enough-win}(d)$

f. $[\![\text{is enough to win}]\!]([\![\textsc{d-meas}\ \textsc{meas}\ \text{votes}]\!]) = [\lambda d.\text{enough-win}(d)](\lambda d'.\mu_d(\lambda d.\exists x.\text{vote}(x) \wedge \mu(x) = d) = d') = \lambda d'.\mu_d(\lambda d.\exists x.\text{vote}(x) \wedge \mu(x) = d) = d' \wedge \text{enough}(d')$

g. $[\![\text{ten}]\!]([\![\textsc{d-meas}\ \textsc{meas}\ \text{votes is enough to win}]\!]) = [10](\lambda d'.\mu_d(\lambda d.\exists x.\text{vote}(x) \wedge \mu(x) = d) = d' \wedge \text{enough}(d')) = \mu_d(\lambda d.\exists x.\text{vote}(x) \wedge \mu(x) = d) = 10 \wedge \text{enough}(10)$

Quantity words as D-MEAS

- It has been proposed that Q(uantity)-words such as *many*, *much*, *few* are overt realizations of the D-MEAS operator (Cresswell 1976; Klein 1982; Schwarzschild 2005; Rett 2008, 2014, 2018; Brasoveanu 2008; Solt 2015 i.a.)
- Following Klein (1982) and Rett 2014, 2018, we assume that a word such as *many* lexicalizes the D-MEAS operator, augmented with an additional specification that the measure value ranges high with respect to a contextual standard s_c:

(33) $[\![many]\!] = \lambda D.\lambda d.\mu_d(D) = d \wedge d > s_c$

- *Many* denotes a degree modifier, a function from sets of degrees D to their measures μ_d, with the additional specification that this measure exceeds a contextual standard s_c.
- *Few* denotes a similar function targetting the lower end of s_c:

(34) $[\![few]\!] = \lambda D.\lambda d.\mu_d(D) = d \wedge d < s_c$

(35) a. Many children came.

b. $[\![\textsc{meas}]\!]([\![\text{children}]\!]) = \lambda d \lambda x.[P(x) \wedge \mu(x) = d](\lambda x.\text{children}(x)) = \lambda d \lambda x.\text{children}(x) \wedge \mu(x) = d$

c. $=_{EC} \lambda d.\exists x[\text{children}(x) \wedge \text{came}(x) \wedge \mu(x) = d]$

d. $[\![\text{many}]\!]([\![\textsc{meas} \text{ children came}]\!]) = [\lambda D.\lambda d.\mu_d(D) = d \wedge d > s_c](\lambda d.\exists x[\text{children}(x) \wedge \text{came}(x) \wedge \mu(x) = d]) = \lambda d'[\mu_d(\lambda d.\exists x[\text{children}(x) \wedge \text{came}(x) \wedge \mu(x) = d]) = d' \wedge d' > s_c]$

e. $=_{EC} \exists d'[\mu_d(\lambda d.\exists x[\text{children}(x) \wedge \text{came}(x) \wedge \mu(x) = d]) = d' \wedge d' > s_c]$

Proposal: RED as a cross-categorial degree affix

- We propose that the morpheme RED in LSF is a degree modifier that encodes a contextual argument $> s_c$ just like *many* and *much*:

The LSF RED morpheme (degree modifier)

(36) $[\![\text{-RED}]\!] = \lambda D_{\langle d,t \rangle}.\lambda d.\mu_d(D) = d \wedge d > s_c$

- RED therefore has the type of a degree modifier $\langle\langle d,t\rangle,\langle d,t\rangle\rangle$ and denotes a relation between an interval (set of degrees) *D* and the size of that interval *d*, provided through a variable μ over dimensions of measurement (quantity, height, weight, density, etc.)

RED as an intensifier: nouns

- Assuming that nouns are provided a degree argument through application of the MEAS operator, RED can subsequently apply and derive a reading corresponding to *many N*.
- MEAS takes the denotation of a noun (a set of individuals) and delivers their degree of measurement μ alongside some salient dimension (here, cardinality).
- RED takes this measure d and identifies it with d' while additionally specifying that d' is high with respect to some contextual standard.

(37)

a. $[\![\text{MEAS}]\!]([\![\text{BOOK}]\!]) = \lambda P_{\langle e,t\rangle}.\lambda d.\lambda x.[P(x) \wedge \mu(x) = d](\lambda y.book(y)) = \lambda d.\lambda x.book(x) \wedge \mu_{|\;|}(x) = d$

b. $=_{EC} \lambda d.\exists x.[book(x) \wedge \mu_{|\;|}(x) = d]$

c. $[\![\text{-RED}]\!]([\![\text{MEAS BOOK}]\!]) = \lambda D_{\langle d,t\rangle}.\lambda d.\mu_d(D) = d \wedge d > s_c(\lambda d.\exists x.[book(x) \wedge \mu_{|\;|}(x) = d]) = \lambda d'.\mu_d(\lambda d \exists x.[book(x) \wedge \mu_{|\;|}(x) = d]) = d' \wedge d' > s_c$

