Relative clause structure and projecting movement: Insights from inverse case attraction in Moksha Mordvin

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1 Introduction

- Inverse case attraction (ICA) is a phenomenon under which the head of a postnominal relative clause bears case assigned to a relativized element inside the relative clause.

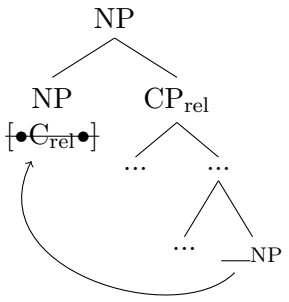
(1) [head-α [$_{CP}$ relative.pronoun-α ... predicate$_{[\text{case: }\alpha]}$...] ... predicate$_{[\text{case: }\beta]}$ ...]

(2) GEN ← DAT
Jalga-z'ə-**n'd'i** [kona-**n'd'i** t'aš-n'ə-n'] mon n'ɛj-sa kurək.
friend-1SG.POSS.SG-DAT which-DAT write-FREQ-PST.1SG I[NOM] see-NPST.3SG.O.1SG.S soon
'I will soon see my friend to whom I have been writing.'

(3) Mon n'ɛj-sa kurək jalga-z'ə-**n'/*n'd'i**.
I see-NPST.3SG.O.1SG.S soon friend-1SG.POSS.SG-GEN/*DAT
'I will see soon my friend.'

- In this talk, I will argue that **(i) ICA relatives are externally-headed** and **(ii) ICA is derived by raising structure**.
- This implies that raising derivation must be part of natural language syntax (see Schachter (1973), Vergnaud (1974), Kayne (1994), Sauerland (1998, 2003), Bianchi (1999, 2000), Bhatt (2002), De Vries (2002), Donati & Cecchetto (2011), and Sportiche (2017)). I further suggest that it co-exists with the head-external generation.
- After this, I will review existing approaches to the syntax of raising and suggest that it is best derived by **projecting movement of the head noun**, which in turn follows from projection by selection approach to labeling (see Chomsky (1995), Adger (2003) as well as Stabler (1997)) combined with the possibility of upward search (see Baker (2008), Wurmbrand (2012), Zeijlstra (2012), Himmelreich (2017), and Bjorkman & Zeijlstra (2019), i.a.).

(4) Projecting movement in RCs



- Finally, I will turn to a long-standing puzzle of case marking in raising derivation (see Borsley (1997)). I will show that ordering of features allows to derive internal case on raising heads in Moksha and external case in other languages.
- This opens up a novel approach to case overwriting phenomena (see Bejar & Massam (1999)) and once again shows that a language specific fixing of an initially indeterminate order of elementary operations may underlie parametrization (cf. Georgi (2017) and Murphy & Puškar (2018)).

Outline

Section 2: Head of relative with ICA is external.
Section 3: Relatives with ICA are derived by raising.
Section 4: Projecting movement underlies raising structure.
Section 5: Derived left peripheral position follows from second order selection features.

2 ICA and typology of relative clauses

2.1 Background

- Virtually all major structures of relative clauses were assigned to relative clauses with ICA.

1. Relative clauses with ICA are a sub-type of correlative clauses with a linearly reversed order of the relative pronoun and the head noun (see Pittner (1995), Bhatt (2005), Georgi & Salzmann (2017) and also Bianchi (1999, 2000)).

(5) $[_{\text{CP}}$ head-α relative.pronoun-α ... case.assigner$_{[\text{case: }\alpha]}$ ... $]$, $[_{\text{MC}}$... case.assigner$_{[\text{case: }\beta]}$ pronoun-β... $]$

2. Relative clauses with ICA are internally-headed, but not correlatives (see, e.g., Abramovitz (2021)).

(6) $[_{\text{MC}}\ [_{\text{DP}}$ D ... $[_{\text{CP}}$ head-α relative.pronoun-α ... case.assigner$_{[\text{case: }\alpha]}$ ... $]\ ]$ ... case.assigner$_{[\text{case: }\beta]}\ ]$

3. Relative clauses with ICA are externally-headed (see Deal (2016)).

(7) $[_{\text{MC}}\ [_{\text{DP}}$ ... head-α, $[_{\text{CP}}$ relative.pronoun-α ... case.assigner$_{[\text{case: }\alpha]}$ ... $]$, $]$ ... case.assigner$_{[\text{case: }\beta]}\ ]$

Claim: Relative clauses with ICA are best analyzed as externally-headed relative clauses.

2.2 Interpretation

- Since Grosu & Landman (1998) and Grosu (2002), three interpretations of relative clauses are standardly identified: appositive, restrictive, and maximalizing.
- Interpretations differ in whether the meaning of a noun phrase with a relative clause is determined inside or outside of the relative CP.
  - Appositive interpretation: Reference of the noun phrase is fully determined outside of the relative CP.
  - Restrictive interpretation: Reference of the noun phrase is determined jointly by a material in the relative CP and a material in the main clause.
  - Maximalizing interpretation: Reference is fully determined inside the relative CP.
- Cross-linguistically, there seems to be a correlation between syntactic type of the relative clause and the set of possible interpretations.
  - Correlatives can be only maximalizing (see Grosu (2002), Lipták (2009), Brasoveanu (2012), Lin (2020)).
  - Internally-headed relative clauses can be maximalizing or restrictive (see Grosu (2002, 2012), Watanabe (2004); cf. also a recent research by Hanink (2021) and Hucklebridge (2022)), but not appositive (see Lehmann (1984, 278), De Vries (2002, 29), Grosu (2012)).

⇝ If relatives with ICA have an appositive interpretation, they must be externally-headed.

- The **appositive interpretation** is possible for relatives with ICA. It can be ensured by parenthetical expression as illustrated in (8).

(8) NOM ← GEN
Rovnaj kaftə pr'istupn'ik-n'ə-**n'** kona-t'n'ə-n' meždu pročim kunda-z'ən' Pet'ɛ
straight two criminal-DEF.PL-GEN which-DEF.PL-GEN between others catch-PST.3PL.O.3SG.S Petja[NOM]
vor'gəd'-kšn'ə-s'-t'.
run.away-AVR-PST.3-PL
'Exactly two criminals, who Petja, by the way, caught, were running away.'

- Incompatibility of continuation (9a) indicates that the head noun is interpreted in the matrix clause and the reference of the noun phrase that contains a relative clause is fully determined there; that is, the relative clause is appositive.

(9) a. #Kolmə-c'ə pr'istupn'ik-s' vor'gəd'-kšn'ə-s' no Pet'ɛ iz'-əz'ə
three-ORD criminal-DEF.SG[NOM] run.away-AVR-PST.3[SG] no Petja[NOM] NEG.PST-PST.3SG.O.3SG.S
kunda son'.
catch PRON.3SG.GEN
'Petja did not catch the third criminal that was also running away.'

b. OK Pet'ɛ kunda-z'ə kolmə-c'ə pr'istupn'ik-t' no son kɛš-s'
Petja[NOM] catch-PST.3SG.O.3SG.S three-ORD criminal-DEF.SG.GEN but PRON.3SG hide-PST.3[SG]
saraj-sə.
barn-IN
'Peter also caught a third criminal, but he was hiding in a barn.'

- Relatives with ICA can be **restrictive** as well.

(10) NOM ← GEN
Koj kona pr'istupn'ik-n'ə-**n'** kona-t'n'ə-n' kunda-z'ən' Pet'ɛ
INDEF which criminal-DEF.PL-GEN which-DEF.PL-GEN catch-PST.3PL.O.3SG.S Petja[NOM]
vor'gəd'-kšn'ə-s'-t'.
run.away-AVR-PST.3-PL
'Some criminals that Petja caught were running away.'

- Under restrictive interpretation, example (10) denotes a non-empty intersection of a set of criminals arrested by Petja and a set of criminals that were running away. This enables the continuation in (11).

