

FREE VARIATION IN FINNISH STRUCTURAL CASE

- (1) View 1: Structural case is assigned by functional heads via agreement (e.g., Chomsky 2000, 2001, Legate 2008, Vainikka and Brattico 2014; see also Bobaljik and Wurmbrand 2009, Baker and Vinokurova 2010).
- (2) View 2: Case serves to identify and distinguish arguments (e.g., Mallinson and Blake 1981, Comrie 1989, de Hoop and Malchukov 2008).
- (3) Evidence from Finnish supports two main conclusions: (i) case arises from distinguishing arguments, not from agreement; (ii) case assignment is cyclic.
- (4) JAHNSSON’S RULE (Jahnsson 1871, Kiparsky 2001): If the clause has a subject, a singular non-pronominal object is genitive (GEN), else it is nominative (NOM).

(a) Matti nukku-i Matti.NOM sleep-PAST ‘Matti slept.’	(b) Matti ampu-i karhu-n Matti.NOM shoot-PAST bear-GEN ‘Matti shot a/the bear.’
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(c) Ammu karhu shoot.IMP bear.NOM ‘Shoot a/the bear!’	(d) Karhu ammu-ttiin bear.NOM shoot-PASS.PAST ‘The bear was shot.’
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- (5) Puzzle: In nonfinite clauses the conditioning context is non-local (see e.g., Vainikka 2003, Vainikka and Brattico 2014) and we have free variation.
- (6) Itkonen structures (Itkonen 1976, 1981):

(a) Pekka luul-i [Mati-n ampu-nee-n karhu-n] Pekka.NOM think-PAST [Matti-GEN shoot-ACT.PERF-GEN bear-GEN] ‘Pekka thought Matti to have shot a/the bear.’	(b) Mati-n luul-tiin [ampu-nee-n karhu ~ karhu-n] Matti-GEN think-PASS.PAST [shoot-ACT.PERF-GEN bear-NOM~GEN] ‘Matti was thought to have shot a/the bear.’
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- (7) Ikola structures (Ikola 1950, 1957, 1964, 1989):

(a) Pekka arvostel-i [pääätös-tä ampu-a karhu ~ karhu-n] Pekka.NOM criticize-PAST [decision-PAR shoot-1INF bear.NOM~bear-GEN] ‘Pekka criticized the decision to shoot a/the bear.’	(b) Taas arvostel-tiin [pääätös-tä ampu-a karhu] again criticize-PASS.PAST [decision-PAR shoot-1INF bear.NOM] ‘Again, the decision to shoot a/the bear was criticized.’
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- (8) Proposal:
 (a) Case serves to distinguish the external argument from other arguments.
 (b) Case assignment is cyclic.
- (9) (a) Stratal OT (Kiparsky 2000): Faithfulness protects case assigned on prior cycles, but it is violable, hence non-locality.
 (b) Partial Order OT (Anttila and Cho 1998, Djalali 2013) predicts both categorical and variable patterns, including degrees of grammaticality.

1. Simplex clauses

- (10) (a) Nominative is the unmarked case (Vainikka 1989, Legendre et al. 1993, Aissen 1999, 2003, McFadden 2009, McFadden and Sundaresan 2011).
 (b) Case distinguishes arguments (e.g., Wiik 1972, Hakulinen and Karlsson 1975, Toivainen 1993, T. Mohanan 1994; cf. Maling 2009)

- (11) Constraints:
 (a) *MARKEDCASE Do not case-mark an argument.
 (b) *MARKEDCASE/E Do not case-mark an external argument.
 (c) UNIQUENESS The external argument on the current cycle must be distinct in case from all other arguments.

- (12) **Matti** ampu-i **karhu-n**
Matti.NOM shoot-PAST **bear-GEN**
 ‘Matti shot a/the bear.’

- (13) Transitive clause: Establishes the ranking UNIQ >> *MC

NP/E NP	*MC/E	UNIQ	*MC
(a) *NOM NOM		1!	
→(b) NOM GEN			1
(c) *GEN NOM	1		1
(d) *GEN GEN	1	1	2

- (14) Talo-ssa o-n **karhu**
 house-INE have-3P.SG **bear.NOM**
 ‘There’s a bear in the house.’

- (15) Existential clause: Undominated MAXLEX protects the inherent inessive case

NP-INE NP	*MC/E	UNIQ	*MC
→(a) INE NOM			
(b) *INE GEN			1

- (16) **Matti** o-n **sotilas**
Matti.NOM be-3P.SG **soldier.NOM**
 ‘Matti is a soldier.’