RED as an intensifier: nouns

(38) a. STUDENT$_a$ READ$_a$ BOOK$>+>+_a$
‘Students-RED read books.’

b. $[\![\text{STUDENT READ BOOK-RED}]\!] = \lambda d'.\mu_d(\lambda d \exists x \exists y.[book(x) \wedge \mu_{|\ |}(x) = d \wedge student(y) \wedge read(y, x)]) = d' \wedge d' > s_c$

c. $=_{ec} \exists d'[\mu_d(\lambda d \exists x \exists y.[book(x) \wedge \mu_{|\ |}(x) = d \wedge student(y) \wedge read(y, x)]) = d' \wedge d' > s_c]$

d. ‘There is a plurality of books of cardinality d s.t. some student read d and the measure of d is high relative to some contextually valued standard.’

RED as an intensifier: adjectives

- In order to compose with gradable adjectives like *hard* of type $\langle d\langle e,t,\rangle\rangle$, we assume that RED can also denote a degree-predicate modifier of type $\langle\langle d\langle e,t,\rangle\rangle,\langle d\langle e,t,\rangle\rangle\rangle$:

The LSF RED morpheme (degree-predicate modifier)

(39) $[\![\text{-}\mathrm{RED}_A]\!] = \lambda G_{\langle d\langle e,t\rangle\rangle}.\lambda d.\lambda x.G(d,x) \wedge d > s_c$

- This version of RED is similar to the entry for *very* assumed e.g. in Kennedy and McNally (2005).

RED as an intensifier: adjectives

(40) a. PI_a WALL_a HARD++
'This wall is hard-RED.'

b. $[\![\text{HARD}]\!] = \lambda d \lambda x.hard(x, d)$

c. $[\![\text{-RED}_A]\!]([\![\text{HARD}]\!]) = \lambda G_{\langle d \langle e,t \rangle \rangle}.\lambda d.\lambda x.G(d, x) \wedge d > s_c(\lambda d \lambda x.hard(x, d)) = \lambda d \lambda x.[hard(x, d) \wedge d > s_c]$

d. $[\![\text{PI WALL HARD-RED}]\!] = \exists x \exists d[wall(x) \wedge hard(d, x) \wedge d > s_c$

e. 'This wall x whose hardness d is above the contextual standard.'

RED as an intensifier: verbs

- Assuming that some version of MEAS can also apply to events to deliver their corresponding degrees alongside some dimension of measurement μ, we can also derive the meaning of RED when it attaches to verbs:

The event measurement operator MEAS

(41) $[\![\text{MEAS}]\!] = \lambda P_{\langle v,t \rangle}.\lambda d.\lambda e.P(e) \wedge \mu(e) = d$

- For the sake of simplicity, we leave aside the distinction between the two realizations of RED analyzed in Kuhn and Aristodemo 2017.

RED as an intensifier: verbs

(42) a. C-A-M-I-L-L-E BUY>+>+ DRESS .
'Camille bought-RED dresses.'

b. $[\![\text{MEAS}]\!]([\![\text{BUY}]\!]) = \lambda P_{\langle v,t\rangle}.\lambda d.\lambda e.[P(e) \wedge \mu(e) = d](\lambda e.buy(e)) = \lambda d.\lambda e.buy(e) \wedge \mu_{|\ |}(e) = d$

c. $=_{EC} \lambda d.\exists e.[buy(e) \wedge \mu_{|\ |}(e) = d]$

d. $[\![\text{-RED}]\!]([\![\text{MEAS BUY}]\!]) = \lambda D_{\langle d,t\rangle}.\lambda d.\mu_d(D) = d \wedge d > s_c(\lambda d.\exists e.[buy(e) \wedge \mu_{|\ |}(e) = d]) = \lambda d'.\mu_d(\lambda d \exists e.[buy(e) \wedge \mu_{|\ |}(e) = d]) = d' \wedge d' > s_c$

RED as an intensifier: verbs

(43)
a. $[\![\textsc{Camille bought-}\mathrm{RED}\textsc{ dress}]\!] = \lambda d'.\mu_d(\lambda d \exists e.[buy(e) \wedge \textsc{agent}(C, e) \wedge \textsc{theme}(dr, e) \wedge \mu_{|\ |}(e) = d]) = d' \wedge d' > s_c$

b. $=_{EC} \exists d'[\mu_d(\lambda d \exists e.[buy(e) \wedge \textsc{agent}(C, e) \wedge \textsc{theme}(dr, e) \wedge \mu_{|\ |}(e) = d]) = d' \wedge d' > s_c]$

c. 'There is a degree d' of dress-buying events e by Camille which cardinality is above the contextual standard.'

Why can't RED appear in DE-environments?

- The basic idea: this is because the semantics of RED are akin to that of *many* and encode a contextual argument denoting the upper range of a measure scale s_c.

