

LATENT RELATIONS OF REFERENTIAL CHOICE AND DEICTIC GESTURES' STROKES

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HISTORY

- From the 1980s: works on coordination between gestures and verbal expressions
- Schegloff 1984; Loehr 2004; Leonard, Cummins 2011 – coordination between gesture stroke and accent
- Nakano et al. 2004; Spets 2016 – coordination between gestures and different syntactic units

DEICTIC (=POINTING) GESTURES AND REFERENCE

- Kibrik 2011: Pointing is the most specialized of all gestures in terms of its association with particular verbal expressions, specifically referential expressions; and conversely, reference is closely related to pointing.
- Gullberg 2006; Perniss & Yoshioko 2008; Debreslioska et al. 2013; Azar, Özyürek 2015– Studies on reference tracking along with co-speech gestures
- Deictic gestures were quite rarely treated separately (but see however, e. g. Sluis, Krahmer 2007 on Dutch; Azar, Özyürek 2015 on Turkish)

GESTURES AND REFERENCE: CONCLUSIONS OF PREVIOUS RESEARCH

- New and less accessible units are more likely to be expressed by a lexical NP (Chafe1994) and to be accompanied by a gesture (Gullberg 2006; Levy & Fowler, 2000).
- In contrast, given and more accessible units are more likely to be expressed by a pronoun and zero anaphora. Usually they are not accompanied by any gesture.
- Debreslioska et al. 2013: Reintroduced referents are also more likely to coincide with a gesture

CURRENT TASK

- Aim: Track coordinations between strokes in pointing gestures and referential expressions of different types
- **Material:** Russian Pear Chats and Stories (RuPeCS) <http://multidiscourse.ru/corpus/>
- Pilot subcorpus of 3 recordings (## 4, 22, 23)
- 9 videos
- Total duration: 141 minute

DESIGN



TYPES OF REFERENTIAL EXPRESSIONS (RE)

1 Full reference: NP with a head noun or numeral

23R: čto u nego [odnoj **korzinki**] /net,
'that he does not have one of the baskets'

22N: a potom spuskaetsâ [po /**lestnice**]
'and then [he] passes down the stairs'

Žuët [**tol'**ko /**pervyj**]

TYPES OF REFERENTIAL EXPRESSIONS (CONT.)

2. Reduced reference

■ Personal pronouns

4C potomu čto oni [mimo nego] (0.32) /prošli,
'because they passed him'

■ Demonstrative pronouns (Dem)

22R a-a [/etot] —
kotoryj byl v \šlâpe i s /korzinoj,
*'and this one
that was with a hat and a basket'*

■ Zeroes (Zero)

23N ∅ nadel platok \obratno.
'[he] put the kerchief back on'

■ Other (not included in current sample) - definite and indefinite pronouns

DEMONSTRATIVE NPS

- **DemNP** – Full NP with a head noun/numeral preceded by a demonstrative (Dem):
- **4N** (ω 0.62) tot mal'chik s /grušami dayot tri-i (0.19) \↑gruši,
'(ω 0.62) That boy with pears gives three pears'
- **22C** oni prohodât -\mimo ètih-h () (e) /korzĭn s grušami
'they are passing those baskets with pears'

ANNOTATION AND CODING

- Concrete reference only
- Frame-by-frame software ELAN
- Parameters:
 - Type of reference (full/reduced) with further precisions (NounP/NumP/Pronoun/Dem/Other)
 - Animacy
 - Gender
 - Number
 - Syntactic role

REFERENTIAL ANNOTATION EXAMPLE (ELAN)

ELAN 5.2 - pears22-R-ref.eaf

The screenshot displays the ELAN 5.2 interface. At the top, the menu bar includes File, Edit, Annotation, Tier, Type, Search, View, Options, Window, and Help. Below the menu is a video player showing a scene with three people sitting in a room. The video is currently at 00:10:10.088. A selection range is marked from 00:10:10.088 to 00:10:11.036. Below the video is a control bar with playback buttons and checkboxes for Selection Mode and Loop Mode.