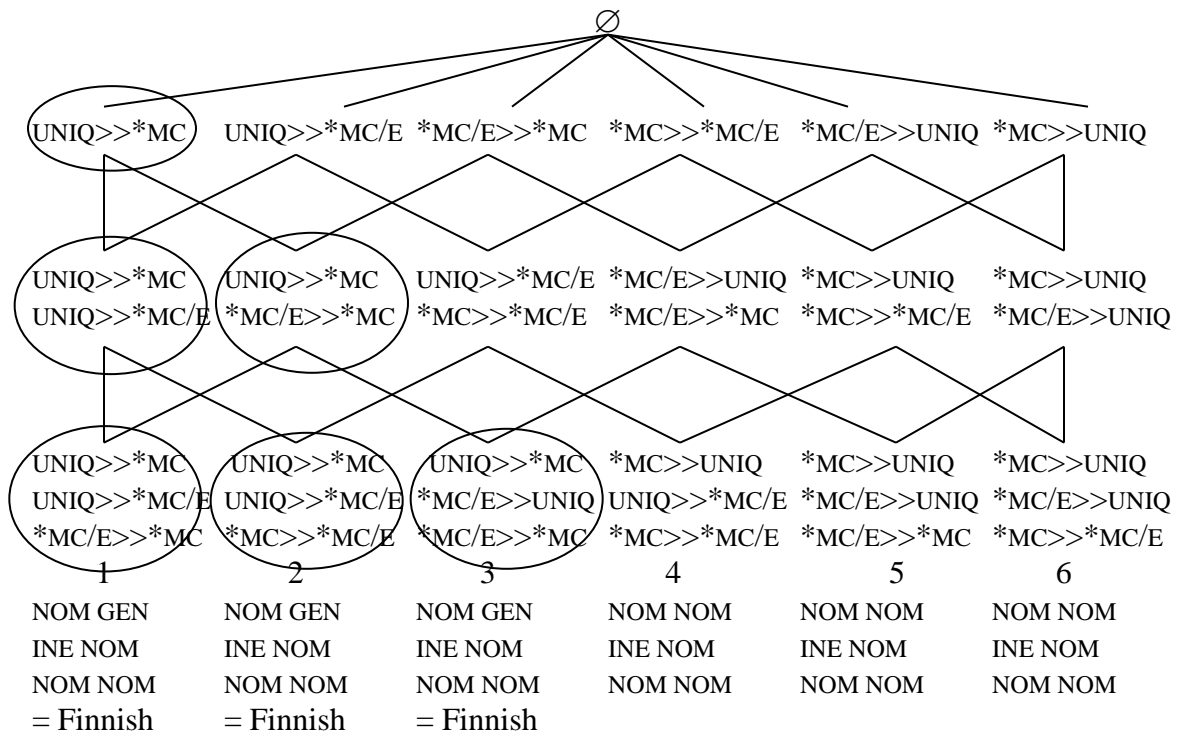
(17) Predicative clause: UNIQ is idle because there is only one argument

NP/E NP/E	*MC/E	UNIQ	*MC
→ (a) NOM NOM			
(b) *NOM GEN	1		1
(c) *GEN NOM	1		1
(d) *GEN GEN	2		2

(18) The 6 total orders. The 3 grammars compatible with Finnish are shown in bold.

TOTAL ORDER	TRANSITIVE	EXISTENTIAL	PREDICATIVE	
1. UNIQ >> *MC/E >> *MC	NOM GEN	INE NOM	NOM NOM	= Finnish
2. UNIQ >> *MC >> *MC/E	NOM GEN	INE NOM	NOM NOM	= Finnish
3. *MC/E >> UNIQ >> *MC	NOM GEN	INE NOM	NOM NOM	= Finnish
4. *MC >> UNIQ >> *MC/E	NOM NOM	INE NOM	NOM NOM	
5. *MC/E >> *MC >> UNIQ	NOM NOM	INE NOM	NOM NOM	
6. *MC >> *MC/E >> UNIQ	NOM NOM	INE NOM	NOM NOM	

(19) The 19 partial orders. The 6 grammars compatible with Finnish are circled.



(20) The simplest grammar compatible with the Finnish data is {UNIQ >> *MC}.

(21) At the moment of performance an individual randomly selects a total order compatible with the partial order {UNIQ >> *MC} = {1, 2, 3}. In this case, all three total orders predict the same outcome. That is not always the case (= variation).

(22) The goal: Find the simplest grammar that correctly predicts both the invariant and variable case patterns in both simplex and complex clauses.

(23) To be explained:

- (a) Why variation (NOM ~ GEN) in some environments, but not in others?
 (b) Why do variable environments prefer different cases (NOM vs. GEN)?

2. Itkonen structures

(24) Nonfinite propositional complements of ‘say’, ‘think’, ‘believe’, etc. headed by a participle inflected in voice, aspect, and case (Hakulinen et al. 2004, §538-542).

(25) Pekka luul-i [Mati-n nukku-va-n]
 Pekka.NOM think-PAST [Matti-GEN sleep-ACT.PRES-GEN]
 ‘Pekka thought Matti to be sleeping.’