(11) OK Kolmə pr'istupn'ik-n'ə-n' Pet'ɛ iz'-əz'ən' kunda i kaft-t'n'ə
three criminal-DEF.PL-GEN Petja[NOM] NEG.PST.3PL.O.3SG.S catch.CN and two-DEF.PL[NOM]
maks'-s'-t' pr'ɛ sin'-c'.
give-PST.3-PL head they-INT
'Petja did not catch three criminals and two criminals surrendered themselves.'

- Relatives with ICA also show other properties typical for externally-headed relatives. As shown in (12), they allow for **stacking**.

(12) NOM ← GEN
Pɛr'ɛkɛ-**t'** **kona-n'** pid'-əz'ə sas'ədə-z'ə **kona-n'** min'
pie-DEF.SG.GEN which-GEN cook-PST.3SG.O.3SG.S neighbor-1SG.POSS.SG[NOM] which-GEN we[NOM]
srazu seva-s'k ul'-s' kapsta-n'.
immediately eat-PST.3.O.1PL.S be-PST.3[SG] cabbage-GEN
'The pie that my neighbor cooked that we immediately ate was with cabbage.'

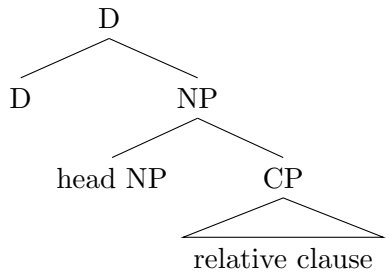
ICA patterns with externally-headed relatives.

- There is a number of other properties that were used as a diagnostic for the relative clause type in existing literature. These are **extraposition**, **extraction** out of the relative CP, and **obligatory left-peripheral position** of relatives with ICA.
- I will return to these properties later and show that they are fully compatible with current analysis and in fact shed no light on the position of the head inside or outside of the relative CP.

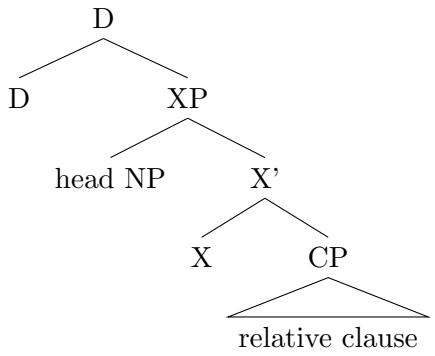
2.3 Structures for externally-headed relatives

- At least, two different structures were proposed for externally-headed relative clauses.
  - The head noun phrase may have a regular DP structure as in (13).
  - The NP may be in the specifier of an additional functional projection; see (14).

(13) Regular DP structure



(14) NP in Spec,XP



- The latter structure was proposed along with the raising derivation, according to which the head of the relative clause originates inside the relative CP and then moves out. Since movement targets specifiers, the head noun must be also in Spec.
- Analyses differ with respect to the identity of the X head: It can be one of the extended CP projections (see Bianchi (1999, 2000)) or some nominal head (see Bhatt (2002), Deal (2016)).
- I will show that independently what the X head is, structures in (14) cannot be correct.

Against NP in Spec,XP: Nominal inflection

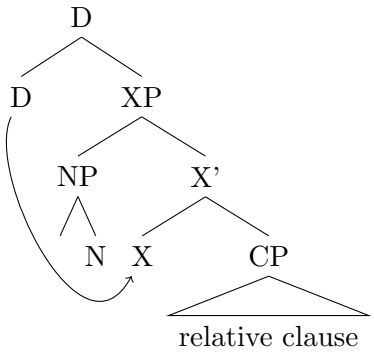
- In (15), XP breaks down the spine of nominal projections, so that the noun is not D's complement, but appears in the specifier of D's complement. This makes wrong predictions for nominal inflection.
- Nouns in Moksha are morphologically marked for definiteness feature.

(15) kodamə bd'ə pin'ə-n'd'i
how INDEF dog-DAT
'to some dog'

(16) t'ɛ pin'ə-t'i
this dog-DEF.SG.DAT
'to this dog'

- Definiteness is often associated with the D head and can appear on the noun via Lowering (see Embick & Noyer (2001)) or head movement. Nouns in Moksha seem to remain low, which excludes head movement.
- Under the structure involving XP, definiteness is predicted to lower onto the X head instead of the noun (see (17)).
- The data in Moksha show that a noun in the head of the relative clause bears a regular definiteness inflection.

(17) *Lowering into Spec



(18) a. NOM ← DAT
T'ɛ pin'ə-**t'i** kona-n'd'i maks-in'ə jaŗca-ma-t' aščˇ-i dvor-sə.
this dog-DEF.SG.DAT which-DAT give-PST.3.O.1SG.S eat-NZR-DEF.SG.GEN be-NPST.3[SG] yard-IN
'This dog that I gave food is in the yard.'

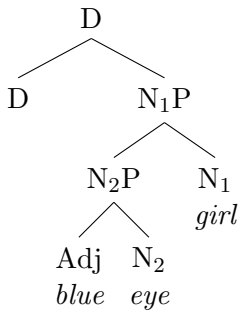
b. NOM ← DAT
Kodamə bd'ə pin'ə-**n'd'i** kona-n'd'i maks-in'ə jaŗca-ma-t' aščˇ-i ul'ic'a-sə.
how INDEF dog-DAT which-DAT give-PST.3.O.1SG.S eat-NZR-DEF.SG.GEN be-NPST.3[SG] street-IN
'Some dog that I gave food is on the street.'

- The argument can be generalized to be independent of Lowering: Data below show definiteness inflection in Moksha is not realized in the structural position occupied by the noun in (17); that is, inflection is not realized on specifiers (or other modifiers) of the main projection line.

(19) [Mosku-stə] pojəzt-t'
Moscow-EL train-DEF.SG.GEN
'(see) the train from Moscow'

(20) Son n'ɛj-əz'ə [s'en'əm sel'mə] s't'ər'-n'ɛ-t'.
she see-PST.3SG.O.3SG.S blue eye girl-DIM-DEF.SG.GEN
a.*[t'ɛ s'en'əm sel'mə] s't'ər'-n'ɛ-t'
this blue eye girl-DIM-DEF.SG.GEN
b. [s'en'əm sel'mə-(*s'/*t'n'ə)] s't'ər'-n'ɛ-t'
blue eye-DEF.SG[NOM]/DEF.PL[NOM] girl-DIM-DEF.SG.GEN
'She saw the girl with these blue eyes.'

(21) NP modifier



- The position of the head in Spec,XP is also problematic for other languages (cf. Heck (2005), Pankau (2018)).

Relatives with ICA have the following structure: [DP D [NP NP [CPrel ...]]]

3 Connectivity effects

3.1 Background

- There are three major generation types proposed for externally-headed relative clauses.

1. **Raising**; see Schachter (1973), Vergnaud (1974), Kayne (1994), Sauerland (1998, 2003), Bianchi (1999), Bhatt (2002), De Vries (2002), Henderson (2007), Donati & Cecchetto (2011), Sportiche (2017).

   (22) [DP head [CP __head C_{rel} ... __head]]

2. **Matching**; see Lees (1960, 1961), Chomsky (1965), Munn (1994), Sauerland (1998, 2003), Cresti (2000), Citko (2001), Salzmann (2006, 2017, 2018), Cinque (2015, 2020).

   (23) [DP head [CP ~~head~~ C_{rel} ... __head]]

3. **External head**; see Partee (1975), Chomsky (1977), Jackendoff (1977), Platzack (2000), Boef (2012) as well as the handbooks by Haegeman (1994) and Heim & Kratzer (1998).

   (24) [DP head [CP ... C_{rel} ...]]