The main area shows a timeline with a grid. The timeline is divided into tiers. The top tier is labeled 'EDU (127)' and contains the word 'вот'. Below this, there is a 'Words (1240)' tier. The 'refAnSpread (181)' tier is expanded to show a 'refAnaphora (181)' tier. This tier is further expanded to show a 'refAnType (181)' tier, which is expanded to show a 'refAnFull (180)' tier. This tier is further expanded to show a 'refAnReduced (73)' tier. This tier is further expanded to show a 'refAnGender (181)' tier, which is expanded to show a 'refAnNumber (181)' tier, which is expanded to show a 'refAnSynt (181)' tier, which is expanded to show a 'refAnComments (44)' tier. The 'refAnComments (44)' tier is expanded to show a 'refAnaphora-2 (38)' tier, which is expanded to show a 'refAnType-2 (38)' tier, which is expanded to show a 'refAnFull-2 (29)' tier, which is expanded to show a 'refAnReduced-2 (13)' tier. This tier is further expanded to show a 'refAnGender-2 (38)' tier, which is expanded to show a 'refAnNumber-2 (38)' tier, which is expanded to show a 'refAnSynt-2 (38)' tier, which is expanded to show a 'refAnComments-2 (14)' tier. The 'refAnComments-2 (14)' tier is expanded to show a 'refAnaphora-3 (8)' tier, which is expanded to show a 'refAnType-3 (8)' tier, which is expanded to show a 'refAnFull-3 (8)' tier.

The 'refAnComments (44)' tier contains the following annotations:

Annotation	Value
Anim; With POSS	
Reduced	
Pron3	
F	
SG	
Other	

Nest structure

POINTING GESTURES: SOME PRINCIPLES OF DETECTION (LITVINENTO ET AL. 2018)

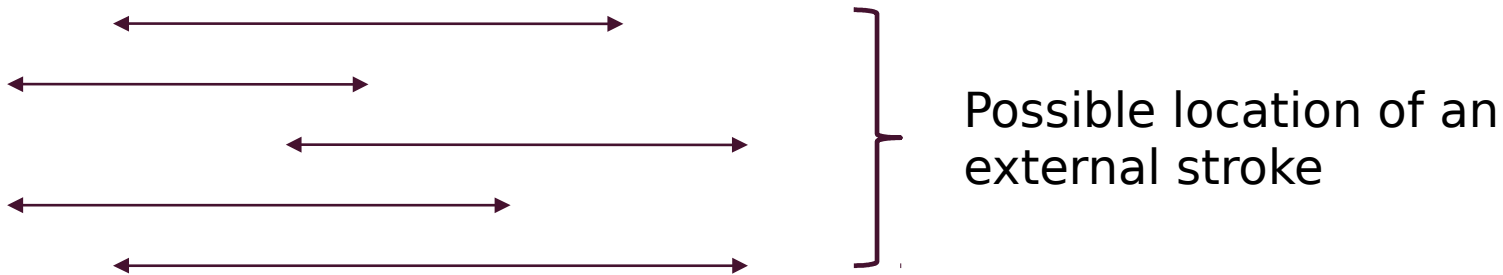
- Speaker indicates at some referent or point in time and space
- No complex trajectory
- No complex hand form
- Pure location of referent in gesture space with a hand or a finger
- Configuration: a bit more tense than in beats; gesture space activated

9 TYPES OF STROKE/RE TEMPORAL ALIGNMENT

Internal strokes



External strokes



COORDINATION OF REFERENCE AND POINTING STROKES IN ELAN

ELAN 5.2 - pears23-N-manu-ref.eaf

The screenshot displays the ELAN 5.2 interface with the following components:

- Video Windows:** Two video recordings. The left window shows a wide shot of three people sitting in a room. The right window is a close-up of a woman pointing. Red circles highlight specific pointing strokes in both videos.
- Timeline:** A horizontal timeline at the bottom of the video windows showing the current selection range from 00:03:06.830 to 00:03:07.220.
- Annotation Tiers:**
 - N-mLMTType:** A top-level tier with a value of 806.
 - N-mRIMovement:** A tier with values N-mRIM283 through N-mRIM290.
 - N-mRIMType:** A tier with values S, R, P, S, P, S, P, S.
 - N-mGesture:** A tier with values N-mGe160 through N-mGe166.
 - N-mGeStructure:** A tier with values S, SR, PS, PS, PS, PS.
 - N-mGeFunction:** A tier with values Depictive, Pragmatic, Depictive, Pragmatic, Pointing, Pragmatic, Pointing, Pragmatic, Beat, Pragmatic, Pointing, F.
 - EDU:** A tier with values N-97, N-98, N-99.
 - Words:** A tier with Russian words: идёт, своей, дорогой, они, идут, своей, (h), и тут, они, замечают, что, шляпа, лежит.
 - refAnSpread:** A tier with values Spr 1, Spr 10, Spr 107.
 - refAnaphora:** A tier with values Reduc, Full.
 - refAnType:** A tier with values NounP.
 - refAnFull:** A tier with values Pron, Pron3.
 - refAnReduced:** A tier with values M, F.
 - refAnGender:** A tier with values M, F.
 - refAnNumber:** A tier with values PL, SG.
 - refAnSynt:** A tier with values Subj, Subj.