(26) The subject GEN seems to be a non-structural case, not ECM (Kiparsky 2010):

- (a) Odot-i-t **si-tä** (b) Odot-i-t [**minu-n** saapu-va-n]
 wait-PAST-2SG **it-PAR** wait-PAST-2SG [**I-GEN** arrive-ACT.PRES-GEN]
 ‘You expected it.’ ‘You expected me to arrive.’

(27) Case pattern 1: In embedded transitive clauses

- (a) If the matrix verb is active, the object is GEN.
 (b) If the matrix verb is passive, the object varies NOM~GEN.

Pekka luul-i [Mati-n ampu-nee-n ***karhu / karhu-n**]
 Pekka.NOM think-PAST [Matti-GEN shoot-ACT.PERF-GEN **bear-*NOM / GEN**]
 ‘Pekka thought Matti to have shot a/the bear.’

Mati-n luul-tiin [ampu-nee-n **karhu ~ karhu-n**]
 Matti.GEN think-PASS.PAST [shoot-ACT.PERF-GEN **bear-NOM ~ GEN**]
 ‘Matti was thought to have shot a/the bear.’

(28) Case pattern 2: In embedded existential clauses

- (a) If the matrix verb is active, the “existential subject” prefers GEN.
 (b) If the matrix verb is passive, the “existential subject” prefers NOM.

Pekka luul-i [metsä-ssä ole-va-n **?karhu ~ karhu-n**]
 Pekka.NOM think-PAST [forest-INE be-ACT.PRES-GEN **bear-?NOM ~ GEN**]
 ‘Pekka thought there to be a bear in the forest.’

Metsä-ssä luul-tiin [ole-va-n **karhu ~ ?karhu-n**]
 forest-INE think-PASS.PAST [be-ACT.PRES-GEN **bear-NOM ~ ?GEN**]
 ‘There was thought to be a bear in the forest.’

(29) Case pattern 3: In embedded predicative clauses

- (a) If the matrix verb is active, the predicative prefers NOM.
 (b) If the matrix verb is passive, the predicative strongly prefers NOM.

Pekka luul-i [Mati-n ole-va-n sotilas ~ ?sotilaa-n]
 Pekka.NOM think-PAST [Matti-GEN be-ACT.PRES-GEN soldier-NOM ~ GEN]
 ‘Pekka thought Matti to be a soldier.’

Mati-n luul-tiin [ole-va-n sotilas ~ ??sotilaa-n]
 Matti-GEN think-PASS.PAST [be-ACT.PRES-GEN soldier-NOM ~ ??GEN]
 ‘Matti was thought to be a soldier.’

(30) Experiment (Itkonen 1976, 1981): 126 native speakers reported whether they prefer NOM or GEN on the embedded NP in 28 constructed sentences. Example:

- (a) Active + existential

Ole-n luul-lut jokaise-ssa seurakunna-ssa
 be-1P.SG think-ACT.PAST every-INE parish-INE

ole-va-n kappalainen / kappalaise-n
 be-ACT.PRES-GEN chaplain.NOM / chaplain-GEN
 ‘I have thought there to be a chaplain in every parish.’

- (b) Passive + existential

Jokaise-ssa seurakunna-ssa luul-tiin
 every-INE parish-INE be-1P.SG think-PASS.PAST

ole-va-n kappalainen / kappalaise-n
 be-ACT.PRES-GEN chaplain.NOM / chaplain-GEN
 ‘There was thought to be a chaplain in every parish.’

- (c) Active + predicative

Minä ainakin luul-i-n se-n miehe-n
 1P.SG at.least think- PAST-1P.SG it-GEN man-GEN