- **Inverse case attraction** was initially taken to be one of the arguments for the raising analysis (see Bianchi (1999, 2000), Deal (2016)) but then re-analyzed.
  - Relative clause internal origin of the head noun straightforwardly predicts the head can get its case assigned inside the relative clause.

   (25) [DP head-DAT [CP __headDAT C_{rel} ... $predicate_{[dat]}$ __head-DAT] $predicate_{[nom]}$]

- However, it was later shown that matching and external head analyses can also capture the data.
  - In matching derivation, it can be the internal head that is overt instead of the external one (see Cinque (2015, 2020), Wood et al. (2017), and to some extent Abramovitz (2021))

   (26) [[DP ~~head-NOM~~ [CP head-DAT relative.pronoun-DAT ... $predicate_{[dat]}$ ...]] ... $predicate_{[nom]}$]

– External head can also just agree with the relative pronoun in case (see Harbert (1983), Gračanin-Yuksek (2013), and also Bader & Meng (1999), Bader & Bayer (2006), Czypionka et al. (2018)).

(27) [[$_{DP}$ head [$_{CP}$ relative.pronoun-DAT C_{rel} ... predicate$_{[dat]}$ ...]] ... predicate$_{[nom]}$]
case

- On the basis of connectivity effects and comparison to regular externally-headed relatives as in (28), I will argue that relative clauses with ICA must be indeed analyzed by raising.

(28) Mon kurək n'ɛj-sa jalga-z'ə-n' [kona-n'd'i t'aš-n'ə-n'].
I soon see-NPST.3SG.O.1SG.S friend-1SG.POSS.SG-GEN which-DAT write-FREQ-PST.1SG
'I will soon see my friend to whom I have been writing.'

3.2 Data

Idioms

- The first diagnostic is based on the assumption that parts of an idiom must be base generated as a constituent (see Bach (1974), Chomsky (1980, 149-153), and McCawley (1998, 57)).
- If so, the ability of the head noun to build an idiom with a material from the relative CP and/or with a material from the main clause must shed light on the derivational path of the head noun.
- I will use idiom *pan'žəms potmə*. Its direct translation is 'to open guts/insides' and idiomatic meaning is 'to open up / to tell everything'.
- Example (29) shows that the head noun can build an idiom with the relative clause internal material only if the head noun has an internal case.

(29) NOM ← GEN
Potmə-nc/*c [kona-n' Vas'ɛ **pan'ž-əz'ə** ava-ncti]
gut-3SG.POSS.SG.GEN/*3SG.POSS.SG which-GEN Vasja[NOM] open-PST.3SG.O.3SG.S wife-3SG.POSS.SG.DAT
kunarə af maks-i pokoj.
long.ago NEG give-PST.3[SG] rest
'Everything that Vasja told to his wife was worrying him for a long time.'

- Example (30) illustrates that the idiom in the main clause is grammatical only if the head noun shows case assigned in the main clause.

(30) **Potmə-nc/*c** [kona kunarə af maks-i pokoj] Vas'ɛ
gut-3SG.POSS.SG.GEN/*NOM which[NOM] long.ago neg give-PST.3[SG] rest Vasja
pan'ž'-əz'ə ava-ncti
open-PST.3SG.O.3SG.S wife-DEF.SG.DAT
'Vasja opened his wife the secret that was worrying him for a long time.'

Anaphor binding

- The second diagnostic is based on binding of anaphors which according to Condition A of the standard Binding Theory must be bound by a local c-commanding syntactic object (see Chomsky (1981, 1986)).
- One of the ways to express reflexivity in Moksha is by pronoun *es'* 'self' (see Toldova & Shalganova (2018) for a recent description).

(31) Van'ɛ$_i$ es'$_{i/*j}$ var'aga-nc mu-z'ə.
Vanja[NOM] self mitten-3SG.POSS.SG.GEN find-PST.3SG.O.SG.S
{Context: Petja lost his mitten.} 'Vanja$_i$ found his$_i$ mitten.' (Toldova & Shalganova, 2018, 654)

- Anaphor in the head noun can be bound inside the relative CP only if the head has internal case.

(32) NOM ← GEN
Es'$_i$ kud-**ənc** [kona-n' **Vas'ɛ$_i$** mi-z'ə ___] t'ɛn'i aščː-i
self house-3SG.POSS.SG.GEN which-GEN Vasja[NOM] sell-PST.3SG.O.3SG.S now be-PST.3[SG]
savə
empty
'His$_i$ house that Vasja$_i$ sold is now empty.'

(33) ***Es'$_i$** kud-**əc** [kona-n' **Vas'ɛ$_i$** mi-z'ə ___] t'ɛn'i aščː-i
self house-3SG.POSS.SG[NOM] which-GEN Vasja[NOM] sell-PST.3SG.O.3SG.S now be-PST.3[SG]
savə.
empty
Intended: 'His house that Vasja sold is now empty.'

- This dependency seems to be sufficient to diagnose the base position of the head noun, but I would like to strengthen the argument by excluding the possibility of binding by a logophoric center.
- Following Charnavel & Sportiche (2016), Charnavel (2019), and Charnavel & Bryant (2022), logophoric binding is excluded if a reflexive refers to an inanimate object, because inanimate objects cannot constitute a perspectival center; cf. (34).

(34) ***Es'** luv-ij-ənzə kelk-saz' t'ɛ **kn'iga-t'**.
self read-PTCP.ACT-3SG.POSS.PL[NOM] love-NPST.3.O.3PL.S this book-DEF.SG.GEN
Intended: 'Its$_i$ readers love this book$_i$.'

- Applied to relative clauses, reflexives with an inanimate antecedent show the same dependency from the case marking on the head noun.

(35) NOM ← DAT
Es'$_i$ luv-ij-ənzə-**n'd'i** [kona-t'n'ə-n'd'i t'ɛ **kn'iga-s'$_i$** maks-i ___
self read-PTCP.ACT-3SG.POSS.PL-DAT which-DEF.PL-DAT this book-DEF.SG[NOM] give-NPST.3[SG]
nad'əja-ma] uč-i̊j-t' pe.
hope-NZR wait-NPST.3-PL end
'Its$_i$ readers whom this book$_i$ gave hope are waiting for the continuation.'

(36) ***Es'** luv-ij-ənzə [kona-t'n'ə-n'd'i t'ɛ **kn'iga-s'** maks-i ___
self read-PTCP.ACT-3SG.POSS.PL[NOM] which-DEF.PL-DAT this book-DEF.SG[NOM] give-NPST.3[SG]
nad'əja-ma] uč-i̊j-t' pe.
hope-NZR wait-NPST.3-PL end
Intended: 'Its$_i$ readers whom this book$_i$ gave hope are waiting for the continuation.'

- Unlike the data on idioms in the last section, anaphor binding does not show a further dependency between case and binding in the main clause.

(37) GEN ← DAT
Es'$_i$ mašina-**ncti/**^{OK}**nc** [kona-n'd'i put-f lama jarmak] **Vas'ɛ$_i$** dagə
self car-3SG.POSS.SG.DAT/^{OK}GEN which-DAT put-PTCP.RES many money[NOM] Vasja[NOM] again
pet'-əz'ə.
repair-PST.3SG.O.3SG.S
'Vasja$_i$ again repaired his$_i$ car that a lot of money was invested into.'

- Given that anaphor binding can apply at any stage of the derivation (cf. Barss (1986, 2001)), this result is expected.

Condition C

- The final diagnostic comes from Condition C, a requirement for R-expressions to be free throughout the derivation (see Chomsky (1981)).
- Relatives with the external case show no connectivity with respect to Condition C.

