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The Syntax of Relative Clauses and the Nature of Merge

Linguistische Arbeiten

Volume 593

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Inverse Case Attraction in Moksha Mordvin

DE GRUYTER
MOUTON

Zugl.: Dissertation, Universität Leipzig, 2023

ISBN 978-3-11-222585-1
e-ISBN (PDF) 9783112225868
ISSN 0344-6727

Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available on the Internet at http://dnb.dnb.de.

Cover image: Cover-Firma
Typesetting: le-tex publishing services GmbH, Leipzig
Printing and binding: Druckerei XYZ

www.degruyter.com

In memory of my father, Yury Anatolyevich Goldin

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Preface

This work would have been impossible without my Moksha consultants: Anastasija Artëmovna Bormotova, Sergej Ivanovič Vasljaev, Anastasija Ivanovna Vasljaeva, Valentina Jur'evna Liskina, Marija Petrovna Liskona, Matrëna Jakovlevna Morozova, Anna Leont'evna Nečajkina, Aleksandra Ivanovna Spirkina, Masha Spirkina, Gennagij Semënovič Utkin, Marija Petrovna Utkina, Boris Ivanovič Šnjakin, and Tat'jana Sergeevna Šnjakina. I am extremely grateful for all the time they have spent answering my strange and confusing questions, for their hospitality and patience.

This books is based on my 2023 dissertation from University of Leipzig. Its contents has greatly benefited from the comments of Gereon Müller, Rajesh Bhatt, Maria Kouneli, Fabian Heck, and Gerg Kobele. I am also grateful for discussions with Raphael Abramovitz, Maria Kholodilova, Ekaterina Anatol'evna Lyutikova, Martin Salzmann, and Svetlana Jur'evna Toldova.

The research for this book was made possible by a DFG grant for the Research Training Group Interaction of Grammatical Building Blocks (GRK 2011). The publication was supported by funds from the Publication Fund for Open Access Monographs of the Federal State of Brandenburg, Germany.

https://doi.org/10.1515/9783112225868-201

Abbreviations

1,2,3	1st, 2nd, 3rd person
ABL	Ablative
ACC	Accusative
ADD	Additive particle
AGR	Agreement
ART	Article
ATT	Attenuative
ATTR	Attributive
AVR	Avertive
CAR	Caritive
CAUS	Causative
CL	Clitic
CN	Connegative
COLL	Collective
COM	Comitative
COND	Conditional
CONV	Converb
CSL	Causalis
DAT	Dative
DEF	Definite
DIM	Diminutive
EL	Elative
EQU	Equative
F	Feminine
FREQ	Frequentative
FUT	Future
GEN	Genitive
ILL	Illative
IMP	Imperative
IMPF	Imperfect
IN	Inessive
INCH	Inchoative
INCP	Inceptive
INDEF	Indefinite
INF	Infinitive
INT	Intensifier
IPFV	Imprefective
LAT	Lative
LOC	Locative
M	Masculine
NEG	Negation
NEX.EX	Existential negation
N	Neuter

https://doi.org/10.1515/9783112225868-202

NOM	Nominative
NPST	Non-past
NZR	Nominalizer
O	Object
OBL	Oblique
OPT	Optative
ORD	Ordinal
PASS	Passive
PL	Plural
POSS	Possessive
PROH	Prohibitative
PROL	Prolative
PRON	Pronoun
PRS	Presence
PST	Past
PTCP	Participle
RES	Resultative
S	Subject
SG	Singular
SMLF	Semelfactive
TAM	Tense aspect mood marker
TMPR	Temporal case
TRANS	Translative
VOC	Vocative

1 Overview

This book is about the syntax of relative clauses and the elementary syntactic operation Merge. The book begins as an empirical investigation of inverse case attraction (ICA), a typologically rare type of relative clause that is characterized by special case marking on the head noun: heads of relative clauses with ICA show case assigned to the gap position inside the relative CP.

(1) [[head-α rel.pron-α … case.assigner$_{[\text{case: }\alpha]}$ …] … case.assigner$_{[\text{case: }\beta]}$ …]

Despite being a comparatively niche phenomenon, ICA is important for the theory of relative clause syntax in several ways. First, relative clauses with ICA have been the subject of intensive research, and essentially all possible relative clause structures have been proposed for these relative clauses: they have been argued to be regular externally-headed relatives (Deal 2016), regular internally-headed relatives (Abramovitz 2021), or a subtype of correlatives (Pittner 1995, Bhatt 2005, Georgi & Salzmann 2017, and also Bianchi 1999, 2000b). Second, relatives with ICA play a significant role in the debate on the internal syntax of relative CPs and the derivational path of the head noun. As the heads of such relatives show case assigned within the relative CP, ICA constitutes the only non-interpretive argument for the raising derivation (Bianchi 1999, 2000b). Alongside head-external and matching structures, raising is one of the three main derivations of relative clauses. The defining property of the raising derivation is that the head noun originates inside the relative CP and then undergoes movement to a higher position, where it is later overtly realized (Schachter 1973, Vergnaud 1974, Kayne 1994, Bhatt 2002, De Vries 2002, Donati & Cecchetto 2011, and Sportiche 2017).

This book presents an investigation of relative clauses with ICA in Moksha Mordvin, a lesser-studied Finno-Ugric Uralic language. On the basis of new data from Moksha, I argue that relatives with ICA are externally-headed relative clauses and that internal case marking on the head noun results from the raising derivation. The conclusions are reached by applying established syntactic and interpretive tests that diagnose constituency and the derivational path of syntactic material.

I will show that only some of the traditionally accepted tests yield clear results, while others are in fact compatible with different syntactic structures. One such example comes from the extraposition test. The impossibility of displacing the relative clause to the right while leaving the head noun in situ was commonly used as an argument for placing the head inside the relative CP. I will show that the ban on extraposition sheds no light on the surface position of the head noun. Under some approaches to extraposition (Fox & Nissenbaum 1999), it is very generally in-

https://doi.org/10.1515/9783112225868-001

compatible with the raising syntax and therefore impossible despite the CP-external position of the head noun (cf. Hulsey & Sauerland 2006).

Another case comes from connectivity diagnostics. The set of connectivity effects that are used to diagnose the first merge position of the head noun includes (but is not limited to) idiomatic interpretation, anaphor binding, Condition C, variable binding, and crossover effects. At the same time, the empirical picture in relative clauses and the correct analysis for each of these phenomena remain debated; see, among others, Webelhuth, Bargmann, & Götze (2018) on idiom interpretation, Sportiche (2017) and Krifka (2018) on Condition C, and Sternefeld (2018) and Barker (2018) on variable binding. Applying these diagnostics to relative clauses with ICA, I show that idioms, anaphor binding, and Condition C align with the case marking on the noun, but variable binding and crossover effects do not, suggesting that the former phenomena require c-command as a necessary prerequisite, while the conditions on variable binding and crossover are more relaxed.

As a result, a detailed investigation of relative clauses with ICA provides new insight into the syntax of relative clauses and contributes to establishing a set of tools that can reliably diagnose syntactic structure.

Turning to the syntax of raising relative clauses, I argue that the empirical requirements imposed on the raising derivation by the data can be met only if the final position of the raised head is outside the relative CP and there is no additional functional projection mediating between the head noun and the relative CP (pace Bianchi 1999, Bhatt 2002, or Deal 2016). These data are best accounted for if the raising derivation involves projecting movement: the head of the relative clause moves from the CP-internal position and projects in its landing site.

Projecting movement has been shown to be possible under Chomsky's novel Labeling Algorithm (Chomsky 2013, 2015). According to this algorithm, labels are determined by Minimal Search, where terminals are found before their complements, so that heads always project. Applied to the raising derivation, this means that projecting movement is possible only if the raised head of the relative clause is the N head, not the NP (Donati & Cecchetto 2011, Cecchetto & Donati 2016). At the same time, the majority of connectivity effects used for diagnosis target dependents of the noun, not the N head itself. As a result, this implementation of projecting movement falls short of deriving the connectivity effects, which constitute the core evidence in favor of the raising structure.

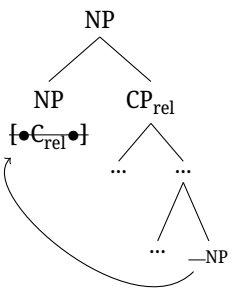
I will show that the raising structure and projecting movement are best derived under the standard projection-by-selection model (Chomsky 1995b, Adger 2003, as well as Stabler 1997). This model presupposes that all merge operations are triggered by features and it is often described by the following slogan:

(2) The item that selects is the item that projects.

Once this approach is combined with the possibility of upward search (Wurmbrand 2012, Zeijlstra 2012, Bjorkman & Zeijlstra 2019, i.a.), projecting movement follows automatically: a syntactic object with an unchecked merge feature finds its goal higher in the tree structure and moves. As movement is triggered by a feature on a displaced syntactic object, the latter also projects.

For the derivation of raising relative clauses, this means that the head noun must enter the derivation with an unchecked [•CP•] merge feature that cannot be discharged until later in the derivation. When the relative CP is built, it probes upward and triggers movement of the head noun. Since the feature on the noun underlies the movement, the NP projects in its landing site. Glossing over some technical details, the raising derivation is presented in (3).

(3) Projecting movement in RCs



Besides relative clauses with ICA, Moksha also has regular externally-headed relative clauses. The heads of these relative clauses are marked with the case assigned by the main clause. A comparison of these two types of relative clauses shows that, in addition to the raising derivation required for relative clauses with ICA, another type of derivation is needed. This aligns with the conclusions of previous studies that several derivations must coexist to derive the full range of relative clause data (Sauerland 1998, 2003, Bhatt 2002, Harris 2008). I further show that the data are best captured if the second available derivation of relative clauses is the head-external structure (see Partee 1975, Chomsky 1977, Jackendoff 1977, Platzack 2000, Boef 2012, Webelhuth et al. 2018, as well as the handbooks by Haegeman 1994 and Heim & Kratzer 1998). Under this approach, there is only one instance of the head noun and it is merged outside the relative CP.

The final contribution of this book deals with another curious property of relative clauses with ICA: in Moksha, as well as in other languages, relatives with ICA are placed at the left edge. I argue that in Moksha, the left-edge position is derived by movement, not by base generation. I show that the obligatory displacement of rela-

tive clauses with ICA does not follow from the information-structural properties of these relative clauses or from their syntactic category. I suggest that movement to the left follows from an effect that is known in the literature under the term *local instability* (see Ott 2012, 2015). The phenomenon is defined by the construction of a constituent that does not persist until the end of the derivation and must be dismantled before that. Local instability is schematically presented in (4): constituent [X Y] can be formed at an intermediate stage of the derivation, but it cannot be present when the derivation terminates.

(4) a. Intermediate: [X Y] — OK

b. Final: Y [X _] — OK

c. Final: [X Y] — *

The concept of local instability was introduced in relation to feature-free Merge and Chomsky's novel Labeling Algorithm (Chomsky 2013, 2015). A syntactic constituent is said to be locally unstable if it is built by merging two phrases but cannot receive a label unless one of the two phrases moves out. While the displacement of relative clauses with ICA in Moksha clearly shows a signature of local instability, it cannot be captured by the labeling-based approach, because ICA often involves the Merge of a head and a phrase that can be labeled without movement, or the Merge of two phrases where a label is established via Agree.

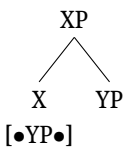
Instead, I suggest that local instability effects are accounted for under feature-driven Merge if second-order Merge features are introduced. This means that syntactic selection may apply not only to the category of the selected syntactic object, but also to its unchecked features. Example (5) shows a regular Merge feature; it is satisfied by the corresponding categorial label in (6).

(5) Regular Merge feature

X

[•YP•]

(6) Merge



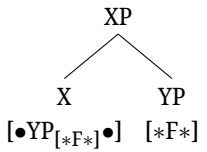
The second-order Merge feature is shown in (7); it is satisfied in (8) by the categorial label and the unchecked feature of the selected phrase.

(7) Second order Merge feature

X

[•YP$_{[*F*]}$•]

(8) Merge



Second-order Merge features allow one to determine, at the point of selection, how a selected syntactic object will behave later in the derivation. This accounts for the obligatory displacement of relative clauses with ICA to the left as follows. I assume that heads in the main clause select not just for a DP, but for a DP with an active, unsatisfied probe (cf. the Activity Condition in Chomsky 2000, 2001). This unsatisfied feature is typically an unvalued case probe, but heads of relatives with ICA have their case feature valued in the relative CP, and in order to satisfy the selection requirements in the main clause, they must have another active feature that then enforces movement of the relative clause to the left.

I further show that the feature-based approach extends to other known cases of local instability, such as split topicalization in German (Ott 2012, 2015). It also accounts for several new phenomena that display local instability derivation but have not yet been considered from this perspective in the existing literature. These include the derivation of raising relative clauses with relative pronouns *who* or *which* (Aoun & Li 2003, Heck 2005, Salzmann 2014), resumptive pronouns and doubled clitics under the Big-DP approach (Uriagereka 1995, Boeckx 2003), and wager-class verbs (Postal 1974, Kayne 1984). The existing alternative relying on Chomsky's Labeling Algorithm does not cover all cases of local instability; among others, it cannot account for the displacement of relatives with ICA in Moksha. This undermines the labeling-based account and, more generally, removes some empirical foundation from Chomsky's Labeling Algorithm, which has repeatedly been argued to be conceptually superior to the projection-by-selection model but, at least for now, rests on rather scarce empirical evidence.

To sum up, this book starts out as an empirical investigation of relative clauses with ICA in Moksha and makes a contribution to the theory of relative clauses. It proposes a novel implementation of the raising derivation and argues that, together with one another generation type, raising must be a part of natural language syntax. Beyond the syntax of relative clauses, this work contributes to the debate on the mechanics behind the core syntactic operation—Merge. It shows that feature-free

Merge, coupled with the Labeling Algorithm, falls short of accounting for the data, while feature-driven Merge provides the necessary tools to derive the complex empirical patterns. Thus, this research provides evidence in favor of the feature-driven Merge and projection-by-selection approach to labeling.

This book is structured as follows.

In Chapter 2, I lay out the necessary background on Moksha Mordvin, a lesser-studied Uralic language, which this book investigates in more detail. I also present background on the phenomenon of inverse case attraction, previous studies, and general questions.

In Chapter 3, I investigate the syntactic structure of relative clauses with ICA. I argue that the heads of these relative clauses must be outside the relative CP. I further show that the obligatory left-peripheral position of relative clauses with ICA results from movement, not from base generation on the left.

In Chapter 4, I apply connectivity diagnostics to relative clauses in Moksha and show that relatives with ICA are derived by raising. I further argue that raising in Moksha (and potentially in other languages) must coexist with the head-external derivation.

In Chapter 5, I study the syntax of raising and propose a formal analysis of relatives with ICA in Moksha. First, I suggest that the raising derivation of relative clauses involves projecting movement of the head and that it follows from the projection-by-selection labeling algorithm combined with the possibility of upward search. Second, I show that in different languages, the raising derivation can result in external or internal case marking on the head. I derive the different case markings from different orderings of the case probe and other features on the head noun. Third, I argue that the left-peripheral position of the relative clause is an instance of local instability and propose that local instability is best derived by second-order Merge features. I also show how other properties of relative clauses with ICA follow under my analysis.

In Chapter 6, I investigate the consequences of the proposal. I discuss delayed checking of selection features and late Merge, show that forced ex-situ effects are widespread cross-linguistically, and discuss labeling more generally.

2 Background

Several different background sections could be written for this book. These include background on the syntax of relativization, on connectivity effects, on feature-driven vs. feature-free Merge, and on local instability effects. I will indeed present overviews of previous research and the current state of affairs for these topics later in the book. In this chapter, however, I would like to provide background on two lesser-known subjects of the book—the Moksha Mordvin language and inverse case attraction.

2.1 Moksha

The goal of this section is to introduce the reader to the Moksha language. The section contains a discussion of Moksha's areal and genetic properties, a brief overview of existing grammars and dictionaries that were useful at earlier stages of my research, a description of the methodology used for data collection, transcription and glossing conventions, as well as basic properties of Moksha grammar, such as nominal and verbal inflectional categories, morphosyntactic alignment, and word order. This section (and especially its first part) is based on the introductory chapters (Kholodilova 2018 and Korjakov & Kholodilova 2018) of the recent Moksha grammar (Toldova & Kholodilova 2018).

Moksha belongs to the Uralic language family. The internal classification of Uralic languages remains largely debated. According to a traditional approach (see, e.g., Donner 1879), Moksha is classified as follows: Moksha $<$ Mordvin $<$ Volga-Finnic $<$ Finno-Volgaic $<$ Finno-Permic $<$ Finno-Ugric. The existence of the Volga-Finnic group, which comprises the Mordvin and Mari languages, is, however, usually rejected in modern work (Janhunen 2009, Michalove 2002). The larger Finno-Volgaic branch, which also includes Finnish and Sami, is also often argued against (Collinder 1965). The Finno-Permic and Finno-Ugric subdivisions appear to be better motivated (Janhunen 2009), but, in general, none of the subdivisions within the Uralic language family is universally accepted (Salminen 2002).

The language closest to Moksha is Erzya. These two languages form a group of Mordvin (also Mordvinic, Mordovian, or Mordvinian) languages, and in some grammatical descriptions they are viewed as dialects of a single Mordvin language (Evsev'ev 1929/1963 and Zaicz 1998). Both Erzya and Moksha are used predominantly in the Republic of Mordovia, Russia. Around 400,000 people indicated that they spoke one of the Mordvin languages according to the population census in 2010. The data from the census do not allow one to estimate the number of Erzya and

https://doi.org/10.1515/9783112225868-002

Moksha speakers separately, because native speakers often identify their language simply as 'Mordvin'. Despite the significant number of speakers, the UNESCO Atlas of the World's Languages in Danger classifies Erzya and Moksha as 'definitely endangered', because the number of speakers is gradually decreasing and children tend not to acquire these languages.

The first systematic research on Mordvin that is currently available dates back to the nineteenth century (see Moksha grammars by Ornatov" 1838 and Ahlquist 1861). Multiple detailed grammars and shorter sketches were written later in the twentieth century (Evsev'ev 1929/1963, Potapkin 1949, Koljadënkov 1954, Koljadënkov & Zavodova 1962, Babuškina 1966, Feojktistov 1966, 1975, 1993, Cygankin 1980, Zaicz 1998, Bartens 1999, and László 2011). The most recent and detailed grammar is Toldova & Kholodilova (2018). In addition to grammars, there are also dictionaries of the Mordvin languages. For the current work, I used the Moksha–Russian dictionary by Serebrennikov, Feojktistov, & Poljakov (1998), the Moksha–Russian and Russian–Moksha dictionary by Ščankina (1993), and the Russian–Moksha–Erzya dictionary by Ščankina, Kočevaktin, & Mišina (2011).

The Moksha data presented in this book were collected in the villages of Lesnoe Cibaevo and Lesnoe Ardaševo, in the Temnikovskij district. These villages are located in the area of the central Moksha dialect, which is the basis for the Standard Moksha language (Feojktistov 1990). All native speakers who participated in this research are bilingual: they speak Moksha and Russian natively, but use Moksha as their main language at home. The data presented in this book were collected in the course of fieldwork conducted between 2013 and 2022, in person until 2019 and online thereafter. Earlier trips (in 2013–2015) were part of the Lomonosov Moscow State University fieldwork expeditions.

The data were collected by means of elicitation: Moksha speakers were asked to translate sentences from Russian into Moksha or to evaluate constructed Moksha sentences and correct them if necessary. In cases where native speakers' opinions differ only minimally, I provide averaged judgments; however, if evaluations are radically different, this is explicitly mentioned in the text.

The grammaticality of examples in this work is notated as follows: '*' indicates the unacceptability of a sentence; '?' and '??' mark sentences that are mildly and severely degraded, respectively. 'ок' indicates full grammaticality, but is used only if its absence could be misleading (for instance, if grammatical and ungrammatical parts of a sentence are compared). '%' shows that a sentence is ungrammatical for some speakers and acceptable for others. '#' marks sentences that are semantically or pragmatically unacceptable in a given context, but are otherwise fully grammatical.

Examples are presented in accordance with the Leipzig Glossing Rules. One exception is that the symbol '=' is not used to separate clitics, because the affixal or

clitic status of some markers is not clear. Grammatical meanings that are present in a word but are not overtly realized are, as a rule, indicated in square brackets. This does not apply to the following meanings: indicative, active voice, indefiniteness for nouns, and singular number for nouns of the indefinite declension. These are not represented in the glosses. The same applies to nominative. The same applies to the nominative, which is represented in the glosses only when its presence is contrasted with another case.

Moksha sentences are written in a practical transcription that was developed by the participants of the Lomonosov Moscow State University fieldwork project and is used in the recent Moksha grammar (Toldova & Kholodilova 2018). This transcription is largely based on the IPA but inherits some properties of traditional Finno-Ugric transcription (Collinder 1957: ix–xiii, Sinor 1988). The table in 2.1 is taken from Kukhto (2018) and shows how the transcription used here corresponds to the IPA.

In the remaining part of this section, I turn to Moksha grammar and sketch some of its properties. I begin with nominal morphology. Nouns in Moksha are marked for number, definiteness, possessivity, and case. The number category has two values: singular and plural. Definiteness also has two values: overt definite marking and sometimes null indefinite marking. Moksha grammars refer to these as indefinite and definite declensions, because definiteness determines the shape and availability of other markers. I will also use these terms. Possessive marking realizes the person and number of the possessor. The number of cases in Moksha differs depending on the description; I assume that the case system in Moksha distinguishes 15 cases: nominative, genitive, dative, ablative, inessive, elative, illative, lative, prolative, translative, caritive, causalis, equative, temporalis, and vocative. Note that there is no case called 'accusative'. This is because the marking of a direct object is the same as the marking of a possessor, and this case is called genitive. In addition to its rich case system, Moksha has postpositions.

Nominal morphology is not agglutinative (as in some other Finno-Ugric languages), i.e., multiple features are often expressed by a single exponent, and there are non-trivial restrictions on the combination of features. For instance, definiteness cannot be marked in the presence of possessive exponents. In the indefinite declension, number is marked only in the nominative. In the definite declension, only three case forms (nominative, genitive, and dative) are distinguished. Table 2.2 presents part of the nominal paradigm.

Turning to verbal morphology, Moksha distinguishes five grammatical moods: indicative, imperative, optative, conditional, and conjunctive. Verbs in the indicative mood have one of three tense–aspect forms: present, preterite, or imperfect. In the optative and conditional, only the present and the imperfect are marked, and the other moods do not co-occur with tense–aspect marking. Verbs also bear aspectual exponents (avertive, inchoative, semelfactive, *i.a.*), but only the frequentative

Tab. 2.1: Practical transcription vs. IPA

IPA	Practical transcription
m	m
n̪	n
n̪ʲ	n'
p	p
b	b
t̪	t
t̪ʲ	t'
d̪	d
d̪ʲ	d'
k	k
g	g
x	x
f (ɸ)	f
v (β)	v
s̪	s
z̪	z
z̪ʲ	z'
ʃ	š
ʃː (ʃʧ)	šč
ʒ	ž
t͡s̪	c
t͡s̪ʲ	c'
ʧ	č
ç	j̊
j	j
ɾ̥	ɾ̊
ɾ̥ʲ	ɾ̊'
ɬ̪	l̥
ɬ̪ʲ	l̥'
l̪	l
l̪ʲ	l'
i	i
u	u
e	e
ə	ə
o	o
ɛ	ɛ

approaches the status of a grammatical category. Moksha has a voice category with two values: active and passive. Finally, verbs take agreement morphology. They can agree with the subject, as well as with both the subject and a direct object. Exponents

Tab. 2.2: Part of the Moksha nominal paradigm illustrated by the noun *vel'ə* 'village'

	Indefinite declension		Definite declension	
	SG	PL	SG	PL
nominative	vel'ə	vel'ə-t	vel'ə-s'	vel'ə-t'n'ə
genitive	vel'ə-n'		vel'ə-t'	vel'ə-t'n'ə-n'
dative	vel'ə-n'd'i		vel'ə-t'i	vel'ə-t'n'ə-n'd'i
ablative	vel'ə-də			
inessive	vel'ə-sə			
elative	vel'ə-stə			

of subject and subject–object agreement are different. In general, two numbers and three persons can be distinguished, but some oppositions are not always expressed. For instance, in subject–object agreement forms, the number of the object is not realized if the subject is plural, and the number of the subject is not realized if the object is plural and first or second person.

Even though Moksha does not have a case called the accusative, it shows nominative–accusative alignment: subjects of intransitive clauses (S-arguments) and transitive clauses (A-arguments) receive the nominative (typically unmarked), and the verb agrees with the subject in both clause types. This is illustrated in (1).

(1) a. T'ɛ ava-s' ud-i.
this woman-DEF.SG sleep-NPST.3[SG]
'This woman sleeps.'

b. T'ɛ ava-s' rama-z'ə kut-t'.
this woman-DEF.SG buy-PST.3SG.O.3SG.S house-DEF.SG.GEN
'This woman bought the house.'

Moksha has differential object marking. A direct object (O-argument) can be either unmarked (see (2a)) or marked for the genitive (see (2b)). The choice of marking is determined by an interplay of factors that include definiteness, referentiality, and information-structural status (Toldova 2018). Greatly simplifying the pattern, definite nouns tend to be marked for the genitive, while indefinite nouns tend to have no overt case marking:

(2) a. Mon n'ɛj-ən' kn'iga.
I see-PST.1SG book
'I saw a book.'

b. Mon n'ɛj-in'ə t'ɛ kn'iga-t'.
I see-PST.3.O.1SG.S this book-DEF.SG.GEN
'I saw this book.'

The marking of the direct object correlates with verbal agreement. Verbs do not agree with unmarked objects, and agreement with genitive objects is obligatory.

Moksha grammars (e.g., Zaicz 1998, Koljadënkov 1954) suggest that the basic word order is SVO, but note that other word orders are possible as well. All six possible word orders for a sentence with a subject, an object, and a verb are judged to be grammatical:

(3) a. Ava-s' rama-z'ə kut-t'. (SVO)
woman-DEF.SG buy-PST.3SG.O.3SG.S house-DEF.SG.GEN

b. Ava-s' kut-t' rama-z'ə. (SOV)
woman-DEF.SG house-DEF.SG.GEN buy-PST.3SG.O.3SG.S

c. Kut-t' ava-s' rama-z'ə. (OSV)
house-DEF.SG.GEN woman-DEF.SG buy-PST.3SG.O.3SG.S

d. Kut-t' rama-z'ə ava-s'. (OVS)
house-DEF.SG.GEN buy-PST.3SG.O.3SG.S woman-DEF.SG

e. Rama-z'ə ava-s' kut-t'. (VSO)
buy-PST.3SG.O.3SG.S woman-DEF.SG house-DEF.SG.GEN

f. Rama-z'ə kut-t' ava-s'. (VOS)
buy-PST.3SG.O.3SG.S house-DEF.SG.GEN woman-DEF.SG
'The woman bought the house.'

On the basis of a small corpus (a collection of texts recorded by participants in the Lomonosov Moscow State University fieldwork project), Toldova (2018) identifies some tendencies in word order. First, in an intransitive clause, the SV order is more frequent in clauses where a pronoun or a noun with definite or possessive marking is the subject. By contrast, VS is more frequent if the subject is marked as indefinite. Second, in transitive clauses, the SOV order is somewhat rarer than the SVO order in general, but significantly rarer in clauses where the verb does not agree with the direct object. Third, there is a tendency for the subject to precede both the object and the verb in transitive clauses.

Word order in the noun phrase is more restricted: there are modifiers that obligatorily precede the noun. These modifiers include demonstrative pronouns, numerals, and adjectives; see (4) with an adjective.

(4) Mon n'ɛj-in'ə [ravžə pin'ə-t'] / *[pin'ə-t' ravžə].
I see-PST.3.O.1SG.S black dog-DEF.SG.GEN dog-DEF.SG.GEN black
'I saw the black dog.'

At the same time, the relative order among these prenominal modifiers is not fixed, and while there are some preferences and tendencies, all pairwise permutations are grammatical (Pleshak & Kholodilova 2018).

DP and PP modifiers of the noun are not obligatorily placed before the noun; they can either precede or follow it.

(5) Kol'ɛ kepəd'-əz'ə [t'ɛ ava-t' sumka-nc] /
Kolja grab-PST.3SG.O.3SG.S this woman-DEF.SG.GEN bag-3SG.POSS.SG.GEN
[sumka-nc t'ɛ ava-t'].
bag-3SG.POSS.SG.GEN this woman-DEF.SG.GEN
'Kolja grabbed this woman's bag.'

Finite nominal modifiers, such as sentential arguments or relatives, always follow a noun:

(6) Mon n'ɛj-sa pin'ə-t' [kona-n' ezdə pel'-an].
I see-NPST.3SG.O.1SG.S dog-DEF.SG.GEN which-GEN in.ABL fear-NPST.1SG
'I see the dog that I am afraid of.'

2.2 Inverse case attraction

This second part of this background chapter presents an overview of ICA, its cross-linguistic distribution, and questions central to research on this phenomenon.

A definition of ICA that does not presuppose a theoretical analysis is as follows: ICA is a phenomenon in which the head of a finite relative clause that is to the left of left-peripheral material in the relative CP (such as a relative pronoun or a complementizer) shows case marking assigned to the relativized position inside the relative clause. ICA is schematically shown in (7). Note that this scheme does not indicate whether the position of the head noun is inside or outside the relative clause. In what follows, the case assigned in the relative clause (α in (7)) will be called an internal case, and the case assigned to the position of the head noun in the main clause (β in (7)) will be called an external case.

(7) [[head-α rel.pron-α ... case.assigner$_{[case:\ \alpha]}$ ...] ... case.assigner$_{[case:\ \beta]}$ ...]

The example in (8) illustrates ICA in Latin. Here, *urbem* 'city.ACC' is the head of the relative clause. It is the subject of the main clause and is therefore expected to show nominative case. Instead, the head noun is marked with the accusative case, which is assigned in the gap position inside the relative clause and also appears on the relative pronoun.

(8) [**Urbem** quam statuo] vestra est.
city.ACC which.ACC I.found yours is
'The city that I found is yours.' (Bianchi 1999: 93, (48))

Research on ICA began with work on extinct Indo-European languages. Among them, ICA is attested in Ancient Greek (Grimm 2005: 78–92), Hittite, Old Persian, Oscan, and Umbrian (Hahn 1964), Latin (Touratier 1980: 147–211), Vedic and Sanskrit (Gonda 1975: 195), Middle High German (Pittner 1995), Modern Church Slavonic (Smotrickij 1619: 238), and Old English (Harbert 1983). At some point, it was believed that ICA was restricted to extinct Indo-European languages (see, e.g., De Vries 2003), but further research has shown that ICA is also present in currently spoken Indo-European languages; see Albanian of Xranje (Bevington 1979), Dari (Houston 1974), East Franconian German (Fleischer 2006: 229), Modern Persian (Aghaei 2006: 72–76, 90–95), and non-standard Icelandic (Wood, Sigurðsson, & Nowenstein 2017).

The phenomenon has further been attested in a number of non-Indo-European languages; see Besermyan Udmurt (Belyaev 2012, Kholodilova & Privizentseva 2015), Ingrian Finnish (Kholodilova 2013), Nez Perce (Deal 2016), and Koryak (Abramovitz 2021), among others. Recent in-depth research on ICA is primarily based on languages from the latter group.

Despite the growing number of languages that have ICA, the phenomenon remains rather rare. There are several hypotheses that attempt to explain why this is the case. One of them suggests that ICA is a step in the diachronic development of relative clauses. It arises when a language with correlative clauses develops an externally-headed relativization strategy (Haudry 1973, Bianchi 1999, 2000b), or, in the reverse scenario, when a language with externally-headed relatives develops correlatives (Harris 1992). Another hypothesis was proposed by Kholodilova & Privizentseva (2015). It suggests that ICA tends to be present only in non-standard language varieties and disappears in the course of standardization.

Another question, most recently raised by Abramovitz (2021), is whether ICA is uniform cross-linguistically; that is, whether relatives with ICA have the same underlying syntax in all languages in which the phenomenon is attested. One point of cross-linguistic variation is identified by Kholodilova & Privizentseva (2015). They

observe that while in some languages ICA is possible independently of the type of head noun, in others (e.g., in Standard Udmurt) it is allowed only in so-called light-headed relative clauses, when the head is a pronoun, but not when it is a noun. Abramovitz (2021), on the other hand, shows that the phenomenon appears to be uniform across a number of languages with respect to extraposition and extraction out of the relative CP.

Besides inverse case attraction, there is also progressive case attraction, sometimes also called relative attraction. In this case, it is the relative pronoun that shows the case assigned to the position of the head noun in the main clause instead of the expected case assigned in the relative clause. This phenomenon is schematically shown in (9).

(9) [[head-β rel.pron-β ... case.assigner$_{[case:\alpha]}$ ...] ... case.assigner$_{[case:\ \beta]}$ ...]

Progressive case attraction is attested in Latin (Bianchi 1999), New Testament Greek (Kirk 2012: 202), Old High German (Pittner 1995: 198), and Nez Perce (Deal 2016), among others. Example (10) illustrates progressive attraction on the basis of Nez Perce. In this example, the relative pronoun *yox̂* displays a nominative case form instead of the expected accusative case. The nominative here corresponds to the position of the head noun in the main clause.

(10) NOM → ACC

Mine	hii-we-s	samx̂	yox̂	kex	‘a-sayqi-ca?
where	AGR-be-TAM	shirt.NOM	which.NOM	C	AGR-like-TAM

‘Where is the shirt that I like?’ (Deal 2016: 441)

Both attraction phenomena can coexist in a language (see, e.g., Latin or Nez Perce), but this is by no means always the case. Moksha, for instance, has inverse attraction but not progressive attraction. Despite the similarities between inverse and progressive attraction and the initial appeal of a unified analysis, existing approaches usually focus on only one of the phenomena, so that the proposed analyses are not meant to, and often cannot, account for both.

Georgi & Salzmann (2017) suggest that the term case attraction can also apply to phenomena in which unusual case marking is not directly present as such, but nevertheless influences other processes in a sentence; for instance, the distribution of resumptive pronouns in Swiss German relative clauses depends on both the case assigned to the head noun in the main clause and the case assigned in the relativized position.

A separate niche in research on case attraction is occupied by experimental studies of languages in which native speakers generally judge attraction to be un-

grammatical, but effects of case attraction nevertheless occur in processing (Bader & Meng 1999, Bader & Bayer 2006, and Czypionka, Dörre, & Bayer 2018). The properties of such case attraction differ from the properties of ICA in Moksha and other languages that have been studied in depth (such as Koryak and Nez Perce), in that ICA effects attested in processing show sensitivity to the relative markedness of the internal and external interacting cases.

Theoretical research on ICA focuses on solving two closely related issues: what the surface structure of relatives with ICA is, and what underlies the unusual case marking on the head noun. The first question concerns placing relative clauses with ICA within the typology of relative clauses. The options are as follows. First, relative clauses with ICA have the same structure as correlatives; that is, the head is inside the relative clause, and the relative clause is a CP without a D layer on top (Bhatt 2005, Georgi & Salzmann 2017). Second, relative clauses with ICA belong to internally-headed relatives. This means that the head is inside the relative CP, as in the previous option, but the relative clause is embedded under a possibly null nominal shell (Abramovitz 2021). Third, ICA belongs to externally-headed relatives (Deal 2016). Answering this question on the basis of Moksha data is the main goal of Chapter 3.

A second question deals directly with the unusual case marking on the head noun. An answer to this question correlates with an answer to the previous question. Nevertheless, two options can be identified. First, the head of the relative clause shows the case assigned in the gap position in the relative CP because it occupies this position at some stage of the derivation (Bianchi 1999, 2000b, Cinque 2015, 2020, Deal 2016, Wood et al. 2017, Abramovitz 2021). Second, the head receives the internal case due to agreement with a relative pronoun or an operator that is on the left periphery of the relative CP (Harbert 1983, Gračanin-Yuksek 2013, and also Czypionka et al. 2018). Under this latter view, the internal case of the head noun does not indicate that the head noun occupied the gap position earlier in the derivation. This question of the origin of internal case marking will be addressed for relatives with ICA in Moksha in Chapter 4.

3 Inverse case attraction

3.1 Introduction

Relative clauses with ICA in Moksha Mordvin are at the center of this book. The sentence in (1) provides an example. It contains a finite relative clause ‘to whom I have been writing’ and the head of the relative clause appears before the relative pronoun. The sentence, however, differs from regular externally-headed relative clauses in that the head noun shows the case assigned to the relativized position inside the relative clause instead of the case assigned according to the position of the head noun in the main clause.

(1) GEN ← DAT

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

The goal of this chapter is to investigate the syntactic structure of relative clauses with ICA, compare them to cross-linguistically established types of relative clauses, and determine the place of such relatives in the typology of relative clauses. In what follows, I show that relative clauses with ICA share their properties with externally-headed relatives that are derived under the raising analysis, and I argue that, despite the internal case marking, the head of such relative clauses is best viewed as being in the main clause, outside the relative CP.

The chapter proceeds as follows. In section 3.2, I begin with the necessary background on relative clause typology, relativization strategies in Moksha, and existing approaches to the syntax of relatives with ICA. After this, I go through the main properties of relative clauses with ICA in Moksha in section 3.3. I discuss their interpretation, positional restrictions, extraposition, coordination, and the possibility of extraction out of such relatives. In section 3.4, I summarize the data and propose that relatives with ICA are best analyzed as externally-headed relative clauses. After this, I discuss different positions of the head noun in externally-headed relatives and argue that the entire head noun phrase is outside the relative CP. In the final section, 3.5, I discuss further properties of relatives with ICA that have no immediate effect on the structure assigned to them, namely, restrictions on possible combinations of an external and an internal case.

https://doi.org/10.1515/9783112225868-003

3.2 Background

3.2.1 Typology of relative clauses: Position of the head noun

Before I start this section, two terminological remarks are due. First, the term *relative clause* is often used ambiguously in that it can refer either to a relative CP or to a larger constituent that also includes a head noun. I will continue using this term without resolving its ambiguity, but will refer explicitly to the relative CP or to the entire relative construction where necessary.

Second, the term *head noun* is potentially misleading: it refers to a relativized nominal constituent that does not have to be a syntactic terminal, but is called a head noun because it heads a relative clause.

The goal of this section is to introduce the types of relative clauses as determined by the position of the head noun. Two types of relative clauses are traditionally identified on this basis: externally- and internally- headed (Lehmann 1984, 1986, De Vries 2002: 17–20). Externally-headed relative clauses are characterized by the position of the head noun outside the relative CP. The relative CP can then either precede or follow the head noun. The head of internally-headed relatives is inside the relative CP. As shown by Hiraiwa (2005, 2017), the internal head does not have to remain in situ; it can move to a position on the periphery of the relative CP, which makes it less straightforward to distinguish between relative clauses with an external and an internal head.

Correlatives constitute a separate group among internally-headed relative clauses. They are characterized by the position of the relative clause at the left edge of the sentence, the absence of a nominal shell above the relative CP, the obligatory presence of a correlative pronoun in the main clause, and a maximalizing interpretation (Srivastav 1991, Dayal 1996, Lipták 2009, Lin 2020).

One complication for this simple distinction between externally- and internally-headed relative clauses arises from the notion of movement, as it allows the head of a relative clause to occupy different positions throughout the derivation. For instance, a head noun can start its derivational path inside the relative clause and then move to a position outside the relative CP, rendering the relative clause internally-headed at earlier stages of the derivation but externally-headed in the resulting structure. In what follows, when classifying a relative clause as internally- or externally-headed, I refer to the surface position of the head noun inside or outside the relative clause, not to its derivational path.

Still, some implementations of the raising derivation remain problematic for the classification because they split the head noun phrase between the main clause and the relative CP (Kayne 1994, Bianchi 1999, 2000b). Such approaches assume that the D head and some higher modifiers are base-generated in the main clause, while

the noun itself originates in the relative CP, moves upward, but never leaves the relative CP and instead lands in the specifier of the C head above the relative pronoun. This structure is identical to the structure of standard internally-headed relative clauses in that the noun is inside the relative clause and there is a nominal layer above the CP. Note, however, that this structure was proposed for relative clauses in European languages (English, French) that are traditionally viewed as externally-headed and differ in several relevant respects (e.g., interpretation or case marking) from internally-headed relative clauses.

For the first part of the following discussion, I abstract away from this essentially internally-headed structure proposed for externally-headed relative clauses, and I return to this implementation in section 3.4, where I show that the analysis that splits the head noun between the relative CP and the main CP for externally-headed relative clauses cannot be on the right track for independent reasons: it yields an incorrect constituency within the noun phrase.

3.2.2 Relativization strategies in Moksha

With this background on the structure of relative clauses, I now turn to the relativization strategies in Moksha.

Besides relatives with ICA, Moksha has two other types of relative clauses: correlatives and externally-headed relative clauses. Let us start with correlatives. Cross-linguistically, this type of relative clause is characterized by the position of the relative CP at the left edge of the sentence and by the presence of a correlative pronoun in the main clause (Srivastav 1991, Dayal 1996, Lipták 2009). Example (2) illustrates a correlative construction in Moksha.

(2) [Kona jalga-z'ə-n'd'i t'aš-n'ə-n'] mon n'ɛj-sa
which friend-1SG.POSS.SG-DAT write-FREQ-PST.1SG I see-NPST.3SG.O.1SG.S
son' kurək.
PRON.3SG.GEN soon
'I will soon see my friend whom I have been writing to.' (Lit.: 'To which friend I have been writing, I will see him soon.')

Example (2) shows that the correlative clause *kona jalgaz'ən'd'i t'ašn'ən'* 'to which friend I have been writing' is located at the left periphery of the sentence. It contains the relative pronoun *kona* 'which'. The relative pronoun is not marked for case or number. It is followed by the head noun *jalgaz'ən'd'i* 'to my friend', which bears the case assigned inside the relative clause. The relative clause is internally-headed; both the relative pronoun and the head noun are at the left edge of the

relative CP. The main clause contains the third-person pronoun *son'*. This is a correlative pronoun; it occupies the position that corresponds to the relative clause. The structure of correlatives is schematically represented in (3).

(3) [$_{CP}$ rel.pron head-α ...] [$_{MC}$ ... pronoun-β ...]

The other type of relative clause in Moksha is the regular externally-headed relative construction. It is illustrated in (4).

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

Here, the relative clause *konan'd'i t'ašn'ən'* 'to whom I have been writing' immediately follows the head noun *jalgaz'ən'* 'my friend'. The head noun and the relative clause seem to form a constituent that is embedded in the main clause. The relative clause contains the relative pronoun *kona*, which is placed at the left periphery of the relative CP. Both the head noun and the relative pronoun are inflected and show different case markings. The head noun bears the genitive case assigned in accordance with its position as the direct object in the main clause. The relative pronoun is marked for the dative case assigned inside the relative CP. The structure of externally-headed relatives in Moksha is represented in (5).

(5) [$_{MC}$ ... head-β [$_{CP}$ rel.pron-α ...] ...]

In addition to correlatives and externally-headed relative clauses, Moksha has relative clauses with ICA. They are illustrated in (6) (repeated from above).

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

Relative clauses with ICA are similar to externally-headed relative clauses in that the relative CP *konan'd'i t'ašn'ən'* 'whom I have been writing to' linearly follows

the head noun *jalgaz'ən'd'i* 'to my friend', and both the head noun and the relative pronoun *konan'd'i* are inflected. Relative clauses with ICA, however, differ from externally-headed relatives and pattern with correlatives in that the head noun is marked for the case assigned inside the relative clause, and the constituent that contains the head noun and the relative CP is at the left edge of the sentence. Unlike correlatives, relative clauses with ICA do not show a correlative pronoun in the main clause. It is thus not immediately clear what the exact structure of relatives with ICA is. For now, they can be schematically represented as in (7), which does not include several relevant details.

(7) [[head-α rel.pron-α ... case.assigner$_{[case:\ \alpha]}$ ...] ... case.assigner$_{[case:\ \beta]}$ ...]

3.2.3 Inverse case attraction: State of the art

The description of relative clauses with ICA in Moksha provided at the end of the last section emphasizes that, at first sight, these relatives share some properties (the order of the relative pronoun and the head noun, case marking on the relative pronoun) with regular externally-headed relative clauses in Moksha, and others (placement at the left edge, internal case on the head noun) with internally-headed correlatives. It is therefore not obvious how to classify them. In this section, I present existing approaches to the structure of relative clauses with ICA developed on the basis of data from other languages. Existing analyses of relative clauses with ICA differ with respect to whether the head noun is inside or outside the relative CP. Approaches that postulate the position of the head noun inside the relative CP further vary with respect to whether there are nominal projections above the relative CP.

First, relative clauses with ICA were suggested to be a subtype of correlative clauses that differs from standard correlatives by a linearly reversed order of the relative pronoun and the head noun (Pittner 1995, Bhatt 2005, Georgi & Salzmann 2017). Relative clauses with ICA have the structure shown in (8). The proponents of this analysis usually rely on limited data from extinct Indo-European languages that do not allow for the examination of further properties, so that the main arguments for this account are the internal case on the head noun and the left-peripheral position of the relative clause.

(8) [$_{CP}$ head-α rel.pron-α ... case.assigner$_{[case:\ \alpha]}$] [$_{MC}$ case.assigner$_{[case:\ \beta]}$ ...]

The second approach groups relative clauses with ICA together with internally-headed relative clauses, but not with correlatives (Abramovitz 2021). It differs from the previous approach in that the relative CP is embedded in a nominal structure. This nominal structure includes higher D-level nominal projections as well as a null noun. The overtly realized noun is inside the relative CP, but it moves to the left, into one of the extended CP projections. A ban on extraposition of the relative CP and the possibility for CP-internal material to move to the left of the head noun are used as the main arguments for this analysis. The structure is given in (9).

(9) $[_{MC}\ [_{DP}\ D\ e_{noun}\ [_{CP}$ head-α rel.pr-α ... case.assigner$_{[case:\ \alpha]}$]] ... assigner$_{[case:\ \beta]}$]

According to the third approach, relative clauses with ICA are externally-headed (Deal 2016). Arguments in favor of this analysis come from a comparison between relatives with ICA and regular externally-headed relatives, which reveals similarities in stacking, coordination, and the position of nominal modifiers to the left of the head noun, among other properties. The structure of relatives with ICA under this approach is provided in (10)

(10) $[_{MC}\ [_{DP}$ head-α $[_{CP}$ rel.pron-α ... case.assigner$_{[case:\ \alpha]}$]] ... case.assigner$_{[case:\ \beta]}$]

To sum up, virtually all major structures of relative clauses have been proposed for relative clauses with ICA by different researchers: ICA has been argued to represent (i) correlatives, (ii) regular internally-headed relatives, or (iii) regular externally-headed relatives. In the next section, I investigate the properties of relative clauses with ICA in Moksha that allow us to determine their place in the typology of relatives. I argue that relative clauses with ICA are externally-headed.

3.3 Properties of relative clauses with inverse case attraction

I begin by exploring the semantic interpretation of relative clauses in Moksha and the syntactic restrictions related to them in section 3.3.1. I show that relative clauses with ICA pattern with regular externally-headed relatives and differ from correlatives with respect to their interpretive possibilities. I then turn to the left-periphery restriction in section 3.3.2. This property distinguishes relatives with ICA from regular externally-headed relatives, but, as I argue, it also does not bring relatives with ICA and correlatives closer together, because the nature of this requirement is different in the two cases. I then continue with positional restrictions, discussing extraposition and coordination in section 3.3.3. Finally, I discuss extraction out of the relative clause in section 3.3.4 and show that, together with extraposition, it sets

relatives with ICA apart from externally-headed relatives in Moksha, but not from externally-headed relatives cross-linguistically.

3.3.1 Interpretation

Since Grosu & Landman (1998) and Grosu (2002), three interpretations of relative clauses have been standardly identified: appositive, restrictive, and maximalizing. Under the appositive interpretation, the reference of the noun phrase is fully determined outside the relative CP, and the relative clause only provides additional background information. Under the restrictive interpretation, the reference of the noun phrase is restricted by both the head noun and the relative clause. Under the maximalizing interpretation, the meaning is fully determined inside the relative CP.[1]

The interpretation of a relative clause can be determined by a set of possible continuations. Let us consider the example in (11) and the two continuations in (12).

(11) Two criminals(,) who Peter caught(,) were running away from the police.

(12) a. A third criminal was also running away, but he managed to escape.
*appositive; ^{OK}restrictive; ^{OK}maximalizing

b. Peter also caught a third criminal, but he was hiding in a barn.
^{OK}appositive; ^{OK}restrictive; *maximalizing

The grammaticality judgments in (12a–b) show whether a continuation is possible for a relative clause with lexical content as in (11), depending on whether it receives an appositive, restrictive, or maximalizing interpretation. The continuation in (12a) indicates that other criminals are also running away. It is compatible with the restrictive or maximalizing interpretation of the relative clause, but it is infelicitous under the appositive interpretation. The appositive interpretation presupposes that the reference of the noun phrase is fully determined in the matrix clause, i.e., that exactly *two* criminals were running away. The continuation in (12b) is felicitous under the appositive or restrictive interpretation, but not under the maximalizing reading. Under the maximalizing interpretation, the reference of the noun phrase is

1 More formal characteristics of the three semantic types are provided, for instance, in Grosu (2002): appositive relative clauses are relative clauses that denote a proposition containing a free variable. This free variable receives its value from the main clause. Restrictive relative clauses denote a property. A variable that they contain must be abstracted over. Maximalizing relative clauses are interpreted as a singleton set; its member is the output of the uniqueness operator.

determined inside the relative CP and therefore contradicts the continuation, which presupposes that more than two criminals were caught.

Thus, the two continuations in (12a–b) make it possible to distinguish among the three interpretations of relative clauses: the appositive interpretation renders the first, but not the second, continuation infelicitous. Both continuations are compatible with the restrictive interpretation. The maximalizing interpretation excludes the second continuation, but is compatible with the first. A semantic interpretation also determines further properties of relative clauses. For instance, only appositive relative clauses can include parentheticals emphasizing that the relative clause contains background information. Restrictive relative clauses allow for indefinite nonspecific heads. Maximalizing relative clauses do not allow stacking, unlike the other types of relative clauses.

Against this background, I now turn to the interpretive possibilities of relative clauses in Moksha. I begin with relative clauses with ICA, then turn to regular externally-headed relative clauses and correlatives. I show that both relative clauses with ICA and regular externally-headed relative clauses can be appositive or restrictive, while correlatives are maximalizing in Moksha.

The possibility of an appositive interpretation for relatives with ICA in Moksha is illustrated in (13). The appositive interpretation is ensured by the parenthetical expression *meždu pročim* 'by the way'. It emphasizes that the information in the relative CP is not essential.

(13) NOM ← GEN

Rovnaj	kaftə	pr'istupn'ik-n'ə-**n'**	kona-t'n'ə-n'	meždu	pročim	
straight	two	criminal-DEF.PL-GEN	which-DEF.PL-GEN	between	others	
kunda-z'ən'		Pet'ɛ	vor'gəd'-kšn'ə-s'-t'.			
catch-PST.3PL.O.3SG.S		Petja	run.away-AVR-PST.3-PL			

'Exactly two criminals, who, by the way, Petja caught, were running away.'

According to native speakers' judgments, the continuation in (14a) is infelicitous, while the continuation in (14b) is possible. The incompatibility with (14a) confirms that the relative clause is appositive.

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

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

The availability of the restrictive interpretation for relative clauses with ICA is illustrated in (15)–(16). Note that *kona*, which precedes the head noun in (15), is part of the indefinite pronoun *koj kona* 'some' that modifies the head noun, not a relative pronoun. As is often the case cross-linguistically (see Haspelmath 1997: 26–27), indefinite pronouns in Moksha are based on interrogative pronouns. The relative pronoun *kona* 'which' in (15) follows the head noun and is thus in its usual position.