External stroke

Manual annotation

Referential annotation

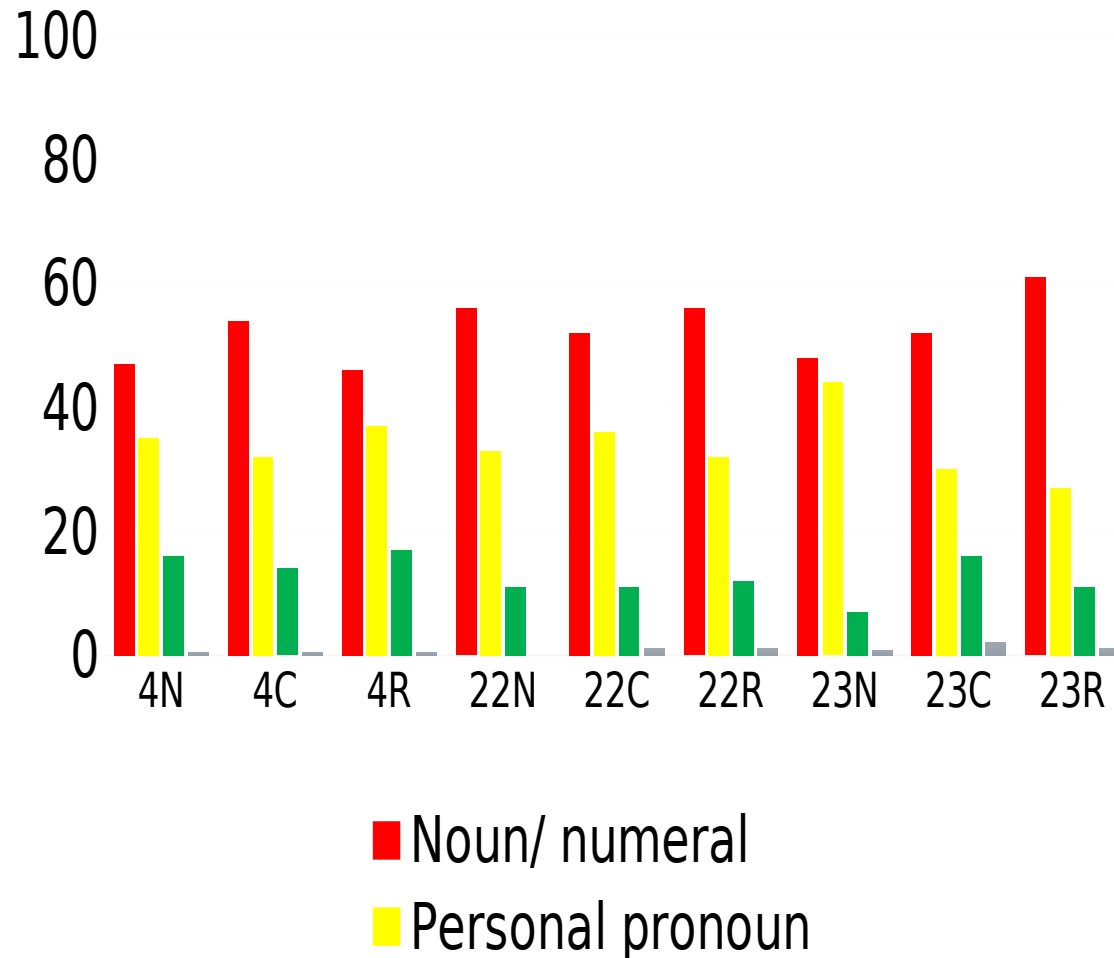
EXAMPLE



REFERENTIAL EXPRESSIONS ACROSS THE CORPUS: RAW NUMBERS

	4N	4C	4R	23N	23C	23R	22N	22C	22R	Total
FullNP	161	103	187	144	92	154	121	123	133	1218
Pron	119	61	152	86	63	88	112	72	58	811
Dem	2	1	2	0	2	2	2	5	2	18
Zero	54	27	68	27	19	32	18	38	25	308
DemNP	7	3	8	4	5	13	3	14	12	69
Dem_a ll (Dem+ Dem in DemNP)	9	4	10	4	7	15	5	19	14	87

Referential expressions across the corpus (%)



RESULTS: FULL VS REDUCED REFERENCE

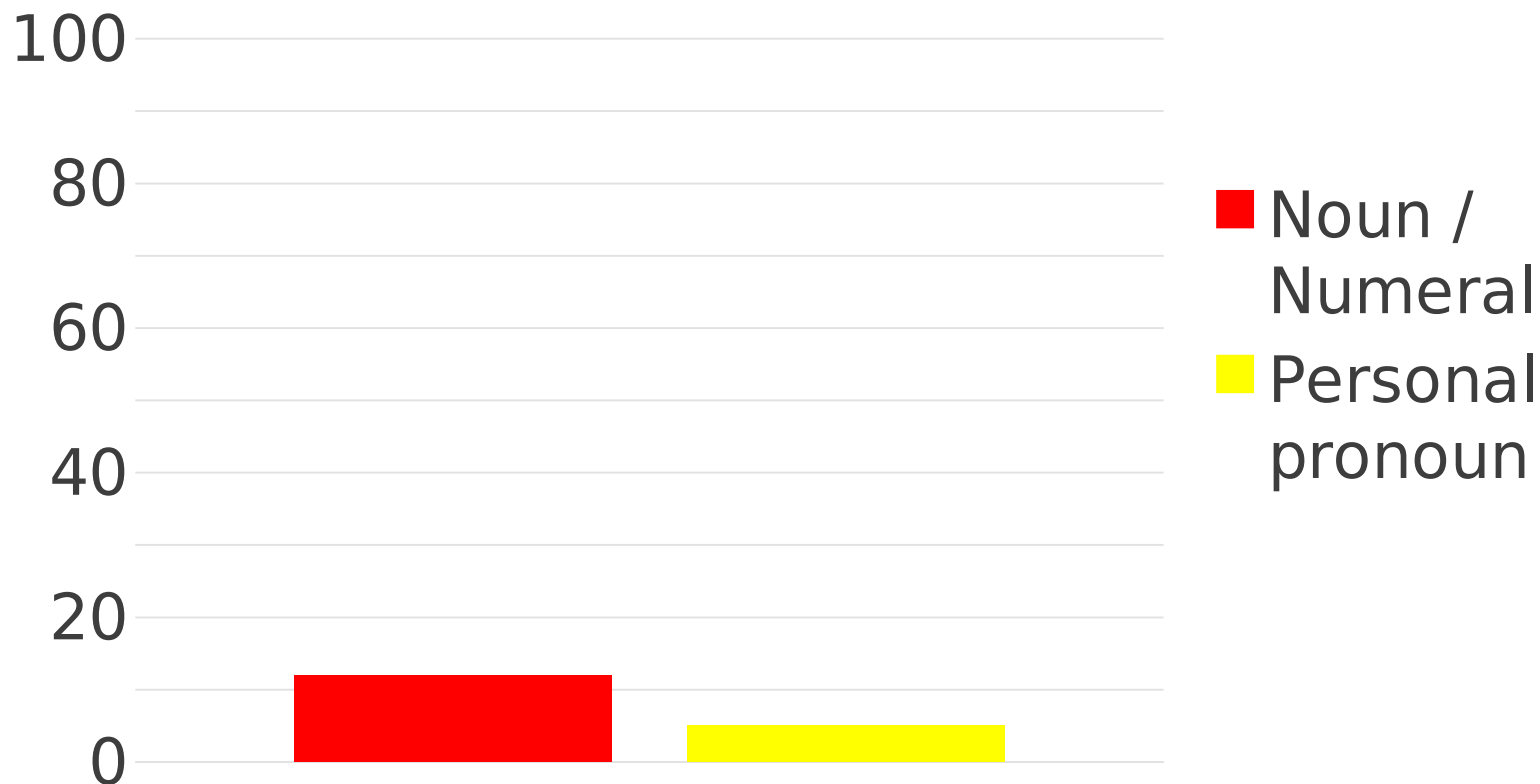
- Full NPs with a head noun/ numeral are significantly more often accompanied by a gesture stroke (χ -square, p-value < 0.01).
- Consistent with similar findings on other languages (Debreslioska 2013: 434)
- Demonstratives are significantly more often accompanied by a pointing stroke than personal pronouns