(38) **Puškin-ən'$_j$** kn'iga-**c** [kona-n' **son$_{i/j}$** t'ɛšt'-əz'ə ___
Pushkin-GEN book-3SG.POSS.SG[NOM] which-GEN PRON.3SG[NOM] write-PST.3SG.O.3SG.S
Pavləfskɛj dača-sə] aščˇ-i bibl'iat'eka-sə-nək.
pavlosk's country.house-IN be-NPST.3[SG] library-IN-1PL.POSS
'Pushkin's book that he wrote in Pavlovsk's country house is in our library.'

- Coreference between the proper name in the head and the pronoun in the relative CP is not allowed with ICA.

(39) NOM ← GEN
Puškin-ən'$_j$ kn'iga-**nc** [kona-n' **son$_{i/*j}$** t'ɛšt'-əz'ə ___ Pavləfskɛj
Pushkin-GEN book-3SG.POSS.SG.GEN which-GEN PRON.3SG[NOM] write-PST.3SG.O.3SG.S pavlosk's
dača-sə] aščˇ-i bibl'iat'eka-sə-nək.
country.house-IN be-NPST.3[SG] library-IN-1PL.POSS
'Pushkin's book that he wrote in Pavlovsk's country house is in our library.'

Summary

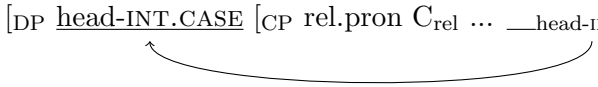
(40) Connectivity in Moksha relative clauses

Diagnostics	RC with ICA	RC with external case
1. Idioms in the relative clause	OK	*
2. Idioms in the main clause	*	OK
3. Anaphor binding in the relative clause	OK	*
4. Anaphor binding in the main clause	OK	OK
5. Condition C in the relative clause	*	OK

3.3 Analysis

- I suggest that **relative clauses with ICA are derived by raising** as schematized in (41):
  - The head noun is base generated in the argument position in the relative CP. It obligatorily gets its case there and moves to the main clause after.

(41) Raising derivation for relatives with internal case



- The derivational path of the head noun accounts for the connectivity profile.
  1. The base position of the head noun phrase inside the relative CP allows the head noun to participate in idioms inside the relative clause.
  2. The position of the head noun in the main clause is a derived one, so the requirement for parts of an idiom to be base generated together is not met.
  3. The presence of the head noun in the relativized position allows it to be locally c-commanded and thus bound by higher noun phrases inside the relative CP.
  4. After movement, the head noun occupies the position in the main clause and can therefore be bound there as well.

5. I assume that condition C applies in syntax and cases where some parts of a moved syntactic object can obviate it are derived by late merge (cf. Takahashi & Hulsey (2009)). Since heads with internal case must be in the relative CP to get their case, the analysis also correctly predicts that they are evaluated for condition C inside relative CPs.

- **Relatives with external case are derived by the head-external generation**:

(42) Head-external derivation for relatives with external case

[$_{DP}$ head-EXT.CASE [$_{CP}$ rel.pron C_{rel} ...]]

  - Since the head noun is first merged in the main clause, it does not get the case marking inside the relative CP. It also cannot form an idiom with a relative CP internal material, be bound there, or evaluated with respect to condition C.
  - Idiomatic interpretation in the main clause, on the other hand, is possible, because the the head is base generated there.

- This analysis supports the co-existence of two structures for relative clauses in one language (Sauerland 1998; Bhatt 2002; Harris 2008) and provides yet another case where superficially similar phenomena have distinct analyses.

Alternatives: Other derivations alone or in combinations fail to derive the data.

- **The head-external only approach** could in principle capture ICA as in (43), but not the correspondence between connectivity and case.

(43) ICA by agreement

[$_{DP}$ head-INT.CASE [$_{CP}$ rel.pron-INT.CASE C_{rel} ... $\_\__{rel.pron}$ ...]]

case

- For **raising only approach** to derive this correlation, it needs to be somehow ensured that nouns are interpreted in their case positions.

(44) Raising only

a. [$_{DP}$ ___ [$_{CP}$ rel.pron C_{rel} ... head-INT.CASE ...]]

b. [$_{DP}$ head-EXT.CASE [$_{CP}$ rel.pron C_{rel} ... ___ ...]]

- This however would be at variance with the anaphor binding data showing that heads with internal case can be present in the main clause position for binding.

- For **matching** to derive ICA, the internal head must move to the main clause across the relative pronoun, thereby forcing matching derivation to include raising as its proper subpart.

(45) [~~head~~ [head [$_{CP}$ [$_{DPrel}$ rel.pron-α $\_\__{head}$] C_{rel} ... $\_\__{DPrel}$ ...]]]

- **The matching only view** further requires that the same head (internal or external) is deleted or interpreted at both PF and LF, contrary to known applications (see Salzmann (2018)) and the anaphor binding data.

Relatives with internal case are derived by raising. Relatives with external case follow from head-external generation.

4 The syntax of raising

- The data so far have shown that
  1. The final structure of relative with ICA is in (46).

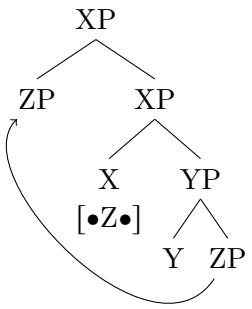
     (46) $[_{DP}\ D\ [_{NP}\ NP\ [_{CPrel}\ \dots\ ]\ ]\ ]$

  2. The head moves from the CP-internal position:

     (47) $[_{DP}\ \text{head}\ [_{CP}\ \_\_\text{head}\ C_{rel}\ \dots\ \_\_\text{head}\ ]\ ]$

- Since movement typically proceeds to a specifier position (cf. (48)), providing an analysis that meets both empirical conclusions is surprisingly not trivial.

(48) Standard movement to the specifier



- What seems to be required instead is **projecting movement of the head**.
- One such approach was developed by Donati & Cecchetto (2011), Cecchetto & Donati (2016)).
  - This approach relies on one of the core ideas of Chomsky's recent labeling algorithm (see Chomsky (2013)) that heads always project.
  - In result, the projecting head must be syntactic terminals, contrary to the data.

(49) NOM ← DAT
Es'$_i$ luv-ij-ənzə-**n'd'i** [kona-t'n'ə-n'd'i t'ɛ **kn'iga-s'$_i$** maks-i
self read-PTCP.ACT-3SG.POSS.PL-DAT which-DEF.PL-DAT this book-DEF.SG[NOM] give-NPST.3[SG]
nad'əja-ma] učʲ-ij̊-t' pe.
hope-NZR wait-NPST.3-PL end
'Its$_i$ readers whom this book$_i$ gave hope are waiting for the continuation.'

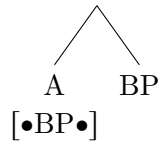
- It is thus the phrase that must project in the landing site.

4.1 Projecting movement

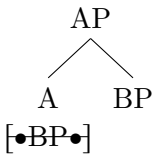
- A possibility for a displaced syntactic object to project in its landing site arises under projection by selection model (see Chomsky (1995), Adger (2003) as well as Stabler (1997)) if movement is triggered by a feature on a displaced syntactic object.

(50) Projection by selection:
The item that selects is the item that projects.

(51) Merge

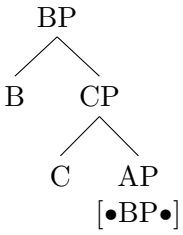


(52) Labeling

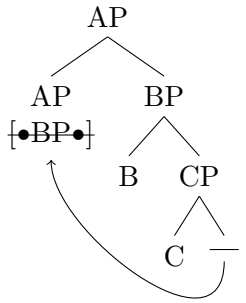


- If a merge feature can search upwards (cf. Baker (2008), Wurmbrand (2012), Zeijlstra (2012), Himmelreich (2017), and Bjorkman & Zeijlstra (2019), i.a.), projecting movement is predicted.