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

Under the restrictive interpretation, example (15) denotes a non-empty intersection of the set of criminals arrested by Petja and the set of individuals who were running away. This implies that there can be two additional sets of criminals: those who were arrested by Petja but were not running away, and those who were running away but were not arrested. The existence of the first set is incompatible with the maximalizing interpretation of the relative clause; the existence of the second set is incompatible with the appositive interpretation. The existence of both of these sets is ensured by the continuation in (16), which is judged felicitous by native speakers and thus shows that the relative clause in (15) can receive the restrictive interpretation.

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

The availability of the restrictive interpretation for relative clauses with ICA is further confirmed by (17). In this example, the indefinite non-specific noun phrase with

a free-choice quantifier is the head of the relative clause. This renders the appositive and the maximalizing interpretations impossible, because both require a specific head noun.

(17) NOM ← GEN

L'ubovaj	pr'istupn'ik-**t'**	kona-n'	pal'icija	kunda-z'ə
any	criminal-DEF.SG-GEN	which	police	catch-PST.3SG.O.3SG.S

jora-j	vor'gəd'-əm-s.
want-NPST.3[SG]	run.away-INF-ILL

'Any criminal who the police caught wants to escape.'

As for the maximalizing interpretation, it is not attested for relative clauses with ICA, at least not in the regular case. This, however, does not exclude the possibility that there may be special subtypes of relative clauses with ICA that allow for a maximalizing interpretation. A similar situation is found in English, where externally-headed relative clauses are typically not maximalizing, but there are several types such as degree relatives or kind relatives, which are externally-headed and maximalizing (Carlson 1977, Grosu & Landman 1998). Whether such special subtypes of relative clauses with ICA or of regular externally-headed relatives exist in Moksha remains a topic for future research.

I now turn to the interpretation of regular externally-headed relatives in Moksha. They show the same semantic profile as relative clauses with ICA: appositive and restrictive interpretations are available.

The appositive interpretation of a regular externally-headed relative clause is illustrated in (18). This example is parallel to the one in (13) and differs only in the case marking on the head noun. The head noun shows the case assigned in the main clause. The relative clause contains a parenthetical that ensures an appositive interpretation, which is further confirmed by the impossibility of the continuation in (19a). The continuation in (19b) is allowed.

(18)

Rovnaj	kaftə	pr'istupn'ik-n'ə	[kona-t'n'ə-n'	meždu	pročim	
exactly	two	criminal-DEF.PL	which-DEF.PL-GEN	between	others	

kunda-z'ən'	Pet'ɛ]	vor'gəd'-kšn'ə-s'-t'.
catch-PST.3PL.O.3SG.S	Petja	run.away-AVR-PST.3-PL

'The two criminals, who, by the way, Petja caught, were running away.'

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

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

The restrictive interpretation of regular externally-headed relatives is demonstrated by (20) and its felicitous continuation in (21). These data differ from the earlier examples involving relatives with ICA only in the case marking on the head noun.

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

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

Regular externally-headed relative clauses also allow for an indefinite non-specific head noun (see (22)), which confirms the availability of the restrictive interpretation.

(22) L'ubovaj pr'istupn'ik-s' [kona-n' pal'icija kunda-z'ə]
any criminal-DEF.SG which police catch-PST.3SG.O.3SG.S
jora-j vor'gəd'-əm-s.
want-NPST.3[SG] run.away-INF-ILL
'Any criminal who police caught wants to escape.'

The semantic profile of correlative clauses in Moksha differs from that of both relative clauses with ICA and regular externally-headed relative clauses. In line with correlative clauses cross-linguistically (Grosu 2002, Lipták 2009, Brasoveanu 2012, Lin 2020), correlatives in Moksha allow only the maximalizing interpretation. The maximalizing semantics of the correlative in (23) is demonstrated by its incompatibility with the continuation in (24b).

(23) [Kona kaftə pr'istupn'ik-n'ə-n' Pet'ɛ kunda-z'ən'] s'in'
which two criminal-DEF.PL-GEN Petja catch-PST.3PL.O.3SG.S they
vor'gəd'-kšn'ə-s'-t'.
run.away-AVR-PST.3-PL
'Petja caught the two criminals that were running away.'

(24) a.[OK] Kolmə-c'ə pr'istupn'ik-s' vor'gəd'-kšn'ə-s' no Pet'ɛ
three-ORD criminal-DEF.SG run.away-AVR-PST.3[SG] but Petja
iz'-əz'ə kunda son'.
NEG.PST-PST.3SG.O.3SG.S catch.CN PRON.3SG.GEN
'The third criminal was running away, but Petja did not catch him.'

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

Another property that has been argued to follow from the maximalizing interpretation is the ungrammaticality of stacking. According to Grosu & Landman (1998) and Grosu (2002), maximalizing relative clauses are interpreted as singleton sets whose unique member meets the content of the relative clause. Stacking of maximalizing clauses then leads to one of two scenarios. First, the singleton sets of the stacked relative clauses contain different unique members, and no individual can be denoted by the sentence. Second, the singleton sets contain an identical member, and the sentence is tautological. Grosu (2002) proposes that both scenarios must result in the ungrammaticality of stacking.

Another approach to the absence of stacking was developed by Bhatt & Pancheva (2006). Building on the analysis of correlative clauses as generalized quantifiers that apply to the main clause and bind a variable there (Srivastav 1991, Dayal 1996), they suggest that stacking is excluded because each of the stacked correlative clauses

attempts to bind a correlative pronoun in the main clause, but the pronoun cannot naturally be bound more than once.[2]

Stacking is ungrammatical for correlatives in Moksha; see (25).

(25) *[Kona pɛrˈɛkɛ-tˈ pidˈ-əzˈə sasˈəda-zˈə] [kona
which pie-DEF.SG.GEN cook-PST.3SG.O.3SG.S neighbor-1SG.POSS.SG which
(pɛrˈɛkɛ-tˈ) minˈ srazu seva-sˈk] son ulˈ-sˈ
pie-DEF.SG.GEN we immediately eat-PST.3.O.1PL.S PRON.3SG be-PST.3[SG]
kapsta-nˈ.
cabbage-GEN
Intended: 'The pie that my neighbor cooked that we immediately ate was a cabbage pie.'

Relative clauses with ICA as well as regular externally headed relatives in Moksha can freely stack. This supports the earlier conclusion that these types of relatives are not maximalizing. Example (26) illustrates the stacking of two relative clauses with ICA.

(26) NOM ← GEN
Pɛrˈɛkɛ-**tˈ** **kona-n**ˈ pidˈ-əzˈə sasˈədə-zˈə
pie-DEF.SG.GEN which-GEN cook-PST.3SG.O.3SG.S neighbor-1SG.POSS.SG
kona-nˈ minˈ srazu seva-sˈk ulˈ-sˈ kapsta-nˈ.
which-GEN we immediately eat-PST.3.O.1PL.S be-PST.3[SG] cabbage-GEN
'The pie that my neighbor cooked that we immediately ate was a cabbage pie.'

Example (27) shows the stacking of two externally-headed relatives with regular external case marking on the head noun.

(27) Pɛrɛkɛ-sˈ [kona-nˈ pidˈ-əzˈə sasˈədə-zˈə] [kona-nˈ
pie-DEF.SG which-GEN cook-PST.3SG.O.3SG.S neighbor-1SG.POSS.SG which-GEN
minˈ srazu seva-sˈk] ulˈ-sˈ kapsta-nˈ
we immediately eat-PST.3.O.1PL.S be-PST.3[SG] cabbage-GEN
'The pie that my neighbor cooked that we immediately ate was a cabbage pie.'

2 Davison (2009) (citing Hettrich 1988) shows that correlative clauses in Sanskrit can stack and proposes that stacking is excluded in some languages because of a language-specific syntactic (not semantic) condition that requires a correlative clause to c-command a correlative pronoun in the main clause.

Furthermore, unlike relative clauses with ICA and regular externally-headed relative clauses, correlatives do not allow indefinite non-specific noun phrases as the head; see (28). This further confirms the absence of the restrictive interpretation.

(28) *[Kona l'ubovaj pr'istupn'ik-t' pal'icija kunda-z'ə] son
which any criminal-DEF.SG police catch-PST.3SG.O.3SG.S PRON.3SG
jora-j vor'gəd'-əm-s.
want-NPST.3[SG] run.away-INF-ILL
Intended: 'Any criminal who the police caught wants to escape.'

Another restriction attested for correlative clauses in Moksha is the ungrammaticality of proper names as the head. This restriction is illustrated in (29).

(29) *[Kona Puškin-ən' jalga-nzə t'er-n'-əz' senat-ən'
which Pushkin-GEN friend-3SG.POSS.PL call-FREQ-PST.3.O.3PL.S senate-GEN
ploščad'-t'i] son ašəz' sa-v.
square-DEF.SG.DAT PRON.3SG NEG.PST.3SG come-PASS
Intended: 'Pushkin, whom his friends were calling to Senate Square, could not come.'

In this example, the surname of the famous Russian writer is used as the internal head of the correlative clause, and this results in the ungrammaticality of the sentence. One of the native-speaker consultants commented that the sentence entails that there are multiple Pushkins, which contradicts their knowledge of the real world. While such a restriction on proper names in the head-noun position is not mentioned in classical work on correlatives or maximalizing relatives in general, it appears to be related to the maximalizing interpretation. I tentatively suggest that this follows from the maximalizing (or definiteness) operator that applies to the relative clause, but becomes vacuous if the head noun already ensures that a unique individual is denoted by the relative clause.

Relative clauses with ICA, as well as regular externally-headed relative clauses in Moksha, allow proper names as head nouns and receive an appositive interpretation in such cases. Example (30) shows this for a relative clause with ICA.

(30) NOM ← GEN
Puškin-**ən'** kona-n' jalga-nzə t'er-n'-əz'
Pushkin-GEN which-GEN friend-3SG.POSS.PL call-FREQ-PST.3.O.3PL.S
senat-ən' ploščad'-t'i ašəz' sa-v.
senate-GEN square-DEF.SG.DAT NEG.PST.3SG come-PASS
'Pushkin, whom his friends were calling to Senate Square, could not come.'

Example (31) demonstrates the use of a proper name as the head of a regular externally-headed relative clause.

(31) Puškin [kona-nʲ jalga-nzə tʲer-nʲ-əzʲ
Pushkin[NOM] which-GEN friend-3SG.POSS.PL call-FREQ-PST.3.O.3PL.S
senat-ənʲ ploščad'-tʲi] ašəzʲ sa-v.
senate-GEN square-DEF.SG.DAT NEG.PST.3SG come-PASS
'Pushkin, whom his friends were calling to Senate Square, could not come.'

Table 3.1 summarizes the data: both relative clauses with ICA and regular externally-headed relative clauses can be appositive or restrictive. They show no differences with respect to diagnostics related to interpretation. Correlatives, by contrast, have a maximalizing interpretation and differ from the other types of relatives in Moksha with respect to the possibility of stacking and the type of noun allowed as the head.

Tab. 3.1: Relative clauses and their interpretations in Moksha

	ICA	Regular externally-headed	Correlatives
Interpretation	APP, RESTR	APP, RESTR	MAX
Free choice quantifiers	OK	OK	*
Stacking	OK	OK	*
Proper names	OK	OK	*

Thus, the comparison among different types of relative clauses in Moksha reveals that (at least with respect to the properties discussed so far) relative clauses with ICA unambiguously pattern together with regular externally-headed relative clauses. I would like to suggest that these data not only show that relatives with ICA are not correlatives in Moksha, but also provide evidence that relative clauses with ICA are not internally-headed. The argument relies on a cross-linguistic picture, according to which there are correlations between the syntactic structure of a relative clause and the set of semantic interpretations it can have. One of the best-known correlations of this type is that correlatives can only be maximalizing. Furthermore, internally-headed relative clauses have also been shown to have restrictions on their semantic interpretation: they can be maximalizing or restrictive (see Grosu 2002, 2012, Watanabe 2004, and recent research by Hanink 2021 and Hucklebridge 2022), but not appositive (Lehmann 1984: 278, De Vries 2002: 29, Grosu 2012). The nature of this restriction is essentially clear: the head of the relative clause is merged inside the relative clause, remains there, and is not part of the main clause at any

stage of the derivation. The head noun is thus expected to be interpreted in the relative clause, not in the main clause, as would be required for the appositive interpretation.[3]

The availability of the appositive interpretation for relative clauses with ICA illustrated in this subsection therefore provides an argument against analyzing them as internally-headed and shows that the head is external to the relative CP despite the unusual case marking.

3.3.2 Left periphery restriction

3.3.2.1 Basics

In this section, I discuss the positional properties of relative clauses with ICA. These relative clauses must appear at the left periphery, as in (32).

(32) GEN ← DAT

[Škaf-t'i	kona-n'd'i	mon	put-in'ə	fətəgrafijə-t'n'ə-n']	
cabinet-DEF.SG.DAT	which-DAT	I	put-PST.3.O.1SG.S	photo-DEF.PL-GEN	
min'	jorda-s'k.				
we	throw.away-PST.3.O.1PL.S				

'We threw away the cabinet where I had put the photos.'

Relative clauses with ICA cannot follow the predicate of the main clause, as shown in (33).

(33) GEN ← DAT

*Min'	jorda-s'k	**[škaf-t'i**	kona-n'd'i	mon	
we	throw.away-PST.3.O.1PL.S	cabinet-DEF.SG.DAT	which-DAT	I	
put-in'ə	fətəgrafijə-t'n'ə-n'].				
put-PST.3.O.1SG.S	photo-DEF.PL-GEN				

Intended: 'We threw away the cabinet where I had put the photos.'

This restriction is attested for relative clauses with ICA in virtually all languages in which the phenomenon is present (Bianchi 1999, Kholodilova 2013, Kholodilova &

3 One formal syntactic account of why internally-headed relative clauses cannot be appositive is given in (De Vries 2006: 266, fn. 58). I will not delve into this analysis, because the syntactic account of appositive relatives proposed there is incompatible with the analysis of relative clauses with ICA developed later in Chapter 5.

Privizentseva 2015, Deal 2016, and Abramovitz 2021), and it distinguishes relative clauses with ICA from regular externally-headed relative clauses. The latter can modify a noun in its base position; see (34).

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

Note that the left periphery is not reserved for relative clauses with ICA. Regular externally-headed relatives can also be placed there; see (35).

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

Placement at the left edge groups relatives with ICA and correlatives. The examples in (36a–b) show that correlatives in Moksha are also obligatorily located at the left edge, and this is cross-linguistically one of the defining properties of correlatives (Srivastav 1991, Dayal 1996, Lipták 2009, and Lin 2020).

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

b. *Min' jorda-s'k (s'ɛ-n') [kona škaf-t'i
we throw.away-PST.3.O.1PL.S that-GEN which cabinet-DEF.SG.DAT
mon put-in'ə fətəgrafijə-t'n'ə-n'].
I put-PST.3.O.1SG.S photo-DEF.PL-GEN
'We threw away the cabinet where I had put the photos.'

The fact that both relatives with ICA and correlatives must appear at the left edge is the main argument for analyzing relatives with ICA as correlatives (Pittner 1995, Bhatt 2005, Georgi & Salzmann 2017, and also Bianchi 1999, 2000b). However, the

nature of the left-peripheral position is debated for both types of relative clauses. For correlatives, it has been suggested that the relative clause is externally merged on the left (Srivastav 1991, Dayal 1996), or alternatively that it moves to the left from a position embedded in the main clause (Bhatt 2003, Bhatt & Nash 2023). The same holds for relative clauses with ICA. They have been argued to be base-generated on the left by Deal (2016) or to move there by Abramovitz (2021). In this section, I argue that despite their shared position at the left periphery, the syntax of relative clauses with ICA in Moksha differs from that of correlatives. Correlative clauses are base-generated on the left, while relative clauses with ICA are generated embedded in the main clause, but obligatorily move to the left later in the derivation.

Before turning to direct evidence for base generation versus movement, I provide some further details on the positions of relatives with ICA and correlatives. First, while both clause types are generally restricted to the left periphery, they do not have to be at the left edge of the entire sentence, but can appear at the left periphery of an embedded clause. This is shown in (37) for a relative clause with ICA.

(37) NOM ← GEN

Katʲɛ	az-əzʲə	[što	[**mašina-t**ʲ	kona-nʲ	son	
Katja	say-PST.3SG.O.3SG.S	that	car-DEF.SG.GEN	which-GEN	PRON.3SG	
rama-zʲə]	aščʲ-i	dvor-sə].				
buy-PST.3SG.O.3SG.S	be-NPST.3[SG]	yard-IN				

‘Katja said that the car that she bought is in the yard.’

Example (38) shows a correlative clause in the same position.

(38)

Katʲɛ	az-əzʲə	[što	[kona	jalga-zʲə-nʲdʲi	kunarə	
Katja	say-PST.3SG.O.3SG.S	that	which	friend-1SG.POSS.SG-DAT	long.ago	
izʲ	zvonʲ-cʲ-an]	Maša	vasʲft-əzʲə	sonʲ].		
NEG.PST	call-FREQ-NPST.1SG	Masha	meet-PST.3SG.O.3SG.S	PRON.3SG.GEN		

‘Katja said that Masha met a friend whom I have not called for a long time.’

Second, despite being restricted to the left periphery, both types of relative clauses can be placed after adjuncts. This is illustrated in (39) for relatives with ICA.

(39) NOM ← GEN

Sa-j kizə-tʹ **[sʹora-nʹɛ-tʹ** kona-nʹ Katʹɛ
come-PTCP.ACT summer-DEF.SG.GEN boy-DIM-DEF.SG.GEN which-GEN Katja
tona-ft-əzʹə luv-əmə] škola-v molʹ-i.
learn-CAUS-PST.3SG.O.3SG.S read-INF school-LAT go-NPST.3[SG]
'Next year the boy Katja taught to read will start school.'

Example (40) shows the possibility of this position for a correlative clause.

(40) Sa-j kizə-tʹ [kona sʹora-nʹɛ-tʹ Katʹɛ
come-PTCP.ACT summer-DEF.SG.GEN which-GEN boy-DIM-DEF.SG.GEN Katja
tona-ft-əzʹə luv-əmə] škola-v molʹ-i.
learn-CAUS-PST.3SG.O.3SG.S read-INF school-LAT go-NPST.3[SG]
'Next year the boy Katja taught to read will start school.'

Third, Moksha speakers' judgments differ as to whether arguments from the main clause can linearly precede a relative clause with ICA. Some speakers accept this order, while others judge it to be degraded; see (41) and (42).

(41) NOM ← GEN

% Mezʹə **[sʹora-tʹ** kona-nʹ mon nʹɛj-inʹə isʹakəmbə]
what boy-DEF.SG.GEN which-GEN I see-PST.3.O.1SG.S yesterday
azən-cʹ?
say-PST.3[SG]
'What did the boy who I saw yesterday say?'

(42) GEN ← DAT

% Katʹɛ **[škaf-tʹi** kona-nʹdʹi mon put-inʹə
Katja cabinet-DEF.SG.DAT which-DAT I put-PST.3.O.1SG.S
fətəgrafijə-tʹnʹə-nʹ] jorda-zʹə.
photo-DEF.PL-GEN throw.away-PST.3SG.O.3SG.S
'Katja threw away the cabinet where I have put the photos.'

Placement after arguments from the main clause is unanimously excluded for correlatives; see (43).

(43) *Katʲɛ [kona škaf-tʲi mon put-inʲə fətəgrafijə-tʲnʲə-nʲ]
Katja which cabinet-DEF.SG.DAT I put-PST.3.O.1SG.S photo-DEF.PL-GEN
jorda-zʲə (sʲɛ-nʲ).
throw.away-PST.3SG.O.3SG.S that-GEN
Intended: 'Katja threw away the cabinet where I have put the photos.'

This minor difference in placement already suggests that the nature of the left-periphery requirement might not be identical for correlatives and relatives with ICA. I now turn to the differences between them.

3.3.2.2 Correlate

One of the defining characteristics of correlatives is the presence of a correlate in the main clause (Srivastav 1991, Dayal 1996, Lipták 2009, and Lin 2020). This property is often called the demonstrative requirement, because cross-linguistically the correlate often contains a demonstrative element. A correlate also appears with correlatives in Moksha, but it is not obligatory in all syntactic positions. The requirement is obviated in the subject and direct object positions. In these positions, the correlate is possible but not obligatory. Example (44) demonstrates the optionality of the correlate in the subject position, and example (45) shows it for the direct object position.

(44) [Kona loman'-tʲ šav-əzʲ hulʲiga-tʲnʲə] (sʲɛ)
which person-DEF.SG.GEN beat-PST.3.O.3PL.S hooligan-DEF.PL that
ašʲčʲ-i balʲnʲica-sə.
be-NPST.3[SG] hospital-IN
'The person whom hooligans have beaten is in the hospital.'

(45) [Kona škaf-tʲi mon put-inʲə fətəgrafijə-tʲnʲə-nʲ] minʲ
which cabinet-DEF.SG.DAT I put-PST.3.O.1SG.S photo-DEF.PL-GEN we
jorda-sʲk (sʲɛ-nʲ).
throw.away-PST.3.O.1PL.S that-GEN
'We threw away the cabinet where I have put the photos.'

I suggest that the correlate may be omitted in the subject and object positions because these two positions are targeted by verbal agreement and allow for pro-drop. The correlate is obligatory in other positions. Example (46) shows the indirect object position.

(46) [Kona sasʹəda-zʹə af suv-sʹ-i] mon zvonʹ-ənʹ
which neighbor-1SG.POSS.SG NEG enter-FREQ-NPST.3[SG] I call-PST.1SG
??(sʹɛ-nʹdʹi).
that-DAT
'I called my neighbor who has not come for a while.'

In (47), the correlative clause corresponds to the argument of the verb *pelʹəms* 'to fear / to be afraid of'. A noun phrase in this position can be marked either with the ablative case or with a postposition that itself bears the ablative case and requires genitive case marking on its complement. Example (47) shows that the correlate is obligatory in this position.

(47) [Kona pinʹə-tʹ mon vasʹft-inʹə] *(sʹɛ-nʹ ezdə)
which dog-DEF.SG.GEN I meet-PST.3.O.1SG.S that-GEN in.ABL
pelʹ-an.
fear-NPST.1SG
'I am afraid of the dog that I encountered.'

The requirement for a correlate is not present with relative clauses with ICA. This is illustrated in (48)–(49). Example (48) constitutes a minimal pair with (46): the relative clause in (48) corresponds to the indirect object position in the main clause and appears at the left periphery, but the sentence is fully grammatical without the demonstrative pronoun in the main clause, in contrast to (46).

(48) DAT ← NOM
[Sasʹəda-zʹə kona af suv-sʹ-i] mon
neighbor-1SG.POSS.SG[NOM] which[NOM] NEG enter-FREQ-NPST.3[SG] I
zvonʹ-ənʹ.
call-PST.1SG
'I called my neighbor who has not come for a while.'

Example (49) shows that in relatives with ICA a correlative pronoun is not needed in the ablative position either.

(49) ABL ← GEN
[Pinʹə-tʹ kona-nʹ mon vasʹft-inʹə] pelʹ-an.
dog-DEF.SG.GEN which-GEN I meet-PST.3.O.1SG.S fear-NPST.1SG
'I am afraid of the dog that I encountered.'

To sum up, the data show that, with the exception of the subject and direct object positions, the presence of a correlate is obligatory in Moksha correlatives, whereas for relatives with ICA, a correlate is not required in any position. This contrast between correlatives and relatives with ICA can be accounted for if a relative clause with ICA itself occupies a position in the main clause and is then moved to the left. Correlative clauses, by contrast, can be assumed to be base-generated at the left edge, and the corresponding position in the main clause must therefore be filled by a correlate.[4]

3.3.2.3 Island structures: Adjunct clauses

The second difference between relative clauses with ICA and correlatives concerns locality. I show that correlatives can refer to a position within a syntactic island, whereas relative clauses with ICA cannot. This groups relative clauses with ICA together with regular externally-headed relative clauses and simple noun phrases; these also cannot correspond to a position within an island.

The data come from two island constructions: complex noun phrase islands and adjunct islands. Let us start with adjunct islands. Example (50) presents a baseline. It shows a grammatical sentence with an adjunct clause, without any movement.

(50) Mon ul'-an kən'ɛr'd'-f [kədə katə-s' karma-j
I be-NPST.1SG happy-PTCP.RES if cat-DEF.SG become-NPST.3[SG]
kunc'-əmə šejəɽ'-t'].
catch-FREQ.INF mouse-PL
'I will be happy if the cat starts catching mice.'

Example (51) demonstrates that movement of a simple noun phrase out of the adjunct clause is ungrammatical, confirming that adjunct clauses are opaque to movement.

(51) *[Katə-s'] mon ul'-an kən'ɛr'd'-f [kədə __
cat-DEF.SG I be-NPST.1SG happy-PTCP.RES if
karma-j kunc'-əmə šejəɽ'-t'].
become-NPST.3[SG] catch-FREQ.INF mouse-PL
Intended: 'I will be happy if the cat starts catching mice.'

4 Strictly speaking, the obligatory presence of a correlate does not exclude the possibility that correlatives are also base-generated embedded in the main clause. According to Bhatt (2003), correlative clauses must first be merged as adjuncts to the nominal element (the correlate) in the argument position and are then dislocated. This analysis will, however, be ruled out by the data presented in the next subsection.

Adjunct clauses are also opaque to relative clauses with ICA. In (52), the relative clause is at the left periphery, but it corresponds to a position inside the adjunct island. The sentence is ungrammatical.

(52) NOM ← GEN

*[Katə-**t'** kona-n' t'ejə-n kaz'-əz'] mon
cat-DEF.SG.GEN which-GEN PRON.DAT-1SG.POSS gift-PST.3.O.3PL.S I
ul'-an kən'ɛr'd'-f [kədə __ karma-j
be-NPST.1SG happy-PTCP.RES if become-NPST.3[SG]
kunc'-əmə šejəɽ'-t'].
catch-FREQ.INF mouse-PL
Intended: 'I will be happy if the cat that they gave me starts catching mice.'

The same restriction applies to regular externally-headed relative clauses; see (53).

(53) *[Katə-s' kona-n' t'ejə-n kaz'-əz'] mon ul'-an
cat-DEF.SG which-GEN PRON.DAT-1SG.POSS gift-PST.3.O.3PL.S I be-NPST.1SG
kən'ɛr'd'-f [kədə __ karma-j kunc'-əmə
happy-PTCP.RES if become-NPST.3[SG] catch-FREQ.INF
šejəɽ'-t'].
mouse-PL
Intended: 'I will be happy if the cat that they gave me starts catching mice.'

Correlative clauses in Moksha are not subject to this restriction. As shown in (54), they can refer to a position inside the adjunct clause. To minimize differences from noun phrases and other types of relative clauses, there is no correlate in the embedded clause, which is permitted here because the relative clause corresponds to the subject position.

(54) [Kona katə-t' t'ejə-n kaz'-əz'] mon ul'-an
which cat-DEF.SG.GEN PRON.DAT-1SG.POSS gift-PST.3.O.3PL.S I be-NPST.1SG
kən'ɛr'd'-f [kədə __ karma-j kunc'-əmə
happy-PTCP.RES if become-NPST.3[SG] catch-FREQ.INF
šejəɽ'-t'].
mouse-PL
'I will be happy if the cat that was given to me starts catching mice.'

3.3.2.4 Island structures: Complex noun phrases

The same effect is observed with complex noun phrase islands. I use regular externally-headed relative clauses as an example of a complex noun phrase island. The baseline without movement is shown in (55).

(55) Mon soda-sa s'ɛ loman'-t' [kona
I know-NPST.3SG.O.1SG.S that person-DEF.SG.GEN which[NOM]
pan'-əz'ə pin'ə-t'].
kick.out-PST.3SG.O.3SG.S dog-DEF.SG.GEN
'I know that person who kicked the dog out.'

The islandhood of regular externally-headed relative clauses in Moksha is illustrated in (56), where the extraction of a simple noun phrase is shown to be ungrammatical.

(56) *[Pin'ə-t'] mon soda-sa s'ɛ loman'-t'
dog-DEF.SG.GEN I know-NPST.3SG.O.1SG.S that person-DEF.SG.GEN
[kona pan'-əz'ə __].
which[NOM] kick.out-PST.3SG.O.3SG.S
Intended: 'I know that person who kicked the dog out.'

Example (57) demonstrates that a relative clause with ICA, when placed at the left periphery of the entire sentence, cannot correspond to an argument position inside the embedded relative clause.

(57) GEN ← DAT
*[Pin'ə-**t'i** kona-n'd'i maks-in'ə jaŗca-ma-t']
dog-DEF.SG.DAT which-DAT give-PST.3.O.1SG.S eat-NZR-DEF.SG.GEN
mon soda-sa s'ɛ loman'-t' [kona
I know-NPST.3SG.O.1SG.S that person-DEF.SG.GEN which[NOM]
pan'-əz'ə __].
kick.out-PST.3SG.O.3SG.S
Intended: 'I know that person who kicked out the dog that I gave food to.'

The same restriction holds for regular externally-headed relative clauses; see (58).

(58) *[Pin'ə-t' kona-n'd'i maks-in'ə jaŋ̟ca-ma-t']
dog-DEF.SG.GEN which-DAT give-PST.3.O.1SG.S eat-NZR-DEF.SG.GEN
mon soda-sa s'ɛ loman'-t' [kona
I know-NPST.3SG.O.1SG.S that person-DEF.SG.GEN which[NOM]
pan'-əz'ə __].
kick.out-PST.3SG.O.3SG.S
Intended: 'I know that person who kicked out the dog that I gave food to.'

Correlative clauses, by contrast, are not subject to this restriction. They can appear at the left periphery and refer to a position inside a complex noun phrase island; see (59). Note that, as with simple noun phrases and other types of relative clauses, there is no correlate in the embedded position.

(59) [Kona pin'ə-t'i maks-in'ə jaŋ̟ca-ma-t']
which dog-DEF.SG.DAT give-PST.3.O.1SG.S eat-NZR-DEF.SG.GEN
mon soda-sa s'ɛ loman'-t' [kona
I know-NPST.3SG.O.1SG.S that person-DEF.SG.GEN which[NOM]
pan'-əz'ə __].
kick.out-PST.3SG.O.3SG.S
'I know that person who kicked out the dog that I gave food to.'

Thus, on the basis of adjunct islands and complex noun phrase islands, I have shown that left-peripheral noun phrases, regular externally-headed relative clauses, and relative clauses with ICA cannot correspond to a position within an island, whereas correlative clauses can. This difference follows automatically if the left-peripheral position of relatives with ICA is derived by movement, while correlatives are base-generated at the left edge: relatives with ICA are first merged in a regular argument position and are then moved to the left periphery, so that they are subject to the same locality constraints that apply to movement in general, as illustrated by the movement of simple noun phrases and regular externally-headed relative clauses in Moksha. The insensitivity of correlative clauses to movement restrictions suggests that they are base-generated on the left and that their relation to a corresponding embedded position is one of variable binding (Srivastav 1991, Dayal 1996). The data in (60) confirm that variable binding can apply into island structures in Moksha. In this example, there is a quantified noun phrase in the main clause, and it binds a variable pronoun in the relative clause.

(60) **Ɛr'** **učən'ik-s'$_{i}$** n'ɛj-əz'ə ac'ənkə-nc [kona-n'
every student-DEF.SG see-PST.3SG.O.3SG.S grade-3SG.POSS.SG.GEN which-GEN
učit'əl-s' put-əz'ə **son'-d'ejə-nzə$_{i}$**].
teacher-DEF.SG put-PST.3SG.O.3SG.S PRON.3SG-PRON.DAT-3SG.POSS
'Every student$_{i}$ saw the grade that the teacher gave him$_{i}$.'

3.3.2.5 Variable binding

The third difference between relative clauses with ICA and correlatives concerns variable binding. A simple case of variable binding in Moksha is illustrated in (61).

(61) **Ɛr'** s'ora-n'ɛ-s'$_{j}$ soda-si što **son'$_{i/j}$**
every boy-DIM-DEF.SG know-NPST.3SG.O.3SG.S that PRON.3SG.GEN
d'ɛd'a-c kurək sa-j.
mother-3SG.POSS.SG soon come-NPST.3[SG]
'Every boy$_{j}$ knows that his$_{i/j}$ mother will arrive soon.'

In this example, the quantified noun phrase c-commands the third-person pronoun, and the latter can be interpreted as a variable coindexed with the quantified noun phrase. Such an interpretation of the pronoun is not possible in (62), where the pronoun is no longer c-commanded by the quantified noun phrase.

(62) **Son'$_{i/*j}$** kn'iga-c ašč-i **ɛr'** s'ora-n'ɛ-t'$_{j}$
PRON.3SG.GEN book-3SG.POSS.SG be-NPST.3[SG] every boy-DIM-DEF.SG.GEN
komnata-sə-nzə.
room-IN-3SG.POSS
'His$_{i/*j}$ book is in every boy's$_{j}$ room.'

The contrast between (61) and (62) suggests that, for variable binding to succeed, a quantified noun phrase must c-command the variable. I return to variable binding in the next chapter, where I investigate the derivational path of the head noun. In section 4.3.3, I discuss the conditions on variable binding in more detail and present examples in which a bound-variable interpretation is possible despite the absence of c-command between a quantified noun phrase and a pronoun. For now, however, I make the simplifying assumption that variable binding applies under c-command (Chomsky 1981, Büring 2005) and, relying on the clear contrast between different types of relative clauses, draw conclusions about the base position of the relative clause on the basis of variable binding.

I now turn to the data. They show that a variable inside a relative clause with ICA can be bound by a quantified noun phrase in the main clause, despite the fact that the bound variable is in the relative clause, which appears at the left edge, so that the quantified noun phrase does not c-command the pronoun at the surface. This is shown in (63), where the pronominal subject in the relative CP covaries with the quantified subject of the main clause.

(63) GEN ← DAT

[Pinˈə-**tˈi** kona-nˈdˈi **son$_{\mathbf{i}}$** maks-əzˈə jaˌcambɛlˈ-tˈ]
dog-DEF.SG.DAT which-DAT PRON.3SG give-PST.3SG.O.3SG.S food-DEF.SG.GEN

ɛrˈ **sˈora-nˈɛ-sˈ$_{\mathbf{i}}$** mɛlˈaft-əzˈə.
every boy-DIM-DEF.SG remember-PST.3SG.O.3SG.S

'Every boy$_i$ remembered the dog that he$_i$ gave food to.'

A pronoun inside a correlative clause, by contrast, cannot covary with a quantified noun phrase in the main clause. Example (64) has only the interpretation in which some third person fed the dog.

(64) [Kona pinˈə-tˈi **son$_{\mathbf{j/*i}}$** maks-əzˈə jaˌcambɛlˈ-tˈ] **ɛr**ˈ
which dog-DEF.SG.DAT PRON.3SG give-PST.3SG.O.3SG.S food-DEF.SG.GEN every

sˈora-nˈɛ-sˈ$_{\mathbf{i}}$ mɛlˈaft-əzˈə.
boy-DIM-DEF.SG remember-PST.3SG.O.3SG.S

'Every boy$_i$ remembered the dog that he$_{j/*i}$ gave food to.'

Regular externally-headed relative clauses trivially allow the binding of a variable inside the relative clause by a quantified noun phrase from the main clause. This is shown in (65) for a relative clause in the argument position.

(65) **ɛr**ˈ **sˈora-nˈɛ-sˈ$_{\mathbf{i}}$** mɛlˈaft-əzˈə [pinˈə-tˈ kona-nˈdˈi
every boy-DIM-DEF.SG remember-PST.3SG.O.3SG.S dog-DEF.SG.GEN which-DAT

son$_{\mathbf{i}}$ maks-əzˈə jaˌcambɛlˈ-tˈ].
PRON.3SG give-PST.3SG.O.3SG.S food-DEF.SG.GEN

'Every boy$_i$ remembered the dog that he$_i$ gave food to.'

Example (66) shows that variable binding is also possible if a regular externally-headed relative clause is dislocated to the left:

(66) [Pinʹə-tʹ kona-nʹdʹi **son$_{i}$** maks-əzʹə jaɽ̯cambɛlʹ-tʹ]
dog-DEF.SG.GEN which-DAT PRON.3SG give-PST.3SG.O.3SG.S food-DEF.SG.GEN
ɛr' **sʹora-nʹɛ-sʹ$_{i}$** mɛlʹaft-əzʹə.
every boy-DIM-DEF.SG remember-PST.3SG.O.3SG.S
'Every boy$_{i}$ remembered the dog that he$_{i}$ gave food to.'

Thus, for left-peripheral clauses, variable binding is possible into relatives with ICA as well as into regular externally-headed relative clauses, but not into correlatives. This pattern is straightforwardly accounted for if relative clauses with ICA are generated in an argument position of the main clause. In this position, the variable is c-commanded by a quantified noun phrase and can be bound before the relative clause moves to the left edge. Correlatives, by contrast, are first merged on the left and are never c-commanded by material in the main clause. As a result, the variable in the correlative CP cannot be bound by material in the main clause.

3.3.2.6 Anaphor binding into the head noun

There are two further arguments that provide evidence for the movement of relative clauses with ICA to the left edge. These arguments differ from those presented so far in that comparable data on correlative clauses are not available.

The first such argument comes from the binding of an anaphor in the head noun. Example (67) shows that this is possible for relative clauses with ICA: the head noun contains the reflexive *esʹ* that is bound by the subject of the main clause. These data suggest that, despite its left-peripheral position in the final structure, the relative clause appears in a position c-commanded by the subject of the main clause at some stage in the derivation.

(67) GEN ← DAT
[Es$_{i}$ mašina-**ncti** kona-nʹdʹi put-f lama jarmak] **Vasʹɛ$_{i}$**
self car-3SG.POSS.SG.DAT which-DAT put-PTCP.RES many money Vasja
dagə petʹ-əzʹə.
again repair-PST.3SG.O.3SG.S
'Vasja$_{i}$ again repaired his$_{i}$ car that a lot of money was invested in.'

Example (68) illustrates that binding is also possible for regular externally-headed relative clauses.

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

The anaphor binding facts suggest that, independently of the case on the head noun, relatives are base-generated in a regular argument position in the main clause.

3.3.2.7 Coordination

The final argument comes from coordination. The data are given in (69) and (70). In both examples, a head noun bearing an internal case is coordinated with a noun phrase that, in turn, shows a case assigned in the main clause. The main-clause case is genitive, and the internal case is dative in both examples. The examples differ in the order of the conjuncts, ensuring that this is not a relevant factor. In (69), the relative clause is the first conjunct, and a simple noun phrase is the second conjunct.

(69) GEN ← DAT
[Osal pin'ə-**t'i** kona-n'd'i ton maks-at jaa̯rca-ma] i [ečkə
skinny dog-DEF.SG.DAT which-DAT you give-NPST.2SG eat-NZR and thick
katə-t'] mon soda-sajn'ə.
cat-DEF.SG.GEN I know-NPST.3PL.O.1SG.S
'I know the skinny dog that you give food to and the fat cat.'

The order of the conjuncts is reversed in (70): a simple noun phrase is the first conjunct, while the relative clause is the second.

(70) GEN ← DAT
[Ečkə **katə-t'**] i [osal pin'ə-**t'i** kona-n'd'i ton
thick cat-DEF.SG.GEN and skinny dog-DEF.SG.DAT which-DAT you
maks-at jaa̯rca-ma] mon soda-sajn'ə.
give-NPST.2SG eat-NZR I know-NPST.3PL.O.1SG.S
'I know the skinny dog that you give food to and the fat cat.'

In both examples, the predicate of the main clause bears a plural object agreement marker. This excludes an account under which these examples involve a coordination of CPs and all material from one of the clauses, except for the left-dislocated noun phrase, is elided, as in *[$_{CP}$ the fat cat ~~I know~~] and [$_{CP}$ the skinny dog that I gave*

food I know]. Thus, the presence of regular main-clause case marking on the noun coordinated with the relative clause with ICA argues that the entire coordination (*the cat and the skinny dog that I gave food*) must have occupied a case-assignment position in the main clause at some stage of the derivation. This excludes the base generation of relative clauses with ICA at the left periphery.

Example (71) shows that such coordination is also trivially possible for regular externally-headed relative clauses.

(71) [Ečkə **katə-ťi**] i [osal pinʹə-ťi kona-nʹdʹi ton
thick cat-DEF.SG.GEN and skinny dog-DEF.SG.GEN which-DAT you
maks-at jaŋ̣ca-ma] mon soda-sajnʹə.
give-NPST.2SG eat-NZR I know-NPST.3PL.O.1SG.S
'I know the skinny dog that you give food to and the fat cat.'

3.3.2.8 Summary

To sum up, relative clauses with ICA are obligatorily positioned at the left edge, and this constitutes a major difference between them and regular externally-headed relatives. The latter can appear in an argument position in the main clause. The position at the left periphery groups relatives with ICA together with correlative clauses, which are also obligatorily placed on the left. I have argued that, despite their shared position on the left, relatives with case attraction and correlatives differ in that correlative clauses are base-generated at the left periphery, while relatives with ICA move there. The evidence comes from five empirical phenomena and is summarized in Table 3.2.

Tab. 3.2: Properties of left-peripheral relatives

	ICA	Regular externally-headed	Correlatives
1. Obligatory correlate in positions other than subject and direct object	no	no	yes
2. Base position inside an island structure	*	*	OK
3. Variable binding into the relative CP	OK	OK	*
4. Anaphor binding into the head noun	OK	OK	
5. Coordination with a noun phrase marked for a regular case	OK	OK	

I conclude that correlatives have the structure shown in (72): they are base-generated on the left, and the corresponding position in the main clause is filled by a correlate.

(72) Correlative clauses
[$_{CP}$ ... correlative clause ...] [$_{MC}$ ... correlate ...]

Relative clauses with ICA, on the other hand, have the derivation illustrated in (73a–b). The relative clause is first merged in a regular noun phrase position in the main clause (see (73a)) and moves to the left later in the derivation, giving rise to the structure in (73b).

(73) Relative clauses with ICA

a. [$_{MC}$ ... predicate ... [head [$_{CP}$ ...]] ...]

b. [[head [$_{CP}$ ...]] [$_{MC}$ ... predicate ... ___ ...]

Before turning to other properties of relatives with ICA in the next section, I briefly discuss cross-linguistic variation in relative clauses with ICA. Kholodilova (2013) and Kholodilova & Privizentseva (2015) discuss ICA in other Finno-Ugric languages. They show that it is also restricted to the left-edge position in Ingrian Finnish and Beserman Udmurt and provide data on the coordination of a relative clause with a noun phrase marked for regular external case, suggesting that in these languages the left-peripheral position also results from movement. Abramovitz (2021) provides a detailed discussion of relatives with ICA in Koryak and suggests that the Koryak data also point toward a movement account: unlike relative clauses with ICA, which are well established in Koryak, a construction with a noun phrase base-generated at the left periphery is accepted only by some speakers and, unlike relatives with ICA, requires a pronoun to be present in the corresponding position in the main clause.

Relatives with ICA in Nez Perce appear to be different. Deal (2016) argues that relatives with ICA are base-generated on the left in this language. The main argument comes from the fact that relatives with ICA can refer to a position inside an island. A potential caveat of this argument is that such behavior is not shown to be ungrammatical for regular externally-headed relatives or simple topicalized nouns marked for regular case. The islandhood of relative clauses and adjuncts is illustrated by other movement types—relativization and wh-movement. This leaves open an alternative interpretation under which relatives with ICA move to the left periphery after all, but different types of movement have different locality restrictions (see, e.g., Keine 2019).

The same logic could be applied to the locality restrictions in Moksha presented above. In that case, both relative clauses with ICA and correlatives would move to the left, but movement of correlative clauses would involve a different type of movement or target a different position and, as a result, show different locality restrictions, i.e., tolerate some island violations. However, such an approach encounters several additional problems, making it untenable for Moksha. First, potential movement of correlative clauses would be topicalization, i.e., the same movement type as the displacement of simple noun phrases in (51) and (56). Note that comparable data on the topicalization of noun phrases are at present not available for Nez Perce. Second, if both relatives with ICA and correlatives in Moksha were moved to the left edge, the ungrammaticality of variable binding into correlatives would not be predicted by the analysis.

If relative clauses with ICA are indeed base-generated at the left periphery in Nez Perce, but not in Moksha, Beserman Udmurt, Ingrian Finnish, or Koryak, this would mean that relative clauses with ICA do not constitute a uniform phenomenon and exhibit somewhat different properties cross-linguistically. While this is an interesting topic for further investigation, it is rather common that superficially similar phenomena in different languages show non-uniform behavior under closer examination; cf., for instance, cross-linguistic variation in passive structures (Legate 2021) or in pseudo-noun incorporation phenomena (Driemel 2020).

3.3.3 Extraposition and coordination

In this subsection, I continue investigating the properties of relative clauses with ICA and turn to two constituency diagnostics intended to examine whether the head noun is inside or outside the relative clause. These are extraposition and coordination.

I begin with extraposition. An extraposed relative CP is separated from its head noun by additional main-clause material, and in the simplest case, the possibility of extraposition shows that there is a constituent that contains a relative CP but does not include the head noun; cf. the schematic representation in (74). This diagnostic targets the position of the head noun inside or outside the relative CP and allows us to distinguish between internally-headed and externally-headed relative clauses.

(74) $[_{\text{MC}}$ ... head-noun ... *further main clause material* ... $[_{\text{relative CP}}$ ...]]

There are, however, several difficulties with this diagnostic. One problem arises from a class of raising relative clauses, that is, relative clauses whose heads are base-generated in a gap position within the relative CP and move out later. In some

languages, these relative clauses have been shown to prohibit extraposition of the relative CP (Hulsey & Sauerland 2006), even though they have a structure in which the final landing site of the head noun is outside the relative CP, at least according to some analyses (Bhatt 2002, Deal 2016).

Another complication concerns the theoretical account of extraposition. While an account in which the relative CP moves to the right across main-clause material may seem suggestive, it is not the only possible derivation of the word order illustrated in (74). Several approaches derive extraposition of a relative clause without rightward movement of the relative CP. For instance, according to the analysis developed by Kayne (1994), extraposed relative CPs occupy the base position of the relative construction, and it is the head noun that moves to the left.

Acknowledging the potential confounds, let us nevertheless consider the empirical picture in Moksha. The data show that extraposition is not allowed for relative clauses with ICA; see (75a) with extraposition of the relative CP and the corresponding grammatical example (75b) without extraposition.

(75) a. NOM ← DAT

***S't'ər'-n'ɛ-t'i** tu-s' kaftə n'ed'ɛl'a-t **[kona-n'd'i** maks-in'ə
girl-DEF.SG.DAT go-PST.3[SG] two week-PL which-DAT give-PST.3.O.1SG.S
kel'gəma kn'iga-z'ə-n'].
favorite book-1SG.POSS.SG-GEN

Intended: 'The girl left for two weeks, whom I gave my favorite book to.'

b. NOM ← DAT

S't'ər'-n'ɛ-t'i **kona-n'd'i** maks-in'ə kel'gəma
girl-DEF.SG.DAT which-DAT give-PST.3.O.1SG.S favorite
kn'iga-z'ə-n' tu-s' kaftə n'ed'ɛl'a-t.
book-1SG.POSS.SG-GEN go-PST.3[SG] two week-PL

'The girl whom I gave my favorite book to left for two weeks.'

At the same time, regular externally-headed relative clauses in Moksha allow the extraposition of the relative CP; see (76).

(76) **S't'ər'-n'ɛ-s'** tu-s' kaftə n'ed'ɛl'a-t **[kona-n'd'i** maks-in'ə
girl-DEF.SG go-PST.3[SG] two week-PL which-DAT give-PST.3.O.1SG.S
kel'gəma kn'iga-z'ə-n'].
favorite book-1SG.POSS.SG-GEN

'The girl left for two weeks, whom I gave my favorite book to.'

The ungrammaticality of extraposition in relatives with ICA might be due to their derived left-peripheral position; see the contrast in extraposition depending on wh-movement of the head noun outlined for English (Baltin 1978: 82). This analysis is, however, unlikely to be correct for Moksha, because extraposition remains possible for regular externally-headed relative clauses displaced to the left; see (77).[5]

(77) **Kin' pin'ə-ncti** ton maks-it' jaṛca-ma-t' [kona
who.GEN dog-3SG.POSS.SG you give-PST.3.O.2SG.S food-NZR-DEF.SG.GEN which
t'ɛn'i ašč-i dvor-sə].
now be-NPST.3[SG] yard-IN
'Whose dog that is now in the yard you did you gave food to?'

Instead, I suggest that the ban on extraposition of relatives with ICA is yet another instance of the ban on extraposition for raising relatives (Hulsey & Sauerland 2006, Takahashi & Hulsey 2009, as well as Henderson 2007). In the next chapter, I argue that relatives with ICA are derived via raising and correspondingly present a full-fledged analysis of the ban on extraposition in Chapter 5. For now, I briefly preview the analysis.

It is based on the approach to extraposition proposed by Fox & Nissenbaum (1999), under which extraposition is derived by merging the extraposed constituent with its host late, after the host has moved to the right. The host is syntactically present in the extraposed position but is not phonologically realized there; instead, its lower copy is spelled out. This analysis predicts the ban on extraposition of raising relatives as follows. The head of such relatives moves from inside the relative CP and therefore cannot be merged in the main clause and undergo rightward movement before it merges with the relative CP. The relative-clause-internal origin of the head noun thus excludes the extraposition of the relative CP under this account. The final landing site of the head noun is not relevant for the blocking of extraposition; it may be outside the relative CP. As a result, extraposition does not distinguish between CP-internal and CP-external placement of the head noun in the final structure, as originally intended.

5 There might be an alternative derivation for this example: the head noun moves to the left, while the relative CP simply remains in situ. If so, the sentence does not illustrate the intended derivation, in which the full noun phrase first moves to the left and then the relative CP is extraposed to the right. This analysis is unexpected, given that wh-movement usually targets full DPs, and the DP clearly includes the relative CP as well. Under the alternative suggested in this footnote, the ban on extraposition for relative clauses with ICA would raise a different question: why is movement of the head noun with stranding of the relative CP possible for regular externally-headed relatives, but not for relatives with ICA?

(78) 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 ...]]]

The next constituency diagnostic I discuss in this section is coordination. The data show that coordination of two relative clauses under the same head is possible for both relatives with ICA (see (79a)) and regular externally-headed relatives (see (79b)). In example (79a), which involves ICA, the case assigned to the relativized participant is the same in both relative CPs.

(79) a. NOM ← GEN

Jalga-t' [**kona-n'** vɛt'-in'ə kud-u] i
friend-DEF.SG.GEN which-GEN bring-PST.3.O.1SG.S house-LAT and
[**kona-n'** and-in'ə l'ɛm-də] kurək n'i tu-j.
which-GEN feed-PST.3.O.1SG.S soup-ABL soon already go-NPST.3[SG]
'The friend that I brought home and that I gave soup to is leaving soon.'

b. **Jalga-s'** [**kona-n'** vɛt'-in'ə kud-u] i [**kona-n'**
friend-DEF.SG which-GEN bring-PST.3.O.1SG.S house-LAT and which-GEN
and-in'ə l'ɛm-də] kurək n'i tu-j.
feed-PST.3.O.1SG.S soup-ABL soon already go-NPST.3[SG]
'The friend that I brought home and that I gave soup to is leaving soon.'

Taken at face value, the data in (79) suggest that the head noun is outside the relative CP: if two relative clauses can be coordinated under the same head noun, the noun must be outside the coordination and hence outside the CP.

(80) [NP $[_{CP1}$ ... relative clause ...] & $[_{CP2}$ ... relative clause ...]]

In fact, approaches that position the head at the left edge, but inside the relative CP, can derive these data by assuming that the realized head is inside the first conjunct. The head inside the second conjunct is also present, but it is null, e.g., deleted under identity; see Borsley (1997) and Bianchi (2000a,b).

(81) $[_{CP}$ NP ... relative clause ...] & $[_{CP}$ ~~NP~~ ... relative clause ...]