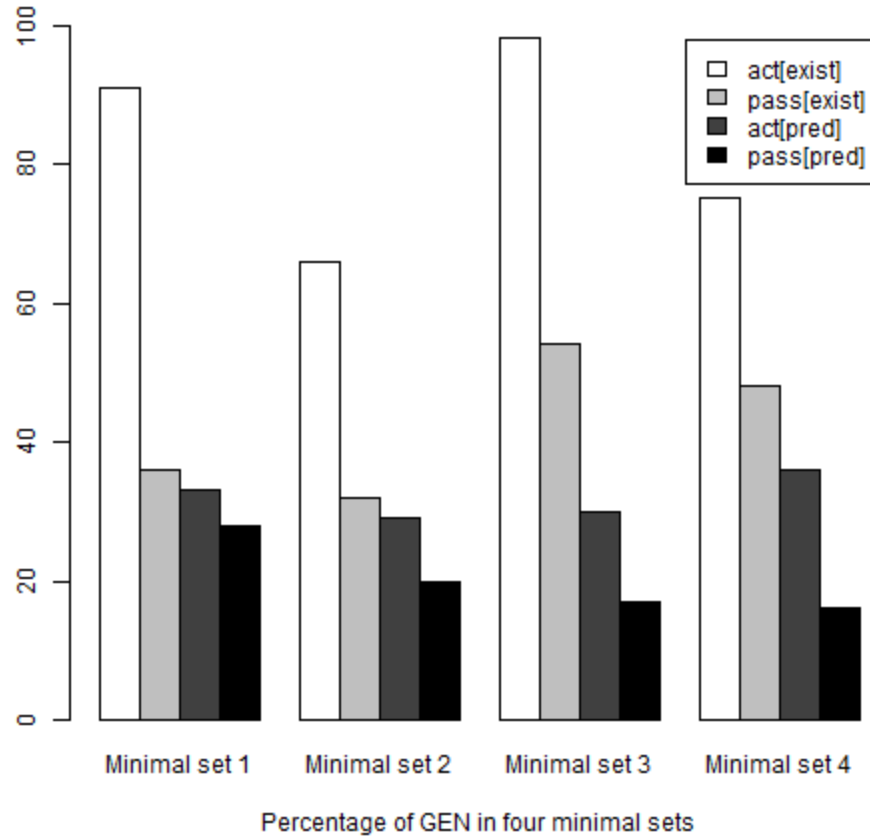
ole-va-n kappalainen / kappalaise-n
 be-ACT.PRES-GEN chaplain.NOM / chaplain-GEN
 ‘At least I thought that man to be a chaplain.’

- (d) Passive + predicative

Jo-i-ssa-kin kyl-i-ssä luul-tiin se-n miehe-n
 some-PL-INE-some village-PL-INE think- PASS.PAST it-GEN man-GEN

ole-va-n kappalainen / kappalaise-n
 be-ACT.PRES-GEN chaplain.NOM / chaplain-GEN
 ‘In some villages that man was thought to be a chaplain.’

(31) Itkonen's (1976, 1981) results for four minimal quadruplets

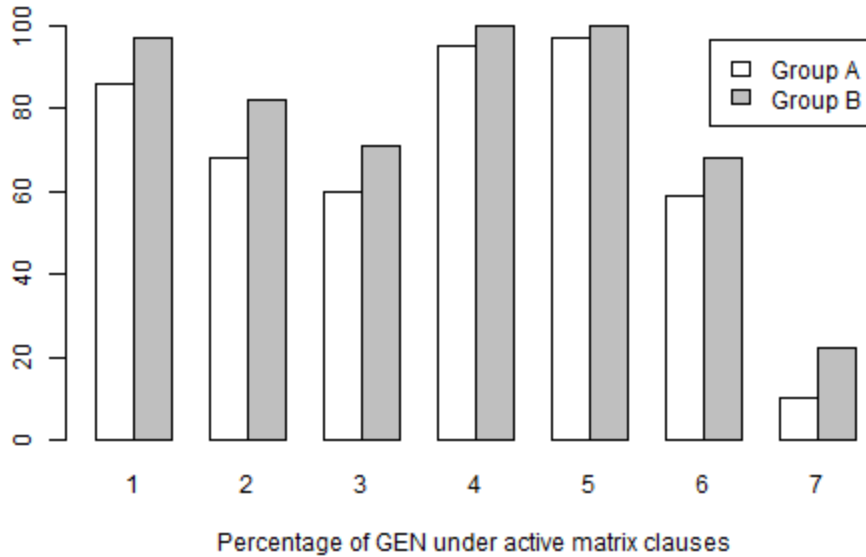


(32) Generalizations:

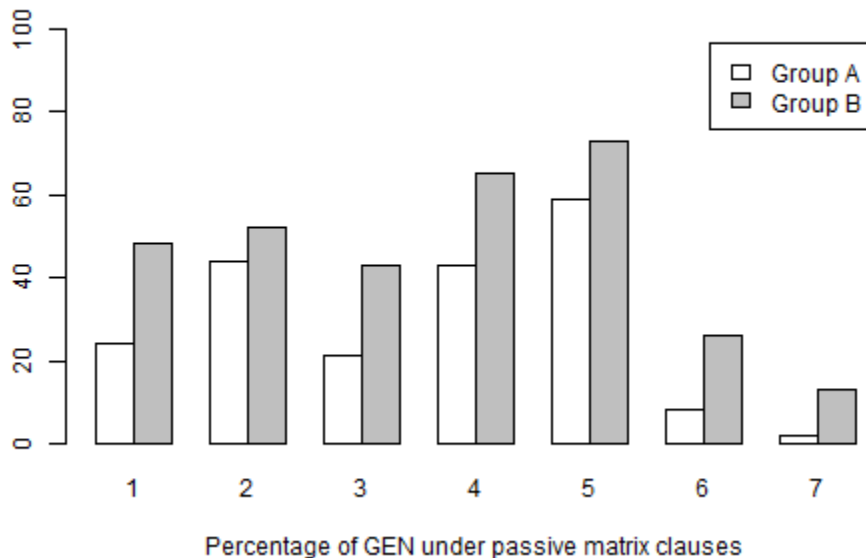
- (a) GEN is more common under actives than under passives.
- (b) GEN is more common in existentials than in predicatives.
- (c) The profiles of the four sentences are similar, but not identical.