(53) Base position



(54) Movement and projection

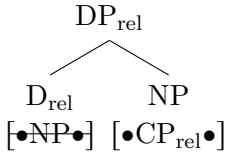


- Raising relative clauses have the following derivation.

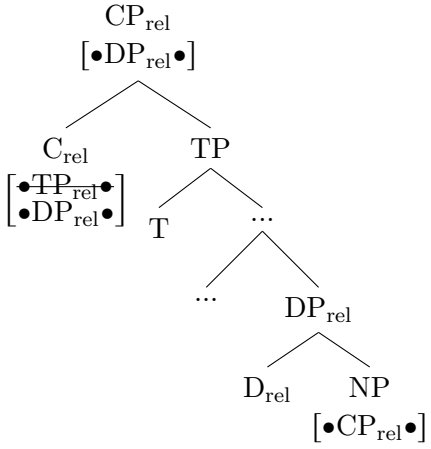
(55) Numeration for raising relative clauses:

$$\{ \begin{bmatrix} C_{rel} \\ \bullet TP \bullet \\ \bullet DP_{rel} \bullet \end{bmatrix}, \dots, \begin{bmatrix} V \\ \bullet DP \bullet \\ \dots \end{bmatrix}, \begin{bmatrix} D_{rel} \\ \bullet NP \bullet \\ \dots \end{bmatrix}, \begin{bmatrix} N \\ \dots \\ \bullet CP_{rel} \bullet \\ \dots \end{bmatrix}, \dots \}$$

(56) Step 1: Relative DP

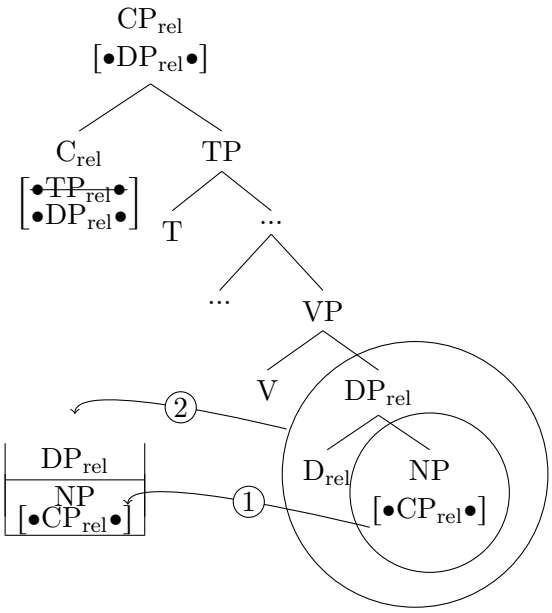


(57) Step 2: Relative CP

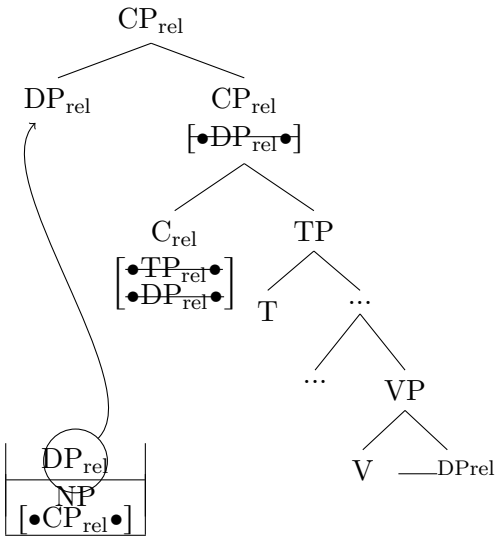


- After Merge of C_{rel}, there are two unordered active selection features that have both located their goals: $[\bullet DP_{rel} \bullet]$ and $[\bullet CP_{rel} \bullet]$.
- I suggest that copies of the two syntactic objects that are to be displaced are then subsequently created and merged to the workspace and organized there in a stack (see Heck (2016), Heck & Himmelreich (2017)), similarly to features on the heads.
- I further assume that the upward search is given precedence over the downward search (cf. Assmann et al. (2015) and Bjorkman & Zeijlstra (2019)), so that the head NP is copied first.

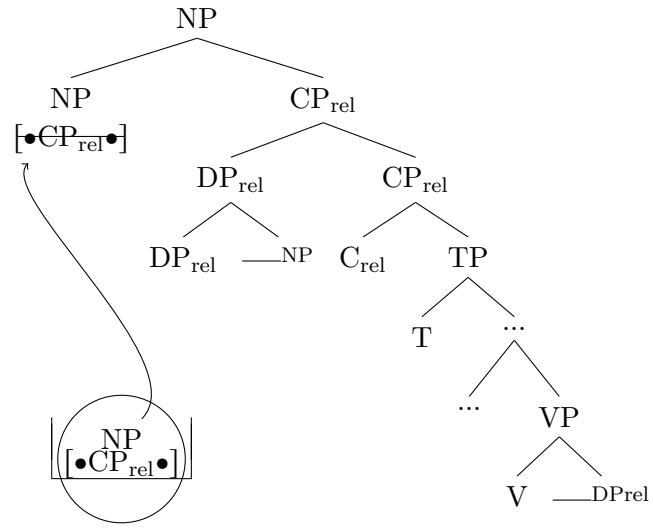
(58) Step 3: Search and copying



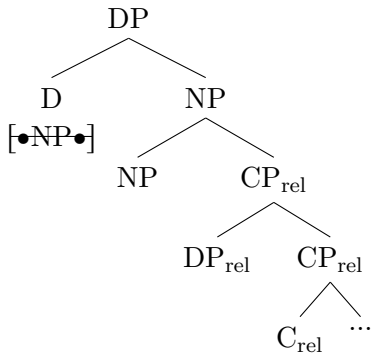
(59) Step 4: Merge of DP$_{rel}$



(60) Step 5: Merge of the head NP



(61) Step 6: Merge of the external D head



4.2 Internal vs. external case

- Raising derivation yield internal case on the head in Moksha. Besides Moksha, such internal case marking of the head is attested in a number of languages; see Ancient Greek (Grimm (2005, 78-92)), Latin (Touratier (1980, 147-211)), Vedic and Sanskrit (Gonda (1975, 195)), Middle High German (Pittner (1995)), non-standard Icelandic (Wood et al. (2017)), Besermyan Udmurt (Belyaev (2012), Kholodilova & Privizentseva (2015)), Ingrian Finnish (Kholodilova (2013)), Nez Perce (Deal (2016)), and Koryak (Abramovitz (2021)) among others.
- However, raising with external case is attested in other languages; see, for instance, example (62) from German showing anaphor binding into the head by relative CP internal material.

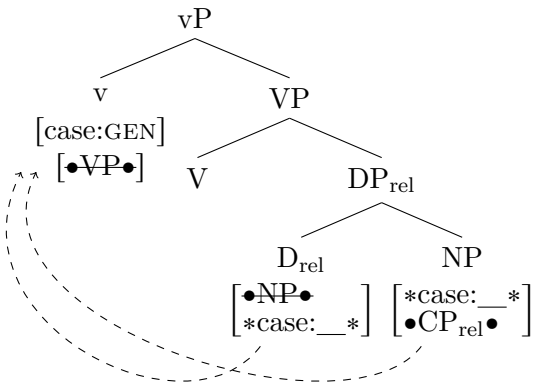
(62) Der Wesenszug von **sich$_i$**, [den **Peter$_i$** noch nicht ___ kannte], störte
the.NOM trait of self which.ACC Peter still not know.PST.3SG annoy.PST.3SG
niemanden.
no.one.ACC
'No one was annoyed by the side of himself$_i$ that Peter$_i$ did not know yet.' (Salzmann, 2006, 99)

- Different orderings of the [•CP_{rel}•] merge feature and a case probe on the head NP underlie the difference in case marking.