An argument against the structure in (81) comes from the data in (82). The examples present a coordination of two relative CPs with different internal cases assigned to the relativized constituent and show that, under ICA, the head noun can be marked for either of the two cases. Specifically, the presence of the case from the second conjunct on the head noun in (81b) excludes the possibility that the head is inside the first conjunct.

(82) a. NOM ← GEN

Jalga-t' **[kona-n'** vɛt'-in'ə kud-u] i
friend-DEF.SG.GEN which-GEN bring-PST.3.O.1SG.S house-LAT and
[kona-n'd'i n'ɛft'-in'ə od škaf-t'] kurək n'i
which-DAT show-PST.3.O.1SG.S new cabinet-DEF.SG.GEN soon already
tu-j.
go-NPST.3[SG]

'The friend whom I brought home and whom I showed the new cabinet is going to leave soon.'

b. NOM ← DAT

Jalga-t'i **[kona-n'** vɛt'-in'ə kud-u] i
friend-DEF.SG.DAT which-GEN bring-PST.3.O.1SG.S house-LAT and
[kona-n'd'i n'ɛft'-in'ə od škaf-t'] kurək n'i
which-DAT show-PST.3.O.1SG.S new cabinet-DEF.SG.GEN soon already
tu-j.
go-NPST.3[SG]

'The friend whom I brought home and whom I showed the new cabinet is going to leave soon.'

However, these data do not exclude an analysis under which the examples involve the coordination of constituents smaller than the full CP, so that the head is above the coordinated phrases but still inside the relative CP (Bianchi 2000a,b). Finally, this diagnostic is also complicated by the raising analysis of relatives with ICA outlined above: if the head noun moves from within the relative CP, coordination of two relative CPs under the same head involves ATB movement. Notably, unlike most known cases of ATB movement (see De Vries 2017 and Georgi 2019 for a recent overview), this case does not require matching of the cases assigned to the ATB-moved phrase in the two conjuncts. I return to this issue in Chapter 5.

To sum up, in this section I have applied two standard constituency diagnostics to relative clauses with ICA in Moksha. At first sight, the extraposition data favor the structure under which the head noun is inside the relative CP, while the coor-

dination data support the opposite analysis, in which the head noun is outside the relative CP. In fact, however, neither of these diagnostics provides convincing evidence for either an internally-headed or an externally-headed analysis of relatives with ICA.

3.3.4 Extraction out of the relative clause

In this section, I turn to the possibilities of extraction out of the relative clause. The extraction data for relatives with ICA in Koryak were presented by Abramovitz (2021) (see also Belyaev (2012) for Beserman Udmurt) as an argument in favor of a relative-clause-internal position of the head noun in relatives with ICA. In Moksha, material from inside the relative CP may be placed to the left of the head noun with internal case marking; see (83) and (84). In (83), the adjunct *bibl'iat'eka-stə* 'library-EL' precedes the head noun.

(83) NOM ← DAT

Bibl'iat'eka-stə	**jalga-z'ə-n'd'i**		kona-n'd'i	mon	sɛv-in'ə
library-EL	friend-1SG.POSS.SG-DAT		which-DAT	I	take-PST.3.O.1SG.S
kn'iga-t'	__	kelk-si		luv-əm-s.	
book-DEF.SG.GEN		love-NPST.3SG.O.3SG.S		read-INF-ILL	

'My friend who I borrowed the book from the library for loves to read.'

Similarly, in (85), the adverb *is'ak* 'yesterday' semantically belongs to the predication inside the relative clause but is placed before the head noun.

(84) NOM ← GEN

Is'ak	mon'	**al'ɛ-z'ə-n'**			kona-n'	šav-əz'
yesterday	I.GEN	father-1SG.POSS.SG-GEN			which-GEN	beat-PST.3.O.3PL.S
__	hul'iga-t'n'ə	t'ɛn'i	aščˇ-i		bal'n'ica-sə.	
	hooligan-DEF.PL	now	be-NPST.3[SG]		hospital-IN	

'My father, whom hooligans beat yesterday, is in the hospital.'

This contrasts with the behavior of regular externally-headed relative clauses: adjuncts cannot appear to the left of the head in regular externally-headed relatives; see (85) and (86).

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

(86) *Is'ak mon' **al'ɛ-z'ə** [kona-n' šav-əz'
yesterday I.GEN father-1SG.POSS.SG[NOM] which-GEN beat-PST.3.O.3PL.S
__ hul'iga-t'n'ə] t'ɛn'i aščˇ-i bal'n'ica-sə.
hooligan-DEF.PL now be-NPST.3[SG] hospital-IN
Intended: 'My father, whom hooligans beat yesterday, is in the hospital.'

For similar data from Koryak, Abramovitz (2021) assumes that the material positioned to the left of the head noun is still inside the relative CP, in one of the split-CP projections. Under this view, the data unambiguously indicate that the head noun is also inside the relative CP. Consequently, relatives with ICA are argued to be internally-headed, and the contrast with regular externally-headed relatives further supports this conclusion.

Such an analysis does not account for the Moksha data, because the assumption that displaced adverbs are inside the relative CP is not empirically supported. In (87), *bibl'iat'eka-stə* 'library-EL' is separated from the relative CP by additional material that clearly belongs to the main clause, not to the relative clause. Thus, the material from the relative clause not only appears to the left of the head noun, but also to the left of main-clause material. This means that it is no longer inside the relative CP but has been extracted out of the relative CP into the main clause and therefore provides no evidence as to whether the head noun is inside or outside the relative CP.

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

The situation in which adjuncts can move out of relative clauses is surprising, given that relative clauses are one of the classical examples of island structures and extraction out of them is therefore expected to be ruled out (Ross 1967). At the same

time, numerous cases of extraction out of relative clauses have been discussed in the literature. These studies show that extraction out of finite relative clauses is a well-attested but heavily restricted phenomenon (Erteschik-Shir 1973, McCawley 1981, Engdahl 1997, Cinque 2010, Kush, Omaki, & Hornstein 2013, Sichel 2018, Vincent 2021). Sichel (2018) relates extraction out of relative clauses to the raising derivation. I suggest that this is also the case in Moksha: relative clauses with ICA are derived by raising and, for this reason, allow limited extraction from the relative CP.

Before concluding this section, I present two further data points concerning extraction out of relatives with ICA. First, native speakers' judgments differ with respect to what can be extracted. While all speakers allow extraction of adjuncts, extraction of arguments is accepted by some speakers and rejected by others.

(88) NOM ← GEN

%Kat'ɛ **kn'iga-t'** kona-n' __ sɛv-əz'ə bibl'iat'eka-stə
Katja book-DEF.SG.GEN which-GEN take-PST.3SG.O.3SG.S library-EL
aščˇ-i stol-sə.
be-NPST.3[SG] table-IN
'The book that Katja borrowed from the library is on the table.'

Extraction of arguments is excluded in regular externally-headed relatives by all speakers.

(89) *Kat'ɛ kn'iga-s' [kona-n' __ sɛv-əz'ə bibl'iat'eka-stə]
Katja book-DEF.SG which-GEN take-PST.3SG.O.3SG.S library-EL
aščˇ-i stol-sə.
be-NPST.3[SG] table-IN
Intended: 'The book that Katja borrowed from the library is on the table.'

Second, speakers who prohibit extraction of arguments also do not allow moved syntactic objects to contain elements that must reconstruct to a position inside the relative CP. In (90), the extracted constituent contains an anaphor, and the data show that it cannot be bound inside the relative CP.

(90) NOM ← DAT

Es'$_{\%i}$ bibl'iat'eka-stə **jalga-z'ə-n'd'i** kona-n'd'i Kat'ɛ$_i$
self library-EL friend-1SG.POSS.SG-DAT which-DAT Katja
sɛv-əz'ə kn'iga-t' __ kelk-si luv-əm-s.
take-PST.3SG.O.3SG.S book-DEF.SG.GEN love-NPST.3SG.O.3SG.S read-INF-ILL
'My friend who Katja borrowed the book from her library for loves to read.'

I present a detailed analysis of the extraction data in Chapter 5, once we know more about the derivation of relatives with ICA. For now, I briefly preview the account. I assume the Phase Impenetrability Condition, according to which complements of phase heads are rendered inaccessible as the derivation proceeds, so that all extraction out of phases must proceed through their edges (Chomsky 2000, 2001). I also assume that CPs as well as DPs (Svenonius 2004, Matushansky 2004, Bošković 2014) are phases.

Against this background, I suggest that, at least in Moksha, edge features that allow syntactic objects to move to the edge of a DP become accessible only after that DP is assigned case. Since heads of relative clauses with ICA receive case inside the relative clause, their edge features are readily available when the head DP is built. Heads of regular externally-headed relative clauses, by contrast, receive case from higher projections in the main clause. As a result, when the head noun receives case and its edge features become available, the DP is already a proper subpart of the existing structure, so that movement to Spec,DP would be countercyclic and thus impossible.[6]

As for the restrictions on which syntactic objects can be extracted (adjuncts vs. arguments), I suggest that speakers who allow extraction of both adjuncts and arguments permit movement of relative-clause-internal material to the edge of the relative CP across the relative pronoun. Speakers for whom extraction is restricted to adjuncts block such movement and therefore allow extraction only of material that can be independently base-generated at the left edge. I hypothesize that for the latter group of speakers, movement across the relative pronoun is excluded due to intervention with the movement of the relative pronoun (Starke 2001, Rizzi 2004, Haegeman 2012). The anaphor-binding data in (90) support this account: the anaphor in the extracted adjunct phrase cannot be bound by material in the relative clause—at least for speakers who do not allow extraction of arguments—because extracted adjuncts are base-generated at the left edge and therefore were not in the c-command domain of the arguments in the relative clause.

6 Note that while this analysis derives the selective opacity of relative clauses in Moksha, it does not extend to cases of limited extraction out of relative clauses in other languages. This aligns with the fact that the exact conditions under which extraction becomes possible are not uniform cross-linguistically.

3.4 Taking stock

3.4.1 Summary

The goal of this chapter was to determine, on the basis of the new data, whether relatives with ICA instantiate the externally-headed, the internally-headed, or the correlative structure.

The first set of diagnostics presented in this chapter concerns the interpretation of relative clauses. The data have shown that relatives with ICA allow both restrictive and appositive interpretations and thereby pattern together with regular externally-headed relative clauses with respect to available interpretations and related diagnostics, such as stacking and restrictions on the type of head noun. I have argued that the availability of the appositive interpretation for relatives with ICA speaks against internally-headed and correlative structures, because the appositive reading is cross-linguistically excluded for internally-headed relative clauses.

The second set of diagnostics concerns the position of the relative clause. I have shown that relative clauses with ICA are obligatorily positioned to the left of the main clause. The left-peripheral position may seem to group them together with correlatives, but the two types of relatives in fact differ in that relatives with ICA are moved to the left periphery, whereas correlatives are base-generated there. The similarity between relative clauses with ICA and correlatives is therefore superficial; the underlying syntax is different. I conclude that the left-peripheral position of relatives with ICA does not argue for an internally-headed structure.

Third, I have examined the two constituency diagnostics that are usually applied to relative clauses: extraposition and coordination. At first sight, the data point in different directions: the ban on extraposition suggests that the head noun is part of the relative CP, but coordination of two relative CPs under one head indicates that the head noun is outside the relative CP. A detailed discussion of the underlying syntactic structures revealed that neither of these two diagnostics provides an argument for the head noun being inside or outside the relative CP. In particular, the ban on extraposition follows from the late merge of an extraposed constituent (Fox & Nissenbaum 1999) combined with the raising derivation.

The fourth and final set of data concerns extraction out of the relative CP. It differentiates between relatives with ICA and regular externally-headed relatives in Moksha but does not argue for a relative-clause-internal position of the head noun: several cases of extraction out of externally-headed relatives are attested cross-linguistically. For Moksha, I have tentatively suggested that the differences in extraction follow from the different timing of case assignment to the head noun (see Chapter 5 for a detailed analysis).

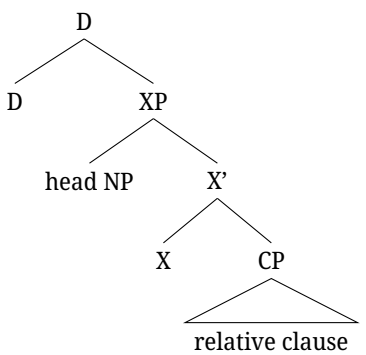
To sum up: despite some superficial similarities between relative clauses with ICA and internally-headed relatives, there are no arguments that unequivocally group them together, and none of the properties of relatives with ICA requires positioning the head noun inside the relative CP. On the contrary, their interpretation and the syntactic properties related to it show that relative clauses with ICA have the profile of externally-headed relatives. I conclude that relative clauses with ICA are most naturally analyzed as externally-headed relative clauses.

3.4.2 Structures for externally-headed relatives

With this conclusion in hand, let us look at structures proposed for externally-headed relative clauses. They vary with respect to several parameters. First, a relative clause can be either a complement or an adjunct of the head noun (Alexiadou, Law, Meinunger, & Wilder 2000 and Salzmann 2014, 2017: 46–48 for recent overviews). Second, a relative clause can be attached at different heights. The attachment sometimes correlates with the interpretation of the relative clause (cf. Partee 1975, 2015 and Jackendoff 1977): appositive relative clauses are often assumed to be attached higher in the nominal projections (e.g., a DP), while restrictive relatives modify a lower nominal projection (e.g., an NP).

Another point of variation is related to the raising derivation. Under the raising derivation, the head noun moves from a position within the relative clause, and since movement typically targets a specifier position, the final position of the head noun is expected to be the specifier of some functional projection, as shown in (91).

(91) Noun in Spec,XP



In this structure, the constituent that moves out of the relative clause is indicated as *head NP*, and it is positioned in the specifier of some XP projection. This XP pro-

jection is the complement of the relative-clause-external D head. Analyses differ with respect to the identity of the XP projection: it can be a nominal functional projection (Bhatt 2002 and Deal 2016) or one of the extended CP projections (Bianchi 1999, 2000b). The latter option has also been proposed for relative clauses classified as externally-headed, but in the actual structure the head noun phrase is split between the main clause and the relative clause: the head NP is at the left edge of the relative CP, and only the D head is external. This once again raises the question of the external vs. internal position of the head noun and therefore belongs to the set of questions discussed in this chapter.

Furthermore, the structure in which the head NP occupies the specifier of one of the CP's extended projections is sometimes adopted for externally-headed relative clauses independently of the raising derivation (Aoun & Li 2003 and Boef 2012). It has been suggested that the configuration [D [$_{CP}$ ...]] is required to derive evidence for selection between the D head and the relative CP that was accumulated after such structures were introduced to meet the needs of the raising derivation.

There are two main arguments in favor of D–CP complementation. The first argument builds on the fact that the presence of a relative clause enables the use of determiners that are ungrammatical if the relative clause is absent (Carlson 1977 and Kayne 1994). This is illustrated in (92a-b). In both examples, the definite article cannot be used unless the noun is modified by a relative clause.

(92) a. Paris / *the Paris / the Paris that I love

b. She is the kind of person that is always helpful. / *She is the kind of person. (Salzmann 2017: 51)

If the head noun is inside the relative CP, this enables the following account of the contrast in (92): the definite article generally cannot be combined with certain types of noun phrases, e.g., with proper nouns in (92a). However, the definite article does not merge directly with the noun when the noun phrase is modified by a relative clause. Instead, it merges with the CP, and the head noun appears in the highest specifier within the CP (cf. structure (93b)). As a result, a noun otherwise incompatible with a determiner can linearly follow the determiner without being its complement.

(93) a. *[$_{DP}$ the [$_{D/?}$ Paris]]

b. [$_{DP}$ the [$_{CP}$ Paris that I love]]

A clear empirical problem for such an analysis is that not only relative clauses but any type of modification can enable the use of determiners:

(94) a. the Paris of my youth / the old Paris

b. She is the most dangerous kind of person / the wrong kind of person. (Salzmann 2017: 52)

Kayne (1994) takes this to be evidence that essentially any type of modification contains a covert predication and a structure analogous to (93b). While this is a welcome result under Kayne (1994)'s Antisymmetry framework, it does not seem plausible from the perspective of current assumptions about noun phrase syntax. Instead, there are several alternative options that allow one to capture the distribution of the definite article with proper names in English and do not require D–CP complementation. First, it has been suggested that proper names can be individuals of type e, but also predicates of type ⟨e,t⟩ (Borer 2005: 70–85, Leckie 2013, and Jeshion 2015). The latter semantic type might be enabled by modification and will consequently require the presence of a determiner. Second, it may be assumed that the D layer is always projected with proper names, but that there are additional morphological conditions allowing determiners to be silent if the noun is not modified; see Matushansky (2006, 2008) for an m-merger-based implementation and Fara (2015) for a rule-based formalization.

The second type of argument for the placement of the head noun in Spec,CP relies on the general possibility for the D head to select a relative CP directly. Evidence here comes from internally-headed relative clauses that in some languages have an external D head, as well as from intransitive determiners that can head relative clauses without a noun phrase being present. The latter is demonstrated on the basis of German in (95). In this example, the D-element heads a relative clause without the NP being present and thereby shows the possibility of the [D CP] structure.

(95) Jeder / keiner, der mich kennt, hasst mich.
everyone no.one who me know.3SG hate.3SG me
'Everyone/no one who knows me hates me.' (cf. Salzmann 2017: 53)

As noted by Salzmann (2014, 2017: 51–54), the data can be reanalyzed as containing a noun that does not receive a phonological realization. Moreover, even if (95) involves a D–CP structure, this as well as internally-headed relatives show only the availability of D–CP complementation. The availability of this structure per se does not argue that it is correct for relative clauses with an overt head noun. Using the general existence of D–CP structures as an argument for the structure in (91) is analogous to suggesting that, since verbs can sometimes take CP complements, all their complements must be CPs.

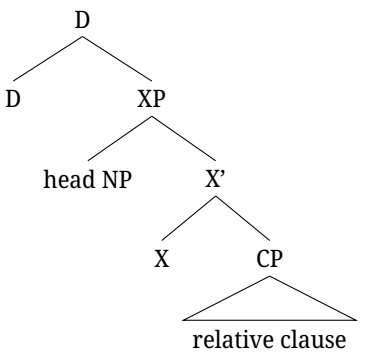
I conclude that there is no good evidence for the relative CP being directly merged with the external D head; see Salzmann (2014, 2017: 51–54) for the same con-

clusion. In the next section, I will proceed to discuss structure (91) and show that, independently of the identity of the XP projection that hosts the head noun in its specifier, such an analysis of relatives is untenable. It leads to a situation where the structure of the noun phrase that heads the relative clause differs radically from the noun phrase structure in virtually all other cases, in that NP is not the complement of the D head but the specifier of D's complement. I will show that such structures, with the head noun in the specifier position, are empirically undesirable in Moksha and cross-linguistically.

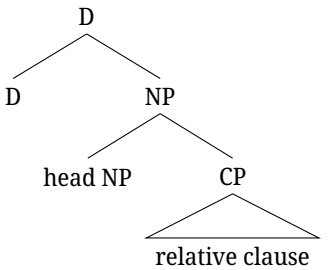
3.4.3 The structure of the head noun phrase

The main difference between (91) (repeated in (96)) and (97) lies in the structural relation between the topmost nominal projection DP and the noun itself: in (97), the projection of the noun is the complement of the D head, while in (96), XP breaks up the spine of nominal projections and the noun appears in the specifier of D's complement. I will explore processes that can be sensitive to this structural difference, as well as to the presence of XP itself. I will abstract away from the possible presence of additional nominal projections such as NumP or PossP, as they have no effect on the shape of the arguments.

(96) Noun in Spec,XP

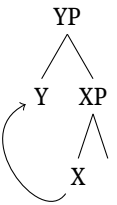


(97) NP in the complement of DP

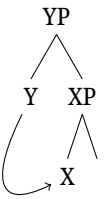


The evidence is based on two widely recognized operations that refer to the structural head–head relation: head movement and Lowering. Head movement involves the upward movement of a head to a position adjoined to the head of the projection immediately dominating it (cf. Travis 1984, Baker 1988). Lowering is similar in that it applies to two structurally adjacent heads, but it differs in that the displacement applies downwards (see Embick & Noyer 2001). The operations are illustrated in (98) and (99), respectively. Both processes can be employed for word formation, in particular for the attachment of nominal inflection to the noun.

(98) Head movement



(99) Lowering



As mentioned in 2.1, nouns in Moksha are morphologically marked for definiteness. The marking is illustrated in (100a–b) for the nominative and in (101a–b) for the dative.

(100) a. kodamə bdʲə pinʲə
how INDEF dog
'some dog'

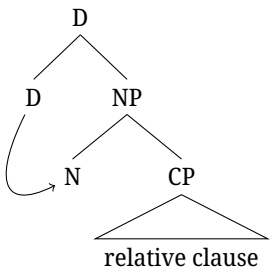
b. tʲɛ pinʲə-sʲ
this dog-DEF.SG
'this dog'

(101) a. kodamə bdʲə pinʲə-nʲdʲi
how INDEF dog-DAT
'to some dog'

b. tʲɛ pinʲə-tʲi
this dog-DEF.SG.DAT
'to this dog'

Being morphologically realized on the noun in Moksha, definiteness is more generally assumed to be associated with the DP projection. The grammar must then ensure that a definiteness feature is instantiated on the D head for interpretation but realized on the noun. One way to ensure this is by head movement of the noun to the D head, but this does not apply to nouns in Moksha, as they remain low in the noun phrase structure: all nominal modifiers other than finite relative and complement clauses precede the noun. Another way to derive the realization of definiteness on the noun is by Lowering of the definiteness feature to the N head. If the heads of relative clauses have the regular noun phrase structure, D-to-N Lowering applies fully in line with its definition; see (102).

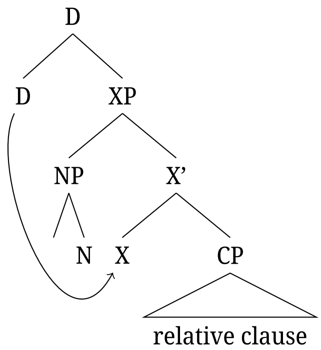
(102) Lowering to N



Under the structure involving XP, definiteness is predicted to lower onto the X head instead of the noun, as shown in (103). Lowering to the N head would be illegitimate,

as it would have to target the specifier of the complement instead of the complement itself.

(103) *Lowering into Spec



The data in Moksha show that a noun heading a relative clause bears regular definiteness inflection. Examples (104a–b) contain relative clauses with ICA and illustrate definite and indefinite marking on the head noun, respectively.

(104) a. NOM ← DAT

T'ɛ	pin'ə-**t'i**	kona-n'd'i	maks-in'ə	jar̥ca-ma-t'
this	dog-DEF.SG.DAT	which-DAT	give-PST.3.O.1SG.S	eat-NZR-DEF.SG.GEN

ašč-i	dvor-sə.
be-NPST.3[SG]	yard-IN

‘This dog that I gave food to is in the yard.’

b. NOM ← DAT

Kodamə	bd'ə	pin'ə-**n'd'i**	kona-n'd'i	maks-in'ə
how	INDEF	dog-DAT	which-DAT	give-PST.3.O.1SG.S

jar̥ca-ma-t'	ašč-i	ul'ic'a-sə.
eat-NZR-DEF.SG.GEN	be-NPST.3[SG]	street-IN

‘Some dog that I gave food to is on the street.’

Thus, the structure of relative clauses that places the head noun in Spec,XP does not derive the correct inflection on the noun. The argument against it has so far been based on the implementation of nominal inflection by Lowering. In what follows, I will generalize the argument and show that definiteness inflection in Moksha is not realized in the structural position occupied by the noun in (103); that is, inflection is

not realized on specifiers (or other modifiers) along the main projection line in the noun phrase.

The evidence comes from noun phrases such as those in (105a–b), where one noun is modified by another. When the modifying noun precedes the head noun, it can be assumed to be in the specifier of some nominal projection. The modifier is thus in the same structural position with respect to the D head as the head of the relative clause under the structure in (103). Definiteness is naturally not realized on the modifier in (105); rather, it is realized on the head of the noun phrase.

(105) a. s'tʹər'-n'ɛ-n'dʹi kaz'n'ə-s'
girl-DIM-DAT present-DEF.SG
'the present for a girl'

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

One potential difference between the heads of relative clauses and the modifiers in (105) is their category. The head of a relative clause placed in the specifier position is a constituent smaller than a DP (e.g., an NP), while the modifiers in (105) might be full DPs. This difference is not present in (106). In this example, the modifier is a noun phrase, but not a full DP. The fact that it is a noun phrase is shown by the adjectival modifier, and the absence of higher nominal projections follows from the ban on demonstratives modifying the nominal dependent (see (106a)) or on definiteness inflection (see (106b)).

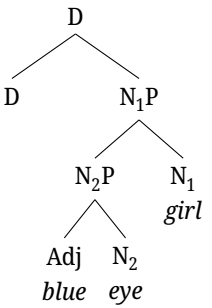
(106) Son n'ɛj-əz'ə [s'en'əm sel'mə] s'tʹər'-n'ɛ-tʹ.
she see-PST.3SG.O.3SG.S blue eye girl-DIM-DEF.SG.GEN

a. *[t'ɛ s'en'əm sel'mə] s'tʹər'-n'ɛ-tʹ
this blue eye girl-DIM-DEF.SG.GEN

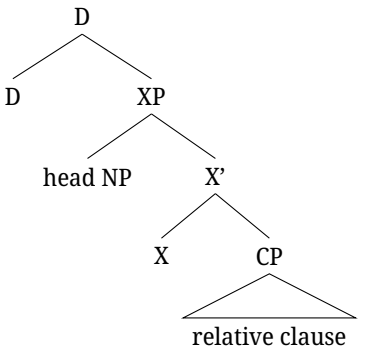
b. [s'en'əm sel'mə-(*s'/*t'n'ə)] s'tʹər'-n'ɛ-tʹ
blue eye-DEF.SG/DEF.PL girl-DIM-DEF.SG.GEN
'She saw the blue-eyed girl.'

The structure of the noun phrase in (106) is illustrated in (107). It is parallel to the structure of the head noun of the relative clause in (96) (repeated in (108)) in that there is an NP modifying the projection of D's complement.

(107) NP modifier



(108) Relative-clause head in Spec,XP



Independently of the exact mechanism that could derive the correct inflection on relative clause heads under the structure with XP in (108), it inevitably predicts that the definiteness from the D head will be realized on the modifier, not on the noun in (107), because the structural configurations are identical in the relevant respects. Nevertheless, example (109) shows that definiteness is not realized on the modifier but obligatorily appears on the noun itself.

(109) Son n'ɛj-əz'ə
she see-PST.3SG.O.3SG.S

a. [t'ɛ [s'en'əm sel'mə] s't'ər'-n'ɛ-**t'**]
this blue eye girl-DIM-DEF.SG.GEN

b. *[t'ɛ [s'en'əm sel'mə-**t'**] s't'ər'-**n'ɛ**]
this blue eye-DEF.SG.GEN girl-DIM

c. *[t'ɛ [s'en'əm sel'mə-**s**'] s't'ər'-n'ɛ-**n**'].
this blue eye-DEF.SG girl-DIM-GEN
'She saw this blue-eyed girl.'

To sum up, I have argued that the structure that places the head of the relative clause in Spec,XP is problematic for the realization of nominal definiteness inflection. First, Lowering—an operation that can be used for the realization of definiteness inflection on the noun in Moksha—by definition lowers a head to the head of its complement and thus does not derive definiteness on the head of the relative clause if it is in the specifier of D's complement. Second, independently of whether some modified version of Lowering or another new operation could be used to derive definite inflection on the head noun in the structure where the head of the relative clause is in Spec,XP, such a mechanism would make incorrect predictions about the distribution of definiteness inflection elsewhere in the language: in noun phrases without a relative clause, inflection would then be predicted to appear on nominal modifiers instead of on the noun itself.

The position of the head noun in Spec,XP is also problematic for inflection in other languages. For instance, in German, agreement inflection on nominal modifiers distinguishes between 'strong' and 'weak' exponents, and the choice between them depends on whether there is a preceding inflection-bearing determiner in the noun phrase. The contrast is illustrated in (110a-b). In (110a), the adjective is preceded by a definite article that realizes nominal inflection, and therefore the adjective has a weak exponent. In (110b), the adjective is the first modifier in the noun phrase, and it shows strong inflection.

(110) a. mit dem gut-**en** Wein
with the good-WEEK wine

b. mit gut-**em** Wein
with good-STRONG wine

As shown by Heck (2005), inflection on adjectives modifying the head of the relative clause is also determined by the presence or absence of the determiner; compare (111a), where the D head is realized and the adjective shows weak inflection, and (111b), where the article is absent and the adjective shows strong inflection.

(111) a. mit dem gut-**en** Wein, den sie gekauft hat
with the good-WEEK wine that she bought has

b. mit gut-**em** Wein, den sie gekauft hat
with good-STRONG wine that she bought has
'with (the) good wine that she bought'

A full identity between inflection in simple noun phrases in (110) and noun phrases modified by a relative clause in (111) is puzzling if they have radically different structures. In particular, if the head noun of relative clauses is in the specifier position (as in (108)), the article that determines the shape of inflection on the following modifier is not part of the same projection line as this modifier.

Another piece of data pointing toward the same conclusion is discussed by Pankau (2018). It comes from antipronominal contexts in German, i.e., positions that must be occupied by full noun phrases rather than by pronouns; see (112).

(112) Er kommt **[aus diesem Land]** / *aus ihm.
he comes out this country out it
'He is from this country.'

Pankau suggests that antipronominal contexts are derived by a formal requirement to fill a position with a DP that has lexical content. He further shows that heads of relative clauses in German can appear in antipronominal contexts; see (113).

(113) Er kommt **[aus einem Land]**, das in der belgischen Gruppe
he comes out a country which in the Belgian group
gespielt hat.
played has
'He is from a country that was part of the Belgian group.' (Pankau 2018: 200)

Example (114b) further shows that the presence of a noun phrase in the specifier of the next embedded projection does not satisfy the requirement.

(114) a. Ich werde **[die nächste Station]** / *sie aussteigen.
I will the next station she leave
'I will leave the next station (/*it).'

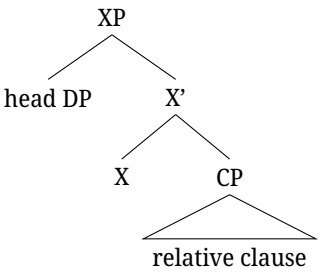
b. *Ich werde aussteigen, **[[welche Station]** du auch immer
I will leave which station you also ever
aussteigen wirst].
leave will
Intended: 'I will leave at whichever station you leave at.' (Pankau 2018: 216)

As a result, the fact that heads of relative clauses are grammatical in antipronominal contexts shows that head nouns are the complements of the corresponding D heads and argues against structures that place the head noun in the specifiers of lower nominal or clausal projections.[7]

To sum up, I have shown that the structure in which the head of the relative clause appears in the specifier of some XP is not correct for Moksha or for other languages: the problem lies in the structure of the head DP. Placement of the head noun in Spec,XP breaks the usual head–complement relation between the D head and the NP. This leads to incorrect empirical predictions for nominal inflection, inflection on nominal modifiers, and antipronominal contexts.

Before concluding that the head of the relative clause must have a regular noun phrase structure, and hence that movement of the head NP under the raising derivation cannot land in a specifier position, as in most known cases of movement, I would like to consider another alternative. Since the problems for the relative clause structure in (108) arise from the D–N relation, it seems that they might be resolved by including the D head in Spec,XP, as shown in (115).

(115) DP in Spec,XP



However, this structure is also problematic in various respects. The first problem is a semantic one. As shown by Partee (1975, 2015), determiners and quantifiers must scope over both the head noun and the relative CP under the restrictive interpretation. This follows if the noun and the relative CP are combined first, but the data

7 Pankau (2018) uses antipronominal contexts to argue for the matching derivation and against the head-external and the raising analyses. At the same time, the work admits that the raising derivation can account for the attested data if the head noun moves to the argument position in the main clause and the requirement of the antipronominal context is satisfied derivationally. Nevertheless, this analysis is rejected because there is no good trigger for the required movement of the head noun from the relative clause to the main clause. I will resolve this problem in Chapter 5.

are not derived if the noun is first merged with the article and only then with the relative CP.[8]

The second problem arises from the fact that XP is the topmost projection in (115), 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. This appears to be incorrect cross-linguistically. In Moksha, the distribution of relative clauses with ICA is obscured by their movement to the left, but as argued in section 3.3.2, their first-merge positions must be the same as those of simple noun phrases.

Third, the whole noun phrase is in the specifier of X in (115) and hence does not c-command the material in the main clause, which is c-commanded by the DP under the regular noun phrase structure as well as under the structure where only NP is in Spec,XP. Example (116) shows that the head noun can bind anaphors inside the main clause. Assuming that anaphor binding requires c-command, these data argue against structure (115), where the DP is embedded in XP and there is no c-command relation between the DP and the anaphor.

(116) NOM ← GEN

Petʹɛ-nʹ$_{\mathbf{i}}$	[kona-nʹ	tona-ft-inʹə	ard-əma]	mi-zʹə	**esʹ$_{\mathbf{i}}$**
Petja-GEN	which-GEN	teach-PST.3.O.1SG.S	drive-NZR	sell-PST.3SG.O.3SG.S	self

mašinə-nc.
car-3SG.POSS.SG.GEN

'Petja$_i$ who I taught to drive sold his$_i$ car.'

The data in (117) show that anaphor binding by material embedded in the c-commanding projection is excluded, further supporting this argument.

(117)

Petʹɛ-nʹ$_{\mathbf{j}}$	jalga-c$_i$	mi-zʹə	**esʹ$_{\mathbf{i/*j}}$**	mašinə-nc.
Petja-GEN	friend-3SG.POSS.SG	sell-PST.3SG.O.3SG.S	self	car-3SG.POSS.SG.GEN

'Petja$_j$'s friend$_i$ sold his$_{i/*j}$ car.'

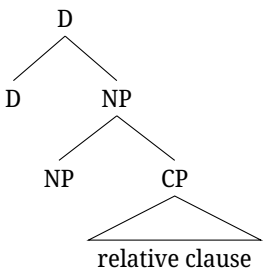
One might suggest that XP agrees with the DP in φ-features and can bind an anaphor instead of it. Such a solution seems natural if XP is a nominal projection (Bhatt 2002, Deal 2016). However, it exacerbates the fourth problem: despite the ubiquitous presence of this XP in the syntax of relative clauses, it is never phonologically realized.

8 In principle, this problem can be resolved if some departure from full compositionality is allowed. Bach & Cooper (1978) suggest that the noun phrase itself can introduce a property variable that is then filled in by the relative CP.

This might be because it has no features that could be targeted by Vocabulary Insertion rules, but if X agrees with the DP, the consistent non-realization of XP becomes an even bigger mystery.

I conclude that the additional XP projection in the structure of relative clauses and the placement of the head noun in Spec,XP are problematic both conceptually and empirically. Combined with the earlier conclusion in this chapter that relative clauses with ICA are a type of externally-headed relatives, this implies that relative clauses with ICA have the structure in (118): the head noun is fully outside the relative CP, in the complement of the external D head.

(118) Relatives with ICA



3.5 Further properties: 'Attracted' case

In this section, I would like to discuss properties of relative clauses with ICA that do not contribute directly to this chapter's central question of classifying relatives with ICA as internally- or externally-headed, but nevertheless provide an important characterization of such relative clauses. Relative clauses with ICA are peculiar in that the head of such relatives shows the case assigned to a corresponding participant in the relative CP instead of the case assigned in the main clause. Following the earlier conclusion, the head of such relative clauses is outside the relative CP, in a regular noun phrase position in the main clause, at least at some stage of the derivation. The head noun is thus in a position in the main clause where the external case can be assigned. One might therefore expect some interaction between the internal case actually realized by the head and the external case that could in principle be assigned to the head noun according to its base position. This interaction may manifest itself in restrictions on ICA that could be sensitive to the respective markedness of the two cases or to the structural/inherent distinction (see Bejar & Massam 1999,

Vogel 2001, Richards 2013, Himmelreich 2017, i.a., on the choice between two potentially available cases in other constructions).

Moksha has 15 case forms, and there are thus 210 possible combinations of different internal and external cases. Checking all these possibilities remains a subject for future research. In this section, I will illustrate some of the possible combinations and, on their basis, show that neither the case hierarchy nor the structural/inherent case distinction directly determines the possibility of ICA. I will show that there are a few contexts in which inverse case attraction is degraded or ungrammatical, and I suggest that this is because the role of the head noun in the main clause cannot be retrieved in the absence of external case marking.

I will start with the possible combinations of nominative, genitive, and dative. The data show that if the internal and external cases belong to one of these three cases, ICA is always grammatical. Examples (119)–(121) illustrate cases where the internal case is more marked than the external one. In (119), the external case is nominative and the 'attracted' case is genitive.

(119) NOM ← GEN

Uča-**t'**	[kona-n'	al'ɛ-z'ə	pečk-əz'ə]
sheep-DEF.SG.GEN	which-GEN	father-1SG.POSS.SG	butcher-PST.3SG.O.3SG.S
ašč-i	kut-t'	ingəl-ə.	
be-NPST.3[SG]	house-DEF.SG.GEN	before-LOC	

'The sheep that my father butchered is lying in front of the house.'

In (120), the head noun is marked for the dative instead of the nominative case expected based on the position of the head noun in the main clause.

(120) NOM ← DAT

Jalga-z'ə-**n'd'i**	[kona-n'd'i	t'aš-n'ə-n'	kiz'-n'	
friend-1SG.POSS.SG-DAT	which-DAT	write-FREQ-PST.1SG	summer-GEN	
per'f]	kurək	sa-j.		
around	soon	come-NPST.3[SG]		

'My friend who I have been writing to all year is coming soon.'

In (121), the external case is genitive, and the head noun shows internal dative instead of the expected genitive.

(121) GEN ← DAT

Jalga-z'ə-**n'd'i** [kona-n'd'i t'aš-n'ə-n' kiz'-n' per'f]
friend-1SG.POSS.SG-DAT which-DAT write-FREQ-PST.1SG summer-GEN around
mon n'ɛj-sa kurək.
I see-NPST.3SG.O.1SG.S soon
'I will soon see my friend to whom I have been writing all year.'

Examples (122)–(124) illustrate configurations in which the external case is more marked than the internal one. ICA is also fully grammatical in these cases, showing that the phenomenon is not governed by the case hierarchy. In (122), the head noun is marked for the nominative instead of the genitive that is expected given the direct object position of the head noun in the main clause.

(122) GEN ← NOM

Uča-**s'** [kona ašč-i kut-t' ingəl-ə]
sheep-DEF.SG[NOM] which[NOM] be-PST.3[SG] house-DEF.SG.GEN before-LOC
mon' al'n'ɛka-z'ə l'ɛc'-əz'ə.
I.GEN uncle-1SG.POSS.SG shoot-PST.3SG.O.3SG.S
'My uncle shot the sheep that is lying in front of the house.'

Example (123) illustrates the grammaticality of ICA when the nominative is assigned in the relative clause and the case in the main clause is dative.

(123) DAT ← NOM

S'ora-n'ɛ-**s'** [kona jora-s' sa-m-s
boy-DIM-DEF.SG[NOM] which[NOM] want-PST.3[SG] come-INF-ILL
abət-tə mel'ə] mon ab'iščanda-n' maks-əm-s kn'iga.
lunch-DEF.SG.GEN after I promise-PST.1SG give-INF-ILL book
'I promised to give a book to a boy who wanted to come after lunch.'

In (124), the external case is dative, but the head noun is marked for the internal genitive case instead.

(124) DAT ← GEN

Pin'ə-**t'** [kona-n' Pet'ɛ rama-z'ə] mon maks-an
dog-DEF.SG.GEN which-GEN Petja buy-PST.3SG.O.3SG.S I give-NPST.1SG
jaŋ̣ca-ma.
eat-NZR
'I am giving food to the dog that Petja bought.'

I will now turn to configurations in which the case assigned in the main clause is more oblique, while the case assigned in the relative clause is still nominative, genitive, or dative. The data in (125) and (127) show that ICA is also possible in such cases. In (125), dative is the case assigned in the relative CP, and it appears on the head noun. The case assigned in the main clause is ablative: the head noun is the argument of the verb *pelʹəms* 'to fear / to be afraid of' in the main clause. The arguments of this verb are marked with the ablative case in Moksha. The genitive case, which is regular for direct objects, is ungrammatical for them; see (126).

(125) ABL ← DAT

Pinʹə-**tʹi** [kona-nʹdʹi Petʹa maksʹ-i jaŗca-ma] mon
dog-DEF.SG.GEN which-GEN Petja give-PST.3[SG] eat-NZR I
pelʹ-an.
fear-NPST.1[SG]
'I afraid of the dog that Petja gave food to.'

(126) Mon pelʹ-an pinʹə-də / *pelʹ-inʹə pinʹə-tʹ.
I fear-NPST.1SG dog-ABL fear-PST.3.O.1SG.S dog-DEF.SG.GEN
'I am afraid of the dog.'

Example (127) shows that ICA is also grammatical if the external case is inessive and the internal case is genitive. Example (128) illustrates the main clause without the relative clause to confirm that the inessive is the case expected for the noun in this example.

(127) IN ← GEN

Oš-**tʹ** [kona-nʹ mon kelʹk-sa] Katʹɛ erʹɛ-j.
city-DEF.SG.GEN which-GEN I love-NPST.3SG.O.1SG.S Katja live-NPST.3[SG]
'Katja lives in the city that I love.'

(128) Katʹɛ erʹɛ-j oš-sə.
Katja live-NPST.3[SG] city-IN
'Katja lives in the city.'

There are also contexts in which ICA with such a combination of an oblique external case and a direct internal case is not fully acceptable. One example is illustrated in (129). The internal case is genitive and the intended external case is inessive (cf. (130)). The example shows that ICA is severely degraded or even impossible in this case.

(129) IN ← GEN

??*Kurtkə-**t'** [kona-n' mon rama-jn'ə] brad-əz'ə
jacket-DEF.SG.GEN which-GEN I buy-PST.3.O.1SG.S brother-1SG.POSS.SG
targa-j modamaɻ'-t'.
take.out-NPST.3[SG] potato-PL
'My brother is digging potatoes wearing the jacket that I bought.'

(130) Brad-əz'ə targa-j modamaɻ'-t' sɛngɛr'ɛ kurtkə-sə.
bother-1SG.POSS.SG take.out-NPST.3[SG] potato-PL green jacket-IN
'My brother is digging potatoes wearing a green jacket.'

I would like to suggest that the restriction on ICA arises because native speakers cannot determine the role of the head noun in the main clause in the absence of overt external case marking on it. Example (129) differs from examples (125) and (127), where the combination of an oblique external case and a direct internal case is grammatical, in that the head noun is neither an argument of the predicate in the main clause nor a typical adjunct. I suggest that the reduced acceptability of (129) is not the result of some clash between the external and the internal case, but is due to the absence of a semantically loaded case marker.

Let us now turn to configurations in which an oblique case is assigned in the relative CP. This introduces an independent complication: the relative pronoun *kona* 'which' has a heavily restricted inventory of case forms (Privizentseva 2018). It allows only nominative, genitive, and dative case marking. Ablative case marking is also possible, but is restricted to a few contexts. One of them is the complement of the postposition *baška* 'except for'. This is illustrated in (131) for a regular externally-headed relative clause.

(131) Min' n'ɛj-əs'k s'ɛ pin'ə-t' **[kona-də baška**
we see-PST.3.O.1PL.S this dog-DEF.SG.GEN which-ABL except
aš-əl' ki-n'd'i sala-m-s sivəl'-t'].
NEG.EX-IMPF[3SG] who-DAT steal-INF-ILL meat-PL
'We noticed this dog, except for which no one would steal the meat.'

Ablative marking on the relative pronoun is ungrammatical if it fills the argument position of the verb *pel'əms* 'to fear / to be afraid of', which requires ablative marking on its argument, as shown earlier (cf. (126)).

(132) *Min' karšə vasʹft-əsʹk pinʹə-tʹ **[kona-də** peļʹ-tʹamə].
we in.front meet-PST.3.O.1PL.S dog-DEF.SG.GEN which-ABL fear-NPST.1PL
Intended: 'We encountered the dog that we are afraid of.'

The relative pronoun in Moksha has no other case forms. For instance, example (133) shows the absence of the inessive form, and example (134) shows the absence of the elative form. Both examples contain regular externally-headed relative clauses.

(133) *Ručka-sʹ [kona-**sə** mon sʹormad-anʹ] ravžə.
pen-DEF.SG[NOM] which-IN I write-NPST.1SG black
Intended: 'The pen with which I am writing is black.'

(134) *Mon kelʹk-sa oš-tʹ [kona-**stə** minʹ tu-mə].
I love-NPST.3SG.O.1SG.S city-DEF.SG.GEN which-EL we go-NPST.1PL
Intended: 'I love the city which we moved from.'

Instead of the non-existing case forms, postpositional phrases are used. Example (135) illustrates a fully grammatical sentence that differs from the earlier example (132) in that the relative pronoun marked for the ablative case is replaced by a postpositional phrase. It contains the postposition *ezdə* 'in.ABL' and the relative pronoun in the genitive.

(135) Minʹ karšə vasʹft-əsʹk pinʹə-tʹ **[kona-nʹ ezdə**
we in.front meet-PST.3.O.1PL.S dog-DEF.SG.GEN which-GEN in.ABL
peļʹ-tʹamə].
fear-NPST.1PL
'We encountered the dog that we are afraid of.'

Similarly, example (136) constitutes a minimal pair with the ungrammatical example (133) and differs from it in that the relative pronoun is marked for the genitive and serves as the complement of the postposition *maŗtə* 'with'.

(136) Ručka-sʹ **[kona-nʹ maŗtə** mon sʹormad-anʹ] ravžə.
pen-DEF.SG which-GEN with I write-NPST.1SG black
'The pen with which I am writing is black.'

Another postposition is illustrated in (137). It replaces the elative case marking.

8 Some speakers marginally also allow comitative and causal case marking.

(137) Polka-s' **[kona-n'** **lank-stə** (/ *kona-stə) mešok-s' bɛc'kafc']
shelf-DEF.SG which-GEN top-EL which-EL bag-DEF.SG fall.PST.3[SG]
s'in'd'-əv-s'.
break-PASS-PST.3[SG]
'The shelf that the bag fell from broke.'

Returning to relatives with ICA and to our initial agenda of checking the combinations of different external and internal cases, the deficient paradigm of the relative pronoun might appear to be an obstacle to checking configurations in which an oblique case is assigned inside the relative CP. However, it turns out that the head noun and the relative pronoun can show different case markings: the head, being a noun, has a full case paradigm and can show an oblique case marking assigned inside the relative clause, while the relative pronoun is marked for the genitive and is accompanied by a postposition. This is illustrated in (138). The head noun is marked for the ablative, which is assigned by the predicate in the relative CP. The ablative form is not available for the relative pronoun in this context, so it is marked for the genitive and is part of thee postpositional phrase.

(138) NOM ← ABL
Pin'ə-**də** **[kona-n'** **ezdə** mon pel'-an] aščˇ-i
dog-ABL which-GEN in.ABL I fear-NPST.1SG be-NPST.3[SG]
ul'c'ɛ-t' kučka-sə.
street-DEF.SG.GEN middle-IN
'The dog that I am afraid of is standing in the middle of the street.'

The same phenomenon is shown in (139) and (140) for other case forms. In (139), the head noun shows the inessive case. The relative pronoun does not have this case form, so the meaning is expressed by the postposition *maŗtə* 'with' and the genitive case marking on the relative pronoun.

(139) NOM ← IN
Ručka-**sə** **[kona-n'** **maŗtə** mon s'ormad-an'] ravžə.
pen-IN which-GEN with I write-NPST.1SG black
'The pen with which I am writing is black.'

In (140), the head is marked for the elative, and the relative pronoun has genitive marking and is the complement of the postposition *lank-stə* 'top.EL'.

(140) NOM ← EL

Polka-**stə** **[kona-n'** **lank-stə** mešok-s' bɛc'kafc'] s'in'd'-əv-s'.
shelf-EL which-GEN top-EL bag-DEF.SG fall.PST.3[SG] break-PASS-PST.3[SG]
'The shelf that the bag fell from broke.'

Note that the relative pronoun can also be marked for the genitive case, thereby 'attracting' the immediate case of the relative pronoun.[9]

(141) NOM ← GEN

Pin'ə-**t'** **[kona-n'** **ezdə** mon pel'-an] ašč-i
dog-DEF.SG.GEN which-GEN in.ABL I fear-NPST.1SG be-NPST.3[SG]
ul'c'ɛ-t' kučka-sə.
street-DEF.SG.GEN middle-IN
'The dog that I am afraid of is standing in the middle of the street.'

(142) NOM ← GEN

Ručka-**t'** **[kona-n'** **maṛtə** mon s'ormad-an'] ravžə.
pen-IN which-GEN with I write-NPST.1SG black
'The pen with which I am writing with is black.'

The case forms absent for the relative pronoun are not always replaced by an overt postposition plus genitive marking. It can also be replaced by another case. In particular, direction in Moksha can be realized by the illative, lative, or dative case. The relative pronoun does not have illative or lative forms, but it does have a dative form. Example (143) shows that the dative case marking on the relative pronoun can correspond to the illative case on the head noun.

9 In Privizentseva (2016), I report that the indefinite genitive exponent *-n'* used on the relative pronoun in (141) and (142) is ungrammatical on the head in similar examples. The same is stated for the indefinite dative exponent in example (143). On the basis of these data, I conclude that the head and the relative pronoun receive case from the predicate of the relative clause independently of each other. However, the data presented here show that the definite genitive exponent is grammatical. Thus, the ban on the indefinite exponent only shows that the morphological marker from the relative pronoun is not simply copied onto the head. I suggest that the ban on indefinite exponents is due to the information-structural status of the head as well as the fact that the respective indefinite markers are usually not used in the relevant contexts. In particular, the indefinite genitive marker is mainly restricted to adnominal modifiers and pronouns/proper names that do not take the definite genitive exponent. Similarly, unlike the definite dative exponent, the indefinite one is typically not used to mark direction and appears in this function only on syntactic objects with a defective paradigm (such as the relative pronoun).

(143) NOM ← ILL

Lauka-**s** [**kona-n'd'i** (/ *kona-s) tu-s' mon' brada-z'ə]
store-ILL which-DAT which-ILL go-PST.3[SG] I.GEN brother-1SG.POSS.SG
af kunarə panžə-v-s'.
NEG long.ago open-PASS-PST.3[SG]
'The store where my brother went has opened recently.'

To sum up, ICA is possible with oblique cases despite the relative pronoun lacking the corresponding case forms.

Attraction of oblique cases is subject to the restriction identified earlier: it is possible unless the role of the head noun in the main clause is unclear in the absence of external case marking. Example (144) illustrates the internal inessive case used instead of the external dative case. In (144), ICA is somewhat degraded, but not fully unacceptable. In this example, the head noun is intended to function as an adjunct in the main clause.

(144) DAT ← IN

Alaša-**sə** [kona-**n'** **esə** soka-tamə paks'ɛ] er'av'-i t'išə.
horse-IN which-GEN in.IN plow-NPST.1PL field need-NPST.3[SG] grass
'The horse with which we plow the field needs grass.'

(145) IN ← ABL

?? Alaša-**də** [kona-**n'** **ezdə** mon pel'-an] er'av'-i
horse-ABL which-GEN in.ABL I fear-NPST.1SG need-NPST.3[SG]
mol'-əm-s oš-u.
go-INF-ILL city-LAT
'We need to go to the city on the horse that I am afraid of.'

In this section, I have shown that ICA in Moksha is, in principle, available with all case combinations. The case hierarchy and the relative markedness of the two cases do not play a role. The distinction between structural and inherent cases also does not directly determine whether ICA is grammatical. The only relevant factor is whether the role of the head noun in the main clause is clear, i.e., recoverable in the absence of external case marking. Cases where ICA is degraded for this reason seem to be more common with adjuncts marked for an oblique case.

