

Supplementary Materials

**“Economy principle in signed narratives: Is it
age-sensitive?”**

TISLR 14

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Figure 1

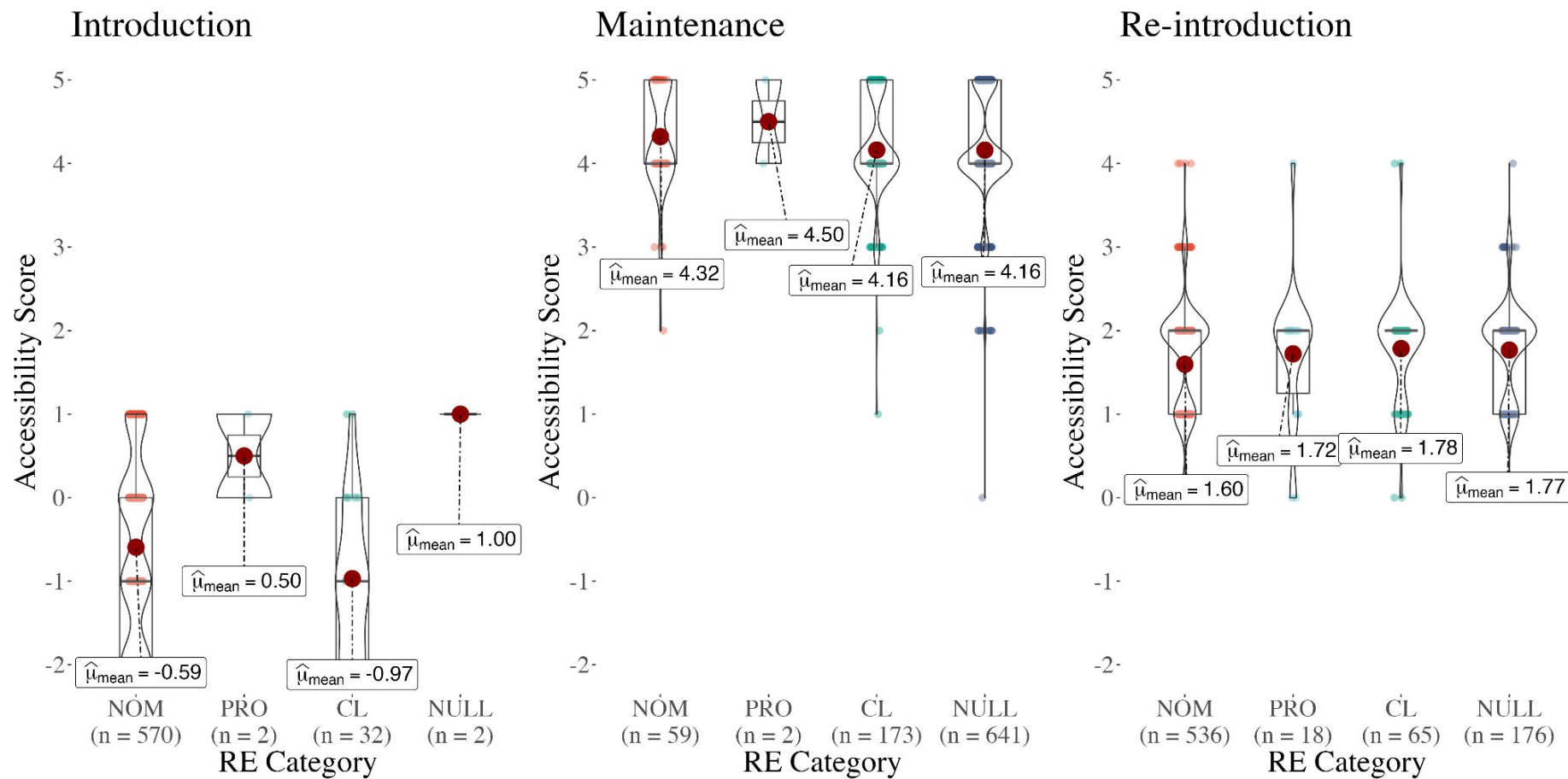
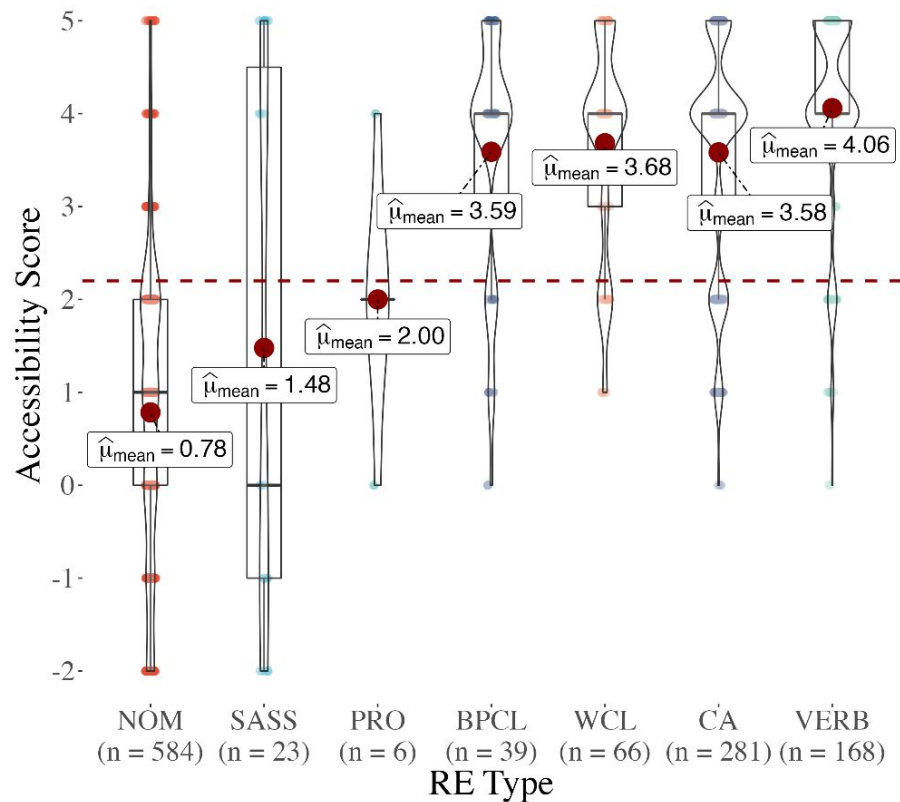