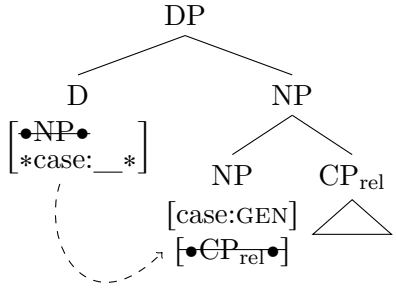
(63) Case marking on the head under raising

Pattern	Ordered features on the N head
1. Internal case (Languages with ICA) *Latin, Moksha, Nez Perce etc.*	[∗case:__∗] ≺ [•CP_{rel}•]
2. External case *German, Russian, Italian etc.*	[•CP_{rel}•] ≺ [∗case:__∗]

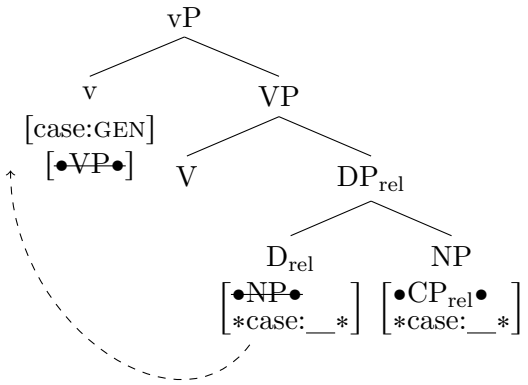
(64) Internal case: In the relative CP



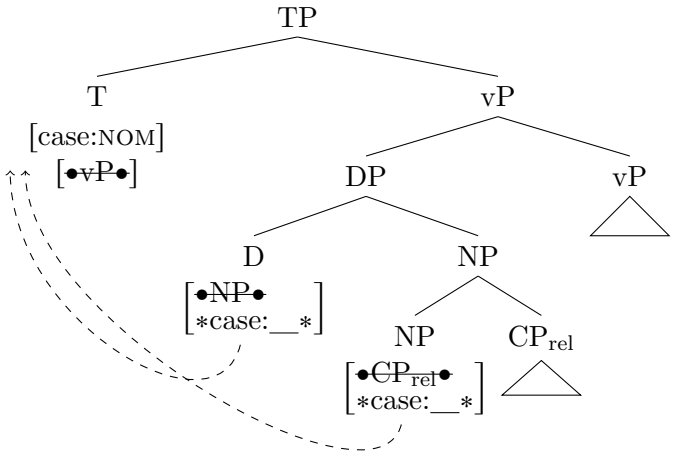
(65) Internal case: In the main clause



(66) External case: In the relative CP



(67) External case: In the main clause



- This provides a novel perspective on one of the long-standing issues in the syntax of raising: Despite originating in a case position in the relative CP, the head shows a case assigned in the main clause in most languages (see Borsley (1997)).
- The current analysis allows to account for a delayed valuation of a case feature by ordering the feature lower in the feature stack and thus shielding it from the probing at earlier stages.
- This approach seems to be also applicable to other case overwriting phenomena (see Bejar & Massam (1999), Merchant (2006), Potsdam (2006), Boeckx et al. (2010), Fong (2019), i.a), but this remains subject to further research.

5 Conclusions

1. Raising derivation is part of natural language syntax. Raising derivation co-exists with the head-external structure.
2. Raising derivation involves projecting movement of the head noun that follows from projection by selection algorithm combined with the possibility of upward search.
3. Ordering of features allows to derive internal case on raising heads in Moksha and external case in other languages.
4. An approach to syntax, where Merge is feature-driven and labeling is derived via projection by selection algorithm allows to account for non-trivial empirical phenomena.

6 Further properties

6.1 Extraposition

- Extraposition of the relative CP is ungrammatical if the head is marked for the internal case.

(68) NOM ← DAT
*__S't'ər'-n'ɛ-t'i__ tu-s' kaftə n'ed'ɛl'a-t [__kona-n'd'i__ maks-in'ə kel'gəma
girl-DEF.SG.DAT go-PST.3[SG] two week-PL which-DAT give-PST.3.O.1SG.S favorite
kn'iga-z'ə-n'].
book-1SG.POSS.SG-GEN
'The girl left for two weeks, whom I gave my favorite book.'

- Abramovitz (2021) takes analogous data in Koryak as an indication that relative clauses with ICA are internally-headed.
- In fact, ban on extraction is typical for raising relatives (see Hulsey & Sauerland (2006), Takahashi & Hulsey (2009)) and follows from the analysis of extraposition by Fox & Nissenbaum (1999):
  - Having final landing site outside of the relative CP, the head that originates in the relative CP still cannot be merged with the main clause first.

(69) a. Movement of the head NP
[MC [... DP ...] DP]

b. Late adjunction of the relative CP and realization of the lower copy
[MC [... DP ...] [~~DP~~ [CP rel.pron ...]]]

6.2 Extraction out of the relative clause

- Relatives with internal case allow extraction out of the relative CP, but this is ungrammatical for relatives with external case.

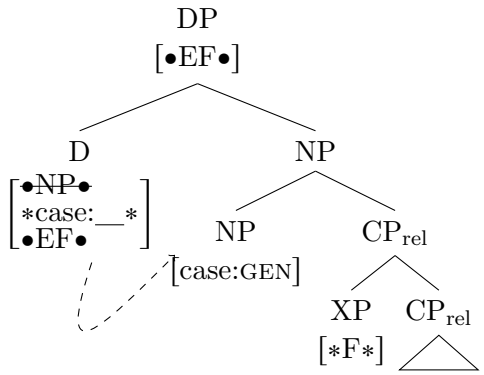
(70) NOM ← DAT
Bibl'iat'eka-stə [__jalga-z'ə-n'd'i/*ø__ [kona-n'd'i mon sɛv-in'ə kn'iga-t'
library-EL friend-1SG.POSS.SG-DAT/*NOM which-DAT I[NOM] take-PST.3.O.1SG.S book-DEF.SG.GEN
___]] kelk-si luv-əm-s.
love-NPST.3SG.O.3SG.S read-INF-ILL
'My friend for whom I took the book from the library loves to read.'

- For Koryak, Abramovitz (2021) assumes that adjuncts are inside the relative CP, in one of the split-CP projections. The data then strongly argue that relatives with ICA are internally-headed.
- Data in (71) show that displaced phrase can be interleaved with the main clause material and is thus outside of the relative CP.

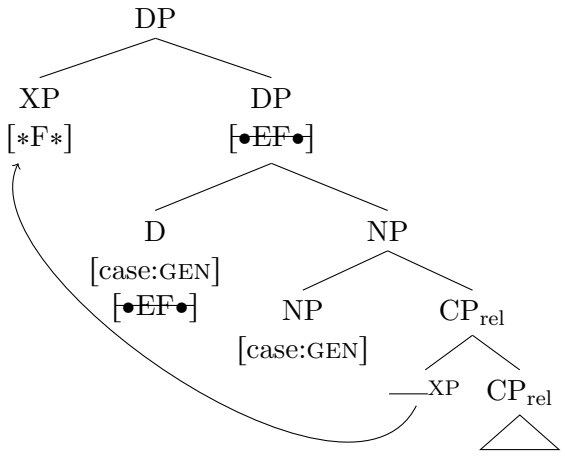
(71) NOM ← GEN
Bibl'iat'eka-stə mon ar's'-an [čtə [**kn'iga-t'** kona-n' sɛv-əz'ə ___
library-EL I[NOM] think-NPST.3[SG] that book-DEF.SG.GEN which-GEN take-PST.3SG.O.3SG.S
Kat'ɛ] ašč-i stol-sə].
Katja be-NPST.3[SG] table-IN
'I think that the book that Katja took from the library is on the table.'