I have also shown that the morphological marking of the head noun does not have to be identical to the marking of the relative pronoun. The mismatch occurs in contexts where the head is marked for a case that the relative pronoun does not

have, so that the genitive case and a postposition are used instead.[10] The mismatch between the case on the head noun and on the relative pronoun can be interpreted in various ways. First, a switch between a postposition and case marking in Moksha might be viewed as a morphological process: the same syntactic structure can be realized as a case marker or as a postposition depending on properties of the host (Caha 2009, Svenonius 2012). On the other hand, differences in marking might show that the case is assigned to the head noun independently of the relative pronoun (Kholodilova 2013, Privizentseva 2016). I postpone the choice between these two options until later, when we know more about the first-merge position of the head noun in relatives with ICA, which will be the topic of the next chapter.

10 In Privizentseva (2016), I suggest that there are mismatches in the marking of the head noun and the relative pronoun that are not related to the deficient paradigm of the relative pronoun. I demonstrate that the mismatch is possible in the context of the postposition *maŗtə* 'with'. A complement of this postposition can be either unmarked or marked for the genitive. However, Muravyeva & Kholodilova (2018: 216–218) later show that this variation is phonological and is conditioned by the initial consonant of the following word. There is thus no actual morphological or syntactic mismatch in the case marking of the head noun and the relative pronoun in this construction.

4 Connectivity

4.1 Introduction

A peculiar property of relative clauses with ICA is the internal case marking on the head noun that occupies a position outside the relative CP, according to the conclusion in the previous chapter. The internal case suggests that, despite its final position in the main clause, the head originates inside the relative CP. Relatives with ICA thus provide an argument for the raising analysis of relative clauses (Bianchi 1999, 2000b and Deal 2016). However, it was also shown that internal case marking on its own can be accounted for under both the matching and the head-external analyses. In particular, under the matching analysis, the external head is deleted instead of the internal one (Cinque 2015, 2020, Wood et al. 2017, and, to some extent, Abramovitz 2021). Furthermore, under both the head-external and the matching analyses, the external head may 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).

The goal of this chapter is to determine how exactly internal case marking on the head noun arises, to investigate the first-merge position and the derivational path of the head noun. To this end, I apply standard connectivity diagnostics to relative clauses with ICA and to regular externally-headed relatives in Moksha. The diagnostics are based on the interpretation of idiomatic expressions, anaphor binding, variable binding, crossover effects, and Condition C.

I will show that the data display a correspondence between case on the head noun, on the one hand, and idiom interpretation, reflexive binding, and Condition C, on the other: If these diagnostics require the presence of the head noun inside the relative CP, the head is obligatorily marked for the internal case; internal case is ungrammatical if the head noun cannot be inside the relative CP according to these diagnostics. I argue that this correlation indicates that the head of relative clauses with ICA is first merged inside the relative clause, receives its internal case there, and then moves to its final position outside the relative CP. I conclude that the raising derivation is one of the available derivations for relative clauses and is thus part of natural language syntax. I further argue that it coexists with another derivation of relative clauses: the head-external analysis. The head-external derivation underlies relative clauses with the regular external case on the head noun. The analysis of relative clauses in Moksha supports the coexistence of two structures for relative clauses in a single language (Sauerland 1998; Bhatt 2002) and provides another case in which superficially similar phenomena have distinct analyses.

https://doi.org/10.1515/9783112225868-004

While idioms, reflexive binding, and Condition C correlate with case marking, pronominal binding and crossover effects do not show dependence on the case marking of the head: pronominal binding into the head noun is possible independently of the case marking, and also independently of the c-command relation between a quantified noun phrase and the relativized position inside the relative CP. Similarly, no crossover violations are attested for heads with either internal or external case marking.

I would like to suggest that this result has implications for the status of the diagnostics typically used to access syntactic structure. In particular, all of the tests employed here have recently been argued to be more controversial than originally suggested. For instance, the use of idiomatic interpretation as a test is based on the assumption that the parts of an idiom must be merged as a constituent (Bach 1974, Chomsky 1980: 149–153, and McCawley 1998: 57). This assumption was questioned by Nunberg, Sag, & Wasow (1994) and Larson (2017); see also Webelhuth et al. (2018) for a reanalysis applied to relative clause data. Similarly, the use of anaphor binding as a diagnostic for relative clause structure was shown to be less straightforward due to peculiarities of anaphor binding inside noun phrases (cf. the discussion in Salzmann 2017). Data on variable binding are often disputed due to the possibility of quantifier raising and several cases in which a quantifier binds a variable that is outside its c-command domain (Cecchetto 2005, Jacobson 2018, Sternefeld 2018, Barker 2018 for discussion of relative clauses). Finally, Condition C obviation, which is at the core of the split between the raising derivation and the matching derivation (Munn 1994, Sauerland 1998, Cresti 2000), has been argued to be empirically less stable in general (Adger, Drummond, Hall, & van Urk 2017, Bruening & Al Khalaf 2019, Wierzba, Salzmann, & Georgi 2020), as well as in relative clauses in particular (Krifka 2018).

A clear correspondence between case marking and idiomatic interpretation, reflexive binding, and Condition C goes against this tendency and contributes to the body of evidence showing that these diagnostics work as originally intended and are reliable for testing the position of a syntactic object. Pronominal binding and crossover effects, by contrast, do not seem to be determined by purely syntactic factors and, as they stand, are not always reliable tests for diagnosing syntactic structure. The data on ICA in Moksha thus contribute to establishing a set of uncontroversial connectivity diagnostics for the derivational path of the head noun in relative clauses, as well as for movement dependencies more generally.

This chapter is organized as follows. I begin with the background in section 4.2. I introduce the three approaches to the syntax of relative clauses (raising, matching, and head-external) and elaborate on the role ICA plays in determining the correct derivation. In section 4.3, I test connectivity diagnostics in relative clauses with ICA in Moksha. For each diagnostic, I first indicate the assumptions on which it is based,

review potential complications and problems, and then show how it applies to Moksha. In section 4.4, I summarize the novel data, present the analysis of relatives in Moksha, and discuss the implications for the syntax of relative clauses in general.

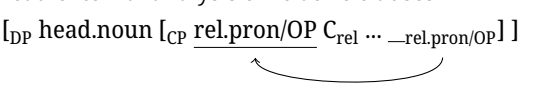
4.2 Background

4.2.1 Head-external, raising, and matching

In this subsection, I review approaches to the structure of finite relative clauses. Depending on the derivational history of the head noun, three types of analysis can be identified: head-external, raising, and matching. Analyses within each type can further differ, for instance, in the final position of the head noun, the position of the relative clause, and the way the relative clause is introduced into the structure.

Let us start with the head-external approach (Partee 1975, Chomsky 1977, Jackendoff 1977, Platzack 2000, Boef 2012, Webelhuth et al. 2018, as well as the textbooks by Haegeman 1994 and Heim & Kratzer 1998). A distinctive property of this approach is that the head of the relative clause is not present in the position of the relativized constituent in the relative CP. The position inside the relative clause is occupied by a relative pronoun or a null operator that moves to the left periphery of the relative CP in the course of the derivation. The head noun is first merged above the relative C head. The derivation in (1) illustrates a classical implementation of the head-external approach.

(1) Head-external analysis of relative clauses



Paradoxically, there is an implementation of the head-external approach under which the head noun is merged inside the relative clause, in the highest specifier of the relative C head (Boef 2012). Even though under such a structure the head noun is inside the relative CP, I still classify this account as head-external because the head noun is not present in the gap position, as it is required to be in both the raising and the matching derivations.

The second type of analysis is raising (sometimes also called promotion). Its defining characteristics are that the head of the relative clause is first merged in the gap position inside the relative CP and that all further occurrences of the head noun are derived by movement (Schachter 1973, Vergnaud 1974, Kayne 1994, Sauerland 1998, 2003, Bianchi 1999, 2000b, Zwart 2000, Bhatt 2002, De Vries 2002, Henderson 2007, Donati & Cecchetto 2011, and Sportiche 2017). The raising derivation is

illustrated in (2). Structure (2a) shows the head noun in its base position inside the relative CP, where it forms a constituent with the relative pronoun (or with a null operator). This constituent is called the relative DP. In (2b), the relative DP moves to the left periphery. Finally, the head noun moves to the left of the relative pronoun in (2c).

(2) Raising analysis of relative clauses

a. $[_{CP}\ C_{rel}$ ... $[_{DPrel}$ rel.pron head.noun] ...]

b. $[_{CP}\ \underline{[_{DPrel}\ \text{rel.pron head.noun}]}\ C_{rel}$ ... $\_\_{}_{DPrel}$...]

c. $[_{DP}\ \underline{\text{head.noun}}\ [_{CP}\ [_{DPrel}\ \text{rel.pron}\ \_\_{}_{\text{head.noun}}]\ C_{rel}$ ... $\_\_{}_{DPrel}$ ...]

The movement of the head noun in (2c) is the most controversial part of the analysis from the perspective of syntactic theory and a major source of variation within the family of raising analyses. In the derivation above, the head noun moves out of the relative DP, but the structure does not specify the final landing site. Movement typically targets specifier positions, so a special functional projection is often postulated to host the movement of the head noun. This can be a nominal projection outside the relative CP (Bhatt 2002 and Deal 2016). It can also be one of the projections in the extended CP domain, in which case the head noun remains inside the relative CP (Bianchi 1999, 2000b). It has also been suggested that the head does not in fact move out of the relative DP, but instead moves from the complement of the relative pronoun/operator to its specifier position, thereby deriving the correct linear order. In the previous chapter (sections 3.4.2–3.4.3), I argued that approaches placing the head noun in a specifier position are problematic because they give rise to an incorrect noun phrase structure in which there is no head–head relation between the head noun and the external D.

There are also a number of further implementations of the raising analysis that do not require the head noun to be positioned in a specifier. One such approach is developed by Donati & Cecchetto (2011) and Cecchetto & Donati (2016). According to this approach, the head noun projects in its landing site and takes the relative CP as its complement. Projection is, however, possible only if the moved syntactic object is a terminal. As a result, only the noun itself can move out of the relative clause; it cannot take any modifiers from within the relative CP. Another analysis that does not place the head noun in a specifier position was suggested by Henderson (2007). This version of the raising analysis employs sideward movement: the head noun phrase is first merged inside the relative clause, moves sideward to another tree

structure and then takes its place in the main clause. The relative clause is late-adjoined to the head noun in the main clause afterwards.

The third analysis is matching. It is similar to the raising analysis in that the head of the relative clause is first merged inside the relative CP and forms a constituent with a relative pronoun or operator, but it differs in that there is another instance of the head noun phrase that is first merged outside the relative CP and is not related to the internal head via movement (Lees 1960, 1961, Chomsky 1965, Munn 1994, Sauerland 1998, 2003, Cresti 2000, Citko 2001, Salzmann 2006, 2017, 2018, Pankau 2018, and Cinque 2015, 2020). The matching derivation is illustrated in (3). The first two steps in (3a-b) are identical to those in the raising derivation. In (3c), the external head is merged. The external and the internal heads match, and one of them—usually the internal one—is not overtly realized.

(3) Matching analysis of relative clauses

a. $[_{CP}\ C_{rel}$ ... $[_{DPrel}$ rel.pron head.noun] ...]

b. $[_{CP}\ \underline{[_{DPrel}\ \text{rel.pron head.noun }]}\ C_{rel}$ ... $\_\_{}_{DPrel}$...]

c. $[_{DP}$ head.noun $[_{CP}\ [_{DPrel}$ rel.pron head.noun] C_{rel} ... $\_\_{}_{DPrel}$ ...]

d. $[_{DP}$ head.noun $[_{CP}\ [_{DPrel}$ rel.pron ~~head.noun~~] C_{rel} ... $\_\_{}_{DPrel}$ ...]

While the most controversial part of the raising derivation is the movement of the noun, for the matching derivation it is the deletion of the internal head. The operation is sometimes identified as ellipsis, but it differs from known cases of ellipsis in that it applies obligatorily and locally. This controversy can be resolved by recognizing that the deletion of the head is not ellipsis but a distinct operation that is attested in a very limited number of cases (Bhatt 2002).

The differences between various implementations of the matching analysis also largely concern the deletion of the head noun. For instance, Cinque (2020) suggests that it is not always the internal head that is deleted; in some cases, the external head can be deleted instead.[1] Further variation concerns the interaction between the two heads at LF. Under some implementations, both heads must be interpreted (Sauerland 1998, 2003). According to others, although the two heads are not related by movement, they can be treated similarly to members of one chain at LF due to their identity: Munn (1994) and Citko (2001) assume that one instance of the head

1 For this reason, Cinque calls this derivation raising, but since the structure includes two occurrences of the head noun that are not related by movement, I identify it here as a version of matching.

can be freely deleted under identity with the other. Salzmann (2018), on the other hand, suggests that one of the heads, or part of it, can be exceptionally deleted at LF only if it is not licensed in its position.

To sum up, there are three analyses of relative clauses. Under the head-external approach, the head of the relative clause is not present in the position of the relativized element; it is first merged above the relative C head. Under the raising approach, the head is merged in the position of the relativized constituent, and all further occurrences of the head are derived by movement. Under the matching approach, the head noun is first merged in the position of the relativized constituent, but the structure also includes a relative clause–external instance of the head that is not related to the internal head by movement.

The syntax of relativization is often not confined to one of the three approaches. Instead, it is sometimes suggested that several derivations can coexist in the grammar. For instance, Sauerland (1998, 2003) proposes that both raising and matching must be available to account for the diverse properties of relative clauses. This idea is further supported by Bhatt (2002), who argues that the inability to account for some phenomenon is not an argument against an analysis in general, but only shows that another derivation underlies relative clauses with a given property.

There are also attempts to show that a single derivation is sufficient to account for all attested properties of relative clauses. Donati & Cecchetto (2011) and Sportiche (2017) argue that the sole available derivation is raising, while Salzmann (2017, 2018) and Cinque (2020) claim that it is matching. In both cases, the unified account of relativization comes at the cost of radically complicating the analysis and allowing for variation within a single derivation type. For raising, Sportiche (2017) suggests that the final landing site of the head can be lower (in the relative CP) or higher (outside the relative CP), which imitates the effects of raising and matching. For matching, it has been suggested that, depending on other factors, either the internal or the external head can be deleted (Salzmann 2017, 2018, Cinque 2020).

In the next section, I turn to the role that the phenomenon of ICA plays in this debate.

4.2.2 The role of ICA

The phenomenon of ICA has been argued to provide a decisive argument in favor of the raising analysis: the head noun shows the case assigned in the relative CP and therefore must have been in a position where this case is assigned, i.e., inside the relative CP (Bianchi 1999, 2000b and Deal 2016). This evidence for the raising derivation is important because it is syntactic/morphological and thus differs from

nearly all existing arguments for the relative CP–internal origin of the head noun, which are based on interpretive semantic effects.[2]

Derivation (4) shows how ICA is analyzed under the raising approach. In (4a), the head is merged inside the relative CP and receives its case there. The second step in (4b) shows the movement of the relative DP to Spec,CP. The third step in (4c) presents the movement of the head noun out of the relative CP.

(4) Inverse case attraction derived by raising

a. Case assignment in the relative CP:
$[\ X_{[\text{case: }\alpha]}\ [_{\text{DPrel}}\ \underline{\text{rel.pron head}}\ ]\ \ldots\ ]$
α

b. Movement of the relative DP:
$[_{\text{CP}}\ [_{\text{DPrel}}\ \underline{\text{rel.pron-}\alpha\ \text{head-}\alpha}\ ]\ C_{\text{rel}}\ \ldots\ X_{[\text{case: }\alpha]}\ \_\_{}_{\text{DPrel}}\ \ldots\ ]$

c. Movement of the head:
$[_{\text{DP}}\ \underline{\text{head-}\alpha}\ [_{\text{CP}}\ [_{\text{DPrel}}\ \text{rel.pron-}\alpha\ \_\_{}_{\text{head}}\ ]\ C_{\text{rel}}\ \ldots\ X_{[\text{case: }\alpha]}\ \_\_{}_{\text{DPrel}}\ \ldots\ ]\ ]$

The internal case marking on the head noun is a direct consequence of the raising analysis. In fact, additional assumptions are required to exclude internal case on the head noun and derive external case marking, which is significantly more common cross-linguistically. Borsley (1997) even mentions this fact that the raising analysis automatically predicts the rather rare ICA and requires additional assumptions to derive external case marking as one of the drawbacks of the raising analysis.

The possibility of deriving ICA by raising is by itself insufficient to provide a full-fledged argument for this derivation. It must also be shown that the other two derivations—matching and head-external—cannot account for ICA. However, it turns out that they can.

Cinque (2015, 2020) and Wood et al. (2017) (to some extent also Abramovitz 2021) claim that relatives with ICA are derived by matching and that it is the internal instance of the head that is realized instead of the external one. The derivation is illustrated in (5). The first two steps in (5a-b) are fully identical to the raising derivation: the head noun is merged inside the relative CP, receives case there, and moves

2 Pankau (2018) suggests that antipronominal contexts provide another argument that is not based on interpretive effects.

to the left periphery together with the relative pronoun. The third step is illustrated in (5c). It differs from the implementation of the raising derivation in (4) in that the head noun remains inside the relative CP, but it is similar to other implementations of raising in this respect (cf. Kayne 1994 or Bianchi 1999, 2000b). After this, the external instance of the head noun is merged in (5d). The final step in (5e) illustrates the deletion of the external head noun. This step might apply significantly later in the derivation, at PF. As a result, the instance of the head noun with internal case is overtly realized.

(5) Inverse case attraction derived by deletion of external head under matching

a. Case assignment in relative CP:
$[\ X_{[\text{case: }\alpha]}\ [_{\text{DPrel}}\ \underline{\text{rel.pron head}}\ ]\ \ldots\ ]$
α

b. Movement of the relative DP:
$[_{\text{CP}}\ [_{\text{DPrel}}\ \underline{\text{rel.pron-}\alpha\ \text{head-}\alpha}\ ]\ C_{\text{rel}}\ \ldots\ X_{[\text{case: }\alpha]}\ \_\_{}_{\text{DPrel}}\ \ldots\ ]$

c. Movement of the internal head:
$[_{\text{CP}}\ \underline{\text{head-}\alpha}\ [_{\text{DPrel}}\ \text{rel.pron-}\alpha\ \_\_{}_{\text{head}}\ ]\ C_{\text{rel}}\ \ldots\ X_{[\text{case: }\alpha]}\ \_\_{}_{\text{DPrel}}\ \ldots\ ]$

d. Merge of the external head:
$[_{\text{DP}}\ \text{head}\ [_{\text{CP}}\ \text{head-}\alpha\ [_{\text{DPrel}}\ \text{rel.pron-}\alpha\ \_\_{}_{\text{head}}\ ]\ C_{\text{rel}}\ \ldots\ X_{[\text{case: }\alpha]}\ \_\_{}_{\text{DPrel}}\ \ldots\ ]\ ]$

e. Deletion of the external head:
$[_{\text{DP}}\ \sout{\text{head-}\beta}\ [_{\text{CP}}\ \text{head-}\alpha\ [_{\text{DPrel}}\ \text{rel.pron-}\alpha\ \_\_{}_{\text{head}}\ ]\ C_{\text{rel}}\ \ldots\ X_{[\text{case: }\alpha]}\ \_\_{}_{\text{DPrel}}\ \ldots\ ]\ ]$

Yet another account of ICA was developed by Harbert (1983) and Gračanin-Yuksek (2013) (see also Bader & Meng 1999, Bader & Bayer 2006, Czypionka et al. 2018). They propose that the head noun receives its case via agreement with the relative pronoun. This analysis is fully compatible with both the matching and the head-external approaches, so that ICA does not provide any insight into the syntax of relativization under this view. Instead, the analysis makes further assumptions about Agree: probes must be able to serve as goals for further Agree after they are valued (cf. the concept of Cyclic Agree proposed by Legate (2005)). The derivation of ICA by agreement is illustrated in (6). The relative pronoun receives case inside the relative CP in (6a), then moves to Spec,CP in (6b). After this, the external head is merged. It has an unvalued case feature. This feature finds the closest suitable goal, namely the

case feature on the relative pronoun; see (6d). The head noun thus receives internal case without being present inside the relative clause at any step of the derivation.

(6) Inverse case attraction derived by agreement

a. Case assignment in relative CP:
[$X_{[case:\ \alpha]}$ rel.pron ...]
α

b. Movement of the relative pronoun to Spec,CP:
[$_{CP}$ rel.pron-α C_{rel} ... $X_{[case:\ \alpha]}$ —rel.pron ...]

c. Merge of the external head:
[$_{DP}$ head [$_{CP}$ rel.pron-α C_{rel} ... $X_{[case:\ \alpha]}$ —rel.pron ...]]

d. Case agreement between the head noun and the relative pronoun:
[$_{DP}$ head [$_{CP}$ rel.pron-α C_{rel} ... $X_{[case:\ \alpha]}$ —rel.pron ...]]
α

To sum up, in this section I have reviewed three existing accounts of ICA and shown that the phenomenon by itself is insufficient to support any conclusions about the correct analysis of relative clauses. In the next section, I will apply standard connectivity diagnostics to relatives with ICA in Moksha and to regular externally-headed relatives. On the basis of these novel data, I will argue that relative clauses with ICA must indeed be analyzed using the raising approach, while the latter reanalyses are incorrect. The combination of ICA and connectivity effects thus provides a clear argument for the raising analysis of relative clauses.

4.3 Connectivity in relative clauses with ICA

The term *connectivity effects* refers to a set of phenomena that are used to diagnose the presence or absence of a syntactic object in a certain position. These diagnostics are based on processes for which it is independently argued that they can apply only if certain structural conditions are met. These conditions are met (or, correspondingly, violated) only if the object of interest is present in a given position or, conversely, only if it is absent from that position. Connectivity effects are typically used to diagnose the first-merge position of moved constituents. They can be ap-

plied to relative clauses to determine whether the head noun is present in the gap inside the relative clause.

Connectivity effects are often called reconstruction effects in the existing literature. I refrain from using the term reconstruction because, even though it is currently often used in a theory-neutral way, it presupposes an analysis under which a syntactic object vacates its base position in syntax but is later reconstructed there, i.e., moves back at LF (May 1977). Current approaches to connectivity do not need to rely on an actual reconstruction procedure. Syntactic approaches to reconstruction make use of the Copy Theory of movement (Chomsky 1993, 1995b), so that a copy of the moved syntactic object remains in its base position and connectivity can be derived by simply interpreting the lower copy instead of the higher one (see Sauerland 1998, Fox 1999, but also Kang & Müller 1996 for arguments against this approach). Semantic approaches to reconstruction often rely on traces of higher types that allow a syntactic object to be interpreted as if it were in a lower position (Cresti 1995, Rullman 1995, among others) and thus also do not require the actual reconstruction of a syntactic constituent to its pre-movement position.

In what follows, I examine the standard connectivity diagnostics—idioms, anaphor binding, variable binding, crossover effects, and Condition C—in Moksha relative clauses with ICA as well as in regular externally-headed relatives.

4.3.1 Idioms

4.3.1.1 Overview

The first diagnostic is based on idiomatic expressions and relies on the assumption that parts of an idiom must be base-generated as a constituent (Bach 1974, Chomsky 1980: 149-153, and McCawley 1998: 57). The ability of the head noun to build an idiom with material from the relative CP or with material from the main clause then sheds light on the derivational path of the head noun.

Let us start with cases where the head noun is part of an idiom in the relative clause. This has been shown to be possible in English as well as in other languages. Consider the English data in (7). Example (7a) shows the idiomatic expression *to keep track of* in a simple sentence. Next, example (7b) contains a relative clause in which the head noun is part of the same idiom as the predicate of the relative clause. An idiomatic interpretation is claimed to be grammatical here. Finally, example (7c) completes the paradigm and shows that the main clause, as in (7b), is ungrammatical on its own because it contains an unlicensed part of the idiom.

(7) a. She's **keeping** careful **track** of her expenses.

b. The careful **track** [that she's **keeping** of her expenses] pleases me.

c. *The/Ø careful track pleases me. (Schachter 1973: 32)

The interpretation of idioms and data such as those in (7) were at the origin of the raising analysis (Brame 1968, Schachter 1973, and Vergnaud 1974). Under this analysis, the head of the relative clause is first merged inside the relative CP and then moves to a higher position, so that the requirement that all parts of an idiomatic expression must be base-generated together is fulfilled; cf. (8).

(8) a. $[_{CP}$ ... is keeping track of ...]

b. $[_{DP}$ track $[_{CP}$ ... is keeping $\_\__{track}$ of ...]]

Whether the data can be derived under the matching analysis depends on its specific implementation. For instance, Sauerland (1998) (see also Bhatt 2002) assumes that both instances of the head noun must be interpreted at LF. Since the external instance of the head also contains part of an idiom but was not merged in the relative CP together with the rest of the idiom, it remains unlicensed, and the sentence is predicted to be ungrammatical, contrary to the facts. Salzmann (2018) (see also Munn 1994 and Citko 2001), on the other hand, develops a version of matching under which one instance of the head can be deleted at LF due to the identity between the two heads. It is then expected that the internal head is interpreted and gives rise to an idiomatic interpretation, while the external head is deleted at LF. However, this also requires to reconsider condition on identity between the two heads: their meanings cannot be identical if one of them has an idiomatic interpretation while the other one has its literal meaning. Furthermore, this analysis presupposes different conditions on idiom licensing and is not obviously compatible with the condition that parts of an idiom must be merged together.

The head-external analysis cannot account for idioms in the relative clause: the head was never in the relative clause, and hence the requirement that all parts of an idiom be base-merged together is not met.

Let us now turn to cases where the head noun forms an idiom with material in the main clause. Under the assumption that parts of an idiom must be base-generated together, idioms in the main clause would be straightforwardly derived under the head-external analysis as well as under the version of the matching derivation that allows the deletion of the second instance of the head noun (the internal one in this case). Implementations of matching that require both heads to be present at LF as well as the raising analysis exclude idioms in the main clause because there is an instance of the head noun that is merged inside the relative CP, away from the rest of the idiom.

The empirical picture is less clear for idioms in the main clause. For instance, Vergnaud (1974) (see also Donati & Cecchetto 2011) claims that the head noun cannot form an idiom in the main clause in French; see (9a). This example shows that the idiom *prendre part* 'to take part' is ungrammatical in the main clause. Example (9b) shows that the idiomatic interpretation is grammatical if the same idiom is split between the head noun and the material inside the relative CP.

(9) a. *Il a **pris** aux travaux du 9ème congrès la **part**
he has taken in.the workings of.the 9th conference the part
[qu'il décrit dans son livre].
that.he describes in his book
'He took part in the 9th conference that he describes in his book.'

b. Il décrit dans son livre la **part** [qu'il a **prise** aux
he describes in his book the part that.he has taken at.the
travaux du 9ème congrès].
workings of.the 9th conference
'He describes in his book the part that he took in the 9th conference.' (Donati & Cecchetto 2011: 524-525 adopted from Vergnaud 1974: 58-59)

A different empirical picture has been reported for English. McCawley (1981) (later also Bhatt 2002, Salzmann 2018) observes that in English the head of the relative clause can form an idiom not only with material in the relative CP, but also with material in the main clause. This is shown in (10).

(10) a. Parky **pulled the strings** [that got me my job]. (McCawley 1981: 137)

b. We **made headway** [that was sufficient]. (Bhatt 2002: 47)

To sum up, idioms in the relative CP can be accounted for by the raising analysis and by the version of the matching analysis that allows the deletion of one of the two heads. The data on idioms in the main clause are controversial: the ban on idioms in the main clause in French is predicted by raising and by matching with the obligatory interpretation of both heads, while the reported grammaticality of idioms in the main clause in English is expected under the head-external analysis and under the version of matching with LF deletion of one of the two heads. As a result, the implementation of the matching derivation that allows deletion at LF is the most permissive approach in that it allows for idioms in both the relative CP and the main clause. Recall, however, that this approach is not obviously compatible with our key assumption that parts of an idiom must be base-generated together. The approach

also requires the deletion of one of the head nouns and assumes that the deletion is enabled by identity between the two heads, but the two heads arguably cannot be identical if one of them is part of an idiom and the other one has its literal meaning. Thus, the analysis requires adjusting the conditions on idiomatic interpretation, so that the instance of the head noun that is merged separately from the idiom could have an idiomatic meaning as well.

If the conditions on idiomatic interpretation are weakened, other analyses become possible as well. For instance, Sportiche (2017) shows that raising can account for idioms in the main clause if parts of an idiom do not have to be base-generated together, but it is sufficient if they form a constituent at some point in the derivation and can thereby be interpreted together at LF. As the head noun moves to the main clause, this condition is fulfilled under the raising analysis.

Further weakening of the conditions on idiomatic interpretation also allows the head-external analysis to account for idioms in the relative CP. A starting point for this revision is the distinction between more transparent and more opaque idiomatic expressions. It has been proposed that the constituency requirement does not hold for more transparent idioms, and they therefore do not shed light on syntactic structure (Nunberg et al. 1994, Larson 2017). Opaque idioms still have to form a constituent, but they are also often syntactically frozen and cannot be split between the head and material inside the relative CP (McCawley 1981 and De Vries 2002). This is shown in (11), where the idiomatic expression *to kick the bucket* 'to die' cannot be split between the head and the predicate in the relative CP. This idiom is considered to be opaque because the literal meaning of none of its parts contributes to its idiomatic interpretation.

(11) *The **bucket** [he **kicked**] was horrible. (De Vries 2002: 78)

Webelhuth et al. (2018) propose that idioms do not provide a good diagnostic tool for the original position of the head noun because only more transparent idioms are used in relative clauses, and they do not require constituency but only the presence of all parts of an idiom in a broader context. This view is by no means uncontroversial: for instance, Bruening (2020) most recently shows that idiomatic expressions, independently of the degree of their idiomaticity, are subject to the same syntactic constraints and argues that this can best be accounted for if all idioms are analyzed uni-formally and must be generated as a constituent.

4.3.1.2 Data

I will now apply this diagnostic to relative clauses with ICA and to regular externally-headed relative clauses in Moksha. I will do so on the basis of two idiomatic expressions. The first one is *pan'žəms potmə*. Its direct translation is to 'open guts/insides',

and its idiomatic meaning is ‘to open up / to tell everything’. Example (12) illustrates this idiom in a simple sentence.

(12) Vasʹɛ panʹž-əzʹə potmə-nc ava-ncti.
Vasja open-PST.3SG.O.3SG.S gut-3SG.POSS.SG.GEN wife-DEF.SG.DAT
‘Vasja told everything to his wife.’

The second idiomatic expression is *sʹedʹijəc af ozaj*. Its literal translation is ‘someone’s heart does not sit’, and it means that the person is worried. Example (13) shows this idiom in a simple sentence.

(13) Sʹedʹi-cʹə af oza-j.
heart-2SG.POSS.SG NEG sit-NPST.3[SG]
‘You are worried.’

In what follows, I will show that the first idiom *panʹžəms potmə* ‘to open up / to tell everything’ demonstrates a correlation between the case of the head noun and the idiomatic interpretation. The second idiom *sʹedʹijəc af ozaj* ‘to worry’ provides a less clear empirical picture: some speakers show the same correlation as with the first idiom, while others use it irrespective of the case on the head noun.

Let us start with sentences in which an idiom is split between the head noun and material inside the relative CP. Examples (14) and (15) use the idiom *panʹžəms potmə*. The relative clause in (14) has ICA, so that the head noun is marked for the case assigned in the relative CP. The idiom is grammatical in this sentence.

(14) NOM ← GEN
Potmə-nc [kona-nʹ Vasʹɛ **panʹž-əzʹə**
gut-3SG.POSS.SG.GEN which-GEN Vasja open-PST.3SG.O.3SG.S
ava-ncti] kunarə af maks-i pokoj.
wife-3SG.POSS.SG.DAT long.ago NEG give-PST.3[SG] rest
‘Everything that Vasja told his wife had been worrying him for a long time.’

Example (15) differs in the case marking on the head noun. The head noun now shows external case, and this leads to ungrammaticality.

(15) *__Potmə-c__ [kona-nˈ Vasˈɛ __panˈž-əzˈə__
gut-3SG.POSS.SG[NOM] which-GEN Vasja open-PST.3SG.O.3SG.S
ava-ncti] kunarə af maks-i pokoj.
wife-3SG.POSS.SG.DAT long.ago NEG give-PST.3[SG] rest
Intended: 'Everything that Vasja told his wife had been worrying him for a long time.'

Thus, the data show that the head noun can form an idiom with the relative clause–internal material only if the head noun is marked for the internal case. The second idiom *sˈedˈijəc af ozaj* can also be split between the head noun and the relative CP if the head is marked for the internal case; see (16).

(16) GEN ← NOM
__Sˈedˈi-cˈə__ [kona __af__ __oza-j]__
heart-2SG.POSS.SG[NOM] which[NOM] NEG sit-NPST.3[SG]
van-ft-k.
see-CAUS-IMP.3SG.O.3SG.S
'Take care of your heart, which cannot calm down.'

In (17), the head noun shows the external genitive case. This sentence is judged as ungrammatical by some speakers but allowed by others.

(17) %__Sˈedˈi-cˈə-nˈ__ [kona __af__ __oza-j]__
heart-2SG.POSS.SG-GEN which[NOM] NEG sit-NPST.3[SG]
van-ft-k.
see-CAUS-IMP.3SG.O.3SG.S
'Take care of your heart, which cannot calm down.'

Thus, some speakers replicate the dependency between case and the idiom in the relative CP observed for the first idiom, while others allow the use of this second idiom independently of the case marking on the head noun.

I will now turn to cases where the head noun forms an idiom with material in the main clause. The first idiom *panˈžəms potmə* shows a correlation with the case of the head noun. Example (18) illustrates that the idiom in the main clause is grammatical if the head noun shows the case assigned in the main clause.

(18) **Potmə-nc** [kona kunarə af maks-i pokoj] Vasʲɛ
gut-3SG.POSS.SG.GEN which[NOM] long.ago NEG give-PST.3[SG] rest Vasja
panʲžʲ-əzʲə ava-ncti.
open-PST.3SG.O.3SG.S wife-DEF.SG.DAT
'Vasja revealed to his wife the secret that had been worrying him for a long time.'

ICA is incompatible with the idiom in the main clause. In (19), the head noun is marked for the internal nominative case, and the idiom leads to ungrammaticality.

(19) GEN ← NOM
*__Potmə-c__ [kona kunarə af maks-i pokoj]
gut-3SG.POSS.SG[NOM] which[NOM] long.ago NEG give-PST.3[SG] rest
Vasʲɛ **panʲžʲ-əzʲə** ava-ncti.
Vasja open-PST.3SG.O.3SG.S wife-DEF.SG.DAT
Intended: 'Vasja revealed to his wife the secret that has been worrying him for a long time.'

The idiom *sʲedʲijəc af ozaj* in the main clause is grammatical if the head noun is marked for the external case.

(20) **Sʲedʲij-əc** [kona-nʲ Paša pɛk van-fci]
heart-3SG.POSS.SG[NOM] which-GEN Pasha very see-CAUS.NPST.3SG.O.3SG.S
af oza-j.
NEG sit-NPST.3[SG]
'His heart, which Pasha takes care of, is not calm.'

If the head noun is marked for the internal case, some speakers still judge the sentence as grammatical, while others do not allow it.

(21) NOM ← GEN
%__Sʲedʲij-ənc__ [kona-nʲ Paša pɛk van-fci]
heart-3SG.POSS.SG.GEN which-GEN Pasha very see-CAUS.NPST.3SG.O.3SG.S
af oza-j.
NEG sit-NPST.3[SG]
'His heart, which Pasha takes care of, is not calm.'

To sum up, first, there is some variation among native speakers with respect to the behavior of the idiom *sʲedʲijəc af ozaj* 'to worry'. For some speakers, it shows the

same correlation between case and grammaticality as the idiom *panʹžəms potmə* 'to open up / to tell everything'. For others, it is grammatical independently of the case marking. I assume that idioms do not constitute a homogeneous class for the latter group of speakers and that they differ in what is required for the idiomatic interpretation to be possible. Second, abstracting away from speakers who do not show the differences for one of the idioms, we observe a correlation between the possibility of the idiomatic interpretation and the case marking on the head noun: idioms inside the relative CP are grammatical only if the head noun shows internal case; idioms in the main clause are possible only if the head noun has external case.

I suggest that the attested correspondence between connectivity and case on the head noun is expected if relative clauses with ICA (i.e., with internal case) are derived by raising, while regular externally-headed relative clauses (i.e., relative clauses with external case) are derived by head-external generation.

The data on idioms also have implications for the analysis of idioms: the dependency between case and idioms can be derived only if the strongest assumptions hold at least for some syntactically flexible idioms; that is, if parts of an idiom must enter the derivation together holds (Bach 1974, Chomsky 1980: 149-153, McCawley 1998: 57, and Bruening 2020).

4.3.2 Anaphor binding

4.3.2.1 Overview

The second connectivity effect is based on anaphor binding. According to Condition A of the standard Binding Theory, anaphors (reflexives and reciprocals) must be bound by a local c-commanding syntactic object (Chomsky 1981, 1986). This is illustrated in (22). Antecedents c-command anaphors in (22a-b), but not in (22c-d). The antecedent is too deeply embedded in the subject in (22c), and no syntactic element c-commands the anaphor in (22d). There is a c-command relation in (22e), but the antecedent is outside the anaphor's local binding domain.

(22) a. John$_i$ hates himself$_i$.

b. The men$_i$ admired each other$_i$.

c. *John$_i$'s mother hates himself$_i$.

d. *Each other$_i$ admire the men$_i$.

e. *John$_i$ said that Mary hates himself$_i$.

The requirement for a local c-commanding antecedent makes anaphor binding a good diagnostic tool for the base position of the head noun. The test is schematized

in (23): the head of the relative clause contains an anaphor, while the intended antecedent is inside the relative CP, where it c-commands the relativized position. If the anaphor in the head noun phrase can be bound by this antecedent inside the relative CP, the head must have been in the relativized position earlier in the derivation.

(23) $[_{DP}$ head.noun+anaphor$_i$ $[_{CP}$ ... antecedent$_i$ ... $__$relativized.position]]

The data in (24) show that binding of the anaphor in the head of the relative clause by material in the relative CP is indeed possible for English.

(24) a. The portrait of **himself$_i$** [that **John$_i$** painted] is extremely flattering.

b. The interest in **each other$_i$** [that **John and Mary**$_i$ showed] was fleeting. (Schachter 1973: 32-33)

These data are straightforwardly accounted for under the raising derivation: the head is first merged inside the relative CP, and the anaphor it contains can be bound in this position. The matching analysis also postulates a representation of the head in the relativized position and thereby allows anaphor binding by the relative clause-internal material. It, however, differs from raising in that another instance of the head is base-generated outside the relative CP, and this external instance of the head also contains an anaphor. The anaphor in the external head noun phrase is not c-commanded by the relative clause–internal material and cannot be bound. This leads to a crash under the implementation of matching in which both heads must be interpreted at LF (Sauerland 1998), but it is grammatical under the implementation of matching that allows the deletion of one of the two heads at LF under identity with the other (Salzmann 2017). In that case, the external head is deleted, so that the unbound anaphor it contains does not lead to a problem for interpretation.

Before applying anaphor binding to relative clauses in Moksha, several problems with this diagnostic must be addressed. One of the problems comes from the peculiar behavior of anaphors in noun phrases. It has been shown for English that an anaphor in a noun phrase can be grammatical despite the absence of a local binder (Pollard & Sag 1992 and Reinhart & Reuland 1993). Example (25a) shows that the anaphor in the noun phrase can refer to the noun outside its local binding domain. This contrasts with example (25b), where the anaphor is the argument of the verb and it cannot have such a reference.

(25) a. Bush and Dukakis$_i$ charged that general Noriega had secretly contributed to each other$_i$'s campaigns.

b. *Bush and Dukakis$_i$ charged that General Noriega has secretly visited each other$_i$. (Pollard & Sag 1992: 267)

Moreover, anaphors in noun phrases are sometimes grammatical without any c-commanding binder; see (26), where the reflexive refers to *John* from the previous sentence.

(26) John$_i$ was furious. The picture of himself$_i$ in the museum has been mutilated. (Pollard & Sag 1992: 268)

If anaphors in noun phrases are not subject to the familiar c-command requirement, as these data suggest, then the binding of an anaphor in the head of the relative clause no longer provides evidence for the relative CP–internal base position of the head noun. There have been several attempts to account for exceptional binding in noun phrases without rejecting the c-command requirement. For instance, it was suggested (Chomsky 1986, i.a.) that the subject position in the noun phrase can be occupied by PRO, which c-commands the anaphor and locally binds it; see (27).

(27) [PRO$_i$ the picture of himself$_i$]

While Pollard & Sag (1992) have argued that this solution does not cover all instances of exempt anaphors, the idea of a null PRO in the external argument of the noun phrase took root and received some independent support from research on nominal syntax (Abney 1987 and Giorgi & Longobardi 1991). Applied to relative clauses, this means that it is PRO, not the intended antecedent in the relative CP, that binds an anaphor in the head noun.[3]

The complication introduced by the potential presence of PRO in the external argument position is circumvented if a noun that does not allow for an external argument is used, if the anaphor is embedded in the external argument, or if the interpretation under which the anaphor refers to the external argument is semantically implausible (Bianchi 1999, De Vries 2002, Cecchetto 2005, and Salzmann 2017). For instance, in (28) from Italian, the anaphor is embedded in the single argument of the noun. In (29) from Dutch, binding of the anaphor by PRO is excluded due to the expected interpretation: the binder must be the hearer, not the storyteller.

3 One way to rescue this diagnostic is to argue that the presence of the head noun inside the relative clause is required for the binding of PRO, which then in turn binds the anaphor, but this option is not pursued in existing work.

(28) L'unica vonseguenza della **propria**$_{\mathbf{i}}$ decisione [che **Gianni**$_{\mathbf{i}}$ non aveva
only consequence of.the own decision that Gianni not had
considerato] si riveló disastrosa.
considered turned.out disastrous
'The only consequence of his decision that Gianni had not taken into consideration turned out to be disastrous.' (Bianchi 1999: 119)

(29) De PRO$_{\mathrm{j}}$ verhalen over **zichzelf**$_{\mathbf{i}}$, [die **Paul**$_{\mathbf{i}}$ hoorde], waren pure
the stories about self which Paul heard were mere
leugens.
lies
'The stories about himself that Paul heard were mere lies.' (De Vries 2002: 80)

In both of these examples, the anaphor cannot be bound by another argument within the noun phrase. Thus, the data resolve the problem posed by PRO in the external argument slot, but the arguably larger problem of a logophoric reading still remains (Charnavel & Sportiche 2016, Charnavel 2019, Charnavel & Bryant 2022 for a recent discussion). Indeed, most of the existing evidence for the relative clause–internal origin of the head noun that is based on anaphor binding does not take this issue seriously and might turn out to be significantly less convincing once the possibility of a logophoric reading is added to the picture.

One language for which this issue has been seriously considered is Italian. Bianchi (1999: 115-119) claims that the regular anaphoric pronoun does not allow for logophoric readings and that pronouns that have logophoric readings are morphologically different. Further evidence that addresses the problem of exempt readings is presented in (30)-(31). These sentences form a minimal pair and differ in the position of the anaphor. In (30), the anaphor is in the head noun and it is bound by the subject of the relative clause. In (31), the anaphor is in the main clause but not in the head of the relative clause. The sentence is ungrammatical, showing that the exempt reading is excluded.[4]

(30) ?Questi sono i contributu al **proprio**$_{\mathbf{i}}$ volume [dei quali
there are the contributions to.the own volume with which
Gianni$_{\mathbf{i}}$ é soddisfatto].
Gianni is satisfied
'These are the contributions to his volume that Gianni is satisfied with.'

4 De Vries (2002: 80-82) makes the same claim for Dutch: he suggests that the anaphor *zichzelf* does not allow for exempt readings and shows that it can be bound inside the relative clause.

(31) *Questi é il **proprio$_i$** constibuto al volume [di cui **Gianni$_i$** é
this is the own contribution to.the volume of which Gianni is
il curatore].
the editor
'This is his own$_i$ contribution to the volume that Gianni$_i$ is the editor of.'
(Bianchi 1999: 117)

To sum up, anaphor binding was and remains an important diagnostic for the structure of relative clauses (Schachter 1973, Kayne 1994, Bianchi 1999, De Vries 2002, Bhatt 2002, Salzmann 2017: 66-71, i.a.), but it suffers from several confounds (PRO inside the noun phrase, a logophoric binder) that were to some extent addressed, but not completely resolved, in the existing literature on relative clauses.

4.3.2.2 Data

Moksha has several ways of expressing reflexivity (see Toldova & Shalganova 2018 for a recent description). Most of them include the reflexive element *esʹ* 'self' and/or the grammaticalized noun *prʹɛ* 'head'. For instance, a widely attested composite reflexive *esʹ prʹɛ*, typically used in the direct object position, is illustrated in (32). In this example, the subject binds the reflexive in the direct object position.

(32) Vasʹɛ$_j$ [esʹ prʹa-nc]$_{j/*i}$ arala-si lomatʹ-tʹnʹə-nʹ
Vasja self head-3SG.POSS.SG.GEN protect-NPST.3SG.O.3SG.S human-DEF.PL-GEN
ezdə.
in.ABL
'Vasja protects himself from these people.' (Toldova & Shalganova 2018: 636)

In the adnominal position, the simple reflexive *esʹ* is used. This is shown in (33). As in the previous example, the reflexive is obligatorily bound by the c-commanding noun phrase here.

(33) Vanʹɛ$_i$ esʹ$_{i/*j}$ varʹaga-nc mu-zʹə.
Vanja 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)

A noun modified by *esʹ* has a possessive marker. The possessive marking can be used without the reflexive, but the reference is then not restricted to a c-commanding noun phrase; see (34).

(34) Vanʹɛ$_{i}$ varʹaga-nc$_{i/j}$ mu-zʹə.
Vanja mitten-3SG.POSS.SG.GEN find-PST.3SG.O.SG.S
{Context: Petja lost his mitten.} ‘Vanja$_{i}$ found his$_{i/j}$ mitten.’ (Toldova & Shalganova 2018: 654)

When present, *esʹ* seems to occupy the possessor position, so that the possessive marking results from agreement with it. This is further supported by the fact that possessive inflection realizes φ-features of the noun phrase that binds the reflexive; see (35), where the first person singular pronoun is the antecedent of the anaphor, and the possessive marker also expresses first person singular features.

(35) Mon$_{i}$ tu-šənd-an esʹ$_{i}$ velʹə-zə-n.
I go-FREQ-NPST.1SG self village-ILL-1SG.POSS.SG.GEN
‘I am going to my village.’ (Toldova & Shalganova 2018: 654)

Since, unlike in English and some other European languages, the reflexive pronoun in Moksha can appear directly in the possessor position (the highest argument in the noun phrase), the problem of the silent PRO that appears within the noun phrase and c-commands a lower PP where the anaphor is embedded does not arise.

Turning now to the binding of reflexives in relative clauses, we see that the anaphor in the head noun can be bound inside the relative CP if the head has internal case:

(36) NOM ← GEN
Esʹ$_{i}$ kud-**ənc** [kona-nʹ **Vasʹɛ$_{i}$** mi-zʹə] tʹɛnʹi
self house-3SG.POSS.SG.GEN which-GEN Vasja sell-PST.3SG.O.3SG.S now
ašč-i savə.
be-PST.3[SG] empty
‘The house of his$_{i}$ that Vasja$_{i}$ sold is now empty.’

If the head noun shows external case, the reflexive cannot be bound inside the relative CP; see (37).

(37) *Esʹ$_{i}$ kud-**əc** [kona-nʹ Vasʹɛ$_{i}$ mi-zʹə] tʹɛnʹi
self house-3SG.POSS.SG[NOM] which-GEN Vasja sell-PST.3SG.O.3SG.S now
ašč-i savə.
be-PST.3[SG] empty
Intended: ‘The house of his$_{i}$ that Vasja$_{i}$ sold is now empty.’

Thus, analogous to the data from the previous section, we see a dependency between the case on the head noun and the connectivity effect—anaphor binding, in this case. The presence of a correlation between binding and the case on the head noun 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 that is in principle possible in Moksha; see (38). In this example, the reflexive is embedded in the subject of the finite clause, so that there is no local c-commanding antecedent and the reflexive refers to the speaker and their associates.

(38) ⟨...⟩ a **es'** vel'ə-n' s'ora-n'əkə tu-j̊-t' l'ijɛ vel'-i
and self village-GEN boy-1PL.POSS go-NPST.3-PL other village-LAT
s'or... s't'ər'-ən'd'i.
<girl> girl-DAT
'... and boys from our village go to see girls from another village.' (Toldova & Shalganova 2018: 655 (the sentence from text 'Easter'))

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. In (39), the reflexive *es'* has an inanimate antecedent.

(39) T'ɛ **kn'iga-s'$_i$** maks-i **es'$_i$** luv-ij-ənzə-n'd'i
this book-DEF.SG give-NPST.3[SG] self read-PTCP.ACT-3SG.POSS.PL-DAT
nad'əja-ma.
hope-NZR
'This book$_i$ gives its$_i$ readers hope.'

Example (40) shows that in this case binding is impossible if the noun phrase is placed in the subject position and there is no overt c-commanding antecedent.

(40) ***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$_i$.'

When introduced into relative clauses, reflexives with an inanimate antecedent show the same dependency on the case marking on the head noun that was attested earlier. In examples (41) and (42), the head is marked by the internal case, and the reflexive is successfully bound by the head of the relative CP.

(41) NOM ← DAT

Es'$_i$ luv-ij-ənzə-**n'd'i** [kona-t'n'ə-n'd'i t'ɛ **kn'iga-s'$_i$**
self read-PTCP.ACT-3SG.POSS.PL-DAT which-DEF.PL-DAT this book-DEF.SG

maks-i nad'əja-ma] uč-iĵ-t' pe.
give-NPST.3[SG] hope-NZR wait-NPST.3-PL end

'Its$_i$ readers whom this book$_i$ gave hope to are waiting for the sequel.'

(42) NOM ← GEN

Es'$_i$ fundamənt-**ənc** [kona-n' vel'd'ə t'ɛ **kuc'$_i$**
self foundation-3SG.POSS.SG.GEN which-GEN through this house.DEF.SG

ašč-i] n'ingə af naksad-i.
be-NPST.3[SG] yet NEG rot-NPST.3[SG]

'Its$_i$ foundation, thanks to which this house$_i$ is standing, is not rotting.'

Binding by the relative CP–internal material becomes impossible if the head noun is marked for the external case.

(43) *__Es'__ luv-ij-ənzə [kona-t'n'ə-n'd'i t'ɛ **kn'iga-s'**
self read-PTCP.ACT-3SG.POSS.PL[NOM] which-DEF.PL-DAT this book-DEF.SG

maks-i nad'əja-ma] uč-iĵ-t' pe.
give-NPST.3[SG] hope-NZR wait-NPST.3-PL end

Intended: 'Its$_i$ readers whom this book$_i$ gave hope to are waiting for the continuation sequel.'

(44) *__Es'__ fundamənt-**əc** [kona-n' vel'd'ə t'ɛ **kuc'**
self foundation-3SG.POSS.SG[NOM] which-GEN through this house.DEF.SG

ašč-i] n'ingə af naksad-i.
be-NPST.3[SG] yet NEG rot-NPST.3[SG]

Intended: 'Its$_i$ foundation, thanks to which this house$_i$ is standing, is not rotting.'

To sum up, the anaphor in the head of the relative clause in Moksha can be bound in the relative CP only if the head noun is marked for the internal case. These data strongly suggest that heads with internal case are present inside the relative CP and for this reason binding there is allowed. Heads marked for external case, on the contrary, cannot be bound within the relative CP and therefore must not be present in the relative CP. The clear effect that the case marking on the head has on the possibility of binding also supports anaphor binding as a reliable diagnostic for the structure of relative clauses, at least once possible confounds are excluded.