Figure 2

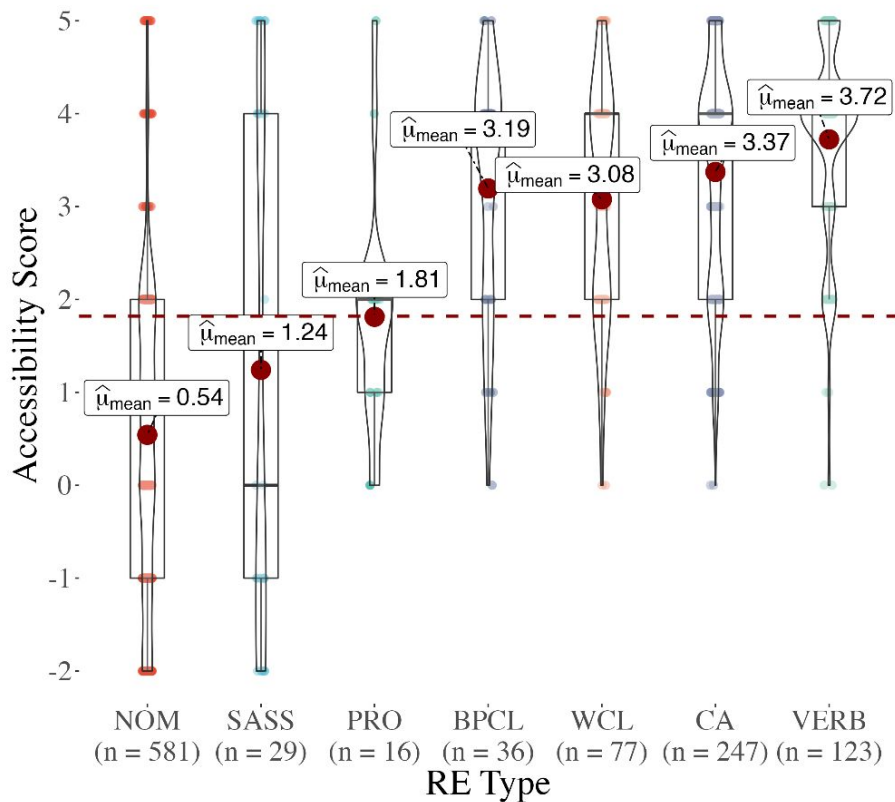
a

Native Signers



b

Late Signers



Methods & Data

**Supplementary 1 - Participant background information
(8 native, 8 late [AoA > 3 years])**

No	Status	Sex	AoA	Age	LOE	Deaf schools	Home language
2	Native	M	0-3	33	12	PS, MS, HS	TiD, home sign
3	Native	F	0-3	27	12	PS, MS, HS	TiD, home sign
18	Native	M	0-3	28	12	PS, MS	TiD
22	Native	M	0-3	35	12	PS, MS, HS	TiD
24	Native	F	0-3	23	12	PS, MS, HS	TiD
27	Native	F	0-3	25	12	PS, MS	TiD
30	Native	M	0-3	18	12	PS, MS	TiD
16	Late	F	4-7	33	12	PS	TR, home sign
21	Late	F	4-7	31	14	PS, MS	Home sign
25	Late	M	4-7	35	12	PS, MS, HS	Home sign
35	Late	F	8-12	49	8	PS, MS	Home sign, TR
12	Late	M	8-12	28	16	MS	TR
15	Late	F	8-12	24	12	PS, MS, HS	TR, TiD
19	Late	F	8-12	24	8	PS, MS	Home sign
31	Late	M	13-17	50	8	MS	TR, home sign

Supplementary 2 - Example elicitation clip & narration video



Supplementary 3 - Example ELAN annotation

Referant Tracking [160]		Introduction	Maintenance	Maintenance
RE [160]		Bare noun	Plain verb	Constructed Action
Narrative [10]		Narrative 8		
Clause Boundary [146]				
Event [75]		Event 1		
Sign Gloss [440]		KEDİ	HASTA	BİT YÜZ-? HASTA HALSİZ-YATMAK
Turkish Translation [68]		Kedi hasta, bit var gibi, yüzünde noktalar, halsiz duruyor.		

Supplementary 4 - Calculation of Accessibility Rating (AR) following Toole (1996)'s protocol

```
# Scale for Topicality
if ref[i-4:i].count(ref[i]) >= 3 and reference[i] > 2 and\
    ((narrative[i] == narrative[i-4])
     or (narrative[i] == narrative[i-3]
          and reference[i] == 4 and ref[i] == ref[i-3]