(44) $[\![\text{-RED}]\!] = \lambda D_{\langle d,t\rangle}.\lambda d.\mu_d(D) = d \wedge d > s_c$

(45) $[\![\textit{many}]\!] = \lambda D_{\langle d,t\rangle}.\lambda d.\mu_d(D) = d \wedge d > s_c$

- The degree modifier *few*, however, denotes the lower end of a similar scale (or the higher end of the reversed *many* scale, c.f. Rett 2018):

(46) $[\![\textit{few}]\!] = \lambda D.\lambda d.\mu_d(D) = d \wedge d < s_c$

Why can't RED appear in DE-environments?

(47) a. $^{??}$PI$_a$ TREE$_a$ LEAF+ FEW
'This tree has a few leaves-RED.'

b. $[\![\text{MEAS}]\!]([\![\text{LEAF}]\!]) = \lambda P_{\langle e,t\rangle}.\lambda d.\lambda x.[P(x) \wedge \mu(x) = d](\lambda y.leaf(y)) = \lambda d.\lambda x.leaf(x) \wedge \mu_{|\ |}(x) = d$

c. $=_{EC} \lambda d.\exists x.[leaf(x) \wedge \mu_{|\ |}(x) = d]$

d. $[\![\text{-RED}]\!]([\![\text{MEAS LEAF}]\!]) = \lambda D_{\langle d,t\rangle}.\lambda d.\mu_d(D) = d \wedge d > s_c(\lambda d.\exists x.[leaf(x) \wedge \mu_{|\ |}(x) = d]) = \lambda d'.\mu_d(\lambda d \exists x.[leaf(x) \wedge \mu_{|\ |}(x) = d]) = d' \wedge d' > s_c$

e. $[\![\text{FEW}]\!]([\![\text{MEAS LEAF-RED}]\!]) = \lambda D.\lambda d.\mu_d(D) = d \wedge d < s_c(\lambda d'.\mu_d(\lambda d \exists x.[leaf(x) \wedge \mu_{|\ |}(x) = d]) = d' \wedge d' > s_c) = \lambda d'.\mu_d(\lambda d \exists x.[leaf(x) \wedge \mu_{|\ |}(x) = d]) = d' \wedge d' > s_c \wedge d' < s_c$

f. 'For a given individual x, the measure of the function mapping each degree d to whether there are leaves y of x with measure d is d' and **d' is above the contextual standard and below the contextual standard.**'
$\rightsquigarrow$??

Why can’t RED appear in DE-environments?

- However, this does not predict RED to be infelicitous under negation, producing a ‘not many - not very’ reading.
- A possible solution (to be investigated further) is that RED has a PPI-like behavior (p.c. Andreea Nicolae).

Why can't RED compose with numerals?

- Recall that in LSF, RED is degraded when co-occurring with numerals:

(48) a. IX$_1$ HAVE 3 CHILD 6/7
'I have three children.'

b. IX$_1$ HAVE 3 CHILD>+>+ 3/4
'I have three children-RED.'

- One possible solution to this problem is syntactic in nature: once a predicate has composed with a numeral, it cannot compose further with RED because a variable *d* is no longer available.

Why can't RED compose with numerals?

- Assuming that numerals and other measure phrases are of type d (Kennedy, 2013), those saturate the degree argument provided by MEAS, preventing RED to apply:

(49) a. $^{?}$IX$_1$ HAVE 3 CHILD>+>+
'I have three children-RED.'

b. $[\![3]\!] = 3_d$

c. $[\![\text{MEAS}]\!]([\![\text{CHILD}]\!]) = \lambda P_{\langle e,t\rangle}.\lambda d.\lambda x.[P(x) \wedge \mu(x) = d](\lambda y.child(y)) = \lambda d.\lambda x.child(x) \wedge \mu_{|\ |}(x) = d$

d. $[\![\text{MEAS CHILD}]\!]([\![3]\!]) = \lambda d.\lambda x.[child(x) \wedge \mu_{|\ |}(x) = d](3) = \lambda x.child(x) \wedge \mu_{|\ |}(x) = 3$

- However, this should lead to ungrammaticality proper, not just infelicity.
- This account forces us to stipulate additional syntactic parametrization to account for the cross-linguistic variation (NUM+RED being observed in ÖGS, LIS and NGT).

Outline

Conclusions

- Contrary to standard approaches of RED in sign language, which treat it as an exponent of grammatical plural number, we have proposed to analyze it in LSF as a degree modifier, akin to *many* and *very*.
- We therefore straightforwardly derive the intensification meaning associated with the various uses of RED.
- Such an analysis also helps us to understand why (what is taken to be) LSF plural number marking surfaces in unexpected places, e.g. on mass nouns.
- It also helps us to understand why RED can associate further with *many*, but not with other quantity words such as *few*: since RED has the same semnantics as the former, it is expected not to surface with *few*, which denotes the opposite interval of measure.

Conclusion

- However, our analysis falls short at accounting for the infelicity of RED in other DE-contexts, such as negation.
- As it stands, it also predicts that RED should behave uniformly across SLs, contrary to fact.

Thank you!

Feedback much welcome:

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