Turning to anaphor binding by material in the main clause, we observe that the empirical picture differs from the one presented for idioms in the previous section. Anaphors do not display a dependency between case marking on the head noun and the possibility of binding in the main clause. Examples (45) and (46) (repeated from section 3.3.2) show that the anaphor in the main clause can be bound regardless of whether the head noun shows internal or external case marking.

(45) GEN ← DAT

Es'$_i$ mašina-**ncti** [kona-n'd'i put-f lama jarmak] **Vas'ɛ$_i$**
self car-3SG.POSS.SG.DAT which-DAT put-PTCP.RES many money Vasja
dagə pet'-əz'ə.
again repair-PST.3SG.O.3SG.S
'Vasja$_i$ again repaired his$_i$ car into which a lot of money had been invested.'

(46) **Es'$_i$** mašina-**nc** [kona-n'd'i put-f lama jarmak] **Vas'ɛ$_i$**
self car-3SG.POSS.SG.GEN which-DAT put-PTCP.RES many money Vasja
dagə pet'-əz'ə.
again repair-PST.3SG.O.3SG.S
'Vasja$_i$ again repaired his$_i$ car into which a lot of money has been invested.'

Previewing the analysis at the end of this chapter, I would like to point out that the observed difference between idioms and anaphors is expected because the conditions for the two are not the same. Idioms were argued to require constituency at base generation, so that movement cannot create a new context for idiomatic interpretation. Anaphors, on the other hand, require only c-command and therefore can be bound both in the first-merge position and in the landing site; see also Barss (1986, 2001) for evidence that anaphor binding typically applies throughout the derivation.

4.3.3 Variable binding

4.3.3.1 Overview

This diagnostic as well as the next one are based on variable binding; the two differ in whether the head noun contains a variable or a binder. Here I start with cases of the first type, where the head noun contains the variable (Åfarli 1994, Sauerland 1998, Bianchi 1999, and Bhatt 2002). Data in (47)-(48) show that the variable in the head can be bound by the quantified noun phrase (QNP) inside the relative CP if this QNP c-commands the relativized position.

(47) a. John generally has an opinion of **his$_i$** book [that **every novelist$_i$** respects].

b. **Every novelist$_i$** respects [John's/an opinion of **his$_i$** book].

(48) a. ??John generally has an opinion of **his$_i$** book [that is useful to **every author$_i$**].

b. ??[John's opinion of **his$_i$** book] is useful to **every author$_i$**. (Bhatt 2002: 52)

The pronoun in the head is bound by the QNP in the relative CP in (47a), but the bound-variable interpretation is significantly degraded in (48a). The difference between these two examples lies in the respective positions of the QNP and the relativized position: the QNP c-commands the gap position in (47a), but not in (48a). Thus, if the head noun is merged inside the relative CP in the relativized position, it is c-commanded by the QNP in (47a), but not in (48a). The contrast between these two examples is then easily derived if the head noun is merged inside the relative CP. The data thereby argue for the relative CP–internal origin of the head noun. This can be derived by the raising analysis, under which the head noun phrase is merged inside the relative CP and then moves to a position in the main clause. The data are also accounted for by versions of matching under which the internal instance of the head gives rise to a bound-variable interpretation and the external head is deleted at LF (Munn 1994, Citko 2001, and Salzmann 2017). The binding of a variable in the head is problematic for other versions of matching as well as for the head-external approach.

This diagnostic test is, however, not universally accepted (see, e.g., Donati & Cecchetto 2011 and Salzmann 2018). It is subject to empirical and theoretical concerns. One of them comes from the observation by Hulsey & Sauerland (2006) that a quantifier inside the relative CP can scope over main clause material that is not inside the relative clause under any of the relative clause derivations. According to this paper, the most natural interpretation of (48) is the one in which each person sent a separate picture, i.e., the definite article *the* in the head noun is interpreted in the scope of the quantifier *everybody* that is inside the relative CP.

(49) The picture of **himself$_i$** [that **everybody$_i$** sent in] annoyed the teacher. (Hulsey & Sauerland 2006: 121)

Such a scope does not follow from the relative CP–internal origin of the head noun, because the vast majority of analyses assume that the noun, but not its determiner, is merged in the relativized position (Kayne 1994, Bianchi 1999, Salzmann 2018). The determiner is always external, so that for (49) to receive the relevant interpretation,

the quantifier must raise out of the relative CP to a position where it scopes over the head noun. After quantifier raising, the third person pronoun in the head of the relative clause is also in the scope of the quantifier and can be bound. As a result, quantifier binding can be derived without the head noun being present inside the relative CP.

This alternative is by no means unproblematic: quantifier raising usually proceeds to an Ā-position, and Ā-positions may participate in some scope-taking effects, but nouns in such positions cannot bind. Also, as pointed out by Hulsey & Sauerland (2006), movement of a quantifier across a co-indexed variable is a configuration that is expected to be ungrammatical due to the weak crossover effect.[5]

The next empirical problem was identified in the work by Cecchetto (2005), who has argued on the basis of Italian that binding of a variable in the head noun is more restricted and in fact possible only in copular identity sentences (cf. (50a) vs. (50b)). Example (50a) presents an identity sentence, and the QNP in the relative CP can bind the variable in the head. Pronominal binding is, however, ruled out in the regular subject–predicate sentence; see (50b).

(50) a. Il **proprio$_i$** fallimento [che **nessuno$_i$** dimentica] è quello che
the self failure that nobody forgets is the.one that
è avvenuto per primo.
is happened for first
'Their$_i$ own failure that nobody$_i$ forgets is the one that happened first.'

b. *Il **proprio$_i$** fallimento [che **nessuno$_i$** dimentica] è avvenuto per
the self failure that nobody forgets is happened for
primo.
first
'Their$_i$ own failure that nobody$_i$ forgets happened first.' (Cecchetto 2005)

At the same time, Salzmann (2017: 73-74) points out that the literature contains a number of examples where variable binding into the head is possible in regular subject–predicate sentences in Italian (see, for instance, (51)) as well as in other languages (see the examples from English above).

5 Furthermore, quantifier raising out of the relative clause proposed by Hulsey & Sauerland (2006) is unexpected from the perspective of the locality restrictions on QR (Cecchetto 2004). Interestingly, however, Sichel (2018) claims that raising relative clauses are transparent for movement. If so, the raising of the quantifier out of the relative CP and subsequent binding of a variable in the head noun might be taken to be an argument for the raising derivation, just not in the way it was originally intended.

(51) La parte del **suo$_i$** stipendio [che ho anticipato ad **ogni**
the part of self salary that I paid.in.advance to every
impiegato$_i$] verrà sottratta dalla busta paga.
clerk will.be deducted from.the envelope pay
'The part of his$_i$ salary that I paid in advance to every clerk$_i$ will be deducted from the pay-sheet.' (Bianchi 1999: 124)

Thus, the data in (50a)-(50b) present an interesting contrast that, if correct, needs to be accounted for, but binding of a variable in the head of a relative clause in Italian does not seem to be restricted to copular identity sentences more generally.

Another empirical concern was recently raised by Radó, Konietzko, & Sternefeld (2018). The data come from word-by-word self-paced reading experiments with German native speakers. Two of the sentences used in the experiment are given in (52). They both contain the bound pronoun *seine* in the head and the QNP inside the relative CP, but differ in that the QNP c-commands the relativized position in (52a), but not in (52b). This means that the QNP c-commands the bound variable if the head noun is merged within the relative CP in (52a), but there is no c-command between the quantifier and the variable at any stage of the derivation in (52b). The data are thus parallel to the English examples (47a) and (48a), which show a contrast in grammaticality depending on whether the QNP c-commands the variable in its original position. Radó et al. (2018) argue that this contrast is absent in German.

(52) a. **Seine** Ärztin, [die **jeder** **Patient** seit Langem
his doctor.NOM/ACC who.NOM/ACC every.NOM patient since long
gekannt hat], hat ihm ein teures Medikament verschrieben.
known has has for-him an expoensive medication prescribed
'His doctor who every patient has known for a long time prescribed him an expensive medication.'

b. **Seine** Ärztin, [die **jeden** **Patienten** seit
his doctor.NOM/ACC who.NOM/ACC every.ACC patient.ACC since
Langem gekannt hat], hat ihm ein teures Medikament
long known has has for-him an expensive medication
verschrieben.
prescribed
'His doctor who has known every patient for a long time prescribed him an expensive medication.' (Radó et al. 2018: 411)

In the experiment, comprehension questions were used to check the availability of bound-variable readings. The answers show that around one third of all partici-

pants allow such readings. Slightly more participants allow the bound reading of the pronoun in (52a), but the difference is not statistically significant. This suggests that the c-command relation between the quantified noun phrase and the gap position plays no role.

This result connects with deeper theoretical problems of this diagnostic. It has also been noted that in English pronouns can sometimes be bound despite not being c-commanded by a QNP. For instance, the widely cited example (53) shows that the QNP inside the relative CP binds the pronoun that is in the main clause but is not part of the head noun.

(53) The woman [whom **every true Englishman**$_{\mathbf{i}}$ most reveres] is **his**$_{\mathbf{i}}$ mother. (Geach 1964: 174)

Some approaches suggest that binding of the variable outside the head noun, as in (53), is attested only in identity sentences (Lakoff 1970, but also Sharvit 1999) and tie this possibility to the syntax of copular sentences. In particular, it was suggested that the post-copular part of the sentence contains the binder, but it receives no phonological realization (cf. Schlenker 2003 and Romero 2005, 2018). This could derive the contrast in Cecchetto's Italian examples, but the analysis cannot be applied to subject–predicate sentences such as (47a), where the bound variable is in the head of the relative clause.

While some specific cases of binding from a non-c-commanding position, as in (53), may indeed have an alternative explanation, this seems to be just one of the numerous examples where variable binding is possible without a c-command relation between a QNP and a pronoun; for other examples, see, for instance, the 'almost c-command' sentences (as Hornstein 1995: 108 calls them) in (54a-b) or seemingly more complex cases illustrated in (54c-e).

(54) a. [[**Every author's**]$_{\mathrm{i}}$ editor] followed **his**$_{\mathbf{i}}$ instructions.

b. [Somebody from **[every city]**$_{\mathrm{i}}$] despises **its**$_{\mathbf{i}}$ architecture. (May 1988: 89)

c. [Every daughter of every professor in **[some small college town]**$_{\mathbf{i}}$] wishes she could leave **it**$_{\mathbf{i}}$. (Higginbotham 1980: 690)

d. I then caught **[each fish]**$_{\mathbf{i}}$, measured **it**$_{\mathbf{i}}$, and placed **it**$_{\mathbf{i}}$ in the plastic container. (Barker 2012: 623)

e. **[Each boy]**$_{\mathbf{i}}$ walked to the stage. **He**$_{\mathbf{i}}$ took his diploma from the dean and returned to his seat. (Nouwen 2020)

Sentences such as those in (54) are part of the complex debate on the necessary and sufficient conditions for variable binding. While I will not be able to do justice to the

variety of the existing literature (see Déchaine & Wiltschko 2017 and Nouwen 2020 for recent overviews), the approaches can be divided into two types. Approaches of the first type claim that c-command between the QNP and the co-varying pronoun is still required (see, e.g., Reinhart 1983, Heim & Kratzer 1998, and Büring 2001). To account for examples such as those in (54), these approaches often postulate an additional structure in the pronoun and sometimes also in the larger DP that contains the quantifier. Approaches of the second type derive variable binding by postulating more complex semantic representations, but without an appeal to c-command in syntax; see, for instance, Barker (2002, 2012) as well as Jacobson (1994), Jacobson (2018), Sternefeld (2018), and also Barker (2018) for such analyses of variable binding in relative clauses. Under approaches of this latter type, binding of a variable in the head of the relative clause by a quantifier inside the relative CP is by no means an argument for the relative CP–internal origin of the head noun. Interestingly, however, it is also not immediately clear that the diagnostic based on binding of a variable in the head works as originally intended under approaches of the first type once they are adjusted to incorporate the data such as those in (54). The additional syntactic or semantic mechanisms required to derive binding from seemingly non-c-commanding positions might also apply to derive binding into the head noun without it actually being present in the relative CP. With this (rather unsatisfying) conclusion, I will end the general overview and turn to variable binding in Moksha.

4.3.3.2 Data

Personal pronouns as well as reflexives can be bound by QNPs in Moksha. I will start with cases where the reflexive plays the role of a bound variable. This is illustrated in (55). A reflexive pronoun is preferred here, presumably because the variable is locally c-commanded by its binder in this case.

(55) **ɛr'** **s'ora-n'ɛ-s'$_{i}$** and-əz'ə **es'$_{i}$** pin'ə-nc.
every boy-DIM-DEF.SG feed-PST.3SG.O.3SG.S self dog-3SG.POSS.SG.GEN
'Every boy$_{i}$ fed his$_{i}$ dog.'

Example (56) shows that, at least in some cases, the reflexive pronoun cannot covary with a QNP that does not c-command it.

(56) * **Es'$_{i}$** pin'ə-c susk-əz'ə **ɛr'** **s'ora-n'ɛ-t'$_{i}$**.
self dog-3SG.POSS.SG bite-PST.3SG.O.3SG.S every boy-DIM-DEF.SG.GEN
Intended: 'His$_{i}$ dog bit every boy$_{i}$.'

In relative clauses, binding of the reflexive by a QNP shows the by now familiar correlation between case and connectivity: in (57), the head noun is marked for the internal case and binding into the head noun succeeds.

(57) NOM ← GEN

Es'$_i$	pin'ə-**nc**	[kona-n'	**ɛr'**	**azər-s'$_i$**	
self	dog-3SG.POSS.SG.GEN	which-GEN	every	owner-DEF.SG	
t'er'd'-si]	van-ft-əz'ən'	žuvata-t'n'ə-n'.			
call-NPST.3SG.O.3SG.S	see-CAUS-PST.3PL.O.3SG.S	animal-DEF.PL-GEN			

'His$_i$ dog that every owner$_i$ calls was guarding the animals.'

In (58), the head shows the case assigned in the main clause, and the sentence is judged to be ungrammatical due to the inability to bind a variable in the head.

(58) ***Es'$_i$** pin'ə-**c** [kona-n' **ɛr'** **azər-s'$_i$** t'er'd'-si]
self dog-3SG.POSS.SG which-GEN every owner-DEF.SG call-NPST.3SG.O.3SG.S
van-ft-əz'ən' žuvata-t'n'ə-n'.
see-CAUS-PST.3PL.O.3SG.S animal-DEF.PL-GEN
Intended: 'His$_i$ dog that every owner$_i$ calls was guarding the animals.'

Thus, the data in which the reflexive pronoun plays the role of a bound variable suggest that there is a relative CP–internal representation of the head noun for relatives with ICA, but not for regular externally-headed relatives. I will next turn to cases where personal pronouns are used as variables and show that the empirical picture is different.

Example (59) illustrates a simple case where the third person pronoun is bound by the QNP. The QNP does not c-command the pronoun but is embedded in the noun phrase that does. This additional embedding is needed because the reflexive would be used if the QNP were not further embedded but directly c-commanded the pronoun.

(59) **[Ɛr'** **s'ora-n'ɛ-t'$_j$** s'estra-c] s'ɛv-əz'ə
every boy-DIM-DEF.SG.GEN sister-3SG.POSS.SG take-PST.3SG.O.3SG.S
son'$_{i/j}$ kruška-nc.
PRON.3SG.GEN cup-3SG.POSS.SG.GEN
'Every boy's$_j$ sister took his$_{i/j}$ cup.'

The pronoun can also be used if a QNP c-commands the pronoun but is not in the local binding domain, as, for instance, in (60), where the variable is embedded in the lower clause (repeated from section 3.3.2).

(60) **Ɛr'** **s'ora-n'ɛ-s'$_{j}$** soda-si [što **son'$_{i/j}$**
every boy-DIM-DEF.SG know-NPST.3SG.O.3SG.S that PRON.3SG.GEN
d'ɛd'a-c kurək sa-j].
mother-3SG.POSS.SG soon come-NPST.3[SG]
'Every boy$_{j}$ knows that his$_{i/j}$ mother will come soon.'

At the same time, there are cases where binding of the third person pronoun is not possible from a non-c-commanding position; see (61).

(61) **Son'$_{i/*j}$** kn'iga-c ašč-i **ɛr'** **s'ora-n'ɛ-t'$_{j}$**
PRON.3SG.GEN book-3SG.POSS.SG be-NPST.3[SG] every boy-DIM-DEF.SG.GEN
komnata-sə-nzə.
book-IN-3SG.POSS
'His$_{i/*j}$ book is in every boy's$_{j}$ room.'

Let us now test variable binding of personal pronouns in relative clauses. Example (62) contains a relative clause with the internal case. It shows that a pronoun in the head can be bound by a QNP in the relative CP. The QNP in this example is embedded in the noun phrase that occupies the subject position, and the relativized position corresponds to the direct object position.

(62) NOM ← GEN
Son'$_{i/j}$ kel'gəma igruška-**nc** [kona-n' **[ɛr'**
PRON.3SG.GEN favorite toy-3SG.POSS.SG.GEN which-GEN every
s'ora-n'ɛ-t'$_{j}$ d'ɛd'a-c] kand-əz'ə __ bal'n'ica-s]
boy-DIM-DEF.SG.GEN mother-3SG.POSS.SG bring-PST.3SG.O.3SG.S hospital-ILL
l'ezd-i af pel'ə-m-s vrač-də.
help-NPST.3[SG] NEG fear-INF-ILL doctor-ABL
'His$_{i/j}$ favorite toy that every boy's$_{j}$ mother brought to the hospital helps him not to be afraid of doctors.'

Example (63) presents a relative clause with the external case. The bound-variable interpretation is judged to be grammatical here as well.

(63) **Son'$_{i/j}$** kel'gəma igruška-**c** [kona-n' **[ɛr'**
PRON.3SG.GEN favorite toy-3SG.POSS.SG[NOM] which-GEN every
s'ora-n'ɛ-t'$_j$ d'ɛd'a-c] kand-əz'ə __ bal'n'ica-s]
boy-DIM-DEF.SG.GEN mother-3SG.POSS.SG bring-PST.3SG.O.3SG.S hospital-ILL
l'ezd-i af pel'ə-m-s vrač-də.
help-NPST.3[SG] NEG fear-INF-ILL doctor-ABL
'His$_{i/j}$ favorite toy that every boy's$_j$ mother brought to the hospital helps him not to be afraid of doctors.'

Thus, the pronoun in the head can co-vary with a QNP in the relative CP independently of the case marking on the head noun. This result differs from the pattern we have seen so far in that there is no correlation between case and connectivity. If the assumption that the head noun must be in the relativized position for variable binding to apply is correct, these data indicate that heads with both internal and external case must be present in the gap position. This contradicts the earlier conclusion that only heads with internal case, but not external case, are present in the relative CP. This earlier conclusion was based on the interpretation of idioms and the binding of reflexives. In an attempt to reconcile idioms and reflexives with the data on pronominal binding, I will now explore whether the position inside the relative CP is indeed crucial for the bound-variable interpretation. If the position of the head in the relative CP indeed determines the possibility of variable binding into the head, we expect a bound-variable interpretation to be ungrammatical if the positions of the QNP and the variable in the relative CP are reversed. This is, however, not the case: in examples (64) and (65), the relativized position (and correspondingly the head noun) is the subject of the relative CP, while the QNP is embedded in the noun phrase that is lower in the relative CP. Nevertheless, a bound-variable interpretation is grammatical in both examples. The head noun is marked with the internal case in (64).

(64) GEN ← NOM
Son'$_{i/j}$ kel'gəma igruška-**c** [kona __ ašč-i
PRON.3SG.GEN favorite toy-3SG.POSS.SG[NOM] which[NOM] be-NPST.3[SG]
ɛr' **s'ora-n'ɛ-t'$_j$** komnata-sə] vrač-t ur'ada-z'.
every boy-DIM-DEF.SG.GEN room-IN doctor-PL take.away-PST.3.O.3PL.S
'Doctors took away his$_{i/j}$ favorite toy that is in every boy's$_j$ room.'

Example (65) illustrates a relative clause with external case marking.

(65) **Son'$_{i/j}$** kel'gəma igruška-**nc** [kona __ ašč-i
PRON.3SG.GEN favorite toy-3SG.POSS.SG.GEN which[NOM] be-NPST.3[SG]
ɛr' s'ora-n'ɛ-t'$_j$ komnata-sə] vrač-t ur'ada-z'.
every boy-DIM-DEF.SG.GEN room-IN doctor-PL take.away-PST.3.O.3PL.S
'Doctors took away his$_{i/j}$ favorite toy that is in every boy's$_j$ room.'

To sum up, variable binding into the head of the relative clause shows a twofold result. If the reflexive is used, the bound-variable interpretation is grammatical for relative clauses with internal case, but not with external case. If a personal pronoun is used, the bound interpretation is possible for both relatives with internal and external case. It is, however, also possible if the gap (and, thus, the bound pronoun in the relative CP) is structurally higher than the QNP. This shows that quantifier binding of reflexives and personal pronouns differs (cf. Baltin, Déchaine, & Wiltschko 2015, Déchaine & Wiltschko 2017): reflexives are subject to syntactic constraints, most notably c-command by the binder (the QNP in this case), while personal pronouns are not. I suggest that the bound-variable interpretation of reflexives reliably diagnoses the position of the head noun in the relative CP, but the state of affairs differs for personal pronouns. Since the bound interpretation does not depend on the respective positions of the gap and a QNP in the relative CP, the presence of the head noun in the gap position is not expected to facilitate binding of the pronoun. Pronominal binding into heads with external and internal case therefore does not show that heads with either case are present in the relative CP. I conclude that pronominal binding, as it stands, does not constitute a good test for the first-merge position of the head noun (see Salzmann 2018 for the same conclusion).

A remaining challenge now is to reconcile these findings with the data in (61) (repeated in (66)) showing that the bound-variable interpretation is ungrammatical if a pronoun c-commands a quantified noun phrase, as well as with the data from section 3.3.2, where I use variable binding as a diagnostic for the base position of the whole relative clause (see (67)). These data show that a quantifier in the main clause can bind a variable in relatives with external or internal case, but not in correlatives. I take these examples to show that relatives with internal and external case are base-merged in the argument position, while correlatives are base-merged at the left periphery of the main clause.

(66) **Son'$_{i/*j}$** kn'iga-c ašč-i **ɛr' s'ora-n'ɛ-t'$_j$**
PRON.3SG.GEN book-3SG.POSS.SG be-NPST.3[SG] every boy-DIM-DEF.SG.GEN
komnata-sə-nzə.
book-IN-3SG.POSS
'His$_{i/*j}$ book is in every boy's$_j$ room.'

(67) a. GEN ← DAT

[Pinʹə-**tʹi** kona-nʹdʹi **son$_{i}$** maks-əzʹə
dog-DEF.SG.DAT which-DAT PRON.3SG give-PST.3SG.O.3SG.S
jaʒcambɛlʹ-tʹ] **ɛrʹ** **sʹora-nʹɛ-sʹ$_{i}$** mɛlʹaft-əzʹə.
food-DEF.SG.GEN every boy-DIM-DEF.SG remember-PST.3SG.O.3SG.S
'Every boy$_{i}$ remembered the dog that he$_{i}$ gave food to.'

b. [Pinʹə-tʹ kona-nʹdʹi **son$_{i}$** maks-əzʹə
dog-DEF.SG.GEN which-DAT PRON.3SG give-PST.3SG.O.3SG.S
jaʒcambɛlʹ-tʹ] **ɛrʹ** **sʹora-nʹɛ-sʹ$_{i}$** mɛlʹaft-əzʹə.
food-DEF.SG.GEN every boy-DIM-DEF.SG remember-PST.3SG.O.3SG.S
'Every boy$_{i}$ remembered the dog that he$_{i}$ gave food to.'

c. [Kona pinʹə-tʹi **son$_{j/*i}$** maks-əzʹə jaʒcambɛlʹ-tʹ]
which dog-DEF.SG.DAT PRON.3SG give-PST.3SG.O.3SG.S food-DEF.SG.GEN
ɛrʹ **sʹora-nʹɛ-sʹ$_{i}$** mɛlʹaft-əzʹə.
every boy-DIM-DEF.SG remember-PST.3SG.O.3SG.S
'Every boy$_{i}$ remembered the dog that he$_{j/*i}$ gave food to.'

The results in this section, on the one hand, question the legitimacy of using pronominal binding as a diagnostic for the syntactic position in the previous chapter. On the other hand, pronominal binding in the previous chapter shows the same result as other diagnostics: the use of the correlate, extractions out of islands, anaphor binding, and coordination with a case-marked noun phrase. Together with the judgments in (66), this suggests that pronominal binding nevertheless reflects syntactic structure to some extent. The attested differences in pronominal binding here and in 3.3.2 require further research on the distribution of bound pronouns, the role of c-command, and restrictions on E-type interpretation in Moksha as well as cross-linguistically. I will not undertake this task for now.

4.3.4 Crossover effects

4.3.4.1 Overview

This diagnostic also involves variable binding but differs from the previous one in that the head of the relative clause contains a quantifier, while the variable is inside the relative CP. Safir (1999) observed that in English a pronoun in the relative CP can co-vary with a QNP inside the head noun if the relativized position c-commands the pronoun in the relative CP. The bound-variable interpretation is ungrammatical if

the gap position does not c-command the pronoun but the pronoun or a noun phrase containing it c-commands the gap position instead. The contrast is illustrated in (68) and (69).

(68) a. *Pictures of **anyone$_i$** [which **he$_i$** displays prominently __] are likely to be attractive ones.

b. Pictures of **anyone$_i$** [which __ put **him$_i$** in a good light] are likely to be attractive ones.

(69) a. *?Pictures of **anyone$_i$** [that **his$_i$** agent likes __] are likely to be attractive.

b. Pictures of **anyone$_i$** [that __ please **his$_i$** agent] are likely to be attractive. (Safir 1999: 611)

In all four sentences above, the head of the relative clause contains the quantifier and c-commands the pronoun that this quantifier intends to bind. The bound-variable interpretation is, however, allowed only in (68b) and (69b). In these examples, but not in (68a) and (69a), the gap inside the relative CP c-commands the variable. If the head noun is first merged in the gap position and moves to its surface position from there, the contrast between the [a] and [b] examples is due to a crossover effect (see Postal 1971 and Wasow 1972). Example (68a) shows the secondary strong crossover effect, and (69a) shows the secondary weak crossover effect. In the latter case, the pronoun does not directly c-command the gap position; it is embedded in the noun phrase that does.

Since crossover effects essentially present an additional restriction on a co-construal between a QNP and a variable, their analysis depends on how variable binding is derived. As discussed in the previous section, some approaches to variable binding rely on syntactic structure and c-command, while others derive the data without an appeal to such notions. Under approaches of the first type, crossover effects can be informally described as a prohibition on the movement of a quantified antecedent over a variable bound by it. This applies to the examples in (68) and (69) if the head of the relative clause is merged inside the relative CP in the relativized position and moves to the position where it is realized. The examples in (68b) and (69b) are grammatical because the noun phrase containing the quantifier c-commands the pronoun both before and after movement. In (68a) and (69a), the quantifier moves across the variable that it intends to bind, and this leads to ungrammaticality.

Note that specific analyses subsumed under this type of approach can vary significantly. For instance, crossover effects can be derived by a representational constraint on the respective positions of variables and their binders (Safir 2004, 2019)

or follow from the inability of the quantifier to bind a variable in its displaced position, which in turn can be due to a mismatch in semantic types or to the required interpretation of a moved phrase in its launching site (Sauerland 1998, Van Urk 2015, Keine 2016, and Keine & Poole 2018). Importantly, for any of these analyses to be applicable to the relative clause data in (68) and (69), the head of the relative clause must originate inside the relative CP. The data thus argue for a relative CP-internal position of the head noun.

The situation is different under approaches that derive variable binding without an appeal to c-command. Such approaches model crossover effects in different ways. For instance, Jacobson (1999) simply includes in the model a rule that produces the effect of binding a pronoun by a higher argument slot, but not by a lower one. Shan & Barker (2006) and Barker (2018), on the other hand, complicate syntactic categories so that a binder of a pronoun can be only to its left. These approaches do not require postulating syntactic movement in order to account for crossover effects and therefore can model the contrast between (68) and (69) without the head of the relative clause being merged inside the relative CP. Crossover phenomena therefore do not argue for a relative CP-internal position of the head noun.

Before closing this section, it should be noted that the original argument presented by Safir (1999) is further complicated by the difference between complements and adjuncts. While complements give rise to the contrast illustrated in (68) and (69), binding of a variable turns out to be possible independently of the respective positions of the gap and the variable inside the relative clause if the quantifier is within an adjunct; see (70) and (71).

(70) a. Pictures on **anyone's$_i$** shelf [which **he$_i$** displays prominently __] are likely to be attractive ones.

b. Pictures on **anyone's$_i$** shelf [which __ put **him$_i$** in a good light] are likely to be attractive ones.

(71) a. Pictures on **anyone's$_i$** shelf [that **his$_i$** agent likes __] are likely to be attractive.

b. Pictures on **anyone's$_i$** shelf [that __ please his$_i$ agent] are likely to be attractive. (Safir 1999: 612)

The data in (70) and (71) are parallel to the data in (68) and (69), with the only difference being that the quantifier is embedded in the adjunct of the head noun. The position of the gap c-commands the pronoun in examples (70b) and (71b), while the pronoun in (70a) and the noun phrase that includes the pronoun in (71a) c-command the relativized position. This, however, does not result in crossover effects, and pronominal binding is grammatical in all four examples.

Safir (1999: 602–603) proposes that these data strengthen the argument in favor of a relative CP-internal origin of the head noun, because the same asymmetry between adjuncts and complements is attested for the movement of the relative pronoun as well as for other instances of wh-movement and topicalization. He suggests accounting for these data by the late merge of adjuncts (Lebeaux 1990). This means that adjuncts, but not complements of the head noun, are merged late in the landing site, so that the quantifier never moves across the bound variable in (70) and (71). Similarly, Bhatt (2002) suggests that the asymmetry between different types of modifiers presents a significantly more serious challenge for approaches to crossover effects that do not rely on syntactic movement. In fact, however, the adjunct–argument asymmetry appears to be an additional complication for both types of approaches.

4.3.4.2 Data

In this section, I present data on crossover effects in Moksha relative clauses. I test configurations with reflexive and personal pronouns as bound variables in relative clauses with the external and internal case. Similarly to the data in the previous section, no effect is observed here.

I start with cases where an anaphor plays the role of a variable and the head of the relative clause is the QNP. Examples (72) and (73) contain relative clauses with the external case and differ in that the relativized position in the relative CP c-commands the variable in (72), but not in (73). If the head noun with the external case were first merged in the relative CP, the latter example would be expected to show a crossover effect.

(72) **ɛr'** **t'ɛd'ɛ-t'i$_i$** [kona __ kel'k-si **es'$_i$**
every mother-DEF.SG.GEN which[NOM] love-NPST.3SG.O.3SG.S self
id'-ənc] škola-n'kə l'ezd-i.
child-3SG.POSS.SG.GEN school-1PL.POSS help-NPST.3[SG]
'Our school helps every mother$_i$ who loves her$_i$ child.'

(73) **ɛr'** **t'ɛd'ɛ-s'$_i$** [kona-n' **es'$_i$** s'ora-c
every mother-DEF.SG[NOM] which-GEN self child-3SG.POSS.SG
kel'k-si __] t'ɛ-z'-i pičəd'-ə.
love-NPST.3SG.O.3SG.S PROH-OPT-NPST.3[SG] worry-CN
'Every mother$_i$ whom her$_i$ son loves is not worried.'

The data show that in these examples the reflexive can be bound by the quantified head, so that the c-command relation between the reflexive and the gap position

plays no role. This suggests that heads marked for the external case show no connectivity to the gap position.

The data in (74) and (75) illustrate that variable binding is also possible and shows no correlation with c-command in the relative CP if the head is marked for the internal case:

(74) DAT ← NOM

ɛr'	**t'ɛd'ɛ-s'$_i$**	[kona	__	kel'k-si	**es'$_i$**
every	mother-DEF.SG[NOM]	which[NOM]		love-NPST.3SG.O.3SG.S	self

id'-ənc]	škola-n'kə	l'ezd-i.
child-3SG.POSS.SG.GEN	school-1PL.POSS	help-NPST.3[SG]

'Our school helps every mother$_i$ who loves her$_i$ child.'

(75) NOM ← GEN

ɛr'	**t'ɛd'ɛ-t'$_i$**	[kona-n'	**es'$_i$**	s'ora-c	
every	mother-DEF.SG.GEN	which-GEN	self	child-3SG.POSS.SG	

kel'k-si	__]	t'ɛ-z'-i	pičəd'-ə.
love-NPST.3SG.O.3SG.S		PROH-OPT-NPST.3[SG]	worry-CN

'Every mother$_i$ whom her$_i$ son loves is not worried.'

One explanation of why crossover effects are not attested in these examples concerns the position of the quantifier. Raising and matching approaches commonly assume that elements such as quantifiers or determiners are always external to the relative CP (Kayne 1994, Bianchi 1999, Salzmann 2018, i.a.). In that case, quantifiers do not move across bound variables in the examples above, even if head nouns are merged in relative CPs.

This confound is circumvented if secondary crossover phenomena are considered; that is, if a QNP is more deeply embedded in the head noun. The QNP then does not c-command the variable. As shown in the previous section, the personal pronoun rather than the reflexive is used as the bound variable in this case:

(76)

[**ɛr'**	**s'ora-n'ɛ-t'$_i$**	s'estra-c]		sɛv-əz'ə
every	boy-DIM-DEF.SG.GEN	sister-3SG.POSS.SG		take-PST.3SG.O.3SG.S

son'$_i$	(/ *es'$_i$)	kruška-nc.	
PRON.3SG.GEN	self	cup-3SG.POSS.SG.GEN	

'Every boy$_i$'s sister took his$_i$ cup.'

Examples (77) and (78) contain relative clauses with the external case and differ in whether the relativized position c-commands the bound variable or vice versa. The

data show that in both examples the variable in the relative CP can be bound by the QNP embedded in the head.

(77) **Ɛr'** **s'ora-n'ɛ-t'$_i$** s'estra-nc [kona __
every boy-DIM-DEF.SG.GEN sister-3SG.POSS.SG.GEN which[NOM]
sɛv-əz'ə **son'$_i$** igruška-nc] učit'əl'-s'
take-PST.3SG.O3SG.S PRON.3SG.GEN toy-3SG.POSS.SG.GEN teacher-DEF.SG
kr'ikənda-z'ə.
scold-PST.3SG.O.3SG.S
'The teacher scolded every boy's$_i$ sister who took his$_i$ toy.'

(78) **Ɛr'** **s'ora-n'ɛ-t'$_i$** s'estra-c [kona-n' **son'$_i$**
every boy-DIM-DEF.SG.GEN sister-3SG.POSS.SG[NOM] which-GEN PRON.3SG.GEN
učit'əl'-c šna-z'ə __] l'ez-s' kud-ən'
teacher-3SG.POSS.SG praise-PST.3SG.O.3SG.S help-PST.3[SG] house-GEN
zadan'ija-t'.
task-DEF.SG.GEN
'Every boy's$_i$ sister whom his$_i$ teacher praised helped with the homework.'

Similarly, no crossover effect is attested when the head noun is marked with the internal case:

(79) GEN ← NOM
Ɛr' **s'ora-n'ɛ-t'$_i$** s'estra-**c** [kona __
every boy-DIM-DEF.SG.GEN sister-3SG.POSS.SG[NOM] which[NOM]
sɛv-əz'ə **son'$_i$** igruška-nc] učit'əl'-s'
take-PST.3SG.O3SG.S PRON.3SG.GEN toy-3SG.POSS.SG.GEN teacher-DEF.SG
kr'ikənda-z'ə.
scold-PST.3SG.O.3SG.S
'The teacher scolded every boy's$_i$ sister who took his$_i$ toy.'

(80) NOM ← GEN

Ɛr' **s'ora-n'ɛ-t'$_i$** s'estra-**nc** [kona-n' **son'$_i$**
every boy-DIM-DEF.SG.GEN sister-3SG.POSS.SG.GEN which-GEN PRON.3SG.GEN
učit'əl'-c šna-z'ə __] l'ez-s' kud-ən'
teacher-3SG.POSS.SG praise-PST.3SG.O.3SG.S help-PST.3[SG] house-GEN
zadan'ija-t'.
task-DEF.SG.GEN
'Every boy's$_i$ sister whom his$_i$ teacher praised helped with the homework.'

These data seem to provide more reliable evidence for the absence of crossover effects in Moksha relative clauses. One problem, however, concerns the status of nominal possessors. It might be suggested that possessors are exempt from crossover effects, analogous to adjuncts in English (see examples (70)–(71) above). The distinction between arguments and adjuncts in the nominal domain is more blurred than in the verbal domain, and simple diagnostics such as, for instance, the obligatory presence of the modifier do not apply, as nominal modifiers are always optional. All nominal modifiers were suggested to be subject to late merge by Donati & Cecchetto (2011), and if this approach is correct, QNPs in the possessor position do not have to be present in the relativized position even if the head noun is base-generated there. The data, then, again do not ensure that the quantifier obligatorily moves across the variable.

Despite the existing suggestion that all nominal modifiers are adjuncts, I next tested relative clauses where QNPs are interpreted as agents rather than as possessors of the head noun and are thus more likely to be arguments rather than adjuncts. The QNP in examples (81) and (82) is interpreted as the author of the stories, not their possessor. The pronoun c-commands the gap in the relative CP in both examples, but the bound-variable reading remains grammatical and does not depend on whether the head is marked with the external case (as in (81)) or with the internal case (as in (82)).

(81) **Ɛr'** **pisat'əl'-t'$_i$** azks-əc [kona-n' **son'$_i$**
every writer-DEF.SG.GEN story-3SG.POSS.SG[NOM] which-GEN PRON.3SG.GEN
jalga-c af kel'k-si __] ad'əla-j kal'd'əv-stə.
friend-3SG.POSS.SG NEG love-NPST.3SG.O.3SG.S end-NPST.3[SG] bad-EL
'Every writer's$_i$ story that his$_i$ friend does not like ends badly.'

(82) NOM ← GEN

Ɛr'	**pisat'əl'-t'$_i$**	azks-**ənc**	[kona-n'	**son'$_i$**	
every	writer-DEF.SG.GEN	story-3SG.POSS.SG.GEN	which-GEN	PRON.3SG.GEN	
jalga-c	af	kel'k-si	__]	ad'əla-j	kal'd'əv-stə.
friend-3SG.POSS.SG	NEG	love-NPST.3SG.O.3SG.S		end-NPST.3[SG]	bad-EL

'Every writer's$_i$ story that his$_i$ friend does not like ends badly.'

I conclude that no crossover effects are attested in Moksha relative clauses: binding of the variable in the relative CP by a QNP in the head is insensitive to the c-command relation between the gap and the variable, as well as to the case of the head noun. This conclusion converges with the result in the previous section, where it was shown that variable binding is not determined simply by c-command. At the same time, the data in this section allow for several other explanations that are compatible with c-command as a precondition for variable binding.

In particular, one reason for the observed state of affairs has already been mentioned earlier. It stems from the idea that all nominal modifiers are adjuncts and can be merged late. However, the data might also have an alternative explanation. Crossover effects are observed with movements traditionally classified as Ā-movement, but are known to be obviated by A-movement (Postal 1993, Sauerland 1998, and Büring 2004). A-moved phrases can bind variables from their landing positions, so that the presence of the c-command relation before movement turns out to be irrelevant. Moksha allows for significant variation in word order (see section 2.1 for more details). The data in (83) show some of the possible reorderings of the arguments:

(83) a. Ava-s' rama-z'ə kut-t'. (SVO)
woman-DEF.SG buy-PST.3SG.O.3SG.S house-DEF.SG.GEN

b. Ava-s' kut-t' rama-z'ə. (SOV)
woman-DEF.SG house-DEF.SG.GEN buy-PST.3SG.O.3SG.S

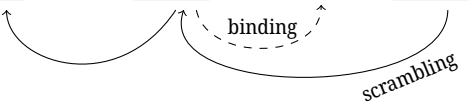
c. Kut-t' ava-s' rama-z'ə. (OSV)
house-DEF.SG.GEN woman-DEF.SG buy-PST.3SG.O.3SG.S

d. Kut-t' rama-z'ə ava-s'. (OVS)
house-DEF.SG.GEN buy-PST.3SG.O.3SG.S woman-DEF.SG

The obviation of crossover effects by some movement types, taken together with the possibility of free scrambling in Moksha, opens up the following approach to the absence of crossover effects in Moksha relative clauses: movement of the head noun to its final position can be preceded by relative-clause-internal scrambling of this

noun phrase across a variable and binding of the variable from this intermediate position (Webelhuth 1992). Such a derivation is schematized in (84).

(84) $[_{DP}\ [\ \underline{QNP_i\ \ldots}\ ]_{head}\ [_{CP}\ [\ \underline{QNP_i\ \ldots}\ ]_{head}\ \ldots\ pron_i\ \ldots\ [\ \underline{QNP_i\ \ldots}]_{head}\ ]\ ]$



This hypothesis is further supported by the fact that crossover effects in Moksha are also not attested for other movement types. For instance, the quantifier is part of the constituent that undergoes wh-movement and crosses the variable in (85) and (86), but the bound-variable interpretation is fully grammatical in both examples.

(85) **[Kodamə s'ora-n'ə-t'$_i$]** **es'$_i$** pin'ə-c susk-əz'ə __ ?
which boy-DIM-DEF.SG.GEN self dog-3SG.POSS.SG bit-PST.3SG.O.3.SG.S
'Which boy$_i$ did his$_i$ dog bite?'

(86) **[Ɛr' pisat'əl'-t'$_i$** kodamə azks-ənc] **son'$_i$**
every writer-DEF.SG.GEN which story-3SG.POSS.SG.GEN PRON.3SG.GEN
jalga-c af kel'k-si __ ?
friend-3SG.POSS.SG NEG love-NPST.3SG.O.3SG.S
'Which story by every writer$_i$ his$_i$ friend does not like?'

To sum up, I have shown that crossover effects in Moksha show no correlation with the case of the head noun or the structural position of the relativized constituent in the relative CP. I have suggested that this state of affairs is expected given the general possibility of scrambling in Moksha, so that Ā-movement might be preceded by A-movement and variable binding may apply from the intermediate scrambling position. Note, though, that deriving the secondary crossover data under this account still requires binding from an almost c-commanding position; see the discussion in the previous subsection.

4.3.5 Condition C

4.3.5.1 Overview

The next diagnostic comes from Condition C. Chomsky (1981) defines it as a requirement for R-expressions to be free, where an R-expression is free if it is not bound by a coindexed syntactic object. Condition C successfully excludes coreference between a full noun phrase and a personal pronoun that c-commands it, as in (87).

(87) a. *He$_i$ admires John$_i$.

b. *She$_j$ thinks that Mary$_j$ lost her job.

The standard version of Condition C was argued to account for the core data but to leave a number of exceptions. It was shown to be more restrictive than required empirically, because it excludes examples such as (88a-b). In both sentences, a noun phrase corefers with a c-commanding pronoun.

(88) a. (Who is this man over there?) He$_i$ is Colonel Weisskopf$_i$. (Grodzinsky & Reinhart 1993: 78)

b. Everyone has finally realized that Oscar is incompetent. Even he$_i$ has finally realized that Oscar$_i$ is incompetent. (Evans 1980: 52)

Various amendments and changes to the original Condition C have been proposed to accommodate the full empirical picture. First, Heim (1982, 1998) makes a distinction between coindexation and coreference and suggests that a full noun phrase can be coreferent with, but not coindexed with, a c-commanding syntactic object. Coreference without coindexation is in turn possible if discourse provides different perspectives on an individual; that is, if it comes in different *guises* in Heim's terminology.

Second, Reinhart (1983) and Grodzinsky & Reinhart (1993) develop a competition-based approach according to which, all else being equal, a syntactic object c-commanded by its binder must be realized as a variable rather than as an R-expression, but a full noun phrase is also allowed if its use leads to differences in interpretation.

Third, Safir (2004) postulates that the use of R-expressions is not prohibited, but merely unexpected, which leaves space for pragmatic factors influencing the grammaticality of full noun phrases in certain positions.

Finally, most recently, on the basis of experimental studies, Gor (2020) suggests that Condition C is not an inviolable grammatical principle but one of the factors that, together with, for instance, salience, determines the distribution of R-expressions.

These complications notwithstanding, Condition C seems to correctly derive at least a sizable portion of the data and is commonly used as a connectivity diagnostic. It differs from the diagnostics discussed so far (potentially with the exception of crossover effects) in that it is prohibitive. While idiom, anaphors, and variable-binding require a noun phrase to be present in a certain position for the process to apply and for the sentence to have the intended meaning, Condition C requires the absence of the noun phrase from a given position in order for coreference between this noun phrase and a pronoun to be possible.

For instance, structure (89) illustrates a testing configuration for relative clauses. Here, the relative CP contains the third-person pronoun in a position c-commanding the gap position, and the head noun contains a further noun phrase that can potentially corefer with this pronoun. In the simplest case, the ban on coreference between the pronoun in the relative CP and this noun phrase indicates that the head noun was present in the relativized position and that coreference therefore leads to a Condition C violation. If the pronoun and the noun phrase can refer to the same individual, then the head noun should not be represented inside the relative CP.

(89) $[_{DP}\ [_{head}\ \ldots\ \text{noun.phrase}_{\mathbf{i}}\ \ldots\ ]\ [_{CP}\ \ldots\ C_{rel}\ \ldots\ \text{pronoun}_{\mathbf{i}}\ \ldots\ \_\_{\text{relativized.position}}\ ]\ ]$

The prohibitive nature of the diagnostic introduces an additional level of complexity: the ban might not apply throughout the derivation, but only at some of its stages. In particular, Condition C is often taken to be evaluated only at LF (Chomsky 1995b). This breaks down the implicational relation between a Condition C violation and the presence of a noun phrase in a given position and allows movements that are not interpreted in the base position to obviate Condition C. Furthermore, evaluation at LF is not the only way to force some syntactic objects to obey Condition C while allowing others to obviate it. Wholesale late merger (Takahashi & Hulsey 2009) allows syntactic objects that are not supposed to be evaluated with respect to Condition C to be introduced into the structure later in the derivation. In that case, Condition C may also apply in syntax and lead to the same selective behavior. It has been argued that A-movement, as well as some parts of Ā-moved phrases, display no connectivity with respect to Condition C (Van Riemsdijk & Williams 1981, Lebeaux 1988, 1990, 1998, Fox 1999, Safir 1999, and Takahashi & Hulsey 2009). Finally, note that competition-based approaches (cf. Reinhart 1983) also allow Condition C effects to be derived without appeal to its application at LF (and LF itself; see Cecchetto 2001, Sternefeld 2001). Krifka (2018) has recently argued that such approaches can be developed to capture at least some of the aforementioned obviations by assuming that syntactic binding is unavailable, or at least less likely, in some configurations.

Condition C connectivity has been the subject of a number of experimental studies, and some of them report an empirical picture different from the one established in the classical literature. Bruening & Al Khalaf (2019) carried out an experiment in English and found no effects of Condition C connectivity for arguments or adjuncts of a displaced noun, but observed a strong effect with complements of prepositions, adjectives, and verbs. Adger et al. (2017) also report Condition C effects with adjectival predicates (except for their CP complements), but claim that in NPs Condition C connectivity is observed only after local movement. Stockwell, Meltzer-Asscher, & Sportiche (2021), on the contrary, report Condition C connectivity in NPs. They claim

that the effects somewhat deteriorate at longer distances but still remain very clear. Stockwell, Meltzer-Asscher, & Sportiche (2022) further observe the contrast between nominal adjuncts and arguments. Finally, Wierzba et al. (2020) conducted similar experiments for German and report clear evidence for Condition C connectivity in both APs and NPs for arguments as well as for adjuncts. They, however, also note the influence of distance, in that coreference is more acceptable if movement proceeds over a clause boundary.

For relative clauses, the empirical picture is also not completely clear. Some studies claim that a head noun shows Condition C connectivity. For instance, Schachter (1973) judges the coreference between *John* in the head of the relative clause and the personal pronoun in the relative CP in (90) to be ungrammatical; for similar judgments see also De Vries (2002: 82), as well as, to some extent, Bianchi (1999) and Bhatt (2002).

(90) *The portrait of **John$_i$** [that **he$_i$** painted __] is extremely flattering. (Schachter 1973: 32)

At the same time, by now it seems to be a near consensus that there is no connectivity with respect to Condition C in relative clauses (Safir 1999, Sauerland 1998, 2003, Munn 1994, Cresti 2000, Citko 2001, Heck 2005, Salzmann 2006, 2017, 2018, and Sportiche 2017). In examples (91) and (92), the pronoun in the relative CP c-commands the relativized position, but coreference between the proper name contained in the head and this pronoun is judged to be grammatical.

(91) A picture of **John$_i$** [which **he$_i$** was very proud of __] was recently stolen. (Safir 1999: 614)

(92) The picture of **Bill$_i$** [that **he$_i$** likes __] (Munn 1994: 204)

If relative clause heads indeed do not show connectivity with respect to Condition C, the empirical picture turns out to be different from the one reported for other connectivity effects that, unlike Condition C, indicate the presence of the head noun inside the relative CP.

One way to account for this difference is to deduce it from the peculiarities of Condition C. As mentioned above, movement can obviate Condition C violations in various cases, and the absence of Condition C connectivity in relative clauses might be one such case. This idea is pursued by Safir (1999) and Sportiche (2017). Safir (1999) suggests that Ā-chains can be subject to vehicle change (Fiengo & May 1994); that is, full noun phrases in lower copies can be interpreted as pronouns and therefore be exempt from Condition C. In the same vein, Sportiche (2017) suggests

that parts of copies can be neglected in some of their occurrences as long as they are interpreted in one of their positions. As a result, both approaches allow the head of the relative clause to be present inside the relative CP despite the absence of Condition C connectivity, and the sentences can be derived by the raising structure.

The data in (93) and (94) suggest that this solution remains problematic, because there is a contrast in Condition C connectivity between wh-movement (that is, a standard case of Ā-movement) and the head of the relative clause, which is assumed to first move to the left periphery together with a wh-word or an operator.

(93) a. Which is the picture of **John$_i$** [that **he$_i$** likes __]?

b. *[Which picture of **John$_i$**] does **he$_i$** like __ ? (Sauerland 1998: 62)

(94) a. The pictures of **Marsden$_i$** [which **he$_i$** displays prominently __] are generally the attractive ones.

b. *[Which pictures of **Marsden$_i$**] does **he$_i$** display prominently __ ? (Sauerland 1998: 62)

The absence of Condition C connectivity has had a major impact on approaches to relative clauses and constitutes a core argument for the matching derivation. Under the matching derivation, the head of the relative clause is present inside the relative CP, and there is another instance of the head that is first merged in the main clause and not connected to the internal head by movement. This allows the absence of Condition C effects to be accounted for in a number of ways. Munn (1994) and Citko (2001) suggest that the internal head can be freely deleted at LF due to its identity with the external head. This deletion ensures that there is no violation of Condition C, which, as they assume, applies only at LF. Sauerland (1998, 2003), Cresti (2000), and Salzmann (2006, 2017, 2018) also capitalize on the deletion of the internal head. As a rule, the relative-clause-external instance of the head noun is realized at PF and the internal head is deleted. The exact nature of this deletion is not fully clear, but the process seems to be akin to ellipsis and thus, unlike a movement chain, constitutes a standard environment for vehicle change (Fiengo & May 1994). The internal head is assumed to differ from the external one in that the former contains a pronoun instead of a full noun phrase and therefore cannot incur a violation of Condition C.