          and ref[i] == ref[i-2]))):
    score += 2
elif ref[i-4:i].count(ref[i]) >= 1 and reference[i] > 1 and\
    ((narrative[i] == narrative[i-2]) or
     (narrative[i] == narrative[i-1] and ref[i] == ref[i-1]))):
    score += 1
else:
    score += 0

# # Scale for Competition
if ref[i] != ref[i-1] and ref[i] != ref[i-2] \
    and reference[i] > 2 and ref[i-1] != ref[i-2]:
    score -= 2
elif ref[i] != ref[i-1] and reference[i] > 1\
    and (ref[i-1] == ref[i-2] or ref[i] == ref[i-2] or reference[i] == 2):
    score -= 1
else:
    score += 0
print(score)
```


Supplementary 5 - Example data

Subject	Nativeness	Narrative	Reference	Accessibility_Rating	Referent_Name	Discourse	RE
2	1	1	1	0	Wood	Introduction	SASS - Tracing
2	1	1	2	0	Tom	Introduction	Body part CL
2	1	1	3	4	Tom	Maintenance	Constructed action
2	1	1	4	-2	Jerry	Introduction	Bare noun
2	1	1	5	4	Jerry	Maintenance	Whole entity CL
2	1	1	6	2	Tom	Re-introduction	Whole entity CL
2	1	1	7	4	Tom	Maintenance	Whole entity CL
2	1	1	8	4	Tom	Maintenance	Whole entity CL
2	1	1	9	5	Tom	Maintenance	Constructed action
2	1	1	10	5	Tom	Maintenance	Plain verb
2	1	1	11	5	Tom	Maintenance	Constructed action
2	1	1	12	5	Tom	Maintenance	Plain verb
2	1	1	13	5	Tom	Maintenance	Constructed action
2	1	1	14	1	Jerry	Re-introduction	Bare noun
2	1	1	15	3	Tom	Re-introduction	Bare noun
2	1	1	16	5	Tom	Maintenance	Body part CL
2	1	1	17	5	Tom	Maintenance	Plain verb
2	1	1	18	5	Tom	Maintenance	Body part CL
2	1	10	1	1	Jerry	Introduction	Bare noun
2	1	10	2	0	Tom	Introduction	Bare noun
2	1	10	3	4	Tom	Maintenance	Bare noun