(33) Differences among individuals (Itkonen 1976, 1981): Some individuals favor GEN, others favor NOM, independently of construction.

- (34) GEN% in embedded existentials under active matrix clauses. Group A favored and Group B disfavored NOM in embedded predicatives (Itkonen 1981:110).



- (35) GEN% in embedded existentials under passive matrix clauses. Group A favored and Group B disfavored NOM in embedded predicatives (Itkonen 1981:110).



- (36) Diachronically, NOM has been spreading along a structured path:
 Stage 1 (c. 1930's): GEN > NOM under matrix passives, in embedded predicatives
 Stage 2 (c. 1970's): GEN > NOM under matrix actives, in embedded existentials
 Why did the change proceed in this particular order?

3. Itkonen structures explained

- (37) Pekka luul-i [talo-ssa ole-va-n **?karhu ~ karhu-n]**
 Pekka.NOM think-PAST [house-INE be-ACT.PRES-GEN **bear-?NOM ~ GEN]**
 ‘Pekka (NP/E) thought there to be a bear (NP) in the house.’

- (38) Where does NOM come from? Itkonen’s proposal: ANALOGY with simplex clauses.

Talo-ssa o-n
 house-ADE have-3P.SG
 ‘There’s a bear in the house.’

karhu
bear.NOM

Pekka luul-i [talo-ssa ole-va-n **?karhu karhu-n]**
 Pekka.NOM think-PAST [house-INE be-ACT.PRES-GEN **bear-?NOM GEN]**
 ‘Pekka thought there to be a bear in the house.’

- (39) Faithfulness constraints:

- (a) MAX/NP No case deletion in an NP
 (b) DEP/NP No case insertion in an NP

- (40) The GEN case on the participle:

* \emptyset_C (CP) All nominal heads in a complement clause must have case

- (41) Example: Active matrix, embedded existential

NP/E [NP-INE NP-NOM]	*MC/E	MAX/NP	DEP/NP	UNIQ	*MC	* \emptyset_C (CP)
(a)→ NOM [INE oleva-n GEN]			1		1	
(b)→ NOM [INE oleva-n NOM]				1		1
(c) *GEN [INE oleva-n GEN]	1		1	1	2	
(d) *GEN [INE oleva-n NOM]	1				1	1
(e) *NOM [INE oleva GEN]			1		1	1
(f) *NOM [INE oleva NOM]				1		2
(g) *GEN [INE oleva GEN]	1		1	1	2	1
(h) *GEN [INE oleva NOM]	1				1	2

- (42) How to find the simplest grammar that predicts (41a) ~ (41b) and excludes (41d)? More generally, how to find the simplest grammar that gets all the data (simplex clauses, Itkonen structures)? Answer: OTOOrder (Djalali and Jeffers 2014).

- (43) The grammar of Finnish structural case (180 total orders)

UNIQ >> *MC (inferred from simplex clauses)
 *MC/E >> DEP/NP (inferred from Itkonen structures)

- (44) The grammar predicts free variation (41a) ~ (41b) reflecting the speaker’s free choice among the available total rankings at the time of performance.

- (45) Explaining Itkonen’s generalizations:
- (a) How does the matrix active/passive difference matter? Answer: In passives UNIQ is idle and markedness (*MC) favors NOM.
 - (b) How does the transitive/existential/predicative difference matter? Answer: The first cycle case is inherited via faithfulness (MAX/NP, DEP/NP).
- (46) How about the intermediate well-formedness judgments in variation?
- (47) Some winners ENTAIL other winners (Prince 2002a, 2002b, 2007). Examples:
- (a) If NOM wins in existentials, it wins in predicatives (Tableaux 1, 2)
 - (b) If NOM wins under actives, it wins under passives (Tableaux 1, 3)

Tableau 1: Active matrix, embedded existential

NP/E [NP-INE NP-NOM]	*MC/E	MAX/NP	DEP/NP	UNIQ	*MC	*Ø _C (CP)
(a) NOM [INE GEN]			1 W	L	1 W	L
(b) → NOM [INE NOM]				1		1

Tableau 2: Active matrix, embedded predicative

NP/E [NP/E-NOM NP/E-NOM]	*MC/E	MAX/NP	DEP/NP	UNIQ	*MC	*Ø _C (CP)
(a) NOM [GEN GEN]	2 W		2 W	L	2 W	L
(b) → NOM [GEN NOM]	1		1	1	1	1