Accounts of anti-connectivity via matching further raise the question of whether a single derivation is sufficient to derive the full range of data. Sauerland (1998, 2003) suggest that at least two derivations of relative clauses coexist in a language: raising is necessary to derive connectivity, and matching is responsible for anti-connectivity. This point of view is supported by the re-emergence of Condition C effects if the head is required inside the relative CP for other processes. Examples

(95a) and (95b) constitute a minimal pair and differ in that the predicate of the relative clause in (95b), but not in (95a), forms an idiomatic expression with the head. This forces connectivity with respect to Condition C and renders coindexing between the NP in the head and the pronoun in the CP ungrammatical. Such coreference, however, remains possible in (95a), where the head is not required in the relative CP for the interpretation of the idiom. Similarly, example (96) contains an idiomatic expression in the relative CP and is claimed to be ungrammatical due to a violation of Condition C.

(95) a. the picture of **Bill$_i$** [that **he$_i$** likes]

b. *the *picture* of **Bill$_i$** [that **he$_i$** *took*] (Munn 1994: 402)

(96) *The *headway* on **Mary$_i$**'s project [**she$_i$** had *made*] pleased the boss. (Sauerland 1998: 71)

This provides an argument in favor of the coexistence of two derivations only under the version of the matching derivation that requires full interpretation of both heads and thus cannot account for binding and idiomatic interpretation of the head noun inside the relative CP. Then raising is enforced for cases where the head noun shows connectivity with respect to a position inside the relative clause and, consequently, Condition C effects emerge as well. This argument does not hold under the version of the matching analysis developed by Munn (1994) or Citko (2001), which allows the external or the internal instance of the head to be freely deleted to derive connectivity or anti-connectivity, respectively. The re-emergence of Condition C then naturally follows from the requirement to preserve the internal head if it is required for idiom interpretation or binding.

The reappearance of Condition C once the head is independently needed in the relative clause is problematic for those implementations of raising-only and matching-only approaches that rely on vehicle change to account for Condition C obviation. The proponents of these approaches question the reality of the correlation. For instance, Salzmann (2017, 2018) suggests that the ungrammaticality of examples such as (95b) and (96) has a different source. In particular, (96) is ruled out because *headway on Mary's project* is not a legitimate constituent. Heck (2005) also reports an absence of Condition C effects in German even when the head noun shows connectivity with respect to binding or idiom interpretation.

I turn to Condition C in Moksha and its correlation with the case on the head noun in the next section.

4.3.5.2 Data

The goal of this section is to explore how Moksha relative clauses with the external and the internal case behave with respect to Condition C. I first set the stage by examining simpler applications of Condition C and its interaction with movement. The sentences in (97) and (98) show basic cases where a full noun phrase cannot refer to the same individual as the pronoun c-commanding it.

(97) Katʲɛ mɛrʲg-sʲ što **son$_{j/*i}$** nʲɛj-əzʲə **Anna-nʲ$_{i}$**
Katja say-PST.3[SG] that PRON.3SG see-PST.3SG.O.3SG.S Anna-GEN
fətəgrafija-nc.
photo-3SG.POSS.SG.GEN
'Katja said that she saw Anna's photo.'

(98) **Son$_{j/*i}$** sʲormad-əzʲə **Puškin-ənʲ$_{i}$** azks-ənc.
PRON.3SG write-PST.3SG.O.3SG.S Pushkin-GEN story-3SG.POSS.SG.GEN
'He wrote Pushkin's story.'

Examples (99) and (100) introduce movement into the picture. They show that CP-internal wh-movement does not obviate the violation of Condition C: the pronoun cannot be coindexed with the noun phrase that it c-commands in the base-merge structure even after the noun phrase has moved to a position where the pronoun no longer c-commands it.

(99) Katʲɛ az-ənd-əzʲə [kodamə **Anna-nʲ$_{j}$** fətəgrafija-nc]
Katja tell-FREQ-PST.3SG.O.3SG.S which Anna-GEN photo-3SG.POSS.SG.GEN
son$_{i/*j}$ nʲɛj-əzʲə __ .
PRON.3SG see-PST.3SG.O.3SG.S
'Katja said which photo of Anna she saw.'

(100) [Kodamə **Pušnik-ənʲ$_{j}$** azks-ənc] **son$_{i/*j}$** sʲormad-əzʲə __ ?
which Pushkin-GEN story-3SG.POSS.SG.GEN PRON.3SG write-PST.3SG.O.3SG.S
'Which story of Pushkin did he write?'

Since the movement of the relative clause head crosses a clause boundary, and some experimental studies discussed in the previous subsection report a fading of Condition C effects upon long-distance movement, I next tested whether Condition C effects persist in Moksha if movement proceeds out of an embedded CP. The data

are controversial and show that cross-clausal movement sometimes repairs a violation of Condition C, but not always. For instance, in (101), some speakers allow the personal pronoun in the subject position of the embedded clause to be coindexed with the proper name *Pushkin*, which moves to the matrix clause as part of the wh-phrase.[6]

(101) [Kodamə **Puškin-ən'$_{j}$** kn'iga-nc] ton soda-sak
which Pushkin-GEN book-3SG.POSS.SG.GEN you know-NPST.3SG.O.2SG.S
što **son$_{i/\%j}$** s'ormad-əz'ə __ dača-sə?
that PRON.3SG write-PST.3SG.O.3SG.S country.house-IN
'Which book of Pushkin you know that he wrote at the country house?'

Judgments are different for the sentence in (102). Here, coreference between the pronoun in the embedded clause and the proper name *Anna*, moved to the higher clause as part of the wh-phrase, is ungrammatical.

(102) Kat'ɛ az-ənd-əz'ə [kodamə **Anna-n'$_{j}$** fətəgrafija-nc]
Katja tell-FREQ-PST.3SG.O.3SG.S which Anna-GEN photo-3SG.POSS.SG.GEN
Miša ar's'-i što **son$_{i/*j}$** n'ɛj-əz'ə __?
Misha think-NPST.3[SG] that PRON.3SG see-PST.3SG.O.3SG.S
Intended: 'Katja said which photo of Anna Misha thinks she saw.'

It is not completely clear what underlies the difference between the judgments on the two examples. One option is that the interpretation with coreference is more salient in example (101), where the proper name refers to the famous Russian writer Pushkin and the pronoun in the relative clause is the subject of the verb 'to write'. In (102), on the other hand, there are no initial expectations as to whether it was Anna or someone else who saw the photo. If so, this suggests that there are further pragmatic factors that influence coreference between a pronoun and a noun phrase after the noun phrase has moved away (cf. Gor 2020). This, however, remains a topic for further research. For now, the conclusion is that violations of Condition C persist

6 Note that the matrix predicate shows object agreement in example (101). This might be viewed as an indication that the wh-phrase is base-merged in the main clause and that we are dealing with the so-called prolepsis construction here. Such an interpretation of the data is untenable: First, factive predicates in Moksha, as a rule, show object agreement with a finite clause in their argument position (Egorova 2018). Second, proleptic objects are usually marked by a postposition and trigger no object agreement.

at least in some cases of long-distance movement, and with this conclusion in hand I now turn to the relative clause data.

The data show a correlation between Condition C connectivity and the case marking on the head noun. Relative clauses where the head is marked with the external case show no connectivity with respect to Condition C; see (103). In this example, the full noun phrase in the head noun can corefer with the pronoun that c-commands the gap in the relative CP.

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

Example (104) constitutes a minimal pair with (103) and differs only in the case marking of the head, which shows the internal case here. Coreference between the proper name in the head and the pronoun in the relative CP is not allowed.

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

Note that in these examples the proper name in the head is the writer *Pushkin*, and the pronoun is again the subject of the verb 'to write'. The same effect is, however, also attested in neutral contexts: example (105) shows a relative clause with the external case, and coreference between the proper name in the head and the pronoun is grammatical.

(105) **Anna-n'$_{j}$** jalga-nc [kona-n'd'i **son$_{i/j}$** kunarə af
Anna-GEN friend-3SG.POSS.SG.GEN which-DAT PRON.3SG long.ago NEG
zvon'-c'-i __] mon vas'ft-in'ə.
call-FREQ-NPST.3[SG] I meet-PST.3.O.1SG.S
'I met Anna's friend who she had not called for a while.'

Example (106) illustrates a relative clause with the internal case marking and shows that coreference between the proper name and the pronoun is ungrammatical.

(106) GEN ← DAT
Anna-n'$_{j}$ jalga-**ncti** [kona-n'd'i **son$_{i/*j}$** kunarə af
Anna-GEN friend-3SG.POSS.SG.DAT which-DAT PRON.3SG long.ago NEG
zvon'-c'-i __] mon vas'ft-in'ə.
call-FREQ-NPST.3[SG] I meet-PST.3.O.1SG.S
'I met Anna's friend who she had not called for a while.'

To sum up, the data show a dependency between the case marking on the head and connectivity with respect to Condition C. In particular, heads with the internal case cannot corefer with a pronoun inside the relative CP, while heads with the external case can. This difference between heads with the external and the internal case follows if heads with the internal case originate in the relative CP and are therefore evaluated there for Condition C. Heads with the external case are never present in the relative CP and are not c-commanded by the pronoun, so that coreference with the pronoun is possible and not regulated by Condition C. Under this analysis, the data on Condition C converge with the evidence from idiom interpretation and the binding of reflexives presented earlier in this chapter.

Alternatively, one might suggest that the differences in Condition C do not follow from differences in the first merge position of heads with the external and the internal case, but are instead derived from the distance at which a head moves away from its base position. On this view, both types of heads are first merged in the relative CP, but differ in that heads with the external case move out of the relative CP, while heads with the internal case remain in Spec,CP (cf. Sportiche 2017). This approach is, however, problematic, because outside of relative clauses the effect of distance in Moksha is attested only in a restricted number of cases (presumably only when the coreferential interpretation is more natural) and has been reported only by some speakers. The effects in relative clauses, on the contrary, were shown to be independent of the broader context. More importantly, such an approach would go against the conclusion in the previous Chapter 3 that relatives with ICA are

externally-headed and that heads with the internal case occupy regular argument positions in the main clause.

4.4 Raising and head-external derivations

4.4.1 Data summary and proposal

In this chapter, I have applied connectivity diagnostics to relative clauses in Moksha. The data are summarized in Table 4.1 and the results are as follows. First, idioms and the binding of reflexives indicate that only heads with the internal case participate in these processes inside the relative CP; heads with the external case do not. Second, the data on Condition C further show that heads with the internal case must be present inside the relative CP. Third, idioms in the main clause show that there are processes in the main clause in which only heads with the external case can participate. Idioms and anaphor binding differ in this respect in that anaphor binding in the main clause is also possible for heads independently of the case marking on the head, while only heads with the external case can form an idiom with the main-clause material. I suggest that this difference between idiom interpretation and anaphor binding arises because idiom interpretation is determined by the base structure, while anaphor binding can apply at later stages of the derivation as well. Fourth, variable binding and crossover effects show no dependency on the case marking of the head noun.

Tab. 4.1: 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. Variable binding in the relative clause: Reflexive	OK	*
6. Variable binding in the relative clause: Personal pronoun	OK	OK
7. Crossover (reflexive, personal pronoun)	OK	OK
8. Condition C in the relative clause	*	OK

These data have implications for the status of the employed connectivity effects and for the syntax of relativization. Starting with the former, we see that idioms, the binding of reflexives (by simple or quantified noun phrases), and Condition C depend on the case marking of the head. I take this as evidence that these phenomena

reliably diagnose syntactic structure in general and the structure of relative clauses in particular, contrary to some recent suggestions; see Webelhuth et al. (2018) on idioms, Donati & Cecchetto (2011) on anaphor binding, and Krifka (2018) on Condition C. Anaphor binding in the main clause, variable binding of personal pronouns, and crossover effects show no correlation with the case marking on the head noun. This result is expected for anaphor binding, as it is commonly assumed to apply throughout the derivation (Barss 1986, 2001), but it is surprising for pronominal binding and crossover effects. This leads to the conclusion that neither pronominal binding nor crossover constitutes a good argument for the structure of relative clauses (see also Salzmann 2017), at least for now, when the conditions on pronominal binding are not completely understood and potential intervening factors cannot be fully excluded. Note also that there are further widely assumed tests for relative clause structure that I did not apply here. For instance, at the moment there are no data on adjectival modification, which was suggested as an argument for the raising derivation by Bhatt (2002) and has been discussed ever since (Bhatt & Sharvit 2005, Heycock 2005, and Hulsey & Sauerland 2006).

Turning now to the syntax of relative clauses, the data clearly show that the properties of relative clauses with internal case marking and those with external case marking are different. Relative clauses with internal case show connectivity to a position inside the relative CP. Their heads must be merged inside the relative CP and then moved to the position where they are phonologically realized. According to the conclusion from the previous chapter, this final position must be in the main clause. Thus, I suggest that relative clauses with the internal case are derived by the raising structure.

As for relatives with the external case, one of two options can be pursued. First, on the basis of the differing syntactic properties, one might assume that relative clauses with the external case instantiate a different derivation: the head-external one. This allows the observed empirical effects to be accounted for in a more straightforward manner but requires the coexistence of two distinct derivations for relative clauses in the grammar. Second, one might suggest that despite the empirical differences, relatives with the internal and the external case, in a nutshell, represent one derivation type, but that further variations within this derivation type are possible, such as differences in the height of the head's final position or the deletion of either the external or the internal head. While the approach with one derivation type might seem conceptually more attractive, in fact, the variation within one type of derivation required to account for the clearly different properties of relative clauses might turn out to be so significant that it is not clear in what sense such an account is more parsimonious than the alternative with two derivations.

I will pursue the first approach. I suggest that the data are best analyzed as follows: relative clauses with ICA are derived by raising, while relative clauses with

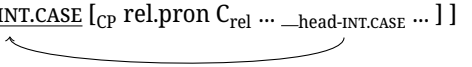
the external case are derived by the head-external derivation. I will spell out this approach in more detail and then show that the alternatives are untenable.

4.4.2 Analysis

In this section, I show how the combination of the raising derivation for relative clauses with ICA and the head-external derivation for relatives with the external case captures the full set of data presented in this chapter. Here I do not delve into the details of the raising derivation, nor do I derive further properties of relatives with the internal case discussed in Chapter 3. Instead, I turn to these topics in the next chapter, after this general account with two types of derivations for relative clauses in Moksha has been set up.

Let us start with relative clauses with ICA. I suggest that they are derived by raising, as schematized in (107). The head noun is base-generated in the argument position in the relative CP. It obligatorily receives its case marking in this position and moves to the main clause afterward.

(107) Raising derivation for relatives with internal case



The derivational path of the head noun then derives the connectivity profile of these relatives. I now go through the relevant diagnostics and spell out how this analysis captures them.

First, the base position of the head noun phrase inside the relative CP allows the head noun to participate in idioms inside the relative clause, as the requirement for idiomatic interpretation—that parts of an idiom must be first merged together (Bach 1974, Chomsky 1980: 149–153, McCawley 1998: 57, and Bruening 2020)—is fulfilled inside the relative CP. The position of the head noun in the main clause is a derived one, and consequently this condition for idiomatic interpretation is not met there, so that the head with the internal case cannot form an idiom with main-clause material.

Second, the presence of the head noun in the relativized position allows it to be locally c-commanded by higher noun phrases inside the relative CP. Assuming that c-command is required for the binding of reflexive pronouns (Chomsky 1981, 1986 and Reinhart 1983), this derives the possibility of binding into the head noun from inside the relative CP. After movement, the head noun occupies a position in the main clause and can therefore also be bound there. I assume that anaphor binding is derived via Agree in syntax (Hicks 2008, Rooryck & Vanden Wyngaerd 2011, i.a.).

Third, I assume that Condition C also 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 head nouns must be in the relative clause to receive their internal case marking, the analysis also correctly predicts that heads with the internal case are evaluated for Condition C inside relative CPs.

I now turn to relative clauses with the external case. I suggest that they are derived by the head-external analysis:

(108) 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 receive case marking inside the relative CP. It also does not participate in syntactic processes there; that is, it cannot form an idiom with relative-CP-internal material, be bound there, or be evaluated with respect to Condition C. Idiomatic interpretation in the main clause, on the other hand, is possible because the base-merge position of the head noun is in the main clause.

This analysis supports the coexistence 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.

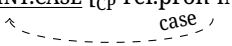
4.4.3 Alternatives

In this section, I show that other derivations, whether considered alone or in combination, do not derive the data.

4.4.3.1 Head-external only

Suppose that the head-external derivation is the single derivation available for relative clauses and that it must derive both regular externally-headed relatives and relatives with ICA in Moksha. As shown in the previous section, the head-external derivation easily accomplishes the first task, i.e., it accounts for regular externally-headed relatives. Next, as shown in section 4.2.2, the derivation can also account for the internal case marking on the head. For this, it must be assumed that former probes can act as goals, so that the head noun can simply agree in case with the relative pronoun, as in (109) (Harbert 1983, Gračanin-Yuksek 2013, and also Bader & Meng 1999, Bader & Bayer 2006, Czypionka et al. 2018)

(109) Inverse case attraction derived by agreement



The challenge is, however, to incorporate the correspondence between this agreement in case and connectivity effects. In particular, Agree with the relative pronoun must enable the interpretation of the head noun inside the relative CP. This effect clearly does not follow from the Agree operation as it stands, and to the best of my knowledge such consequences of Agree are unknown for its other applications. I therefore conclude that the head-external-only approach is not suitable for deriving relative clauses in Moksha.

4.4.3.2 Raising only

Suppose that raising is the only derivation of relative clauses. It must then derive both relative clauses with the internal and the external case, as well as the related connectivity properties.

One version of the raising-only approach was developed by Sportiche (2017). He attempts to derive the varying properties of relative clauses, e.g., in English, by manipulating the height of the final landing site of the head noun. The raising derivation then comes in two flavors: the so-called low and high promotion. Under low promotion, the head noun lands lower, inside the relative CP, and can then also be interpreted inside the relative CP, giving rise to connectivity effects. Under high promotion, the head noun moves to a higher position outside the relative CP and must also be interpreted there. Since the languages that Sportiche (2017) considers always show the external case, the analysis does not attempt to correlate low vs. high promotion with case marking and thus the analysis in its current form does not derive the Moksha data. Nevertheless, let us explore which further assumptions could allow the case marking to be incorporated.

Here is one option. Under low promotion, the head noun does not reach the case position in the main clause and therefore cannot receive external case there. Since all nouns must be case-marked, such heads must show the internal case assigned to them in the relativized position. Under high promotion, head nouns move to the case position in the main clause and receive case there. Depending on further assumptions about case marking, heads with the external case either do not receive case inside the relative CP and therefore have to move to the higher position, or they receive case in the relative CP but it is overwritten in their new position.

Under this approach, high promotion corresponds to regular externally-headed relative clauses in Moksha: heads of such relatives display the external case and cannot be reconstructed inside the relative CP. Low promotion underlies relative

clauses with ICA. Due to the low landing site of the head, it is marked with the internal case and can be interpreted inside the relative CP.

However, this analysis does not work as intended. First, it contradicts our earlier conclusion about the structure of relatives with ICA. This analysis requires that heads with the internal case remain inside the relative CP, while the main conclusion of Chapter 3 is that they move out of the relative CP. I will not reproduce the full argumentation from the previous chapter here, but, in a nutshell, I have shown there that the higher nominal projections, in particular the D head, which are in the main clause, cannot be separated by the clause boundary from the lower nominal projections, most importantly the noun itself. This means that the basic assumption of the raising-only approach—that relative clauses with ICA correspond to low promotion—is incompatible with the data.

Second, even if we ignore the conclusion of the previous chapter, the outlined approach in fact does not derive the correspondence between the height of promotion and the position where the head noun is interpreted but simply stipulates it. There is no clear reason why heads that move to a higher position cannot be interpreted inside the relative CP. This does not follow from the distance of movement per se, as long-distance movements typically show connectivity with the base-generation position.

Third, such an approach also encounters problems in accounting for individual connectivity effects. For instance, to ensure that under high promotion (that is, for heads with the external case in Moksha) anaphor binding cannot apply inside the relative CP in their base position, Sportiche (2017) assumes that all connectivity effects apply at LF only. This is at variance with the fact that the binding of an anaphor in a displaced syntactic object is typically possible in both the landing and the launching positions. Applied to Moksha, this also does not allow one to account for the fact that an anaphor in the head with the internal case can be bound in the relative CP as well as in the main clause.

To sum up, I have just argued that the existing version of the raising-only approach developed by Sportiche (2017) does not derive relative clauses in Moksha, but this does not necessarily mean that the raising-only approach is generally not viable. In the remainder of this section, I will try to envisage such an analysis.

For the raising-only approach to derive the full range of Moksha data, it must be ensured that despite the same base position and derivational path, heads of relative clauses can show connectivity with different positions, and that the relevant position is largely determined by where a head noun receives case. This dependency between case and connectivity somewhat resembles the distinction between A- and Ā-movement: A-moved noun phrases receive case in their landing position and, as a rule, are not evaluated for Condition C in their base position. They are thus similar to heads with the external case. Ā-moved noun phrases, on the contrary, receive

case in their base position and (leaving out further nuances concerning adjuncts, i.a.) are evaluated there for Condition C as well. They are akin to heads with the internal case. This is, however, where the similarities end. Binding of reflexives is typically possible in both the base and the final position independently of the movement type (Barss 1986, 2001), while the data show that heads with the external case cannot be bound in the relative CP, that is, in their base position under this account. Similarly, both A- and Ā-moved phrases can form an idiom in their first-merge position (Postal 1974), which again differs from the behavior of heads with the external case, which do not form idioms in the relative CP. Furthermore, Ā-moved phrases are known to be unable to bind from their landing site (Van Riemsdijk & Williams 1981, Safir 2019), while heads with both the internal and the external case marking in Moksha can do so.

The correlation between case and connectivity attested in Moksha relative clauses is not the one found elsewhere in movement dependencies. This means that in order to derive both types of relative clauses in Moksha via raising, one needs to ensure a relation between case and connectivity that, first, does not independently follow from properties of the existing syntactic model (as already noted earlier) and, second, is not attested in other instances of movement. Whatever mechanism could derive such a correlation would therefore inevitably be at risk of becoming a construction-specific rule.

Lastly, let us apply to relatives in Moksha an existing mechanism that can derive some type of dependency between case and connectivity: Wholesale Late Merge. According to Takahashi & Hulsey (2009), one of the conditions on its application is that noun phrases cannot be late-merged in positions higher than where they must receive case. First, note that the resulting correlation is not the one required in Moksha: nothing precludes nouns from merging below their case positions, so that heads with the external case are not required to be exempt from binding or from forming an idiom in the relative CP. Second, the operation of Wholesale Late Merge is not straightforwardly applicable to heads of relative clauses, because it requires the D head corresponding to the late-merged noun to be present in the base position, so that the noun can then be late-merged with it. Under the raising derivation, the D head with which the head noun forms a constituent in the final structure is always merged outside of the relative CP. Finally, it is unclear whether the approach still qualifies as raising if the head noun is late-merged as a complement of the external D head outside the relative CP and was in fact never present in the gap position inside the relative CP.

4.4.3.3 Matching and matching only

Since the matching derivation is not involved in the proposed analysis, in this section I consider whether it can derive one of the relative clause types in Moksha or even both of them.

Let us start with a scenario in which matching derives relative clauses with the external case and coexists in the grammar with another derivation (e.g., raising) for relative clauses with the internal case. The external case marking follows from the obligatory realization of the external head and the PF-deletion of the internal head. An analysis of the corresponding interpretive effects depends on assumptions about the behavior of the two heads at LF. The version of the matching approach that allows one of the heads to be deleted (sometimes exceptionally) at LF (Munn 1994, Citko 2001, and Salzmann 2017, 2018) does not exclude connectivity with the position inside the relative CP: the internal head can be interpreted and the external one can be deleted at LF, which predicts that in relatives with the external case idioms or binding in the relative CP are still possible due to the interpretation of the internal head, contrary to the facts.

It might, however, be possible for this version of matching to derive the data if the head that is deleted at LF must be the same as the one deleted at PF. For now, I would like to point out that it is not straightforward how correspondence between deletion at LF and PF could be ensured and that such an assumption would contradict previous applications of the matching derivation. Such an approach would also need to attribute all connectivity effects to LF, which is problematic for anaphor binding, as I pointed out earlier in the discussion of the analysis by Sportiche (2017) and will repeat again at the end of this section.

Matching approaches that require both instances of the head noun to be interpreted (Sauerland 1998, 2003) also do not fully capture the data. On the positive side, the obligatory presence of the external head at LF excludes idioms and binding in the relative CP but can still allow for Condition C obviation if vehicle change is used. This version of the matching analysis, however, does not account for idioms in the main clause. If both heads must be present at LF and contain a part of an idiom that is licensed only in the main clause, the interpretation of the internal head must lead to ungrammaticality. One way to approach this is to weaken the condition for identity between the two heads so that the internal head does not have to include a part of an idiom, but some semantically similar phrase is sufficient. While this option is envisaged in a footnote by Bhatt (2002), an actual analysis has never been formulated, and it still remains to be shown that this general idea can be implemented in such a way that it does not overgenerate idiomatic interpretation and binding of internal heads that now do not have to be identical to the realized external ones. Note also that deletion at PF would then have to apply without lexical identity between the two heads.

Next, let us turn to a scenario in which matching derives relative clauses with internal case marking and coexists with yet another derivation (e.g., the head-external one) for relatives with the external case. As was shown in section 4.2.2, matching can derive internal case marking on the head noun if the internal head is realized and the external head is deleted (Cinque 2015, 2020 and Wood et al. 2017). The overt realization of the internal head immediately leads to further complications. Heads with the internal case in Moksha linearly precede relative pronouns that also have internal case marking and are first merged in the gap position, where they form a constituent with the head noun, as illustrated in (110a). To derive the correct linear order between the head and the relative pronoun, the head must further move across the relative pronoun; see (110b).

(110) a. $[_{CP}$ C ... $[_{DPrel}$ rel.pron head] ...]

b. [head $[_{CP}$ $[_{DPrel}$ rel.pron-α $\_\__{head}$] C_{rel} ... $\_\__{DPrel}$ ...]]

As a result, to derive relatives with ICA, the matching derivation must essentially include the raising derivation as a proper subpart. The matter becomes even more complicated once we try to incorporate into this derivation the conclusion of Chapter 3 that heads with the internal case move out of relative CPs and occupy a regular argument position in the main clause. This practically leaves no position where the external head could be merged.

The corresponding connectivity effects also do not follow automatically. Under the version of matching in which both heads are preserved at LF, the presence of the external head does not allow the attested connectivity with the relative-clause-internal position. The version of matching in which one of the heads can be deleted at LF does not exclude the interpretation of the external head, which would give rise to connectivity with the main-clause material. As mentioned earlier, the approach with deletion of one head at LF seems promising for capturing connectivity effects only if it can be ensured that the same head is deleted at both PF and LF.

Finally, suppose that matching is the only analysis and that it must capture both types of relative clauses in Moksha. PF-deletion of the internal head then underlies relatives with the external case, while PF-deletion of the external head gives rise to relatives with ICA, and the connectivity effects follow because in Moksha (unlike in other languages) the head that is pronounced at PF is also the one interpreted at LF. Such an approach encounters a number of problems. Most of them were mentioned earlier, but I will briefly list them here. First, the realized internal head moves across the relative pronoun, so that matching properly includes the raising derivation and, given the final landing site of the head noun in the main clause, leaves no place for

the external head. Second, it is unclear how simultaneous deletion at LF and PF can be ensured. One known case of non-realization at PF is ellipsis, and it does not force deletion at LF as well. Third, the approach requires all connectivity effects to take place at LF, which is at odds with the properties of reflexive binding, which is usually assumed to apply throughout the derivation. In particular, if the external head must be deleted at LF in relatives with ICA and all connectivity effects apply at LF, the approach cannot derive anaphor binding by the main-clause material and does not allow the head with the internal case to bind further material in the main clause, contrary to the facts.

4.5 Conclusion and outlook

On the basis of novel empirical data on the relation between the case of the head noun and connectivity, I have argued that relatives with ICA are best derived by raising. Raising must thus be part of natural language syntax. I have also shown that relatives with external case marking have different properties and have argued that they are derived by the head-external structure. As a result, the two structures for relative clauses coexist in one language.

While I hope the reader is by now convinced that this is the correct analysis for relative clauses in Moksha, a bigger and potentially more important question is whether the analysis proposed for Moksha is sustainable for other languages. In particular, is it possible to derive all the existing data on relative clauses in different languages by assuming that natural language syntax allows only the two derivations required for Moksha—the raising and the head-external structures? In what follows, I list the four most notable problems for such a view. One of them will be resolved in the next chapter, two of them will be resolved right away, and for the final one I will show that matters are at least more controversial than originally suggested.

First, while the raising derivation has been proven to be successful in deriving various effects attested in relative clauses, it has also been extensively criticized for producing an incorrect phrase structure for a noun phrase, predicting the wrong case marking on the head noun, and having no clear trigger for the final movement of the head noun (Borsley 1997, Pankau 2018, and also Salzmann 2014, 2017 for a recent overview).

In particular, Borsley (1997) points out that the raising derivation predicts internal case marking on the head noun. If the head noun originates within the relative clause, as suggested by the raising derivation, the noun is expected to show case assigned inside the relative clause. While this is exactly what is attested in Moksha, this prediction is problematic for other languages, where the raising derivation typ-

ically results in external (not internal) case on the head noun. For that to happen, the head noun must either somehow avoid case assignment in the relative clause and wait to receive case in the main clause, or be able to receive case twice, once inside the relative clause and then again in the main clause. The latter case must then overwrite the former one.

A different problem was raised most recently by Pankau (2018) (see also the discussion in Chapter 3). The argument is based on antipronominal contexts. These are positions that must be occupied by full noun phrases, not by pronouns; see (111) from German.

(111) Er kommt **[aus diesem Land]** / *aus ihm.
he comes out this country out it
'He comes/descends from that country / *from it.' (Pankau 2018: 194)

The data on relative clauses demonstrate that the head of the relative clause may occupy an antipronominal position (see (112a)). This is problematic for most implementations of the raising analysis, because the head noun typically lands in a specifier position in the main clause and therefore cannot fulfill the requirement of antipronominal contexts that a full noun phrase must be present. It is further shown that the relativized position inside the relative clause and the position of the head in the main clause can both be in antipronominal environments at the same time; see (112b).

(112) a. Er kommt **[aus einem Land]**, das in der belgischen Gruppe
he comes out a country which in the Belgian group
gespielt hat.
played has
'He comes from a country that was part of the Belgian group.' (Pankau 2018: 200)

b. Ich komme **[aus dem Land]**, **[aus dem** __] der verstorbene
I come out the country out which the deceased
Papst stammt.
pope descends
'I come from the country that the deceased pope comes from.' (Pankau 2018: 203)

Pankau (2018) concurs that the data can be captured by the raising derivation if the head noun moves from the relativized position to the argument position in the main clause, so that the requirement for a noun phrase in antipronominal environments

is satisfied derivationally. Nevertheless, he rejects this account because there is no satisfactory implementation of the final movement of the head noun and concludes that the data are best derived by matching.

I will address these and further problems of the raising derivation in the next chapter, where I will spell out the syntax of raising. I will show that the issues related to the final movement of the head noun are resolved if the head noun selects the relative CP itself and, once the CP is built, probes upward, moves, and projects in its landing site. Whether the head noun receives case in the relative CP or in the main clause can be modeled by different orderings of case probes and other features on the head.

The second problem comes from the existence of the head-external derivation. The argument was presented by Safir (1999) and repeated by Sauerland (1998), Bhatt (2002), and Sportiche (2017). It is based on English data showing that a quantifier in the head noun cannot co-vary with a variable in the relative CP if this variable (or a noun phrase that contains it) c-commands the gap position:

(113) a. *[Pictures of anyone$_i$] which he$_i$ displays prominently are likely to be attractive ones.

b. [Pictures of anyone$_i$] which put him$_i$ in a good light are likely to be attractive ones.

(114) a. *?[Pictures of anyone$_i$] that his$_i$ agent likes are likely to be attractive.

b. [Pictures of anyone$_i$] that please his$_i$ agent are likely to be attractive. (Safir 1999: 611)

Safir (1999) claims that the ungrammaticality in (113a) and (114a) is due to the crossover effect: the quantifier in the head noun moves across the coindexed variable. Such movement naturally occurs under the raising derivation when the noun moves from the relativized position, as well as under matching, when the internal instance of the head noun moves to the left edge of the relative CP, where it is local enough with the external head to be deleted under identity. Notably, this movement does not have to take place if the head-external derivation is available, because the head noun—and thereby the quantifier—could simply be first merged outside the relative CP, and crossover effects would then not be triggered. Thus, if the head-external derivation is part of natural language syntax, sentences such as (113a) and (114a) are predicted to be grammatical.

This is the problem that will remain open for now. There are, though, some ways to approach it. For instance, it can be noted that there are in fact very few available data: practically all existing English judgments come from Safir (1999), and Moksha does not show this correlation. Next, the most natural interpretation of the

grammatical examples (113b) and (114b) is the one where *pictures*, i.e., the head noun represented by an operator inside the relative CP under the head-external analysis, also covaries with the quantifier. As a result, it might turn out that the head-external structure is ruled out here for an independent reason, but I leave this for further research.

The third problem also comes from the existence of the head-external derivation and was recently raised by Sportiche (2017). He observes that there are restrictions on the relativized position inside the relative CP that directly follow if all relative clauses are derived by raising, but are surprising if raising coexists with a derivation in which the head of the relative clause and the position inside the relative CP are not related by movement. In particular, relying on English data, Sportiche (2017) shows that the relation between the head of the relative clause and the relativized position is sensitive to intervention by another noun phrase (see (115)), the Coordinate Structure Constraint (see (116)), as well as other island structures such as complex noun phrase islands (see (117)).

(115) *The [$_{NP}$ summer] [the famous [$_{NP}$ storm during **which**] I remember ...]

(116) *The neighbor [because [of **whom** and (of) the doorman] I talked about the fight ...]

(117) a. *Any law [**which** you met the activist [who proposed _]]

b. *Any law [[the activist who proposed **which**] you met _]

I would like to suggest that the source of ungrammaticality in the examples above is not the illegitimate movement of the head but the position of the relative pronoun. Example (117a) is ungrammatical because the relative pronoun moves out of another relative CP, thereby violating the Complex NP Constraint. In examples (115), (116), and (117b), the relative pronoun is in the general left-periphery region of the relative clause, but not directly in its specifier. I suggest that an insufficiently local relation between the relative pronoun and the C head leads to ungrammaticality. In general, these data therefore call for research on the limits of pied-piping in English but do not provide an argument against the head-external derivation of relatives.

The fourth problem in extending the analysis proposed for Moksha to other languages concerns so-called conflicting requirements. Salzmann (2006, 2017, 2018) (see also Heck 2005) notes that heads of relative clauses can show connectivity simultaneously with the position in the relative CP and with the position in the main clause and argues that these data can be captured only under the matching analysis, as it postulates two independent heads in the main clause and in the relative clause. While some types of conflicting requirements could be problematic for the current

analysis, a careful consideration suggests that the existing examples are not. There are two types of examples.[7] Examples of the first type combine idiomatic interpretation in the relative clause and anaphor binding in the main clause, as in (118).

(118) ... **he$_i$** showed me [the *picture* of **himself$_i$**] that one of my fellow students *took*. (Salzmann 2006: 42)

These data follow from the raising analysis: the head noun is base-generated in the relative clause, forms an idiom there, and is then moved to the main clause, where the anaphor is locally c-commanded by its binder.

The second type of conflicting requirements shows a combination of idiomatic interpretation in the main clause and pronominal binding in the relative clause; see (119), as well as the German data presented by Heck (2005).

(119) I always try to *take* [*pictures* of **his$_i$** wife] that **every man$_i$** likes. (Salzmann 2006: 42)

Such examples are not problematic either because one of the connectivity effects involves pronominal binding, a diagnostic that was argued in this chapter to be highly unreliable. As a result, this example instantiates the head-external structure: it allows the head noun to form an idiom with the main-clause material. The personal pronoun must then receive a bound interpretation without a surface c-command relation between the quantified noun phrase and the pronoun in syntax. While I do not articulate the mechanism that allows this, these data illustrate one of numerous cases in which a pronoun that has never been part of the relative clause can be bound by a variable inside the relative CP (see section 4.3.3 above).

To sum up, in this section I have considered whether the view argued to be correct for Moksha can also be correct universally. I have discussed four potential problems for the coexistence of the raising and the head-external derivations as the only two possible structures for relative clauses and shown that only one of them might indeed seem concerning for the proposal, but it is also confounded in several ways and requires further research before it can be used as a firm counterargument.

7 Salzmann (2017: 157) also suggests in a footnote that the head noun can simultaneously form an idiom in the main clause and in the relative clause. Whether these data are problematic for the current analysis depends on the status of the idiomatic expression used. As we have seen in 4.3.1 above, in Moksha one of the considered idioms shows no correlation with respect to case, at least for some speakers. If it turns out that some English idioms do not require being base-generated as a constituent, the data are not problematic.

5 Analysis

5.1 Introduction

In the previous two chapters, I have investigated the properties of relative clauses with ICA in Moksha. I have shown that relative clauses with ICA belong to the class of externally-headed relative clauses, and that their main differences from regular externally-headed relatives are the internal case marking on the head noun and the position of the relative clause in the left periphery. I have argued that the internal case is due to the raising derivation that underlies relative clauses with ICA. Under this derivation, the head of the relative clause first merges inside the relative CP and then moves to an argument position in the main clause. I have also shown that the position of the relative clause in the left periphery is a derived one; that is, the noun phrase that includes the relative clause with ICA starts in an argument position in the main clause, but is obligatorily displaced to the left in the course of the derivation.

In this chapter, I will present an analysis of relative clauses with ICA in Moksha. I begin with the formal implementation of the raising derivation, which remains a subject of extensive debate. The main problem arises from the final movement of the head across the relative pronoun, which does not have a clear trigger and, as was argued in chapter 3, does not land in a specifier position, but must nevertheless proceed, so that the part of the noun phrase that moves out of the relative CP must be directly in the complement of the CP-external higher nominal projections. That is, the structure of the noun phrase in the head of the relative CP must be the same as the regular noun phrase structure.

I propose that the problems raised by the movement of the head are resolved if Merge is feature-driven, projection is determined by selection (see Chomsky 1995b, Adger 2003, as well as Stabler 1997), and Minimal Search applies both upwards and downwards (see Wurmbrand 2012, Zeijlstra 2012, Bjorkman & Zeijlstra 2019, i.a.). In particular, I suggest that heads of relative clauses themselves select for relative CPs. Being first merged in the relativized position, they probe upwards, find the relative CP once it is built, merge with it, and project in the final landing site. The projecting movement of the head noun is thus triggered by a feature on the head itself (cf. the concept of Münchhausen features introduced by Fanselow 2003). The head noun may receive its case before movement, thereby deriving relatives with ICA, or after movement in the main clause, thereby deriving raising relatives with external case, as attested in most languages. The position of case assignment is determined by the respective ordering of the case probe and the Merge feature responsible for the final movement of the head noun.

https://doi.org/10.1515/9783112225868-005

I further suggest that feature-driven Merge and a projection-by-selection labeling algorithm underlie the account of the left-peripheral position of relatives with ICA. The obligatory movement to the left belongs to a group of phenomena that I will call forced ex-situ effects. These encompass cases where a syntactic configuration is legitimate at an intermediate stage of the derivation but must be destroyed before the derivation terminates. I propose that forced ex-situ effects are best derived if Merge features are enriched with second-order subfeatures; that is, selection applies not only to the category, but also to the active syntactic features of a selected syntactic object. The left-peripheral position of relatives with ICA then arises because heads in the main clause typically select for DPs with a further unsatisfied feature. The role of this unsatisfied feature can be fulfilled by an unvalued case feature, but heads of relatives with ICA have their case feature valued in the relative CP and, in order to satisfy the selection requirements in the main clause, they must have a further active feature that then enforces movement of the relative clause to the left.

After the main properties (internal case marking and left-peripheral position) of relative clauses with ICA are derived, I turn to other attested properties of this relativization strategy in Moksha: a ban on extraposition, extraction out of the relative clause, the possibility of an appositive interpretation, and mismatches in case marking between the head and the relative pronoun. I will show that these properties largely follow from the proposed analysis of relatives with ICA, sometimes accompanied by additional assumptions about the corresponding phenomena.

Apart from deriving the data of one specific language and suggesting a novel implementation of raising syntax, the analysis has the following general implications. First, I adopt a model in which Merge is feature-driven and projection is determined by a selection-based labeling algorithm, and I show that it can derive non-trivial syntactic patterns such as projecting movement and forced ex-situ effects. The latter effects are also known under the term local instability (see Ott 2012, 2015).[1] They constitute one of the empirical arguments against the once-default projection-by-selection approach to labeling, and in favor of the novel labeling algorithm developed by Chomsky 2013, 2015. I will show that this novel labeling algorithm does not derive forced ex-situ effects in Moksha, and this research thus provides an argument against it. Second, the proposed analysis relies on ordered feature stacks and once again shows that language-specific fixing of an initially indeterminate order of elementary operations may underlie parametrization (see Georgi 2017 and Mur-

1 I do not adopt the term local instability as a name for the pattern, because it presupposes a specific analysis and appears to be misleading: the relevant configurations are in fact stable locally, but not globally.

phy & Puškar 2018). It also shows that the ordering of features allows for a delayed application of syntactic operations that, all else being equal, could apply earlier in the derivation. Some of these implications will be further investigated in the next chapter.

In this chapter, I will proceed as follows. In section 5.2, I begin by reviewing the syntax of raising, then present the new impremention of the raising derivation, and show how internal and external case marking on the head are derived. In section 5.3, I present the analysis of the left-periphery requirement and then derive further properties of relatives with ICA in Moksha in section 5.4. Section 5.5 concludes.

5.2 Syntax of raising

5.2.1 Background and existing analyses

Investigating the syntax of relatives with ICA in chapters 3 and 4, I arrived at the following conclusions. First, the head of a relative clause with ICA is base-merged inside the relative CP in the relativization position, as shown in (1a). Second, the final position of the head is in the main clause, in the complement of the relative-clause-external nominal projections; see (1b). Third, the two positions of the head in (1a) and (1b) are related by movement, and there are no other instances of the head in the structure.

(1) a. First merge position of the head [$_{\text{CPrel}}$ C_{rel} ... [$_{\text{DPrel}}$ rel.pron NP_{head}] ...]

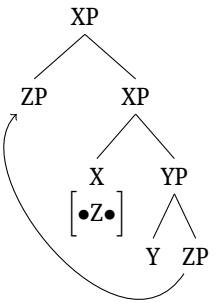
b. Final position of the head [$_{\text{DP}}$ D [$_{\text{NP}}$ NP_{head} [$_{\text{CPrel}}$ rel.pron C_{rel} ...]]]

The first and the last of these requirements are fulfilled by the raising derivation. In this subsection, I review existing implementations of raising and show that they either do not fulfill the second requirement or significantly complicate the system in order to derive it.

As already discussed in section 3.4.2, the final position of the head is in a specifier position in most implementations of the raising derivation. This can be a specifier position in the relative CP (see Kayne 1994, Bianchi 1999, and De Vries 2002) or the specifier of some nominal projection outside the relative CP (see Bhatt 2002 and Deal 2016). This widely assumed position of the head in the specifier is determined by the standard implementation of movement, under which movement is triggered by a feature on a higher syntactic head, and this head then provides a label for the newly created constituent after movement. A moved syntactic object naturally appears in a specifier position; see (2). Throughout this work, I use the notation in-

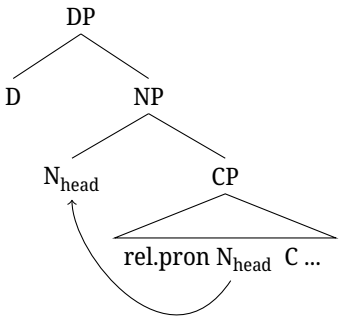
troduced by Heck & Müller (2007), according to which probe features are indicated as [∗F∗] and merge/selection features as [•F•].

(2) Standard movement to the specifier



The placement of the head noun in a specifier position does not provide a regular noun phrase structure for the head DP, and I therefore reject the implementations of raising listed above. What seems to be required instead is so-called projecting movement: before movement of the head, the relevant chunk of syntactic structure is the relative CP, but after movement it can further participate in the derivation as a noun. It is thus the movement of the head that somehow turns the relative CP into a DP. The concept of projecting movement is straightforwardly implemented in the analysis envisaged by Donati (2006) and developed in Donati & Cecchetto (2011) and Cecchetto & Donati (2016). This approach relies on one of the core ideas of Chomsky's recent labeling algorithm (Chomsky 2013), namely that heads always project. Heads are here understood as syntactic terminals, modulo complex structures created by head movement (Rizzi 2016). Under this analysis, heads of relative clauses can indeed provide a label for a newly created constituent in their landing site, but they must be syntactic terminals; see (3).

(3) Projecting movement of N (Donati & Cecchetto 2011, Cecchetto & Donati 2016)



This approach does not capture the data on relatives with ICA in Moksha, because they require the nominal constituent that moves out of the relative CP to be branching, not atomic. This might seem confusing given the terminological tradition of calling it the *head* of the relative clause, but this term reflects the fact that the constituent *heads* the relative CP; it does not mean that it must be a terminal. One piece of evidence showing that the nominal constituent moving out of the relative CP must be branching comes from the binding of anaphors and is presented in the example repeated here as (4). The noun in the head of this relative clause is marked for internal case, which indicates the underlying raising derivation. The noun is accompanied by a reflexive pronoun that is bound in the relative CP and thus must also move from the relative-clause-internal position, showing that movement of the terminal N node is inadequate.

(4) NOM ← DAT

Es'$_i$	luv-ij-ənzə-**n'd'i**	[kona-t'n'ə-n'd'i	t'ɛ	**kn'iga-s'$_i$**	
self	read-PTCP.ACT-3SG.POSS.PL-DAT	which-DEF.PL-DAT	this	book-DEF.SG	
maks-i	nad'əja-ma]	uč-iǰ-t'	pe.		
give-NPST.3[SG]	hope-NZR	wait-NPST.3-PL	end		

'Its$_i$ readers whom this book$_i$ gave hope are waiting for the continuation.'

While the argument for phrasal, rather than terminal, movement in the raising derivation is strengthened in Moksha by the internal case marking on the head noun, comparable evidence is attested in a number of languages. Donati & Cecchetto (2011) acknowledge this problem but suggest that all the evidence demonstrating that a constituent larger than the terminal N node moves to the main clause is a fallacy based on incorrect analyses of the underlying processes. For instance, anaphor

binding, as in (4), is possible because PRO occupies the position of the external argument. This and other potential reanalyses of anaphor binding are discussed in detail and excluded in the previous chapter, in section 4.3.2.[2]

The account developed by Donati & Cecchetto (2011) also does not provide a clear trigger for the movement of the head noun. In earlier work, Donati & Cecchetto (2011) propose that the D head can probe for the N head from the numeration before this D head enters the derivation, while later, in Cecchetto & Donati (2016), the free Merge approach is adopted, so that movement does not have, or need, a trigger.

Yet another implementation of the raising derivation was developed by Henderson (2007). Relying on the concept of sideward movement (Nunes 2001, 2004), he suggests that after the movement of the relativized constituent to Spec,CP, the head is copied to the workspace, and this copy then merges with the external D. In the end, the relative CP is countercyclically late-adjoined to the NP. The derivation is illustrated in (5).

(5) a. Relative CP after CP-internal movement

$[_{\text{CPrel}}\ \text{NP}_{\text{head}}\ \text{C} \ldots]$

b. Copy the head to the workspace

$[_{\text{CPrel}}\ \overline{\text{NP}_{\text{head}}}\ \text{C} \ldots]$ $\qquad\qquad$ NP_{head}

c. Merge of the external D

$[_{\text{CPrel}}\ \overline{\text{NP}_{\text{head}}}\ \text{C} \ldots]$ $\qquad\qquad$ $[_{\text{DP}}\ \text{D}\ \text{NP}_{\text{head}}]$

d. Late adjunction of the relative CP

$[[_{\text{DP}}\ \text{D}\ [_{\text{NP}}\ [_{\text{NP}}\ \text{NP}_{\text{head}}]\ [_{\text{CPrel}}\ \overline{\text{NP}_{\text{head}}}\ \text{C} \ldots]\ ]\ ]$

A clear advantage of this implementation is that the head of the relative clause has a regular noun phrase structure, but this comes at the cost of enriching the model with cross-derivational probing and movement. The analysis also requires obligatory countercyclic late adjunction of the relative CP to the head. Henderson (2007) suggests that the late adjunction of the relative CP is necessary because it derives Condition C obviation effects reported by Lebeaux (1988, 1990). This application of late merge clearly differs from all known of late merge in that late merge only applies when the host for a late-merged constituent is moved, which is not the case

2 Note that by arguing away the evidence that relies on modifiers accompanying the noun, Donati & Cecchetto eliminate the vast majority of arguments for the raising derivation in the first place. This seems to be an unwelcome consequence for an implementation of raising.

under this analysis. As shown by Sportiche (2019), the application of late merge without displacement of the target leads to undesirable empirical consequences. I will address late merge and discuss how it can be derived without overgeneration in Chapter 6.

5.2.2 Proposal

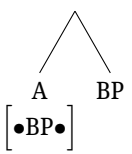
I suggest that the correct structure for raising relative clauses is best derived if the projecting movement of the head noun is taken at face value: the head of the relative clause moves from a position in the relative clause, merges with the relative CP, and projects in the landing site. The displaced constituent can be branching (unlike in the otherwise similar analysis by Donati & Cecchetto (2011)).

The possibility for a displaced syntactic object to project in its landing site arises under the projection-by-selection model if movement is triggered by a feature on the displaced syntactic object. Projection by selection is an approach to labeling,[3] according to which the label of a newly created syntactic object is determined by the features of the two merged syntactic objects, such that the one that bears a feature triggering this Merge operation provides the label (see Chomsky (1995b), Adger (2003), as well as Stabler (1997)). The algorithm is often summarized by the slogan in (6).

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

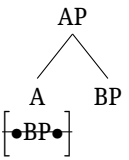
The derivation below illustrates this labeling algorithm: in (7), A has an unchecked selectional feature that triggers Merge with BP, and A also provides the label for the newly created syntactic object in (8).

(7) Merge



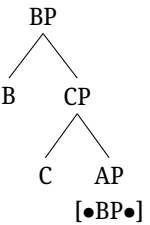
3 I use the terms projection and labeling as mutually interchangeable. I spell out the assumptions I am making in more detail in section 5.2.4.1.

(8) Labeling

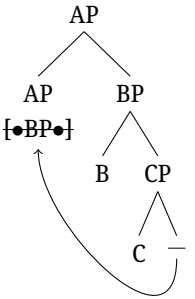


Projecting movement follows if a displaced syntactic object has a selection feature and triggers Merge itself, which is in turn possible if search applies upwards as well (see Baker 2008, Wurmbrand 2012, Zeijlstra 2012, Himmelreich 2017, and Bjorkman & Zeijlstra 2019, i.a.). In this case, a selection feature on a syntactic object that is embedded deeper in the structure may search upwards and target syntactic objects that are built only later in the derivation. Consider the sample derivation in (9)–(10): AP selects BP and moves upwards to merge with it after BP enters the derivation. As the movement is triggered by the selection feature on AP, it also projects a label in accordance with (6).

(9) Base position



(10) Movement and projection



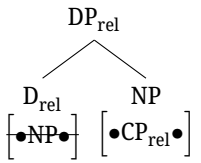
Raising relative clauses then have the following derivation. They start with the numeration in (11), which, among other syntactic objects, obligatorily contains an NP with a [•CP•] selection feature, the relative D (i.e., the relative pronoun or operator) with a [•NP•] feature, and the relative C head.[4] The relative C selects for a TP, which in turn must contain a syntactic object that selects for the DP head of the relative clause in this derivation. This syntactic object is a V head, and the relative DP is a direct object here.