- While relative clauses are a textbook example of island structures (see Ross (1967)), there are numerous examples in the literature showing that extraction out of a relative clause is possible under certain conditions; see Erteschik-Shir (1973), McCawley (1981), Engdahl (1997), Cinque (2010), Kush et al. (2013), Sichel (2018), Vincent (2021).
- Most recently, investigating extraction out of relative clauses in Hebrew, Sichel (2018) suggested that extraction is enabled by the raising derivation.
- I would like to suggest that extraction out the relative clause in Moksha is related to the raising derivation, to the internal case marking on the head in particular.
- I assume that
  - CPs as well as DPs (see Svenonius (2004), Matushansky (2004), Bošković (2014)) are phases and syntactic objects must move to their edge to escape.
  - In Moksha edge features that allow syntactic objects to move to the DP edge are ordered after the case probe, so that movement to the DP edge is possible only after the DP got its case.
- As heads of relative clauses with ICA have case from inside the relative clause, their edge features are readily available when the DP is first build.

(72) External D gets case

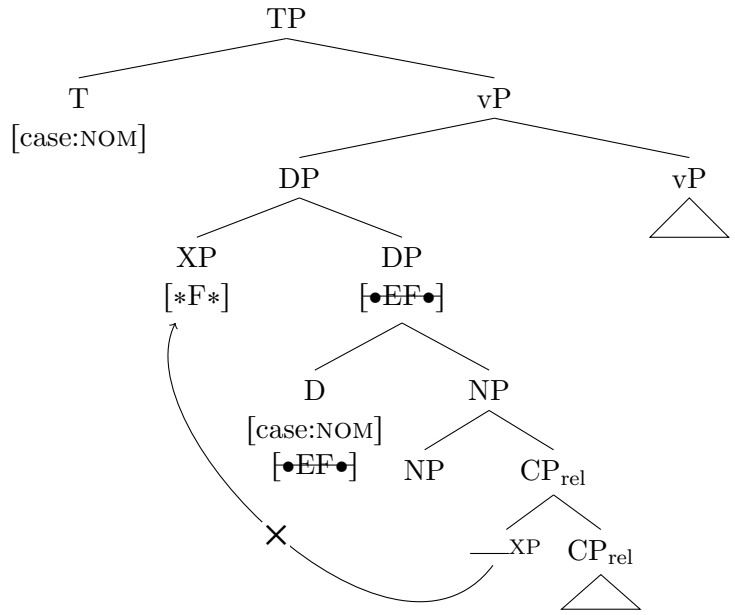


(73) Movement to DP edge



- Heads of regular externally-headed relative clauses, on the contrary, receive case from higher projections in the main clause, when the material in the complement is already rendered inaccessible for movement.

(74) *Extraction



6.3 Left periphery restriction

6.3.1 Basics

- Relative clauses with case attraction must be on the left periphery as in (75).

(75) GEN ← DAT
Škaf-t'i, **kona-n'd'i** mon put-in'ə fətəgrafijə-t'n'ə-n', min'
closet-DEF.SG.DAT which-DAT I[NOM] put-PST.3.O.1SG.S photo-DEF.PL-GEN we[NOM]
jorda-s'k.
throw.away-PST.3.O.1PL.S
'We threw away the closet in which I put the photos.'

- They cannot be embedded in the main clause; see (76).

(76) GEN ← DAT
*Min' jorda-s'k **škaf-t'i**, **kona-n'd'i** mon put-in'ə
we[NOM] throw.away-PST.3.O.1PL.S closet-DEF.SG.DAT which-DAT I[NOM] put-PST.3.O.1SG.S
fətəgrafijə-t'n'ə-n'.
photo-DEF.PL-GEN
'We threw away the closet in which I put the photos.'

- Relative clauses with case attraction cannot follow just an argument from the main clause; see (77).

(77) GEN ← DAT
*Min', **škaf-t'i**, **kona-n'd'i** mon put-in'ə fətəgrafijə-t'n'ə-n',
we[NOM] closet-DEF.SG.DAT which-DAT I[NOM] put-PST.3.O.1SG.S photo-DEF.PL-GEN
jorda-s'k.
throw.away-PST.3.O.1PL.S
'We threw away the closet in which I put the photos.'

- This restriction is attested for relative clauses with inverse case attraction in virtually all languages where the phenomenon is present (see Bianchi (1999), Kholodilova (2013), Kholodilova & Privizentseva (2015), Deal (2016), Abramovitz (2021)).

- It groups relatives with ICA and correlatives that are typically located on the left periphery (see Srivastav (1991), Dayal (1996), Lipták (2009), Lin (2020)).

(78) **Kona škaf-t'i** mon put-in'ə fətəgrafijə-t'n'ə-n', min'
which closet-DEF.SG.DAT I[NOM] put-PST.3.O.1SG.S photo-DEF.PL-GEN we[NOM]
jorda-s'k (s'ɛ-n').
throw.away-PST.3.O.1PL.S that-GEN
'We threw away the closet in which I put the photos.'

- Unlike correlatives (in Moksha), relatives with ICA are not base generated, but moved to the left (*pace* Deal (2016) on Nez Perce).
- First, they cannot refer to a position inside an island.

(79) NOM ← GEN
*__Katə-t'__, __kona-n'__ t'ejə-n kaz'-əz', mon ul'-an kən'ɛr'd'-f,
cat-DEF.SG.GEN which-GEN PRON.DAT-1SG.POSS gift-PST.3.O.3PL.S I[NOM] be-NPST.1SG happy-PTCP.RES
kədə ___ karma-j kunc'-əmə šejəṛ̊'-t'.
if become-NPST.3[SG] catch-FREQ.INF mouse-PL
'I will be happy if the cat that they gifted to me starts catching mice.'

- Second, a variable inside the relative clause with ICA can be bound by a quantified noun phrase in the main clause.

(80) GEN ← DAT
__Pin'ə-t'i__, kona-n'd'i __son$_i$__ maks-əz'ə jaṛ̊cambɛl'-t', __ɛr'__
dog-DEF.SG.DAT which-DAT PRON.3SG[NOM] give-PST.3SG.O.3SG.S food-DEF.SG.GEN every
__s'ora-n'ɛ-s'$_i$__ mɛl'aft-əz'ə.
boy-DIM-DEF.SG[NOM] remember-PST.3SG.O.3SG.S
'Every boy$_i$ remembered the dog that he$_i$ gave food.'

- Third, relatives with ICA can be coordinated with a noun phrase that shows case assigned in the main clause.

(81) GEN ← DAT
Ečkə __katə-t'__ i osal __pin'ə-t'i__, kona-n'd'i ton maks-at jaṛ̊ca-ma, mon
thick cat-DEF.SG.GEN and skinny dog-DEF.SG.DAT which-DAT you give-NPST.2SG eat-NZR I
soda-sajn'ə.
know-NPST.3PL.O.1SG.S
'I know the skinny dog that you give food and the fat cat.'

- Fourth, anaphors in heads of relatives with ICA can be bound in the main clause.

(82) GEN ← DAT
[__Es'$_i$__ mašina-__ncti__ kona-n'd'i put-f lama jarmak] __Vas'ɛ$_i$__ dagə
self car-3SG.POSS.SG.DAT which-DAT put-PTCP.RES many money[NOM] Vasja[NOM] again
pet'-əz'ə.
repair-PST.3SG.O.3SG.S
'Vasja$_i$ again repaired his$_i$ car that a lot of money was invested into.'

- Relative clauses with inverse case attraction have a derivation illustrated in (83a-b).

(83) Relative clauses with inverse case attraction
a. [$_{MC}$ ... predicate ... [head [$_{CP}$ ...]] ...]
b. [[head [$_{CP}$ ...]] [$_{MC}$ ... predicate ... ___ ...]