Tableau 3: Passive matrix, embedded existential

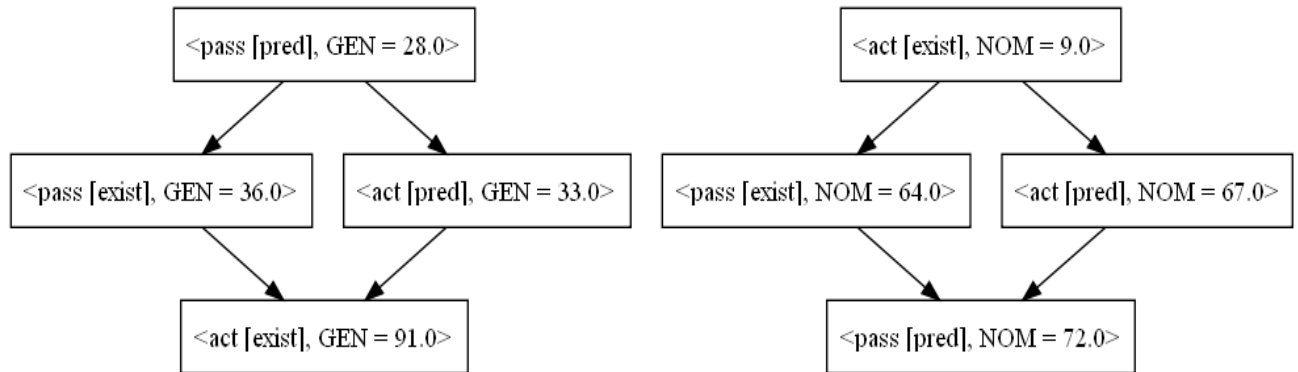
[NP-INE NP-NOM]	*MC/E	MAX/NP	DEP/NP	UNIQ	*MC	*Ø _C (CP)
(a) [INE GEN]			1 W		1 W	L
(b) → [INE NOM]						1

- (48) Entailments structure the space of variation. Our partial order derives the following typology (computed with OTSoft, Hayes et al. 2003):

Inputs	1	2	3	4	5	6
active[existential]:	GEN	GEN	GEN	GEN	GEN	NOM
active[predicative]:	GEN	GEN	GEN	NOM	NOM	NOM
passive[existential]:	GEN	GEN	NOM	GEN	NOM	NOM
passive[predicative]:	GEN	NOM	NOM	NOM	NOM	NOM

- (49) At the moment of performance an individual randomly selects a total order from this typology (Kiparsky 1993, Anttila 1997, Anttila and Cho 1998, Riggle 2010). Prediction: Less NOM with active[existential] than with active[predicative].
- (50) These predictions are consistent with Itkonen’s (1976, 1981) experimental data. The graph in (51) displays the predicted entailments (Anttila and Andrus 2006).

- (51) The case of *chaplain*: predictions and observations
 act[exist] ‘I have thought there to be a **chaplain** in every parish’
 pass[exist] ‘There was thought to be a **chaplain** in every parish’
 act[pred] ‘At least I thought that man to be a **chaplain**’
 pass[pred] ‘In some villages that man was thought to be a **chaplain**’

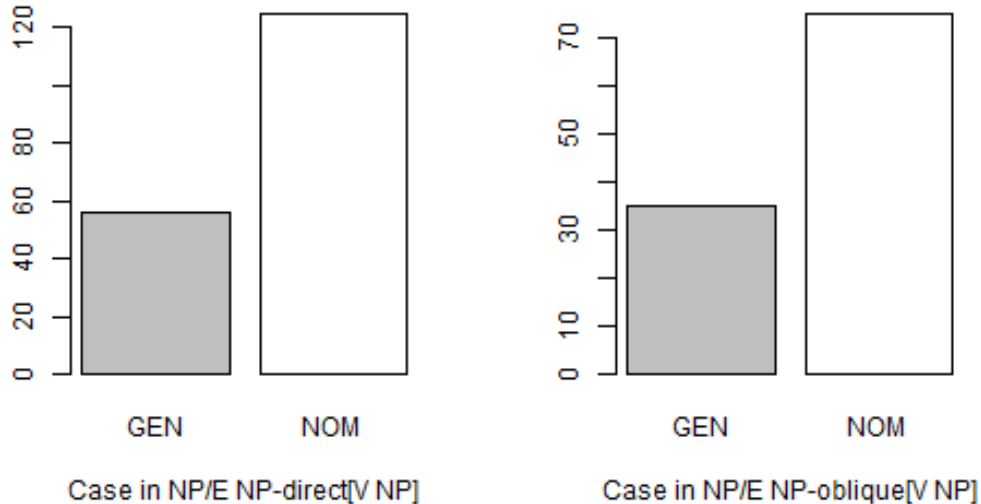


- (52) Diachronically GEN > NOM had to occur in predicatives and passives before existentials and actives. The opposite order would have created synchronically impossible dialects (Kroch 1989, Kiparsky 2006).