(11) Numeration for raising relative clauses (version 1):

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

In (11), the relative C head ultimately selects the head NP by transitivity, but the head NP also has a selection feature for the relative CP. Given the possibility of upward probing, such a numeration can lead to a well-formed derivation if one of the syntactic objects is itself selected while its Merge feature is still active. It then moves upwards to satisfy this active Merge feature. In the derivation of raising relative clauses, the head NP must merge with the relative D head before saturating its own [•CP_{rel}•] Merge feature; see (12).

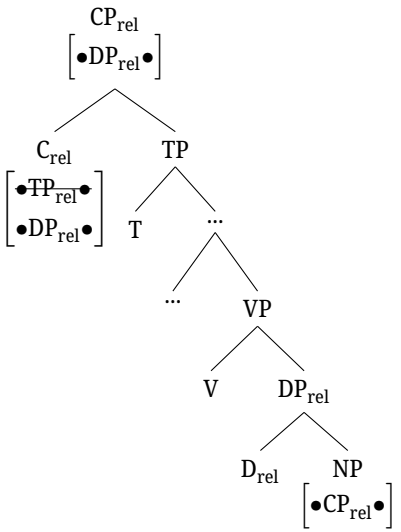
(12) Relative DP



After this, the derivation proceeds in a regular way until the relative C head is merged; see (13). For the sake of simplicity, I ignore possible intermediate movement steps that the relative DP may undergo in order to receive case or to escape the spell-out domains of lower phases in the relative CP.

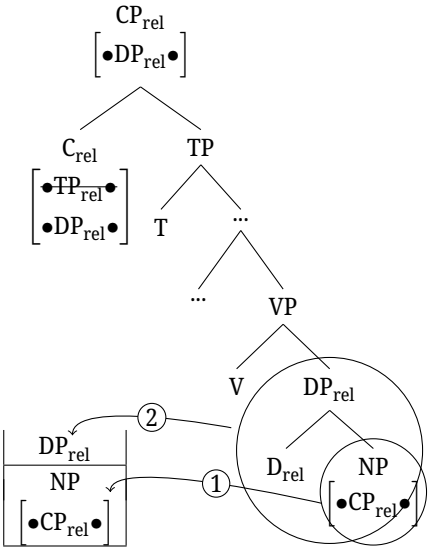
4 Here and in what follows, I identify the constituent that moves out of the relative clause as the NP. At the same time, examples in Chapter 4 show that it can contain a possessor. I will not delve into noun phrase structure, but assume that possessors are in Spec,NP. Should further research demonstrate that possessors are in a separate functional projection, the constituent moving out of the relative CP must then be a PossP, but the rest of the analysis remains the same.

(13) Relative CP

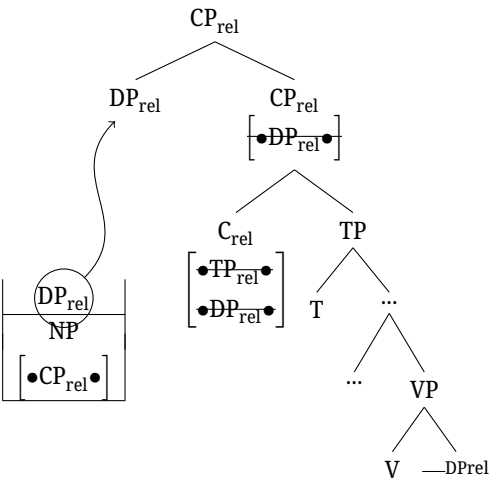


After Merge of C_{rel}, there are two unordered active selection features that have both located their goals: [•DP_{rel}•] on the relative C, which is responsible for the movement of the relative pronoun to the left periphery of the relative CP, and [•CP_{rel}•] on the head NP, which has located its goal by upward search and needs to move upwards to merge with the relative CP. I suggest that copies of the two syntactic objects that are to be displaced are subsequently created and merged into the workspace. Following Heck (2016) and Heck & Himmelreich (2017), I assume that copies are organized in a stack, similarly to features on heads. This means that the copy that is created first appears at the bottom of the stack structure and therefore must be merged back into the derivation last. The structure in (14) illustrates the scenario in which the head NP is copied and placed in the stack first. The copy of the relative DP is created in the next step: it then precedes the head NP in the stack and must be merged into the structure before the head NP can be; see (15).

(14) Search and copying

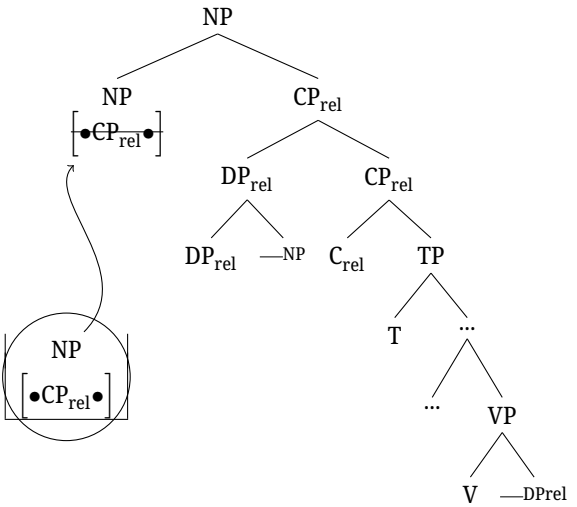


(15) Merge of DP_{rel}



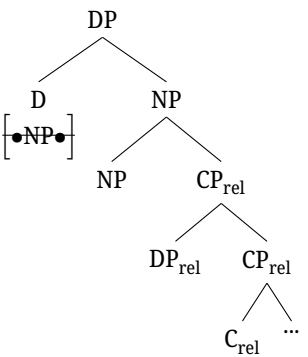
In (16), the head NP merges with the relative CP and checks its selection feature. As Merge is triggered by a feature on the NP itself, it also projects in the landing site, giving rise to projecting movement.

(16) Merge of the head NP



After this, the NP modified by the relative clause is selected by the external D head and merges with it. The resulting DP is then selected by the main clause material.

(17) Merge of the external D head

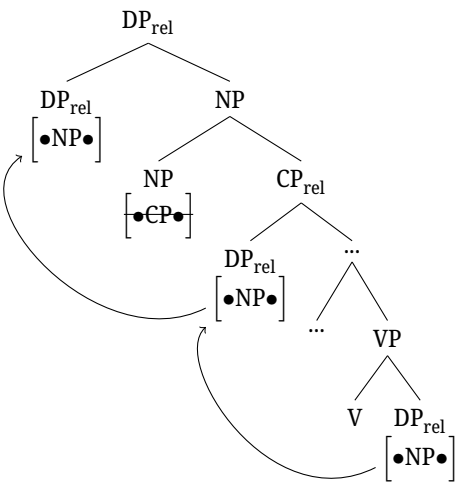


The derivation above has two steps where its course is not a priori determined by the principles of the grammar articulated so far. First, the numeration in (11) contains two heads that, by transitivity, ultimately select each other and thereby require one of them to be selected before its own selection features are checked. Nothing indicates that this must be the NP (rather than the relative DP or CP) that is selected before all its selection features are checked. Second, when the relative C

head is merged and two selection features ([•DP_{rel}•] on the C head and [•CP_{rel}•] on the NP) find their goals, no principle requires that a copy of the NP be created and placed in the stack first.

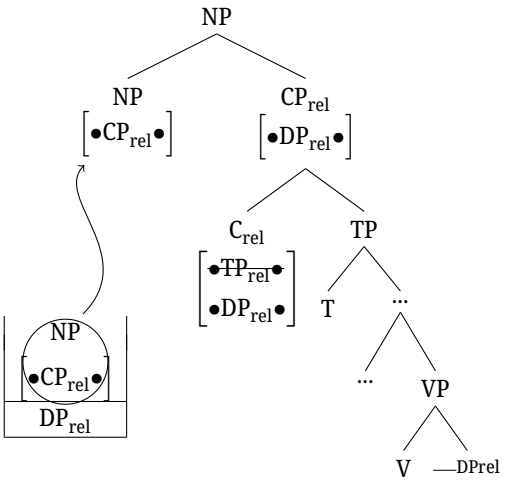
There are two ways to approach such indeterminacy in the derivation. On the one hand, it can be shown for both cases that none of the alternative derivations converges; that is, allows the numeration to be fully exhausted and satisfies the active features on syntactic objects. Let us consider one such derivation. Suppose that it is the relative DP that is selected before its own Merge features are checked, i.e., the head NP is merged only later. In this case, the relative D will move upwards and project later in the derivation; see (18). The external D head, however, searches for an NP, and the derivation therefore either cannot proceed or, if the formed DP can be selected by the main clause material, the external D head cannot merge. I do not go through all possible derivations here, but they lead to an analogous result.

(18) Merge of D_{rel} with the unchecked selection feature



I will now turn to the second indeterminacy in the proposed implementation of raising. Similarly to the previous case, it can be shown that the alternatives fail: if it is the relative DP, rather than the NP, that is copied first, then the NP will be reintroduced into the derivation first, and as it projects, C will not be at the root afterward, as shown in (19). The Merge of the relative DP, necessary to satisfy the selection features on C, would then be countercyclic and is therefore excluded by the Strict Cycle Condition (see Chomsky 1973, 1995b, 2019).

(19) Merge of NP before DP_{rel}



As a result, it can be concluded that no grammatical principle requires the derivation to follow the alternative paths shown above, and it can in fact proceed differently, but in that case it inevitably crashes. However, such an approach seems to undermine the general idea of a highly deterministic (though not necessarily crash-proof) syntax in which all operations are feature-driven and features are ordered in stacks. I will therefore pursue a different view here. First, I suggest that the relative pronoun D_{rel} in fact selects an NP with the unchecked [•CP•] feature; that is, selection applies not only to the category, but also to further active features of the syntactic object. I will elaborate on the possibility of such second-order selection features in section 5.3.

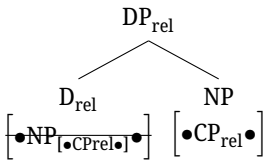
(20) Numeration for raising relative clauses (version 2):

$$\left\{ \begin{bmatrix} C_{rel} \\ \bullet TP \bullet \\ \bullet DP_{rel} \bullet \end{bmatrix} \dots \begin{bmatrix} V \\ \bullet DP \bullet \\ \dots \end{bmatrix}, \begin{bmatrix} D_{rel} \\ \bullet NP_{[\bullet CPrel \bullet]} \bullet \\ \dots \end{bmatrix}, \begin{bmatrix} N \\ \dots \\ \bullet CP_{rel} \bullet \\ \dots \end{bmatrix} \dots \right\}$$

The modified numeration that derives raising relative clauses is given in (21). The feature [•$NP_{[\bullet CPrel \bullet]}$•] on D_{rel} ensures that the NP cannot be merged with CP_{rel} be-

fore it is selected by D_{rel}. The first step, in which the relative D is merged with the NP, is shown in (22).[5]

(21) Relative DP



Second, for the later step of the derivation, when the two copies must be created (see (14)), I suggest that the order is determined by a preference for upward search: in rare cases where there are two unchecked selection features that are not ordered and have both found their goals, upward search is given precedence over downward search (cf. Assmann, Georgi, Heck, Müller, & Weisser 2015 and Bjorkman & Zeijlstra 2019). This ensures that the head NP is copied first.

5.2.3 Inverse case attraction

With the analysis of raising relative clauses in hand, I will now turn to the cross-linguistic differences in the case marking on the head. In Chapter 4 (see section 4.4 in particular), I have argued that relative clauses with ICA in Moksha are derived by raising and differ from raising relatives in the vast majority of languages (see, e.g., German or Russian) in that the head bears the case assigned in the relative CP. The phenomenon is again shown in example (22), where the head is marked for the genitive (the regular direct object case in Moksha) instead of the dative expected given the indirect object position of the head in the main clause.

5 Additional empirical support showing that relative pronouns select for noun phrases with a yet unchecked [•CP$_{rel}$•] feature comes from relative pronouns that cannot form a constituent with a noun in the resulting structure; cf. *the boy who was late*, but **Who boy was late?* (Aoun & Li 2003, Heck 2005, Salzmann 2014). I will return to these data and provide further evidence for the second-order selection feature on the relative pronoun in Chapter 6.

(22) DAT ← GEN

Pin'ə-**t'**	[kona-n'	Pet'ɛ	rama-z'ə]	mon	maks-an
dog-DEF.SG.GEN	which-GEN	Petja	buy-PST.3SG.O.3SG.S	I	give-NPST.1SG

jar̥ca-ma.
eat-NZR

'I am giving food to the dog that Petja bought.'

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.

Examples (23)–(24) come from languages without ICA. They illustrate external case marking on the head in relatives that show connectivity with the position in the relative CP and are therefore also derived by raising. In particular, example (23) from German shows anaphor binding into the head by material internal to the relative CP.

(23)

Der	Wesenszug	von	**sich**$_i$,	[den	**Peter**$_i$	noch	nicht	__
the.NOM	trait	of	self	which.ACC	Peter	still	not	

kannte],	störte	niemanden.
know.PST.3SG	annoy.PST.3SG	no.one.ACC

'No one was annoyed by the side of himself$_i$ that Peter$_i$ did not know yet.' (Salzmann 2006: 99)

Example (25) from Russian contains the idiom *vešat' lapšu na uši* 'to tell lies (lit. to hang noodles on the ears)'. The idiom is split between the head and the material inside the relative CP.

(24)

Lapša,	[kotoruju	nam	**vešaet**	**na**	**uši**	pravitel'stvo],	mešaet
noodles.NOM	which.ACC	us	hangs	on	ears	government	obstructs

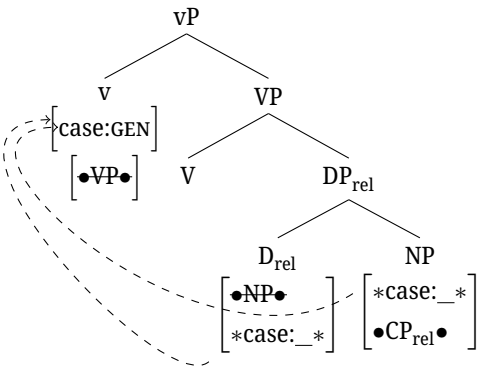
vsem.
all

'Lies that the government tells us obstructs everyone.' (based on Lyutikova 2015: 6)

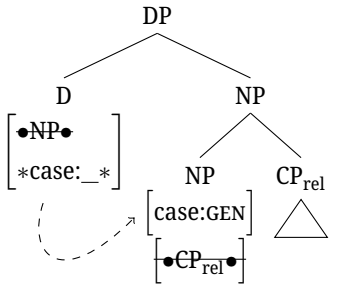
I suggest that different orderings of the [•CP_{rel}•] Merge feature and a case probe on the head NP underlie the difference in case marking. In languages with internal

case, the case probe is ordered before the Merge feature and thus requires case to be assigned inside the relative CP. This is shown in (25), where the head occupies the direct object position in the relative CP (as in (22)) and receives genitive case from *v*. I assume that both the relative pronoun and the noun have case probes in Moksha and receive case via Agree. The head NP moves to the main clause later in the derivation but already has a valued case feature by then. I further suggest that this valued case feature acts as a goal for the case probe on the external D head (if such a probe is present in a language); cf. Legate (2005) on cyclic agreement. The probe on D finds the valued case feature on the noun and agrees with it before higher clausal projections, which are usually targeted by the case probe, enter the derivation (see (26)).

(25) Internal case: In the relative CP

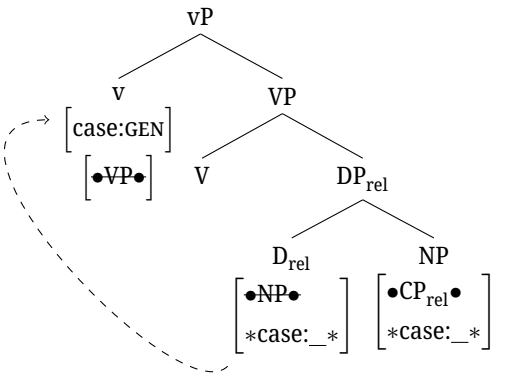


(26) Internal case: In the main clause

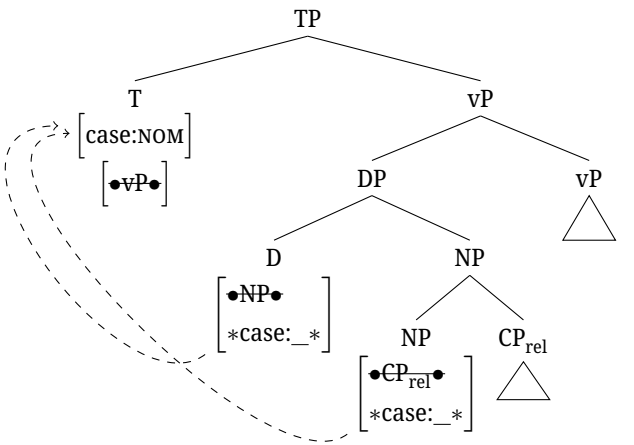


In languages with external case, the case probe is ordered after the [•CP$_{rel}$•] Merge feature and therefore can probe only after the Merge feature is checked; i.e., after movement of the head to the main clause; see (27)–(28).

(27) External case: In the relative CP



(28) External case: In the main clause



Thus, the ordering of features allows the valuation of a case feature to be postponed, even though in principle it could have been satisfied at an earlier stage of the derivation. The two orderings and the resulting case markings are summarized in Table 5.1.

To sum up, ordering the case probe before or after the Merge feature that is checked upon movement of the head to the main clause determines whether the case feature is valued before or after this movement and derives raising with internal or external case, respectively. This provides a novel perspective on one of

Tab. 5.1: Case marking on the head under raising

Pattern	Ordered features on the N head
1. Internal case (Languages with ICA)	[∗case:_∗] ≺ [•CP_{rel}•]
2. External case (Languages without ICA)	[•CP_{rel}•] ≺ [∗case:_∗]

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

5.2.4 Discussion

In this section, I discuss in more detail the assumptions and implications of the proposed analysis. I begin with a discussion of labeling and feature-driven Merge that underlie the approach. I then turn to projecting movement and the reasons why it has often been rejected in the past. Finally, I discuss another common criticism of the raising derivation and show how it can be addressed under the current account.

5.2.4.1 Merge and labeling

In deriving projecting movement, the analysis relies on a projection-by-selection labeling algorithm. An integral part of this algorithm is that Merge is feature-driven. Feature-driven Merge (and syntax in general) is opposed to the idea of free Merge, according to which Merge (and possibly other syntactic operations) does not require a trigger, but its legitimacy is determined by various filters applying to the output representation. While the division between feature-driven and free Merge fundamentally determines the shape of the syntactic theory, there are very few (if any) acknowledged differences in the empirical coverage of the two systems (see Müller 2017 for some suggestions). The choice between the approaches is therefore based on conceptual considerations: Chomsky (2013, 2015, 2019) argues that free Merge is superior because it allows one to formulate the basic syntactic operation (i.e., Merge) in a maximally simple way. Another common argument is that, despite being able to derive empirical data, the postulation of formal features underlying Merge does not contribute to the explanatory depth of the theory. In fact, however,

a model with feature-driven Merge turns out to be better articulated, while the one with free Merge essentially defers syntax to poorly developed representational filters, for which it still remains to be shown that they can derive basic syntactic phenomena in the absence of formal features such as those needed for feature-driven Merge (see, e.g., Safir (2019) for recent work on this).

The other question raised by feature-driven Merge concerns its exact technical implementation. One option is that Merge is indeed directly triggered by Merge features. The other (cf. Collins 2002, Müller 2010, Zeijlstra 2020) is that Merge per se is free after all, but there is a condition, formulated for instance as in (29), that is checked after each Merge step.

(29) Merge condition:
Merge enables an immediate discharge of a categorial selection feature.

Both of these options are viable in my view, and the choice between them does not affect the current work. I now turn to labeling. As mentioned in fn. 3, I use the terms *labeling* and *projection* as mutually interchangeable and assume that they refer to an operation that determines the features on the basis of which formed constituents are identified in the derivation. In the tree structures above, features selected as a label appear on the node immediately dominating the merged objects (cf. Chomsky (1995a)). This is, however, a purely representational notation that is equivalent to the set-theoretic notation embraced in Chomsky (2013, 2015) (see also Seely (2006) for criticism). The two equivalent notations are shown in (30) and (31). Following common conventions, I also distinguish between A and AP to indicate terminals versus branching constituents.

(30) Tree-theoretic notation

(31) Set-theoretic notation
{AP, { A, BP }

I further assume that at least the category and the active features of a syntactic object contribute to the label. This assumption is necessary for what I call second-order selection features, i.e., the possibility of selecting not only for a category but also for other features of a target. So far, the second-order selection feature has been used in the derivation of relative clauses to ensure that the head NP enters the derivation

with an unchecked selection feature. Second-order selection features will also underlie the analysis of the obligatory left-peripheral position of relatives with ICA in Moksha (see section 5.3), and I will present further phenomena providing evidence for the necessity of second-order selection features in Chapter 6.

Finally, the projection-by-selection algorithm endorsed here is criticized for some empirical and conceptual reasons and competes with a number of alternative algorithms, most notably the non-deterministic labeling algorithm proposed by Chomsky (2013, 2015), as well as the label-less syntax pursued by Collins (2002), exocentric labeling by Adger (2012), and the feature-percolation approach by Zeijlstra (2020). I will return to the main problems of projection by selection and review some of its alternatives later (see section 5.3 and Chapter 6).

5.2.4.2 Projecting movement

The concept of projecting movement is not new in generative syntax: projecting movement of terminals has sometimes been used to derive extended functional projections and head movement (see Pesetsky 1985, Ackema, Neeleman, & Weerman 1993, Haider 2000, Koeneman 2000, Bury 2003, Fanselow 2003, Surányi 2005, Georgi & Müller 2010, Müller 2011, Börjesson & Müller 2020). It has also been proposed that wh-words can project upon movement to the left periphery, giving rise to free relative clauses (see Bury 2003, Donati 2006, Citko 2008b) or even complement clauses (see Bayer & Brandner 2008). Bhatt (2002) also envisages and discusses the possibility of projecting movement in headed relative clauses, but ultimately rejects this option due to complications in its technical implementation. In the majority of these proposals, the projecting syntactic object is a terminal, but some proposals also allow for the projecting movement of a branching constituent (see Hornstein & Uriagereka 2002, Bury 2003, Georgi & Müller 2010, Sato 2010). The motivation for projection in the landing site differs across approaches: for instance, Donati (2006) suggests that the displaced syntactic object can project simply by virtue of being a head (cf. the labeling algorithm proposed by Chomsky 2013, 2015), while Fanselow (2003) (see also Surányi 2005 and Georgi & Müller 2010) proposes that the movement is triggered by features on the displaced syntactic object, which allows it to project in the landing site. Fanselow calls such movement Münchhausen-style movement, after the German literary character Baron Münchhausen, who saved himself from drowning by pulling himself up by his own hair. My analysis of projecting movement also employs the idea that movement is triggered by features on the moved syntactic object and thus largely relies on this previous work, but extends it to a clear case of projecting movement for branching constituents.

While the idea of projecting movement has been pursued in some work, it has also been explicitly rejected by Chomsky (1995a,b) (see also Brody 1998). There are

at least three commonly discussed reasons why projecting movement was rejected in the late Government and Binding framework as well as in early Minimalism:

First, according to the Uniformity Condition, members of a chain must be identical with respect to their phrase-structural status; that is, a displaced syntactic object must be either minimal or maximal in both the launching and the landing sites (see Chomsky 1995b: 232). This is not the case under projecting movement, where a displaced syntactic object is maximal before, but not after, movement. As a result, projecting movement is possible only if the Uniformity Condition is not part of the grammar.

Second, projecting movement was sometimes claimed to violate Greed, incorporated in the definition of Attract in (Chomsky 1995b). This condition prevents syntactic objects from participating in operations unless an operation satisfies a need of that syntactic object. Under the current implementation of projecting movement, a projecting object gets to check its feature upon movement, so Greed is satisfied.

Third, projecting movement violates the Projection Principle proposed by Chomsky (1981, 1986: 84). This principle requires all selection requirements of syntactic objects to be satisfied throughout the derivation. It is violated by projecting movement because a syntactic object that projects after movement must be selected with an unchecked Merge feature earlier in the derivation. There are, however, two further considerations. First, it seems that the Projection Principle was initially intended to regulate the selection of arguments, but relative clauses are non-obligatory modifiers of noun phrases and may therefore be outside the scope of this principle, even though their Merge is also driven by features under the current approach (cf. the discussion in Chapter 6). Second, there are further reasons to doubt the Projection Principle. One clear case where it is not respected is late merge (see Lebeaux 1988, 1990 and Takahashi & Hulsey 2009). A syntactic object that is targeted by late merge must be part of the derivation before one of its Merge features can be satisfied by a late-merged object. To incorporate late merge, Takahashi & Hulsey (2009) (see also Fox 2002, Bhatt & Pancheva 2004) reject the Projection Principle and claim that what can be merged later is regulated by interpretability at LF; that is, delayed satisfaction of selection is possible as long as the derivation remains interpretable. This is the case under the late merge of adjuncts, because they are attached by Predicate Modification, and for restrictors of moved operators/determiners, because, following Trace Conversion (Fox 1999), they are supplied to lower copies of the operator by the Variable Insertion operation in any case. Late merge is, however, not the only violation of the Projection Principle in Minimalism. As noted by Müller (2022), the Projection Principle is regularly violated at intermediate stages of structure building, when a head has entered the derivation and merged with its complement but not yet with the specifier, so that its second selectional feature is not yet satisfied.

5.2.4.3 Locality

Before proceeding with the analysis of relatives with ICA in Moksha, I would like to briefly address another common criticism of the raising derivation. It concerns the movement of the head of the relative clause, which seems to violate locality restrictions otherwise imposed on movement in a language. Some examples illustrating this are given in (32) and (33). The examples in (32) come from German and show that the head of the relative clause can correspond to a position inside a PP. It must therefore move out of the PP under the raising analysis, even though PPs in German are usually opaque to the movement of a full lexical noun.

(32) a. die Geschichte, [[mit der __] alles angefangen hat]
ART history with ART everything started
'the story with which everything started'

b. *Welche Geschichte hat alles [mit __] angefangen?
which story has everything with
'With which story did everything start?' (Heck 2005)

Similarly, the English example in (33) shows that the head of the relative clause can be embedded within a possessor. Movement out of possessors is otherwise claimed to be ungrammatical in English.

(33) the student [[whose __ brother's band] Jonah likes] (Bhatt 2002: 81)

One simple response to this problem is that the relative clauses presented above are not derived by raising, but instead instantiate a different derivation (see Bhatt 2002). In Chapter 4, I have indeed argued for the co-existence of the raising and head-external analyses, so that these relatives might be derived by a head-external structure and therefore do not require illegitimate movement of the head.

Bhatt (2002) provides further data in support of the hypothesis that the heads of relative clauses as in (33) do not move out of the relative CP. The data are given in (34). They show that the low reading of the superlative, expected under the raising derivation, is absent for such relatives.

(34) the **first** movie [whose __ score John said that Shostakovich composed]

a. High reading (available): the first movie whose score John ever said that Shostakovich composed

b. Low reading (unavailable): *the first movie whose score John said that Shostakovich ever composed (Bhatt 2002: 82)

However, the empirical picture turns out to be more controversial: Sportiche (2017) claims that relative clauses with extraction out of the possessor are derived by raising. His argument is based on the so-called Heim's ambiguity (Heim 1979), shown in (35). Harris (2008) argues that the two readings correspond to two different derivations: Reading A is enabled by matching, because it allows the situation variables in the external and the internal head to be valued differently. Reading B arises under raising, because there is just one instance of the head and its situation variable is bound within the embedded clause.

(35) John guessed the price [that Mary guessed]

a. Reading A: John and Mary's guesses are independent; John and Mary need not have guessed anything about the other, but they must at least have guessed the identity of the same price (or price-product pair).

b. Reading B: John's guess is about Mary's guess, though he need not have guessed anything more about prices himself. (Harris 2008)

Sportiche (2017) applies this diagnostic to relative clauses with extraction from a possessor and claims that the second reading, which is derived by raising, is grammatical at least for some speakers.

(36) John guessed the integer whose prime factors' exponents Mary guessed

a. Reading A: John and Mary happened to guess related numbers (John an integer, Mary the exponents of the prime factors of this integer) but not necessarily anything about one another. John and Mary need not even know of the other's existence.

b. Reading B: John guessed something about Mary; that is, John guessed the answer to the question "Mary guessed the exponents of the prime factors of what integer?". (Sportiche 2017)

While the literature seems to lack arguments for raising based on more standard diagnostics, let us nevertheless assume that relatives with otherwise illegitimate movement can be derived by raising, and that implementations of raising must be able to account for this. The first step would then be to clearly identify the reasons why the relevant movements are excluded in other constructions, and, as noted by Sportiche (2017), these reasons are often not completely clear and are subject to independent debate; see, e.g., Davis (2021), who shows that possessor extraction in English is possible at least in some cases, pace earlier claims. Here, I will not delve into restrictions on extraction in German or English, but would like to point out that, under the proposed implementation of raising, movement of the head of the

relative clause differs, for instance, from wh-movement in ways that are relevant for locality: movement is triggered by a [•CP_{rel}•] feature that probes upwards. First, since the feature triggering movement is on the NP, there is a clear indication that this NP undergoes movement and thus needs to move to the phase edge and avoid phasal spell-out. Second, since search applies upwards and targets the relative CP, it is expected to have interveners different from those involved in downward search for a noun phrase. In particular, other noun phrases are not expected to act as interveners for this movement.

5.3 Left periphery restriction

5.3.1 Analysis

In this section, I return to relatives with ICA in Moksha and present an analysis of the left-periphery restriction. Recall from section 3.3.2 that relatives with ICA cannot follow the main clause material, but must appear in the left periphery:

(37) GEN ← DAT

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

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

I have also argued that the position on the left is a derived one: relatives with ICA are first merged in a regular nominal position in the main clause, but are then obligatorily displaced to the left, as shown in (39).

(39) Relative clauses with ICA

a. [$_{MC}$ ... predicate ... [head [$_{CP}$ ...]] ...]

b. [[head [$_{CP}$ ...]] [$_{MC}$ ... predicate ... ___ ...]

Relatives with ICA thus present a pattern that I will call a forced ex-situ effect (also known as local instability; see Ott (2012, 2015)). It is schematically shown in (40). Here, two syntactic objects, XP and YP, form a constituent at an intermediate stage of the derivation, but the constituent must be destroyed before the derivation terminates.

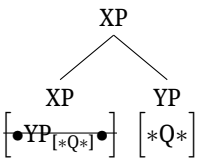
(40) a. Intermediate: [XP YP] – OK

b. Final: YP [XP _] – OK

c. Final: [XP YP] – *

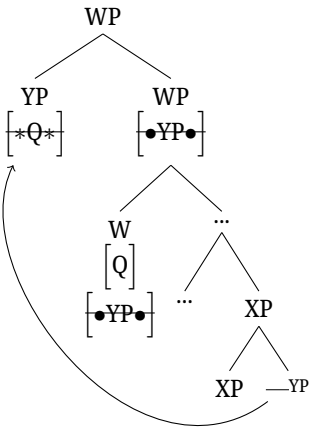
I suggest that the forced ex-situ effect is derived by second-order selection features under the projection-by-selection algorithm. Consider the sample derivation below. In (41), XP selects YP with an active feature. Suppose next that this active feature unambiguously indicates that the syntactic object that bears it will move out. This is the case if the active feature is a Merge feature like the one on the head of the relative clause, but also if it is an Agree feature for a dependency that regularly leads to movement in a given language. One such Agree feature is, for instance, [∗Q∗] on a wh-word in a language where wh-words move to the left.[6] In that case, if a syntactic object XP selects YP with an unchecked [∗Q∗] feature, it follows that the constituent [XP YP] will not persist until the end of the derivation, because YP will be attracted by a higher W head.

(41) Intermediate



6 I assume that if movement of wh-words is generally present in a language but applies optionally, as in Moksha, then wh-phrases that move to the left have the [∗Q∗] probe, while those that stay in situ do not.

(42) Final



This applies to the forced ex-situ effect in Moksha relative clauses as follows. Relative clauses 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[7] and I would like to suggest that this restriction arises because verbal heads in fact select for nouns with an unchecked case feature; see (43). The requirement is loosened in Moksha as well as in other languages with ICA, so that the nature of the unchecked agreement feature is underspecified, as in (44). This allows the head of the relative clause, which already has case from inside the relative CP, to move to another case position, but in that case the DP must have a further unchecked probe. The nature of this probe is not restricted: it can be, for instance, a topic, a focus, or a Q feature, but all of these features ultimately result in the movement of the DP (including the relative clause) to the left.

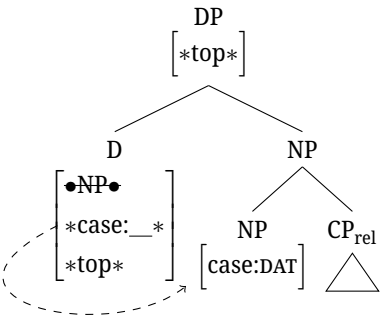
(43) No ICA: V
$[\bullet D_{[*case*]}\bullet]$

7 One clear case of movement from one case position to another is hyperraising, but known examples from languages with case marking show that hyperraised nouns bear case assigned after movement, in the main clause (see Fong 2019 and Zyman 2022), and thus pattern with the raising derivation without ICA. Following the analysis in section 5.2.3, this case does not involve movement of a case-marked noun to another case position, but rather delayed valuation of case, which is possible because the case probe is ordered after the feature checked upon movement.

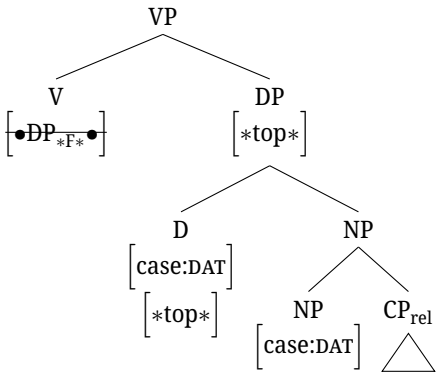
(44) With ICA: V
[•D$_{[*F*]}$•]

Let us now consider how this derives the left-peripheral position of relatives with ICA. The relevant part of the derivation starts with the step in (45), where the head with a valued case feature is moved out of the relative CP and the case of the external D head is already valued by the internal case. In the next step, given in (46), the DP that includes the relative clause is selected by the head of the main clause. It is V in this derivation. The V head has the selection feature [•D$_{[*F*]}$•], and the DP can satisfy it only if it has an active agreement feature. This active agreement feature is usually an unvalued case probe, but this is not possible in relatives with ICA, as the head has already received case inside the relative clause. The DP must therefore have yet another active probe to satisfy the selection requirement. In this derivation, I assume that this is [*top*].

(45) External D

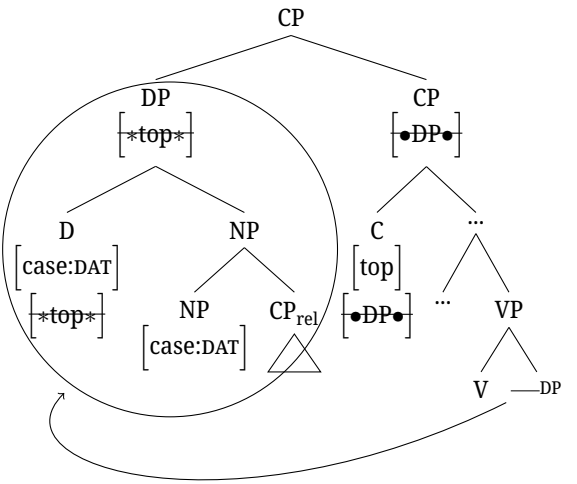


(46) Selection in the main clause



Due to its active topic probe, the DP agrees with the C head and is then attracted to its specifier (see (47)). This inevitably leads to an ex-situ position of the DP and thus derives the effect.

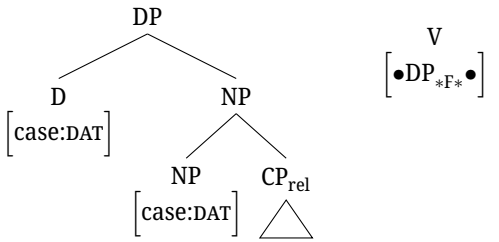
(47) Movement to the left



Notably, if a DP that contains a 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 (48).[8] This excludes the in-situ position of relatives with ICA.

8 In Chapter 3, I have also shown that a DP that contains a relative clause with ICA can be coordinated with a noun phrase that has regular case. This provides one of the arguments for base generation in a regular argument position and subsequent displacement to the left. Coordination, however, also raises further questions for the proposed analysis of obligatory displacement to the left, because main clause projections then select for a coordinated constituent. The problem is not specific to the current case, but is inherent to coordination: there are several processes (see, e.g., identical inflection on coordinated predicates) that require external projections to interact with each conjunct individually. Independently of a formal implementation, I assume that for a coordinated constituent to fulfill the selection requirements of a higher head, these requirements must be satisfied by each of the conjuncts (see Huddleston & Pullum (2002: 1323), Patejuk & Przepiórkowski (2022)).

(48) *Relatives with ICA: No additional probe



Before the analysis is complete, two adjustments are required. First, if the presence of any active probe is sufficient to satisfy the selection requirement of a head that selects the DP, one might wonder why a feature corresponding to some local clause-internal displacement cannot play the role of the active probe on the DP. I assume that 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. There does not seem to be any other meaningful feature that could be present on a DP and be checked upon such movements. I further suggest that the same holds for local clause-internal scrambling, which must be possible in Moksha, as the language has a rather free word order (see section 2.1). Unlike movements to the left periphery, such as wh-movement or topicalization, which require an active feature on the displaced noun phrase, clause-internal scrambling is driven by optional EPP features (or [•DP•] in the current notation) on clausal heads, but does not require active features on DPs themselves (cf. Miyagawa (2001), Bailyn (2004)). As a result, even if a DP that contains a relative clause with ICA undergoes such movement, it will still lack a further unchecked feature necessary to fulfill the selection requirement and be merged with the main clause material.

Second, if the presence of an active feature that leads to movement to the left edge is sufficient to satisfy the selection requirement, it is expected that further syntactic objects may move to the left across an already displaced relative clause, so that the latter is not the leftmost syntactic object in a clause after all. In section 3.3.2, I have reported that relatives can follow adjuncts (see (49)), but the position after arguments is grammatical only for some speakers (see (50)).

(49) NOM ← GEN

Sa-j kizə-tʹ **[sʹora-nʹɛ-tʹ** [kona-nʹ Katʹɛ
come-PTCP.ACT summer-DEF.SG.GEN boy-DIM-DEF.SG.GEN which-GEN Katja
tona-ft-əzʹə luv-əmə]] škola-v molʹ-i.
learn-CAUS-PST.3SG.O.3SG.S read-INF school-LAT go-NPST.3[SG]
'Next year the boy whom Katja teaches to read will go to school.'

(50) GEN ← DAT

'Katja threw away the cubboard where I put the photos.'//

?Katʹɛ **[škaf-tʹi** [kona-nʹdʹi mon put-inʹə
Katja cupboard-DEF.SG.DAT which-DAT I put-PST.3.O.1SG.S
fətəgrafijə-tʹnʹə-nʹ]] jorda-zʹə.
photo-DEF.PL-GEN throw.away-PST.3SG.O.3SG.S

I assume that adjuncts can be base-generated in the left periphery and therefore freely precede relatives with ICA. Arguments, on the other hand, must move to the left across a displaced relative clause. This is impossible for some speakers due to defective intervention: a DP with the relative clause already moved to Spec,CP intervenes and blocks probing for another DP with analogous features (see Fanselow 1996, Ferguson & Groat 1994, Starke 2001, Rizzi 2004, Haegeman 2012). This presupposes that all Ā-related features targeted by movement to Spec,CP form a natural class. Further support for this assumption in Moksha comes from extraction out of the relative CP, which shows a very similar restriction on movement across the relative pronoun (see the data in section 3.3.4 and the analysis in section 5.4.2 below).

As a result, the position of relatives with ICA in Moksha is determined by the interpretation of selection requirements of main clause heads and the rigid structure of the left periphery. This seems to be a welcome outcome: reviewing ICA in different languages, Abramovitz (2021) shows that while relatives with ICA are always displaced to the left,[9] the exact position of a relative clause varies with respect to whether it can follow phrases dislocated to the left. This state of affairs is derived by my analysis if second-order selection underlying movement to the left is uniform across all languages with ICA, while the properties of the left periphery and the possibility of movement across the relative clause vary.

9 Abramovitz (2021) argues that relatives with ICA are internally-headed. Relative clauses in West African Gur languages illustrate the same relativization type but allow the relative clause to remain in situ. I have argued that relatives with ICA are externally-headed and consequently cannot be of the same type as internally-headed relatives in Gur.

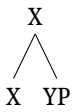
To sum up, I have suggested that the obligatory left-peripheral position of relatives with ICA follows from the requirement for DPs to have an active probe when they enter the derivation. This requirement is formally implemented by means of second-order Merge features that allow selection to apply not only to a category, but also to further active features of the selected syntactic object. Note that the idea of selection for further unsaturated features is not new. It is used in Categorial Grammar (see Steedman 2014, i.a.), where selection often applies to further unsaturated features. The proposal here is, however, different in that the active features that selection applies to are not automatically checked upon Merge, but remain active on a selected syntactic object. As a result, local selection of a syntactic object with some active feature determines how the selected syntactic object will behave later in the derivation and thus whether the created constituent will be destroyed before the derivation terminates.

5.3.2 The alternative

One previous account of forced ex-situ effects was suggested by Ott (2012, 2015) on the basis of the novel labeling algorithm proposed by Chomsky (2013, 2015) and further developed by Epstein, Kitahara, & Seely (2014, 2020), Bošković (2016), Ginsburg (2016), Rizzi (2016), Hayashi (2020), Moro & Roberts (2020), Nakashima (2020), Blümel (2022), Ke (2022), McInnerney (2022), among others. I will now briefly introduce this labeling algorithm. It is formulated in a system where Merge is not triggered by features, but applies freely. As a result, labeling is not required for selection in syntax and takes place at the phase level after all Merge operations have applied. The underlying idea is that labeling applies under Minimal Search and its outcome depends on the phrase-structural status of the merged syntactic objects. Three configurations are distinguished: Merge of a head (i.e., a syntactic terminal) with a phrase, Merge of two phrases, and Merge of two heads. Let us consider these three cases one by one.

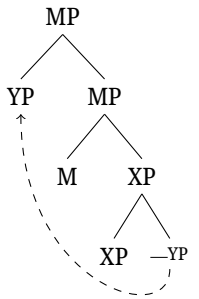
First, if a head is merged with a phrase, being an atomic computational item, the head determines the label, as shown in (51). As pointed out by Rizzi (2016), a significant complication is introduced by head movement, because complex syntactic objects created by head movement seem to count as heads for labeling, and the property of being a head must then essentially be encoded as a diacritic.

(51) {X, YP}

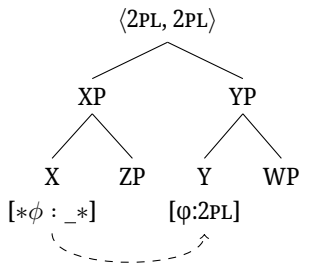


The second relevant configuration is created by the Merge of two phrases. Chomsky (2013) suggests that Minimal Search finds the two heads of the merged phrases and thus does not yield an unambiguous result. There are then two ways to avoid a crash and determine a label. First, one of the merged phrases may undergo further movement and thereby, by assumption, become invisible to the labeling algorithm. The remaining phrase then provides the label; see (52). Second, if the heads of the two merged phrases agree in some feature, this feature is then taken as the label for the created constituent; see (53). Note that in the latter case, it is not the category that provides the label, but a feature present on both heads.

(52) {XP, YP}: Movement



(53) {XP, YP}: Agreement



The third configuration relevant for the labeling algorithm is created by the Merge of two heads. Chomsky (2013) considers this configuration on the basis of a category-defining head and a root and suggests that, since roots have no category, the category-defining head always provides the label. Chomsky (2015) further complicates the algorithm by introducing the concept of a weak head that, by definition, cannot provide a label. Thus, if two heads are merged, one of them must be weak, so that the other can label. This addition has implications for the first {X,YP} configuration in that a weak head also cannot provide a label when merged with a phrase, but it can be strengthened by other features and then label.

Building on this labeling algorithm, Ott (2012, 2015) suggests an analysis of forced ex-situ effects. The analysis utilizes the configuration where two phrases are merged but do not agree in any feature, so that, for labeling to be possible, one of the phrases must move out. The failure to label thus ensures that a constituent formed at an earlier stage of the derivation must be destroyed before labeling applies at the phase level. Ott (2012, 2015) applies this analysis to derive split topicalization constructions in German, to which I will return in the next chapter. Here, I investigate whether this analysis derives the obligatory left-dislocation of relatives with ICA in Moksha. For the analysis to apply to the Moksha data, two preconditions must be met. First, DPs containing a relative clause with ICA must merge with another phrase, not with a head. Second, the heads of the two merged phrases cannot share features. I will show that both of these requirements are not fulfilled.

Starting with the first one, DPs with relative clauses can be merged in any argument or adjunct positions in the main clause, and in some of these positions DPs are standardly assumed to merge with a head. One such case is, for instance, the direct object position, where a DP is merged directly with the V head. Nevertheless, direct object relative clauses with ICA must also be moved to the left; see (54).

(54) GEN ← NOM

Uča-**t'n'ə**	[kona-t'n'ə	ašč-iʲ̊-t	kut-t'	ingəl-ə]	mon'
sheep-DEF.PL	which-PL	be-PST.3-PL	house-DEF.SG.GEN	before-LOC	I.GEN
al'n'ɛka-z'ə	l'ɛc'-əz'ən'.				
uncle-1SG.POSS.SG	shoot-PST.3PL.O.3SG.S				

'My uncle shot the sheep that are in front of the house.'

Pushing this analysis further, one may explore the notion of weak heads added to the model in Chomsky (2015). In this case, V (or R in Chomsky's notation) must be strengthened by Agree before it can provide a label. Chomsky proposes that the head agrees with the direct object. This agreement is not overtly realized in numerous languages, where it must be postulated, but it can be overt in Moksha and is also

present in RCs with ICA; see (54) again. Hence, there is no problem for labeling and no reason for movement of RCs with ICA to the left edge.

Turning now to the second requirement, namely that the heads of the two merged phrases do not agree, this also does not hold in all configurations where the DP with ICA merges with another phrase. While DPs with ICA do not receive case in the main clause, φ-agreement applies to them as it does to regular arguments; see (55) for subject agreement and (54) above for object agreement.

(55) NOM ← DAT

[Pinʹə-tʹnʹ-**nʹdʹi** [kona-tʹnʹ-nʹdʹi maks-inʹə jaŗca-ma-tʹ]]
dog-DEF.PL-DAT which-PL-DAT give-PST.3.O.1SG.S eat-NZR-DEF.SG.GEN
ašč-iǰ-tʹ dvor-sə.
be-NPST.3-PL yard-IN
'The dogs that I gave food to are in the yard.'

Overt agreement in φ-features shows that there is a head in the main clause that shares features with the DP and thus that labeling by shared features is predicted to be possible. For instance, in the case of subject agreement in (55), independently of whether it is TP or vP that hosts the subject agreement probe in Moksha, the subject DP with ICA must then be able to stay in the specifier of one of these projections that agrees with it, according to Chomsky's labeling algorithm. Testing this prediction is complicated by the fact that subjects are usually at the beginning of the sentence, so that it is not immediately clear whether they move to Spec,CP as well. The data in (56)–(57) suggest that subjects are also displaced. Example (56) shows that the relative clause is positioned before the TP-level adverb, which must precede other TP-internal material under standard assumptions.

(56) NOM ← DAT

[Jalga-zʹə-**nʹdʹi** [kona-nʹdʹi mon zvonʹ-ənʹ]] navernə
friend-1SG.POSS.SG-DAT which-DAT I call-PST.1SG probably
sɛv-inʹə knʹiga-tʹ.
take-PST.3.O.1SG.S book-DEF.SG.GEN
'Probably my friend whom I called to has taken the book.'

The examples in (57) further include a direct object that is scrambled across the adverb. Sentence (57a) shows that the relative clause with ICA is to the left of both the direct object and the adverb. Sentence (57b) demonstrates that the relative clause cannot follow the adverb, as would be expected if it could remain in Spec,TP or Spec,vP.

(57) a. NOM ← DAT

[Jalga-z'ə-**n'd'i** [kona-n'd'i mon zvon'-ən']] kn'iga-t'
friend-1SG.POSS.SG-DAT which-DAT I call-PST.1SG book-DEF.SG.GEN
navernə sɛv-in'ə.
probably take-PST.3.O.1SG.S

'Probably my friend whom I called to has taken the book.'

b. NOM ← DAT

*Kn'iga-t' navernə [jalga-**z'ə-n'd'i** [kona-n'd'i mon
book-DEF.SG.GEN probably friend-1SG.POSS.SG-DAT which-DAT I
zvon'-ən']] sɛv-in'ə.
call-PST.1SG take-PST.3.O.1SG.S

'Probably my friend whom I called to has taken the book.'

To sum up, I have considered an alternative analysis of forced ex-situ effects that is based on Chomsky's labeling algorithm. According to this analysis, some formed constituents are unlabelable unless one of the merged syntactic objects moves out. I have shown that this analysis does not account for the forced ex-situ effects in Moksha, because a constituent that a DP with ICA forms with the main clause material can often be labeled without movement. As a result, the analysis does not extend to the Moksha data, even though they clearly show the same pattern as the core data the analysis was developed for. I suggest that this undermines the approach in general, thereby also weakening some of the empirical foundation of this approach to labeling. In Chapter 6, I will show that the analysis relying on the projection-by-selection algorithm proposed here can account for the data that motivated this alternative, as well as for further similar patterns in other languages.

5.4 Further properties

In this section, I go through the remaining properties of relative clauses with ICA and show how they are accounted under the current proposal. I begin with coordination and extraposition in section 5.4.1, then turn to movement out of the relative clause in section 5.4.2. In section 5.4.3, I discuss the appositive interpretation and speculate on how it can be reconciled with the raising structure. Finally, I will present an analysis of case mismatches in section 5.4.4.

5.4.1 Extraposition and coordination

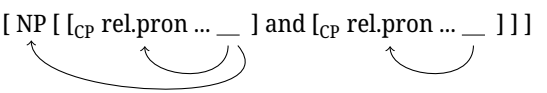
In section 3.3.3, I have demonstrated how standard constituency diagnostics, such as coordination and extraposition, apply to relative clauses with ICA. The data show that coordination of two relative CPs under one head with internal case is possible; see (58).

(58) NOM ← GEN

Jalga-t' **[kona-n'** vɛt'-in'ə kud-u] i **[kona-n'**
friend-DEF.SG.GEN which-GEN bring-PST.3.O.1SG.S house-LAT and which-GEN
and-in'ə l'ɛm-də] kurək n'i tu-j.
feed-PST.3.O.1SG.S soup-ABL soon already go-NPST.3[SG]
'The friend whom I brought home and to whom I gave soup is leaving soon.'

The coordination is expected if the head with internal case is outside the relative CP, as I have proposed above. A complication, however, arises from the raising analysis: it implies that the head undergoes across-the-board (ATB) movement out of the coordinated CPs. I assume an asymmetric approach to ATB-movement, under which extraction takes place only from one conjunct and is accompanied by movement of an operator (a relative pronoun, in this case) in the other conjunct (see Munn 1993, Franks 1995). The structure of coordinated relative clauses with ICA is then summarized in (59).

(59) Coordination of relatives with ICA



In (58), the same case is assigned to the relativized constituent in both conjuncts. The examples in (60a-b) show different cases assigned to the relativized position. These examples show that the head can be marked for case from either of the two conjuncts. This suggests that movement can proceed from either the first or the second conjunct.