FULL VS REDUCED REFERENCE:

	4N	4C	4R	22N	22C	22R	23N	23C	23R	Total
Pointing gestures (raw numbers)	78	14	30	52	30	40	54	19	39	356
Noun/ Numeral	37 (45%)	3 (14%)	14 (47%)	20 (38%)	12 (37%)	15 (38%)	21 (39%)	8 (42%)	22 (56%)	153 (44%)
Pronoun	4 (5%)	2 (14%)	7 (23%)	3 (6%)	7 (23%)	4 (10%)	7 (13%)	2 (10%)	8 (21%)	44 (14%)
Dem in Dem_all	2 (2%)	0 (0%)	2 (7%)	0 (0%)	2 (7%)	1 (3%)	0 (0%)	1 (5%)	2 (5%)	11 (3%)

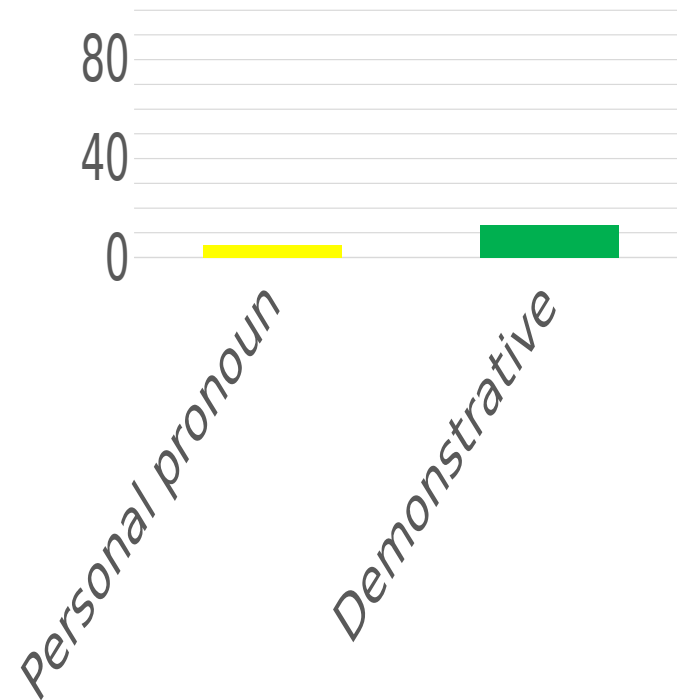
REFERENCE AND POINTING STROKES: NOUNS/ NUMERALS VS PERSONAL PRONOUNS

Aligned with a pointing stroke, % (χ -square < 0.01)