6.3.2 Analysis

- This is an instance of **forced ex-situ effect**: Two syntactic objects can form a constituent at some stage of the derivation but not in the resulting structure.

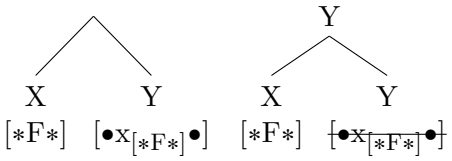
(84) a. Intermediate: [X Y] – OK
b. Final: Y [X __] – OK
c. Final: [X Y] – *

- This type of data were accounted for by Chomsky's recent labeling algorithm (see Chomsky (2013, 2015) and Ott (2012, 2015)), but as I will show here can be also derived under projection by selection approach to labeling.
- I assume that merge features select not only for a category, but also for unchecked agreement or merge features.

(85) Regular merge feature: $\overset{\text{Y}}{[\bullet \text{x} \bullet]}$

(86) Secondary selection features: $\overset{\text{Y}}{[\bullet \text{x}_{[*\text{F}*]} \bullet]}$

(87) Selection and projection:



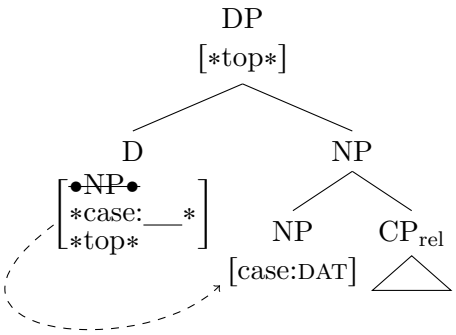
- Relatives with ICA are peculiar in that the head moves to a case position in the main clause after it has already been assigned case in the relative clause.
- Movement of a case marked noun to yet another case position seems to be rare cross-linguistically and I would like to suggest that this restriction arises, because verbal heads in fact select for nouns with an unchecked case feature; see (88).
- The requirement is loosened in Moksha as well as with in other languages with ICA, so that the nature of the unchecked agreement feature is underspecified as in (89).

(88) No ICA: $\overset{\text{V}}{[\bullet \text{D}_{[*\text{case}*]} \bullet]}$

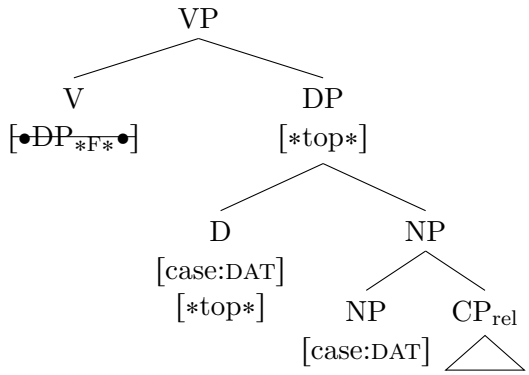
(89) With ICA: $\overset{\text{V}}{[\bullet \text{D}_{[*\text{F}*]} \bullet]}$

- As heads of relatives with ICA receive the case inside the relative clause, the DP must bear yet another active probe to satisfy the selection requirement.
- I suggest that that it forces the presence of an Ā-related probe that inevitably leads to movement of the whole DP to the left.
  - A-movements such as passivization or subject movement to Spec,TP are cross-linguistically related to case that is already valued on relatives with ICA.
  - I also suggest that the same holds for local clause-internal scrambling: It is driven by optional EPP features (or [•DP•] in the current notation) on clausal heads, but do not require active features on DPs themselves (cf. Miyagawa (2001), Bailyn (2004)).

(90) External D

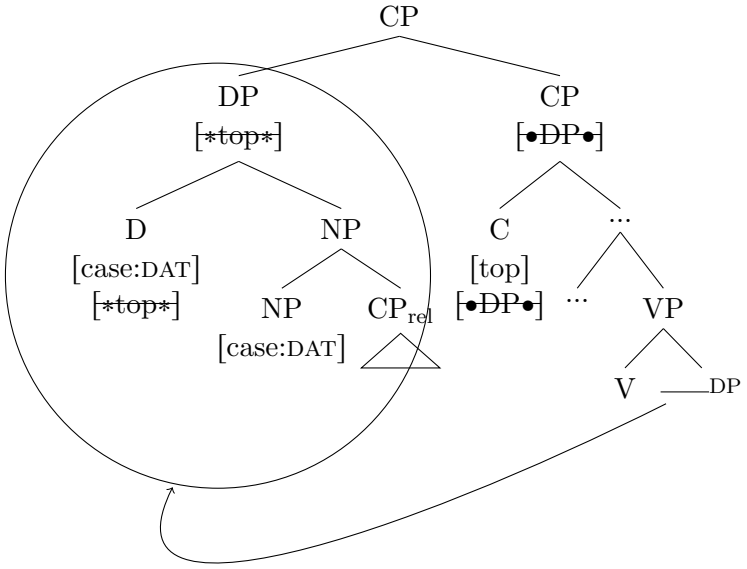


(91) Selection in the main clause



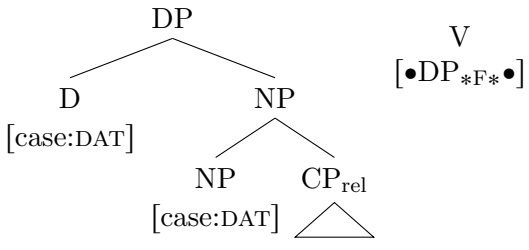
- Due to its active topic probe, the DP agrees with the C head and is then attracted to its specifier (see (92)).

(92) Movement to the left



- Notably, if a DP that contains the relative clause with ICA does not have an active probe, it cannot be selected by a head in the main clause and the derivation crashes; see (93).

(93) *Relatives with ICA: No additional probe



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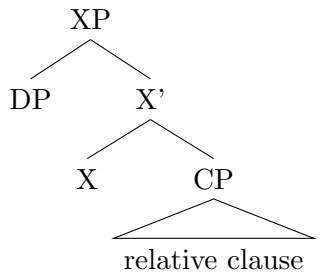
Appendices

A: Against DP in Spec,XP: Category, scope, and c-command

- Since the problems for the relative clause structure in (14) come from the D-N relation, it seems that they might be resolved by including the D head into the noun phrase in Spec,XP.

(94) DP in Spec,XP



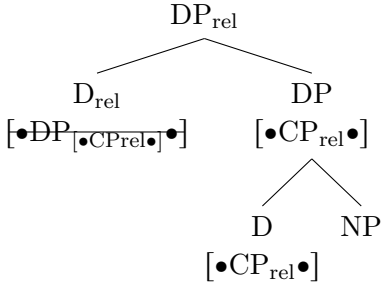
- This structure is also problematic in various respects.
  1. As shown by Partee (1975, 2015), determiners and quantifiers must scope over both the head noun and the relative CP under the restrictive interpretation.
  2. XP is the topmost projection in (94), so it determines the category and the distribution of the phrase. This predicts that the distribution of a noun plus a relative clause differs from the distribution of regular noun phrases.
  3. The whole noun phrase is in the specifier of X in (94) and hence does not c-command the material in the main clause. C-command is though required for anaphor binding

(95) NOM ← GEN
Pet'ɛ-n'$_i$ [kona-n' tona-ft-in'ə ard-əma] mi-z'ə **es'$_i$** mašinə-nc.
Petja-GEN which-GEN teach-PST.3.O.1SG.S drive-NZR sell-PST.3SG.O.3SG.S self car-3SG.POSS.SG.GEN
'Petja$_i$ whom I taught to drive sold his$_i$ car.'

B: Appositive interpretation

- I would like to suggest that the the raising derivation can be reconsiled with the appositive interpretation if it is the DP rather than the NP that moves out of the relative clause.

(96) Relative DP



(97) Merge of the head DP