Results

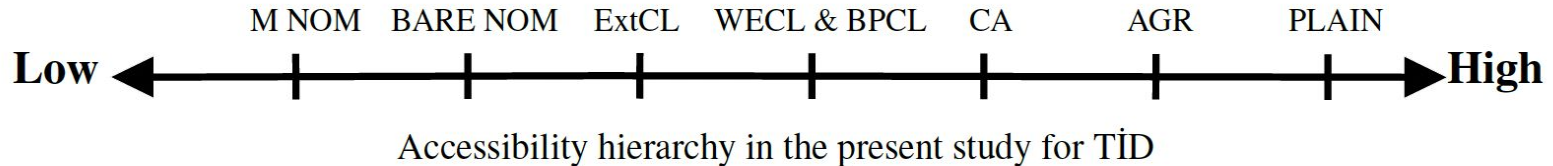
Accessibility Ratings

Supplementary 6 - Accessibility ratings by RE and discourse status

RE	AR
PLAIN	4.0224719
AGR	3.7522124
CA	3.4848485
BPCL	3.4000000
WECL	3.3566434
SASS	1.3461538
PRO	0.7954545
BARE NOM	0.7112245
M NOM	0.5030675

Discourse	AR
Maintenance	4.1725714
Re-introduction	1.6528302
Introduction	-0.6039604

*The accessibility of the referent increases as AR (accessibility ratings) increase.



Supplementary 7 - Accessibility ratings by Nativeness, RE and discourse status

Discourse	Nativeness	AR
Maintenance	Native	4.2515593
Maintenance	Late	4.0761421
Re-introduction	Native	1.6980198
Re-introduction	Late	1.6061381
Introduction	Native	-0.5496454
Introduction	Late	-0.6512346

RE	Nativeness	AR
NULL	Native	3.7616927
NULL	Late	3.4891892
CL	Native	3.2578125
CL	Late	2.7323944
PRO	Native	2.0000000
PRO	Late	1.8125000
NOM	Native	0.7842466
NOM	Late	0.5421687

*The accessibility of the referent increases as AR (accessibility ratings) increase.

Results

Count Data

Supplementary 8 - Aggregated RE counts by discourse status

RE	Discourse	Count	Percentage
SASS	Introduction	29	55.77%
M NOM	Introduction	89	54.60%
PRO	Introduction	22	50.00%
BARE NOM	Introduction	461	47.04%
BPCL	Introduction	2	2.67%
WECL	Introduction	1	0.70%
PLAIN	Introduction	1	0.56%
CA	Introduction	1	0.19%

RE	Discourse	Count	Percentage
PLAIN	Maintenance	158	88.76%
AGR	Maintenance	93	82.30%
CA	Maintenance	390	73.86%
BPCL	Maintenance	53	70.67%
WECL	Maintenance	98	68.53%
SASS	Maintenance	22	42.31%
BARE NOM	Maintenance	52	5.31%
PRO	Maintenance	2	4.55%
M NOM	Maintenance	7	4.29%

RE	Discourse	Count	Percentage
BARE NOM	Re-introduction	467	47.65%
PRO	Re-introduction	20	45.45%
M NOM	Re-introduction	67	41.10%
WECL	Re-introduction	44	30.77%
BPCL	Re-introduction	20	26.67%
CA	Re-introduction	137	25.95%
AGR	Re-introduction	20	17.70%
PLAIN	Re-introduction	19	10.67%
SASS	Re-introduction	1	1.92%