4. Ikola structures

- (53) Matti sa-i [tilaisuude-n ampu-a **karhu ~ karhu-n**]_{NP}
 Matti.NOM get-PAST [opportunity-GEN shoot-1INF bear.NOM ~ bear-GEN]_{NP}
 ‘Matti (NP/E) got an opportunity (NP) to shoot a/the bear (NP).’
- (54) Variation is possible if the following three conditions are simultaneously satisfied:
 (a) the matrix clause is active, i.e., has a nominative subject, and
 (b) the embedded VP is transitive, i.e., the NP is an internal argument, and
 (c) the matrix NP (= Ikola structure itself) is not an external argument.
- (55) Corpus: 1,577 Ikola structures extracted from *Aamulehti 1999* (16.6 million words, CSC, IT Center for Science Ltd, Finnish Ministry of Education, Science and Culture, <http://www.csc.fi/>), manually checked and annotated for 11 variables.

(56) GEN vs. NOM variation in two Ikola structures:



(57) No variation under passives, if the embedded NP is predicative, or if the Ikola structure itself is an external argument (subject or predicative):

Kylä-ssä saa-tiin tilaisuus ampu-a **karhu**
 village-INE get-PASS.PAST opportunity.NOM shoot-1INF bear.NOM
 ‘In the village, an opportunity (NP) was obtained to shoot a/the bear (NP).’

Matti sa-i tilaisuude-n ol-la **sankari**
 Matti.NOM get-PAST opportunity-GEN be-1INF hero.NOM
 ‘Matti (NP/E) got an opportunity (NP) to be a hero (NP/E).’

Tilaisuus ampu-a **karhu** yllätt-i Mati-n
 opportunity.NOM shoot-1INF **bear.NOM** surprise-PAST Matti-GEN
 ‘The opportunity (NP/E) to shoot a/the bear (NP) surprised Matti (NP).’

(58) (a) Itkonen structures

(b) Ikola structures

	Transitive	Predicative
Active	GEN	NOM ~ GEN
Passive	NOM ~ GEN	NOM ~ GEN

	Transitive	Predicative
Active	NOM ~ GEN	NOM
Passive	NOM	NOM

(59) Ikola structures prefer NOM across the board. Why? Because the first cycle has only one embedded argument, hence UNIQ is idle, and NOM always wins.

Matti sa-i [tilaisuude-n ampu-a **karhu ~ karhu-n**]_{NP}
 Matti.NOM get-PAST [opportunity-GEN shoot-1INF **bear.NOM ~ bear-GEN**]_{NP}
 ‘Matti (NP/E) got an opportunity (NP) to shoot a/the bear (NP).’

(60) 1st cycle: 'opportunity to shoot a bear (NP)', 'opportunity to be a hero (NP/E)'

NP	*MC/E	MAX/NP	DEP/NP	UNIQ	*MC	*ØC(CP)
(a) → NOM						
(b) *GEN					1	
NP/E	*MC/E	MAX/NP	DEP/NP	UNIQ	*MC	*ØC(CP)
(a) → NOM						
(b) *GEN	1				1	

(61) 2nd cycle: 'Matti (NP/E) got an opportunity (NP) to shoot a/the bear (NP)'

NP/E [NP NP-NOM]	*MC/E	MAX/NP	DEP/NP	UNIQ	*MC	*ØC(CP)
(a) *NOM [NOM NOM]				2		
(b) *NOM [NOM GEN]			1	1	1	
(c) → NOM [GEN NOM]				1	1	
(d) *GEN [NOM NOM]	1				1	
(e) → NOM [GEN GEN]			1		2	
(f) *GEN [NOM GEN]	1		1	1	2	
(g) *GEN [GEN NOM]	1			1	2	
(h) *GEN [GEN GEN]	1		1	2	3	

(62) Find the simplest grammar that works for simplex clauses, Itkonen structures, and Ikola structures (OTOrder, Djalali and Jeffers 2014).

(63) The grammar of Finnish structural case (150 total orders)

- UNIQ >> *MC (inferred from simplex clauses)
- *MC/E >> DEP/NP (inferred from Itkonen structures)
- *MC/E >> *MC (inferred from Ikola structures)

(64) (a) Itkonen structures

	Transitive	Predicative	Existential
Active	GEN	NOM ~ GEN	NOM ~ GEN
Passive	NOM ~ GEN	NOM ~ GEN	NOM ~ GEN

(b) Ikola structures

	Transitive	Predicative
Active	NOM ~ GEN	NOM
Passive	NOM	NOM

(65) Our analysis predicts the correct outcome in all 10 cells, including the correct quantitative patterns among the 4 variable cells studied by Itkonen.

5. Are all NPs cyclic?

(66) Ikola's hypothesis: The variation in active[transitive] is not free: the object of the infinitive prefers GEN if matrix verb + matrix object form a CLOSELY KNIT UNIT.