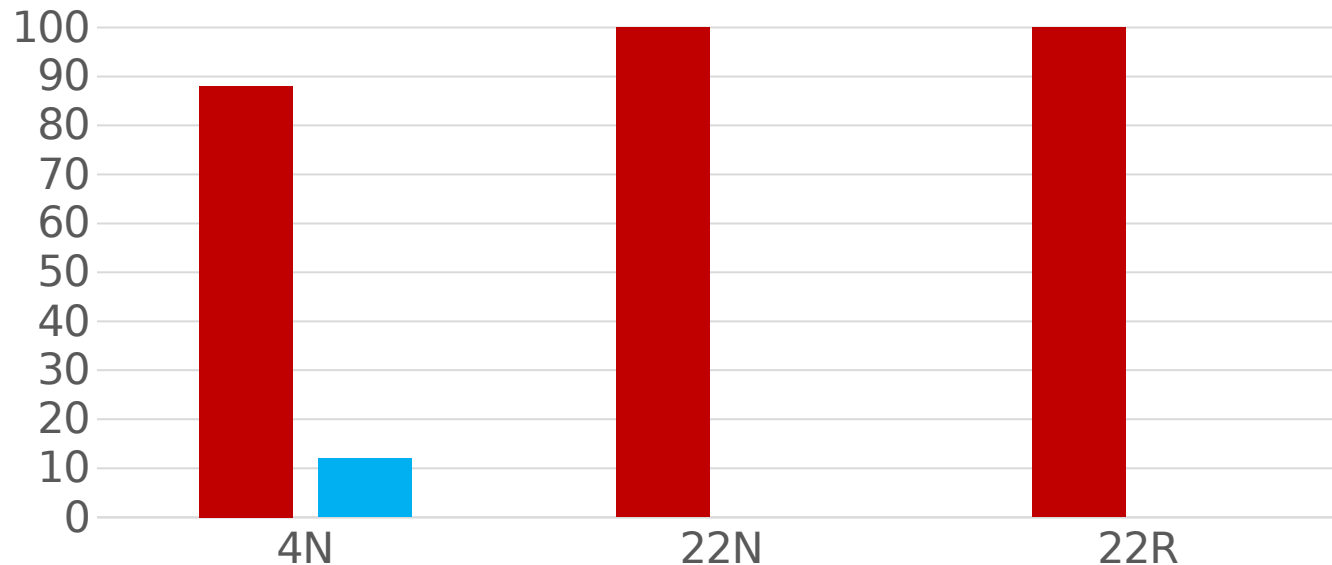
REFERENCE AND POINTING STROKES: NOUNS / NUMERALS VS DEMONSTRATIVES

Covered by a pointing stroke, % (p-value = 0.06, χ -square)



WHAT KIND OF FULL NPS ARE MORE OFTEN ACCOMPANIED BY A POINTING STROKE?

- Concrete referents (χ -square, p-value < 0.01)
- Context of Reintroduction (cf. Hickmann, Hendriks 1999), χ -square, p-value < 0.01



- Reintroduction
- Other contexts (Introduction, maintenance, switch)

OTHER CORRELATIONS FOUND ON FULL NPS

- Syntactic role, gender, animacy: no influence detected
- The only significant correlations detected within the parameter of number
- 121 of 148 Units belonged to SG (82%)

	TOTAL	ALIGNED WITH PT STROKES	%	p-value (χ-square)
Full NP SG	871	121	14%	0.05
Full NP PL	380	37	9%	

ZEROES AND PERSONAL PRONOUNS

- Hypothesis on preliminary coding: long EDUs (≥ 1500 ms) are aligned with a pointing gesture significantly more often when they have one reduced RE and not more than one new referent in total
- Statistically confirmed on a larger sample (binominal test, p -value < 0.05)
- 25 of 31 units covered by a pointing gesture contained a reduced reference in the beginning

EXAMPLES

4N /podnimajut oni ↑ eë

(0.85)

'they are lifting it'

4R i Ø /id'ot k \mal'čiku nazad.

'and [he] goes back to the boy'

22C on ču= || ču=||\čut' otjekhal

'he drove off a little'

23R Ø podkradyvaets'a k etim /korzinam,

[he] sneaks up on these baskets

EXAMPLE



CONCLUSIONS

- Nouns are significantly more often accompanied with pointing strokes than personal pronouns
- The factor of number: SG significantly more often
- Demonstratives (including demonstratives in DemNPs) are significantly more often accompanied by pointing strokes than personal pronouns
- In the majority of cases “Noun+ Pointing stroke” we deal with the context of reintroduction
- All EDU covered by a pointing gesture: not more than 1 Full NP

FURTHER PLANS

- Subdivide types of gesture strokes and track distinctive coordinations between type of RE and type of a stroke
- Subdivide
- Separate studies of First telling stage / Conversations / Retelling
- Multimodal issues: what is happening with eye gazes at the same time?
- ...



THANK YOU! ㄸ