Supplementary 9 - RE counts by nativeness across all discourse statuses

Native Signers

RE	Count	Percentange
BARE NOM	484	41.47%
CA	281	24.08%
PLAIN	108	9.25%
M NOM	82	7.03%
WECL	66	5.66%
AGR	60	5.14%
BPCL	39	3.34%
PRO	24	2.06%
SASS	23	1.97%

Late Signers

RE	Count	Percentange
BARE NOM	496	44.72%
CA	247	22.27%
M NOM	81	7.30%
WECL	77	6.94%
PLAIN	70	6.31%
AGR	53	4.78%
BPCL	36	3.25%
SASS	29	2.61%
PRO	20	1.80%

Supplementary 10 - RE counts by nativeness and discourse status

Native Signers

Discourse	RE	Count	Percentage	Maintenance	CA	213	44.28%	Re-introduction	BARE NOM	243	60.15%
Introduction	BARE NOM	215	76.24%	Maintenance	PLAIN	93	19.33%	Re-introduction	CA	68	16.83%
Introduction	M NOM	37	13.12%	Maintenance	AGR	55	11.43%	Re-introduction	M NOM	42	10.40%
Introduction	PRO	16	5.67%	Maintenance	WECL	52	10.81%	Re-introduction	PLAIN	15	3.71%
Introduction	SASS	13	4.61%	Maintenance	BPCL	29	6.03%	Re-introduction	WECL	14	3.47%
Introduction	BPCL	1	0.35%	Maintenance	BARE NOM	26	5.41%	Re-introduction	BPCL	9	2.23%
				Maintenance	SASS	10	2.08%	Re-introduction	PRO	8	1.98%
				Maintenance	M NOM	3	0.62%	Re-introduction	AGR	5	1.24%

Late Signers

Discourse	RE	Count	Percentage	Maintenance	CA	177	44.92%	Re-introduction	BARE NOM	224	57.29%
Introduction	BARE NOM	246	75.93%	Maintenance	PLAIN	65	16.50%	Re-introduction	CA	69	17.65%
Introduction	M NOM	52	16.05%	Maintenance	WECL	46	11.68%	Re-introduction	WECL	30	7.67%
Introduction	SASS	16	4.94%	Maintenance	AGR	38	9.64%	Re-introduction	M NOM	25	6.39%
Introduction	PRO	6	1.85%	Maintenance	BARE NOM	26	6.60%	Re-introduction	AGR	15	3.84%
Introduction	BPCL	1	0.31%	Maintenance	BPCL	24	6.09%	Re-introduction	PRO	12	3.07%
Introduction	CA	1	0.31%	Maintenance	SASS	12	3.05%	Re-introduction	BPCL	11	2.81%
Introduction	PLAIN	1	0.31%	Maintenance	M NOM	4	1.02%	Re-introduction	PLAIN	4	1.02%
Introduction	WECL	1	0.31%	Maintenance	PRO	2	0.51%	Re-introduction	SASS	1	0.26%

Model Results

Supplementary 11 - Model specification & results

Bayesian mixed effects linear regression model (brms) in R to accessibility score (dependent variable) with discourse status and acquisition group as fixed effects and subject as random effect.

Formula: IS_Score_Auto2 ~ Discourse * Nativeness + (1 | Subject)
Number of observations: 2276
Samples: 4 chains, each with iter = 3000; warmup = 1500; thin = 1;
total post-warmup samples = 6000

parameter	outer_width	inner_width	point_est	ll	l	m	h	hh
Intercept	0.9	0.5	median	−0.74999530	−0.68800499	−0.648005813	−0.60752049	−0.5457821
Maintain	0.9	0.5	median	4.62126886	4.68051778	4.721567945	4.76303012	4.8238272
Reintroduce	0.9	0.5	median	2.15653693	2.21636128	2.255801721	2.29679608	2.3579229
Native	0.9	0.5	median	−0.02771853	0.05518456	0.113515815	0.17479881	0.2600309
Maintain*Native	0.9	0.5	median	−0.06714107	0.01771145	0.075549043	0.13417256	0.2229433
Reintroduce*Native	0.9	0.5	median	−0.15101032	−0.06466241	−0.003400046	0.05517879	0.1422650