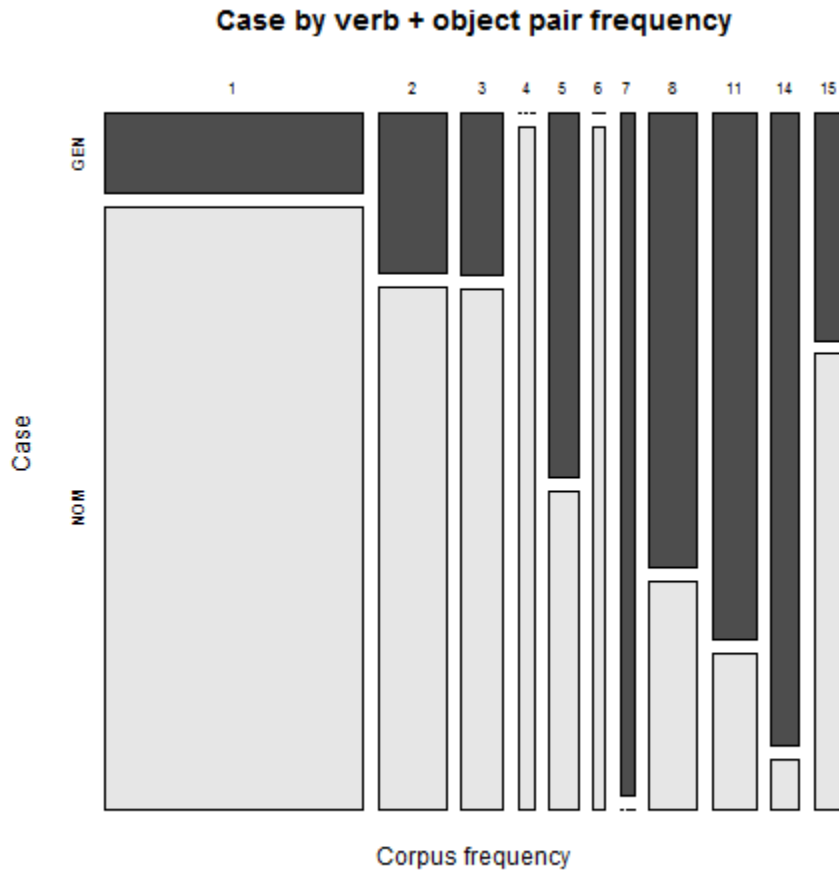
(67) Example: 'grant the right' vs. 'caused a difficulty' (Ikola 1964, 72-73)

Valtiosääntö myöntä-ä hallitukse-lle oikeude-n hajotta-a **eduskunna-n**.
 const.NOM grant-3P.SG govt-ALL right-GEN dissolve-1INF **parliament-GEN**
 'The constitution grants the government the right to dissolve the parliament.'

Tämä aiheutt-i huomattava-n vaikeude-n saa-da **virka** täytety-ksi.
 this cause-PAST significant-GEN difficulty-GEN get-1INF **vacancy.NOM** filled-TRA
 'This caused a significant difficulty in getting the vacancy filled.'

(68) How to operationalize "closely knit unit"? First approximation: the frequency of a matrix verb + matrix object pair. We have 295 pairs, 167 distinct pairs.

(69) The distribution of NOM vs. GEN by matrix verb + matrix object pair frequency



- (70) Modeling the choice of case using logistic regression. Dependent variable: case of embedded object (NOM vs. GEN). Control variables: case (ADV, GEN, NOM, PAR) and number (PL, SG) of matrix object. The log frequency of the matrix verb + matrix object pair emerges as a significant predictor.

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-3.25804	0.53513	-6.088	1.14e-09 ***
Case = GEN	-0.04998	0.34057	-0.147	0.883
Case = NOM	-15.15894	819.30702	-0.019	0.985
Case = PAR	-0.68888	0.46502	-1.481	0.139
N num = SG	0.79221	0.48356	1.638	0.101
VN logfreq	1.32644	0.21506	6.168	6.93e-10 ***

Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.' 0.1 ' ' 1

- (71) Reinterpreting Ikola: There are two kinds of matrix verb + matrix object pairs:
 (a) In a loosely knit (typically low-frequency) pair the object NP is cyclic.
 (b) In a closely knit (typically high-frequency) pair the object NP is noncyclic.
- (72) Noncyclic NPs ignore faithfulness (MAX/NP, DEP/NP). Prediction: If the NP is noncyclic, the matrix clause is active, and the embedded predicate has an internal argument (= the variation environment) only GEN is predicted.

6. Summary

- (73) (a) Case serves to distinguish the external argument from other arguments.
 (b) Case assignment is cyclic.
- (74) The same grammar (6 constraints, 3 rankings) correctly predicts
 (a) categorical case alternation patterns in both simplex and complex clauses
 (b) intermediate well-formedness judgments in variation patterns

Selected references (full list at <http://www.stanford.edu/~anttila/research/papers.html>)

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