(60) a. NOM ← GEN

Jalga-t' **[kona-n'** vɛt'-in'ə kud-u] i
friend-DEF.SG.GEN which-GEN bring-PST.3.O.1SG.S house-LAT and

[kona-n'd'i n'ɛft'-in'ə od škaf-t'] kurə n'i
which-DAT show-PST.3.O.1SG.S new cupboard-DEF.SG.GEN soon already

tu-j.
go-NPST.3[SG]

'The friend whom I brought home and whom I showed the new cupboard to is going to leave soon.'

b. NOM ← DAT

Jalga-t'i **[kona-n'** vɛt'-in'ə kud-u] i
friend-DEF.SG.DAT which-GEN bring-PST.3.O.1SG.S house-LAT and

[kona-n'd'i n'ɛft'-in'ə od škaf-t'] kurək
which-DAT show-PST.3.O.1SG.S new cupboard-DEF.SG.GEN soon

n'i tu-j.
already go-NPST.3[SG]

'The friend whom I brought home and whom I showed the new cupboard to is going to leave soon.'

These data seem to violate the parallelism condition imposed on ATB-movement. There are, however, at least three interpretations of this condition. Under the first, and most general, interpretation, it requires that there be movement dependencies targeting the base position of the ATB-moved constituent in both conjuncts, which is indeed the case in the Moksha examples. Under the second interpretation, it is required that the syntactic position of the extracted syntactic object be identical in both conjuncts. This condition is not met in (61), where the gap is in the direct object position in the first relative CP and in the indirect object position in the second. There are, however, attested cases in other languages where ATB movement is grammatical despite differences in the syntactic positions of the moved constituent (cf. the discussion by Hartmann, Konietzko, & Salzmann 2016). Under the final interpretation of the parallelism condition, it is the morphological case marking on the ATB-moved constituent that must realize the case assigned to the corresponding position in both conjuncts (see Borsley 1983, Franks 1993, Hein & Murphy 2020). This condition is violated in the examples above, where the genitive is assigned in the first conjunct, the dative in the second, and the ATB-moved head realizes only one of these cases. ATB-movement of the head of the relative clause, however, differs from other instances of ATB-movement in that movement proceeds to a case position, and consequently, for regular externally-headed relative clauses, the head

always shows a case different from the one assigned in the relative clause. Despite the fact that the head preserves the case assigned in the relative clause under ICA, I suggest that parallelism in case is not present for relative clauses in general and thus does not apply here. It remains for further research to show how this can be implemented and reconciled with existing approaches to the parallelism condition.

I now turn to extraposition. The data in (61), repeated from Chapter 3, show that extraposition of the relative CP is ungrammatical if the head is marked for internal case.

(61) a. NOM ← DAT

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

b. NOM ← DAT

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

Abramovitz (2021) takes analogous data in Koryak as an indication that relative clauses with ICA are internally-headed. In section 3.3.3, I have, however, claimed that the ban on extraposition is typical of raising relative clauses and is therefore expected for relatives with ICA. The account of the incompatibility of extraposition with the raising derivation is based on the analysis of extraposition by Fox & Nissenbaum (1999). According to this approach, extraposition of adjuncts is derived by silent movement of the host, with subsequent late adjunction in the dislocated position. For relative clauses, the derivation is schematized in (62).

(62) 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 ...]]]

Hulsey & Sauerland (2006) (see also Takahashi & Hulsey 2009) use this analysis to derive the ban on extraposition in raising relative clauses. Since, under the raising derivation, the head of the relative clause moves out of the relative CP, it inevitably merges with this CP before it can be merged with any main clause material. Consequently, the head cannot undergo movement in the main clause before the relative CP late-adjoins to it, as required by the approach to extraposition sketched above. Hulsey & Sauerland (2006) also position the head of the relative clause inside the relative CP, in its highest specifier, but this position of the head has no impact on extraposition: having a final landing site outside the relative CP, the head that originates in the relative CP still cannot be merged with the main clause first, and thus extraposition is still excluded.

Recall that relatives with external case allow for extraposition in Moksha (see (63)). As argued in Chapter 4, these relatives instantiate the head-external structure, and thus nothing prevents the late merge of the relative CP with the displaced head, as shown in (62).

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

5.4.2 Extraction out of the relative clause

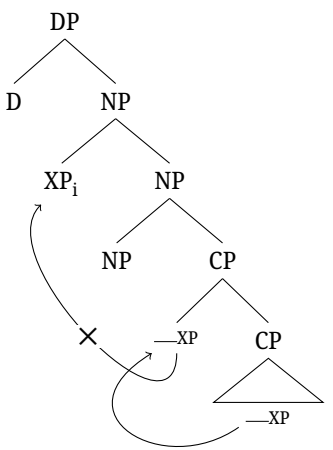
In section 3.3.4, I have shown that relatives with internal case allow extraction out of the relative CP (see (64)), but that this is ungrammatical for relatives with external case (see (65)).

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

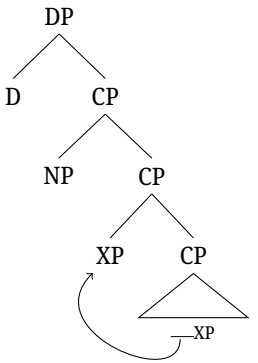
(65) *Bibl'iat'eka-stə **[jalga-z'ə** [kona-n'd'i mon sɛv-in'ə
library-EL friend-1SG.POSS.SG which-DAT I take-PST.3.O.1SG.S
kn'iga-t' __]] kelk-si luv-əm-s.
book-DEF.SG.GEN love-NPST.3SG.O.3SG.S read-INF-ILL
'My friend for whom I borrowed the book from the library loves to read.'

Extraction out of the relative clause is surprising, given that relative clauses are complex noun phrase islands, one of the textbook examples of island structures (see Ross 1967). Nevertheless, 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. She claims that extraction out of the relative CP is ungrammatical under the non-raising structure shown in (66), because the NP (not the DP) and the CP are phases, and the extracted syntactic object has to pass through both of their specifiers, which is, however, prohibited by antilocality; that is, movement from Spec,CP to Spec,DP is ruled out as too local. She further assumes that the head of the relative clause is in Spec,CP under the raising derivation (see (67)), so that the extracted syntactic object is accessible for further movement in Spec,CP and there is no need for the illegitimate short movement.

(66) *Extraction



(67) ^{OK}Extraction



This analysis relies on the placement of the head in the specifier of the CP and therefore is incompatible with the current implementation of raising. Nevertheless, following the gist of Sichel's analysis, I would like to suggest that extraction out of the relative clause in Moksha is related to the raising derivation, and to the internal case marking on the head in particular. I assume that CPs as well as DPs (Svenonius 2004, Matushansky 2004, Bošković 2014) are phases and are subject to the Phase Impenetrability Condition (PIC) given in (68).

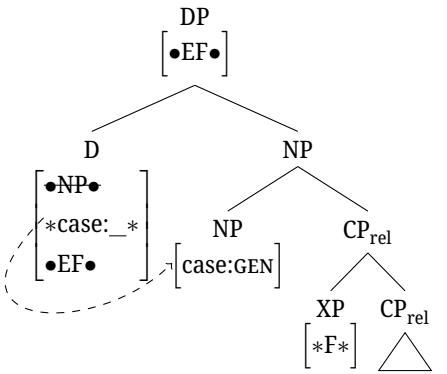
(68) Phase impenetrability condition:
In phase α with head H, the domain of H is not accessible to operations outside α, only H and its edge are accessible to such operations. (Chomsky 2000: 108)

Under the PIC, to be extracted out of a phase, a syntactic object must first move to its edge. I assume that this movement is triggered by optional edge features on phase heads (see Chomsky 2008). Applied to movement out of relative clauses, this means that extracted syntactic objects must move to the CP edge and then to the DP edge. I propose that it is the second step, i.e., movement to the DP edge, that is impossible in relatives with external case. In particular, I suggest that 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 receives its case.

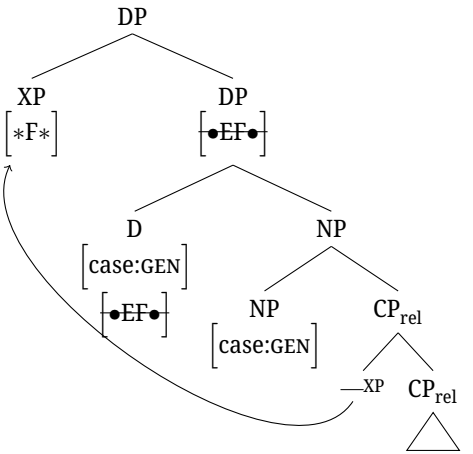
As heads of relative clauses with ICA have case from inside the relative clause, their edge features are readily available when the DP is first built. This allows syntactic objects to move from the CP edge to the DP edge before material in the complement of the D head is rendered inaccessible. This part of the derivation is illustrated in (69)–(70). In (69), the D head is introduced into the derivation and it receives internal case from the NP. The XP that must be extracted out of the relative clause is

in the specifier of the CP at this point. Case assignment makes the edge features that are ordered after the case probe accessible, so that the extracted XP can move to Spec,DP, as shown in (70).

(69) External D gets case

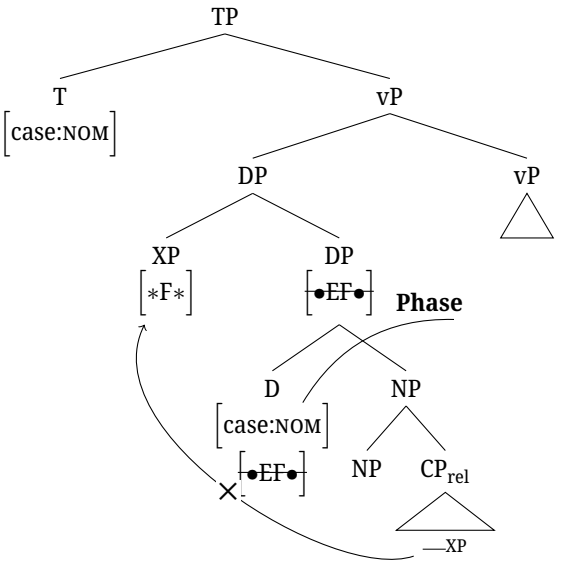


(70) Movement to DP edge



Heads of regular externally-headed relatives, by contrast, receive case from higher projections in the main clause. As a result, when the D head receives case and its edge features become available, the material inside the complement is already rendered inaccessible for movement, so that the extracted syntactic object is trapped in Spec,CP and the derivation cannot succeed; see (71).

(71) *Extraction



Note that for case assignment to the NP across the phasal D-layer, it is required either that Agree in general, or at least upward probing, is exempt from the PIC; cf. Bošković (2007a,b) on the difference in locality domains for movement and agreement.

The analysis also has far-reaching consequences for Moksha syntax: DPs not modified by a relative clause always get their case feature assigned later in the derivation, so that their edge features are also inaccessible until it is too late to extract any DP-internal material to the edge. The analysis thus seems to exclude all extraction out of DPs in Moksha, which is empirically incorrect. One clear case of extraction out of the DP in Moksha that we have already discussed is movement of the head NP. It, however, differs in that movement is triggered by features of the NP itself, so that the PIC, as it is stated in (68), is not violated: the domain of the phase head may still be opaque for search from higher projections. Moreover, it is the whole complement of the D head that undergoes movement, so that the material *inside* the complement may still remain opaque for extraction.

Putting this case aside, the data suggest that Moksha also allows for simpler cases of extraction out of the DP, such as possessor extraction shown in (72).

(72) [T'ɛ ava-t'] Kol'ɛ kepəd'-əz'ə [__ sumka-nc].
this woman-DEF.SG.GEN Kolja lift-PST.3SG.O.3SG.S bag-3SG.POSS.SG.GEN
'Kolja picked up this woman's bag.'

To account for these data, I suggest that syntactic objects that can be extracted out of the DP must be first merged in Spec,DP or moved there due to some DP-internal considerations, but without employing edge features. For instance, for the possessor in example (72), one can assume that it must move to Spec,DP for case assignment.[10] Syntactic objects extracted out of the relative clause are different, because they do not belong to the DP and there can therefore be no independent reasons for them to move to the DP edge.

The proposed analysis accounts for restrictions on extraposition out of RCs with ICA in the following way. Recall that, unlike in Hebrew, in Moksha the extraction of adjuncts is allowed by all speakers, while judgments vary regarding extraction of arguments. Some native speakers do not allow extraction of arguments out of the relative CP (see (73)), and they also do not allow an extracted constituent to be bound inside the relative CP (see (74)).

(73) NOM ← GEN
% Kat'ɛ [kn'iga-**t'** [kona-n' __ sɛv-əz'ə
Katja book-DEF.SG.GEN which-GEN take-PST.3SG.O.3SG.S
bibl'iat'eka-stə]] aščˇ-i stol-sə.
library-EL be-NPST.3[SG] table-IN
'The book that Katja borrowed from the library is on the table.'

(74) NOM ← DAT
* Es'$_i$ bibl'iat'eka-stə **[jalga-z'ə-n'd'i** [kona-n'd'i Kat'ɛ$_i$
self library-EL friend-1SG.POSS.SG-DAT which-DAT Katja
sɛv-əz'ə kn'iga-t' __]] kelk-si luv-əm-s.
take-PST.3SG.O.3SG.S book-DEF.SG.GEN love-NPST.3SG.O.3SG.S read-INF-ILL
'My friend for whom Katja borrowed the book from her library loves to read.'

I suggest that these data converge with the data presented in section 3.3.2 and analyzed in section 5.3 above. They show that adjuncts from the main clause can precede relative clauses with ICA, while for arguments such a position is grammatical

10 Recall that heads raised out of the relative clause can contain a possessor. I suggest that it does not raise to the specifier of the D_{rel} head, because the latter does not assign genitive case. The possessor moves to the specifier of the external D head after the head NP has moved to the main clause.

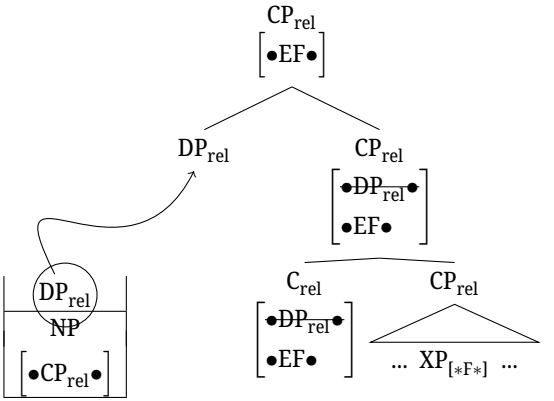
only for some speakers. I have suggested that this pattern arises because adjuncts can be base-generated on the left, while arguments have to move there. This movement is illegitimate for some speakers due to defective intervention: the relative clause displaced to the left earlier blocks further probing for other syntactic objects bearing Ā-related features. This also accounts for the observed restrictions on extraction out of the relative clause: adjuncts can be base-generated in Spec,CP, so that their further extraction is always grammatical. Arguments must move to this position, which turns out to be impossible for speakers sensitive to defective intervention. In this case, the relative pronoun moved to Spec,CP earlier acts as an intervener.[11] This also derives the binding data: speakers sensitive to intervention do not allow extracted adjuncts to be bound in the relative CP, because, to be extracted, they must first be merged at the left edge and are therefore not c-commanded by any material in the relative CP.

To sum up, I have suggested that the difference between relatives with internal and external case with respect to extraction follows from the different timing of case assignment combined with the ordering of the edge feature after the case probe. Note that this account cannot be extended to extraction out of raising relative clauses without ICA in other languages. I suggest that this is again a welcome result, because restrictions on extracted syntactic objects are not identical cross-linguistically. For instance, Sichel (2018) claims that in Hebrew arguments, but not adjuncts, can be extracted, and that extraction is restricted to indefinite heads and existential main clauses (see also Vincent 2021 on restrictions in English). These requirements do not hold in Moksha, so I suggest that distinct mechanisms are responsible for the obviation of relative clause islands in different languages.

Before finishing the section, one further clarification is required: it remains to be shown how the movement of an extracted syntactic object to the CP edge is derived given the current implementation of raising. Recall that at the point when the C head is merged, both the head NP probing upwards and the [•DP_{rel}•] feature on the C head find their goals and are copied to the ordered feature stack, so that the relative DP is at the top and merges back into the derivation first, as shown in (75).

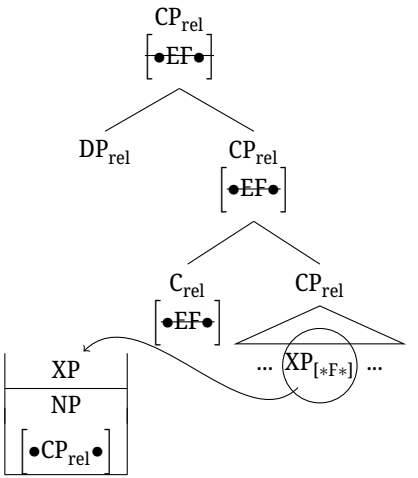
11 Since the movement of the extracted XP is triggered by the edge features on the C head, for defective intervention to apply, these features must belong to the same class as other Ā-related features.

(75) Merge of DP_{rel}

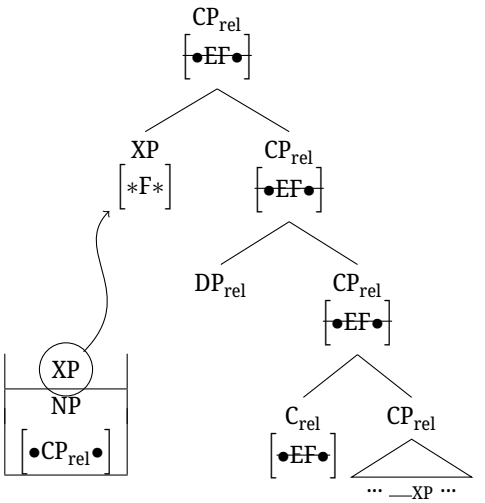


If the CP has an active edge feature, then after Merge of the relative DP, there is a new selection feature on the top of the stack, so that the derivation once again reaches a state in which there are two active Merge features. I suggest that the XP targeted by the edge feature on C is copied and placed on the stack, where the NP is already located; see (76). As a result, XP must merge into the derivation before the NP does; see (77). This allows syntactic objects to undergo intermediate movement to Spec,CP before the NP merges and projects, thereby blocking further movement to Spec,CP.

(76) XP is copied



(77) Merge of XP



5.4.3 Appositive interpretation

As shown in section 3.3.1, relative clauses with ICA can have both a restrictive and an appositive interpretation. Under the appositive interpretation, the relative clause is not interpreted in the scope of the external determiner and does not restrict the reference of the head, but instead provides additional background information about it. The appositive reading of relatives with ICA is illustrated by examples (78) and (79).

(78) NOM ← GEN

Puškin-**ən'** [kona-n' jalga-nzə t'er-n'-əz'
Pushkin-GEN which-GEN friend-3SG.POSS.PL call-FREQ-PST.3.O.3PL.S
senat-ən' ploščad'-t'i] ašəz' sa-v.
senate-GEN square-DEF.SG.DAT NEG.PST.3SG come-PASS

'Pushkin, whom his friends were calling to Senate Square, could not come.'

(79) NOM ← GEN

Rovnaj kaftə pr'istupn'ik-n'ə-**n'** [kona-t'n'ə-n' meždu pročim
straight two criminal-DEF.PL-GEN which-DEF.PL-GEN between others

kunda-z'ən' Pet'ɛ] vor'gəd'-kšn'ə-s'-t'.
catch-PST.3PL.O.3SG.S Petja run.away-AVR-PST.3-PL

'Exactly two criminals, whom, by the way, Petja caught, have been running away.'

Due to differences in the scope of the external determiner and in interpretation, appositive relative clauses are commonly assumed to instantiate a derivation distinct from the one assigned to restrictive relative clauses and to be incompatible with raising of the head out of the relative clause (see Emonds 1979, Jackendoff 1977, and Citko 2008a, i.a.). A further property often used as an argument against raising in appositive relative clauses is the absence of connectivity effects. In fact, however, the data available in the literature are contradictory: for instance, Kayne (1994: 112–113) and Heck (2005) report that heads of appositive relatives can participate in processes inside the relative clause, while Bianchi (1999) and De Vries (2006) claim that (with some minor exceptions) connectivity is not attested. While I have not systematically collected data on interpretational connectivity effects such as binding or idioms in Moksha appositive relatives, the examples in (78)–(79), as well as the data in section 3.3.1, show that heads of appositive relatives can be marked with internal case. Combined with the conclusion in Chapter 4 that internal case corresponds to the raising derivation, this indicates that appositive relative clauses must also be derived by raising. The goal of this section is to explore how the appositive interpretation of relatives with ICA can be reconciled with their raising syntax. I will present three ways to do so.

The first option was suggested by Kayne (1994) and developed by Bianchi (1999). They suggest that appositive relative clauses are derived by raising, followed by movement of the relative clause at LF to the external specifier of the D head. In the original proposal, the constituent that undergoes movement is IP, but under the current implementation, where the DP moves out of the relative CP, it can also be the relative CP that is moved; see (80).

(80) Appositive relatives clauses derived by raising plus CP movement:

$[_{DP}\ \underline{[_{CPrel}\ \cdots\ \_\_{NP}\ \cdots\ ]}\ [_{DP}\ D\ [_{NP}\ NP\ \_\_{CPrel}\ ]\ ]\ ]$

Movement derives the fact that relative clauses are not in the scope of the external determiner. Bianchi (1999) further suggests that movement of the CP forces interpretation of a higher copy: if the head were to be interpreted in its base position,

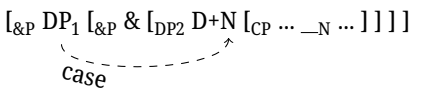
then there would be no material in the scope of the external head. Bianchi claims that this instantiates vacuous quantification and is therefore excluded.

The second option is suggested by De Vries (2002, 2006) (see also Sportiche 2017). According to this approach, appositive relative clauses have the structure illustrated in (81):

(81) Specifying coordination for appositive relatives clauses:

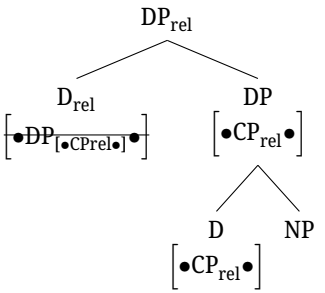
Under this approach, appositive relative clauses involve specifying coordination. The first conjunct is the overt DP that is realized before the relative CP but was never part of the relative CP. The second conjunct is the raising relative clause with a null head. The structure clearly derives the fact that the relative clause is not in the scope of the external determiner, as well as that the relative CP provides only additional background information about the referent. However, under this analysis, the head that has raised out of the relative clause is not the noun phrase that precedes the relative CP on the surface. This analysis, thus, does not predict the internal case marking attested in Moksha relative clauses. To account for the internal case, it is necessary to assume that the DP_1 in the first conjunct agrees in case with the null head that moves out of the relative CP; see (82).

(82) ICA by specifying coordination:

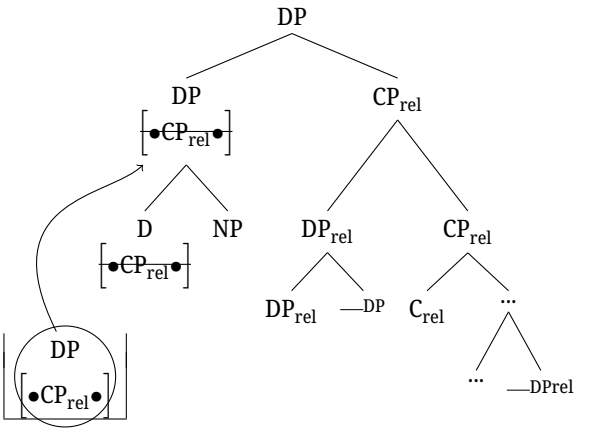


There is also a third way to reconcile appositive relative clauses with the raising derivation. I would like to suggest that the correct structure for appositive relative clauses is derived if it is the DP, rather than the NP, that moves out of the relative clause. The relative pronoun (the D_{rel}) selects for a DP, as shown in (83). This DP moves out of the relative clause and projects in its final landing site, yielding the structure in (84). In this final structure, the CP is not in the scope of the determiner.

(83) Relative DP



(84) Merge of the head DP



This approach seems promising, but for it to be complete, it must be ensured that the DP is interpreted only in the landing position and not inside the relative clause. While there are known cases in which a moved syntactic object must be interpreted exclusively in its landing site (cf. Fox 1995, 1999 on antecedent-contained deletion), at this point it is unclear to me how this can be enforced for relative clauses in this case.

To sum up, I have sketched three ways to derive the appositive interpretation of relative clauses with ICA. Each of them can, in principle, account for the data, but they all raise further questions. Movement of the relative CP (or IP) out of the scope of the external determiner introduces an otherwise unattested type of movement.[12]

12 Depending on the nature of the CP movement, the analysis might be at variance with the account of the ban on extraposition suggested in section 5.4.1, because it requires all cases of extraposition to be derived by late merge of the extraposed constituent with a silently displaced host.

Specifying coordination requires postulating agreement in case to derive internal case marking on the head, which at least partially undermines the earlier claim that ICA does not result from Agree. Finally, movement of the DP (instead of the NP) provides the correct final structure, but raises issues regarding restrictions on semantic interpretation. I leave the choice between these options for further research.

5.4.4 Case mismatches

In this section, I present the analysis of yet another property of relative clauses with ICA. As shown in section 3.5, under ICA the case marking on the head may differ from the case on the relative pronoun. The mismatch arises in contexts where the paradigm of the relative pronoun does not have a form that corresponds to the case assigned in the relative clause. The relative pronoun is then the complement of a postposition and is marked for the genitive case, but the head of the relative clause, being a regular noun, shows an oblique case unavailable for the relative pronoun. This phenomenon is illustrated in (85).

(85) NOM ← ABL

Pinʲə-**də** [**kona-n**ʲ **ezdə** (/ *kona-də) mon pelʲ-an aščʲ-i]
dog-ABL which-GEN in.ABL which-ABL I fear-NPST.1SG be-NPST.3[SG]
ulʲcʲɛ-tʲ kučka-sə.
street-DEF.SG.GEN middle-IN
'The dog that I am afraid of is standing in the middle of the street.'

These data seem to suggest that the choice between a case and a postposition is a matter of morphological realization (see Caha 2009, Svenonius 2012). In that case, the head of the relative clause and the relative pronoun receive the same set of features, but since the relative pronoun does not have a corresponding case form, the features are realized as a postposition plus a genitive marker on the pronoun (cf. Abramovitz 2021).

This approach is problematic for the data in (86), which show that the head of the relative clause can, in such cases, also be marked for the genitive. If a postposition plus genitive is merely a realization of case features in morphology, it is then unclear how the head of the relative clause acquires the genitive.

(86) NOM ← GEN

Pinʹə-**tʹ**	[**kona-n**ʹ	**ezdə**	mon	pelʹ-an	ašč-i]
dog-DEF.SG.GEN	which-GEN	in.ABL	I	fear-NPST.1SG	be-NPST.3[SG]
ulʹcʹɛ-tʹ	kučka-sə.				
street-DEF.SG.GEN	middle-IN				

'The dog that I am afraid of is standing in the middle of the street.'

Another argument against a purely morphological account comes from the data in (87). They show that the 'attraction' of the postposition is ungrammatical, i.e., the postposition cannot be duplicated in the main clause.

(87) NOM ← GEN + PP

*Pinʹə-**tʹ**	**ezdə**	[**kona-n**ʹ	**ezdə**	mon	pelʹ-an	ašč-i]
dog-DEF.SG.GEN	in.ABL	which-GEN	in.ABL	I	fear-NPST.1SG	be-NPST.3[SG]
ulʹcʹɛ-tʹ	kučka-sə.					
street-DEF.SG.GEN	middle-IN					

'The dog that I am afraid of is standing in the middle of the street.'

If a postposition were a morphological realization of some case features, then it would be expected that these features could also be realized in this way on the head, contrary to the facts. Example (88) further shows that the postposition plus genitive marking is in principle available for regular noun phrases; see (88).

(88)

Mon	pelʹ-an	pinʹə-**tʹ**	**ezdə**.
I	fear-NPST.1SG	dog-DEF.SG.GEN	in.ABL

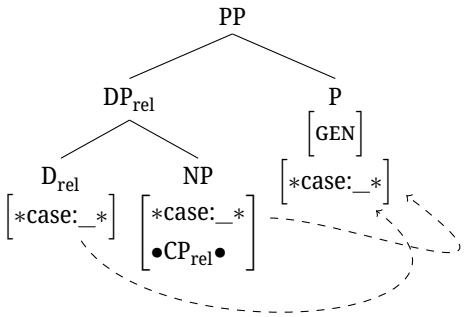
'I fear the dog.'

The lack of postposition attraction follows if postpositions are heads in syntax and thereby differ from case, which is a morphological realization of features on a noun.[13]

I suggest that the different case markings on the head follow from different merge positions of the head NP, which in turn lead to case assignment from different heads. If the NP is merged with the relative pronoun, then its case probe is valued by the genitive feature of the postposition, as shown in (89).

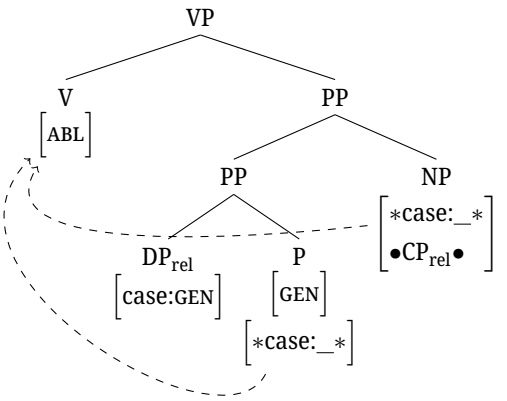
13 See, however, Pleshak (2022) for an analysis of nominal morphology in Moksha that argues that oblique cases also instantiate P heads in syntax.

(89) Genitive from the postposition



If the head is merged directly with the postpositional phrase, as shown in (90), it receives the ablative case from the verb. Note that the postposition in (85) is also marked for the ablative. The head noun thus acquires ablative case in parallel with the postposition. The relative pronoun still receives the genitive from the postposition. This yields a mismatch between the case of the relative pronoun and that of the head.

(90) Ablative from the verb



Note that case mismatches are not restricted to contexts where the relative pronoun is the complement of a postposition: in example (91), the pronoun is marked for the dative, while the head shows the illative.

(91) NOM ← ILL

Lauka-**s** **[kona-n'd'i** (/ *kona-s) tu-s' mon' brada-z'ə]
store-ILL which-DAT which-ILL go-PST.3[SG] I.GEN brother-1SG.POSS.SG
af kunarə panžə-v-s'.
NEG long.ago open-PASS-PST.3[SG]
'A store where my brother was going has opened recently.'

These data can be incorporated into the analysis in two ways. On the one hand, it can be assumed that the data in (91) differ from those discussed above only in that the postposition is silent. In this case, their analysis is identical to the one sketched above. On the other hand, since both the dative and the illative can be used to mark direction, the head and the relative pronoun may in parallel receive different cases from a higher verbal head.

5.5 Summary

In this chapter, I have presented an analysis of relative clauses with ICA in Moksha.

I began by reviewing the syntax of raising and suggested that raising relative clauses are best derived by projecting movement of the head NP. I then showed that projecting movement can be implemented via the projection-by-selection approach to labeling combined with the assumption that Merge features can remain unchecked for part of the derivation and probe upwards to find their goals.

I then turned to case marking on the head and suggested that internal or external case on the head of the relative clause follows from different orderings of the case probe and the Merge feature that is satisfied upon movement of the head to the main clause. Ordering the case probe before the Merge feature forces case assignment in the relative clause, while the reverse order requires case assignment to be delayed until the head has moved to the main clause. This provides a novel perspective on case-overwriting phenomena and accounts for them without involving actual overwriting of a feature value.

Next, I presented an analysis of the left-periphery restriction for relative clauses with ICA. I suggested that the left-periphery restriction instantiates a forced ex-situ effect, i.e., a constituent that is legitimate at an intermediate stage of the derivation must be destroyed before the derivation terminates. I proposed that such effects are also derived by the projection-by-selection model if selection applies not just to the category, but also to further unsatisfied features. I call such selection features second-order merge features. To derive the obligatory ex-situ position of relatives with ICA in Moksha, I assumed that verbal/clausal heads in Moksha select for DPs

with an active probe. This probe is usually an unvalued case feature, but since heads of relatives with ICA receive their case inside the relative CP, they must have another active probe to satisfy selection requirements in the main clause. This unchecked probe then leads to movement of the relative clause to the left periphery.

After this, I showed how the remaining properties of relative clauses with ICA can be derived under this proposal. In particular, I suggested that coordination of two relative clauses under one head involves coordination of relative CPs followed by ATB movement of the head out of one of the conjuncts. I then showed that the ban on extraposition is typical for raising relatives and follows if extraposition is derived by late merge of an extraposed constituent with its silently displaced host. Since, under raising, the head is first combined with the relative clause and only then with the main clause, extraposition turns out to be impossible. Next, I turned to extraction out of the relative CP and suggested that the difference between relatives with external and internal case is derived if edge features in a DP are accessible only after it receives case, i.e., in time for extraction out of relatives with internal case, but too late for relatives with external case. I then showed that the appositive interpretation does not exclude the raising syntax and that there are several ways to reconcile them. Finally, I suggested that mismatches in the case of the head and the relative pronoun follow from different initial merge positions of the head inside the relative CP.

If this analysis is on the right track, it has the following implications for syntactic theory. First, Merge is feature-driven and the projection-by-selection algorithm underlies labeling. Second, syntactic objects can be selected before all their Merge features are satisfied. Such unchecked Merge features can probe upwards. Third, Merge features select not only for a category, but also for further active features of syntactic objects. Fourth, features on syntactic objects are ordered, and at least some of these orderings are determined language-specifically.

6 Extensions and implications

6.1 Introduction

In this chapter, I explore extensions and theoretical implications of the analysis of relative clauses with ICA proposed in the previous chapter. The analysis relies on an approach to syntax in which Merge is driven by features and the label of a newly created constituent is determined via the projection-by-selection algorithm. Other core assumptions are that syntactic objects can be selected before all of their merge features are satisfied and that selection applies not only to a category, but also to further unsatisfied features. The former of these two assumptions is required to derive projecting movement in raising relative clauses, which, as I have suggested, occurs when an unchecked merge feature finds its goal via upward search. The latter assumption introduces second-order selection features, which derive the obligatory ex-situ placement of relative clauses with ICA. In the first two sections of the chapter, I discuss other phenomena whose accounts require these assumptions.

In section 6.2, I begin with the observation that there is a well-known case in syntactic theory in which merge features must remain unchecked until later in the derivation: late merge (see Lebeaux 1988, 1990, Takahashi & Hulsey 2009). I assume that late merge applies when its target undergoes movement, in the course of which it is copied and merged into the workspace (see Nunes 2004, Heck 2022, and also Heck 2016). This implementation arguably allows late merge to be compatible with the Strict Cycle Condition (see Chomsky 1973, 1995b, 2019) and resolves the overgeneration problem pointed out by Sportiche (2019). A novel ingredient that I introduce into the account is that the delayed checking of a merge feature can follow from the ordering of the merge feature after an agreement feature. I then demonstrate how this approach applies to relative clauses, for which it has been widely argued that, as adjuncts, they can be late-merged to their hosts.

Second, in section 6.3, I turn to second-order merge features. I show that the forced ex-situ effects that second-order merge features are intended to derive constitute a persistent pattern cross-linguistically. The first case of forced ex-situ placement comes from split topicalization in German. Following Ott (2012, 2015), the derivation of this phenomenon involves creating a syntactic constituent that is never observed in the resulting structure. Preserving Ott's main assumptions about the syntax of split topicalization, I show how his analysis can be recast under the projection-by-selection algorithm. I then argue that a number of further syntactic phenomena require an obligatorily forced ex-situ position for a syntactic object. These include relative pronouns that can be used in raising relative clauses but cannot form a constituent with the noun on the surface (see Aoun & Li 2003, Heck 2005,

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Salzmann 2014), resumptive pronouns and doubled clitics that, under the Big-DP approach, must form an otherwise unattested constituent with displaced DPs (see Boeckx 2003), as well as wager-class verbs that are known to allow a direct object only if it undergoes Ā-movement (see Postal 1974, Kayne 1984). At the end of this section, I once again briefly review the alternative approach based on Chomsky's algorithm (see Chomsky 2013, 2015) and show that it does not cover the full range of data.

In the final section 6.4, I address existing criticisms of the projection-by-selection labeling algorithm and briefly discuss other existing labeling algorithms. I show that broad selection, as well as adjunction, can be handled by the algorithm if the presence of some merge features is optional. I then address an alleged conceptual issue that projection-by-selection is unmotivated and incompatible with the goals of minimalist syntax. I suggest that projection-by-selection can be reformulated to be compatible with the idea that labeling applies under Minimal Search: in the case of labeling, Minimal Search always finds two syntactic objects, and the choice between them is made on the basis of their properties. A syntactic object that checks an active merge feature provides a label. I conclude that the projection-by-selection labeling algorithm is superior both empirically and conceptually and must therefore be correct.

6.2 Late merge

Late merge is a theoretical tool used to derive anti-connectivity effects, i.e., cases in which a syntactic object that corresponds to a given position does not participate in syntactic or interpretive processes in that position. One of the well-known examples of anti-connectivity is the obviation of Condition C by material inside a relative clause; see (1a). Relative clauses contrast with complement clauses, as in (1b), which incur a violation of Condition C connectivity; see section 4.3.5 for an overview of Condition C.

(1) a. Which claim [that John_i made] did he_i later deny __ ?

b. *Whose claim [that John_i likes Mary] did he_i deny __ ?

Late merge provides a straightforward answer to the question of why *John* in (1a) is not evaluated for Condition C in the base merge position of the DP that contains the relative clause. This is because *John*, together with the rest of the relative CP, is not present in this position; rather, the relative clause is merged with the DP at a later step in the derivation. Late merge has been extensively criticized for violating

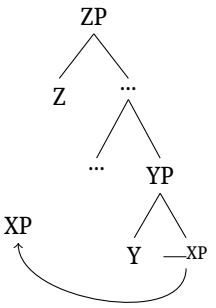
cyclicity: the Strict Cycle Condition (see (2)) as well as the Extension Condition (see (3)).

(2) Strict Cycle Condition:
Within the current domain δ, no operation may affect solely a proper subdomain γ that is dominated by δ. (based on Chomsky 1973, 1995b, 2019, see Müller 2011, 2014 for this formulation)

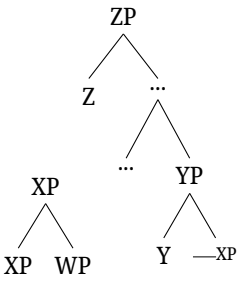
(3) Extension condition:
A syntactic derivation can only be continued by applying operations to the root of the tree. (see Chomsky 1993, 1995b and Adger 2003: 75 for this formulation)

These conditions preclude Merge from applying within a proper subdomain of a given tree structure, but the analysis of Condition C obviation via late merge requires the relative clause to be merged with the noun phrase after the latter has been embedded and is therefore a proper subpart of the structure. The solution to this dilemma comes from the fact that all known cases of late merge involve movement of the host; cf. example (1a), where the noun phrase targeted by late merge undergoes Ā-movement. Movement of the host enables an implementation of late merge that is compatible with the concepts of cyclicity in (2) and (3); see Nunes (2004), Heck (2022), and also Drummond (2010), Heck (2016). The basic idea is that movement proceeds by creating a copy of a displaced syntactic object in the workspace, and this copy is not in a proper subdomain in the resulting structure. Merge features can then be discharged without violating cyclicity conditions. The derivation is sketched below.

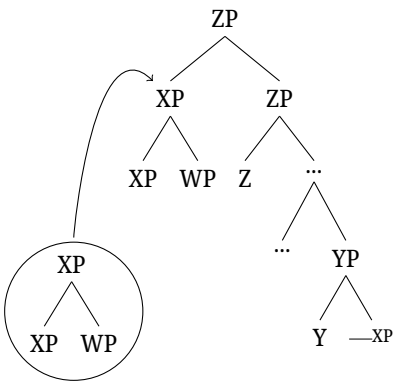
(4) Copy



(5) Late merge



(6) Merge

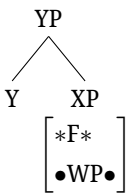


Given that all Merge operations are triggered by features, for late merge to be possible, the discharge of a merge feature must be delayed, and a syntactic object must be selected before its own selection features are checked. This requirement is common to both late merge and projecting movement, for which it is also necessary that a merge feature remain unchecked until later in the derivation. To ensure this for projecting movement, I suggested in section 5.2.2 that relative pronouns select NPs with an active merge feature. Here, I propose that the delayed discharge of merge features can also follow from the general organization of features in stacks: for a merge feature to avoid early checking, it must be ordered after an agreement probe, and this agreement probe is satisfied only later.[1]

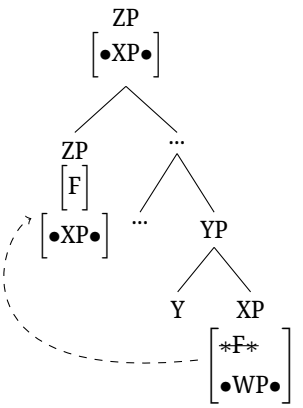
1 Heck (2016, 2022) assumes that the delayed checking of merge features follows from Procrastinate, which explicitly forces features to remain active longer than independently required by the derivation.

The structures below show the revised derivation of late merge. In (7), XP enters the derivation with an unchecked agreement probe and a merge feature that is ordered after this agreement probe and consequently cannot be discharged before the agreement probe. In (8), the goal for the agreement feature enters the derivation, so that the probe finds its goal via upward search and is checked.

(7) Features

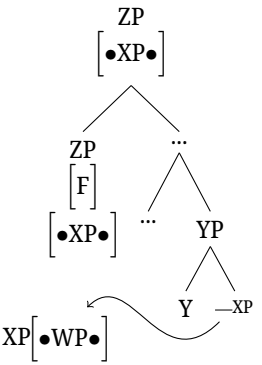


(8) Agree

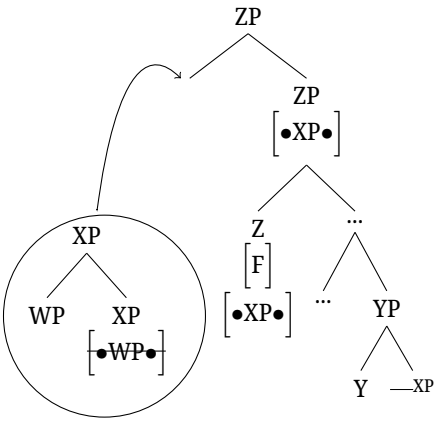


XP has a merge feature on the top of its stack, and the phrase is attracted by ZP. In the course of movement, XP is merged into the workspace, where its selection feature can be discharged without violating cyclicity; see (9)–(10).

(9) Copy



(10) Late merge of XP



As already mentioned above, relative clauses obviate Condition C and are one of the textbook examples of late merge (see Lebeaux 1988, 1990, Hulsey & Sauerland 2006, Takahashi & Hulsey 2009, and also, most recently, Bhatt & Nash 2023). This effect is also attested in Moksha. Examples (11) and (12) show that the material inside the relative clause is not evaluated with respect to Condition C in the main clause. The examples differ in the case marking on the head: it is marked for the external case in (11) and for the internal case in (12).

(11) Pinʲə-tʲi [kona-nʲ **Petʲɛ$_{i}$** rama-zʲə] **son$_{i}$**
dog-DEF.SG.DAT which-GEN Petja buy-PST.3SG.O.3SG.S PRON.3SG
maksi jaǩca-ma-tʲ.
give.NPST.3SG.O.3SG.S eat-NZR-DEF.SG.GEN
'To the dog that Petja bought he is giving food.'

(12) DAT ← GEN
Pinʲə-**tʲ** [kona-nʲ **Petʲɛ$_{i}$** rama-zʲə] **son$_{i}$**
dog-DEF.SG.GEN which-GEN Petja buy-PST.3SG.O.3SG.S PRON.3SG
maksi jaǩca-ma-tʲ.
give.NPST.3SG.O.3SG.S eat-NZR-DEF.SG.GEN
'To the dog that Petja bought he is giving food.'

Recall that, as shown in section 3.3.2, both types of relative clauses allow for anaphor binding into the head as well as variable binding into CP in their base position. This confirms that relative clauses originate in an argument position in the main clause and are not base-generated on the left. Late merge of a relative clause must therefore be optional. These data, however, also suggest that late merge is possible for relative clauses with ICA and must therefore be compatible with the raising structure. This is surprising, given that under this derivation the head moves out of the relative CP and therefore cannot be merged with the relative clause material before it merges with the relative CP. This excludes the late merge of the relative CP and was used in section 5.4.1 to derive the ban on extraposition of relative clauses with ICA.

To resolve this issue, Takahashi & Hulsey (2009) suggest that it is not the relative CP but the whole NP that is late-merged to the external D head. Combined with the suggestion that the delayed valuation of a merge feature is possible because of feature ordering, this means that the D head in (12) has the following features, where [∗Ā∗] stands for any Ā-related probe (e.g., [∗Q∗] or [∗top∗]).

(13) Ordered features on D

D

$$\begin{bmatrix} *\bar{A}* \\ \bullet NP\bullet \\ *case{:}\_* \end{bmatrix}$$

The ordering ensures that the NP that includes the relative clause is late-merged to the D head in the course of its movement to the left. The D head also has a case

probe ordered after the selection feature for NP. This allows it to receive case from the NP, which in turn receives case inside the relative CP. Note that this analysis is compatible with the analysis of the left periphery restriction that applies to relative clauses with ICA: since the D head here is merged into the main clause before it is merged with the NP and receives case from it, the selection requirement of the verbal/clausal head—that there be an active agree feature—is satisfied by a case probe alone. The Ā-related probe is, however, necessary so that the NP can be late-merged. This Ā-related probe ensures that the DP with the relative clause appears at the left periphery at the end of the derivation.

For relatives with external case that are derived by the head-external structure (see Chapter 4), late adjunction of the relative CP is possible.[2] The question that I leave open is whether late adjunction of the NP is also possible for these relatives. Following Takahashi & Hulsey (2009) (see also Keine & Bhatt 2019 and Gong 2022), the NP must be present in the position of case assignment. This blocks late merge of NPs if movement targets a position where no case is assigned. However, this restriction does not seem to hold for raising relatives in English, for which late merge has been claimed to be possible.

To sum up, the delayed discharge of merge features can lead to two different patterns: projecting movement, attested in the raising derivation of relative clauses, and late merge. In this section, I have suggested that the delayed satisfaction of a merge feature can follow from the ordering of a merge feature after an agreement probe that finds its goal only later in the derivation. I have then discussed late merge in Moksha relative clauses and shown that Condition C obviation in raising relatives can be accounted for if the NP, rather than the CP, is late-merged.

6.3 Second order merge features

In this section, I turn to second-order selection features. They derive forced ex-situ effects, under which a constituent is required at an intermediate stage of the derivation but is never attested in the resulting structure. In this section, I present four additional phenomena that instantiate forced ex-situ effects and show how second-order merge features account for them.

2 This further predicts that if a relative clause with external case obviates Condition C, it must be appositive.

6.3.1 Split topicalization

The first case comes from split topicalization. This is a phenomenon under which a noun phrase appears to be split between its base position and a higher position. Split topicalization is attested in a number of languages (see Fanselow & Féry 2006). Here, I consider split topicalization on the basis of German data; see (14).

(14) **Bücher** hat Peter leider erst **drei gute** gelesen.
books has Peter unfortunately only three good read
'As for books, Peter has unfortunately only read three good ones.' (Ott 2015: 157)

While split topicalization has been the subject of intensive research (see Fanselow 1988, Van Riemsdijk 1989, Fanselow & Ćavar 2002, among others), here I focus on the study by Ott (2012, 2015), who argues that the derivation of split topicalization involves building a constituent that never appears on the surface and therefore must break down before the derivation terminates; i.e., split topicalization in German demonstrates a forced ex-situ effect. The argumentation for this view is twofold: first, it must be shown that the construction involves movement. Second, the required base-generated constituent must never occur in the resulting structure; i.e., it must be impossible to reduce split topicalization to subextraction out of a regular noun phrase. I briefly summarize the arguments for these claims.

Arguments for movement, as opposed to base generation, come from locality restrictions, connectivity effects, and the licensing of parasitic gaps. Starting with locality restrictions, the data in (15) show that split topicalization is ungrammatical if the base position of the noun phrase is inside an adjunct island. This restriction follows naturally if the construction involves movement.

(15) *__Bücher__ war Peter traurig [nachdem seine Mutter **viele** weggeworfen
books was Peter sad after his mother many thrown.away
hatte].
had
'As for books, Peter was upset after his mother threw many of them away.' (Ott 2015: 168)

A further piece of evidence in favor of movement comes from anaphor binding (see (16)). It shows that the constituent in the left periphery can be bound by material that c-commands the noun phrase in its base position, but not in the left periphery.

(16) **Bücher über einander$_i$** haben die Männer$_i$ noch nie **welche**
books about each.other have the men yet never any
geschrieben.
written
'As for books about each other, man never wrote any.' (Ott 2015: 168)

The final argument for movement is that split topicalization can license parasitic gaps. This is typical of Ā-movement, but not of constituents base-generated on the left.

(17) **Gäste** hat Sonja [ohne zu kennen] schon **viele** begrüßt.
guests has Sonja without to know already many greeted
'As for guests, Sonja has already greeted many of them though knowing them.' (Ott 2015: 170)

I thus conclude that split topicalization in German involves movement and turn to the data showing that the constituent required in the base position is not a regular DP. The first piece of evidence comes from the data given in (18). Example (18a) contains split topicalization, and the adjective in the dislocated position shows strong inflection. Example (18b) shows that strong inflection is ungrammatical without movement. This suggests that split topicalization cannot be reduced to extraction out of an otherwise grammatical noun phrase.

(18) a. **Polnische Gänse** gekauft hat sie **keine**.
Polish.STRONG geese bought has she no.STRONG
'As for Polish geese, she did not buy any.'

b. Sie hat keine **polnischen** Gänse (/ *keine **polnische**
she has no.STRONG Polish.WEAK geese no.STRONG Polish.STRONG
Gänse) gekauft.
geese bought
'She did not buy any Polish geese.' (Ott 2015: 161)

Being based on adjectival agreement, this argument seems fairly weak, because differences in the morphological marking of nominal modifiers can arguably be derived morphologically and depend on their immediate environment (cf. Murphy 2018). The argument can be strengthened: example (19) shows that the indefinite determiner can be duplicated in both parts of the split noun phrase.

(19) **Eine Katze** habe ich nur **eine ganz kleine** gesehen.
a cat have I only a very small seen
'As for a cat, I only saw a very small one.' (Ott 2015: 161)

Example (20) further shows the duplication of the preposition.

(20) **In fremden Betten** ist er schon **in vielen** aufgewacht.
in stranger's beds is he already in many woken.up
'As for stranger's bets, he has already woken up in many of them.' (Ott 2015: 162)

A different piece of evidence against subextraction is given in (21)–(22). The data in (21) show that, in noun phrases that are modified by a relative CP and by a PP, the PP obligatorily precedes the relative clause. Example (22) illustrates split topicalization in which the noun and the relative clause, but not the PP, are on the left; that is, the extracted syntactic object is not a constituent under the regular DP structure.

(21) a. keine Bücher von Maria, die erfolgreich waren
no books by Maria that successful were

b. *keine Bücher, die erfolgreich waren, von Maria
no books that successful were by Maria

(22) **Bücher**, **die erfolgreich waren**, kennt er **keine von Maria**.
books that successful were knows he no by Maria
'As for books that were successful, he does not know any by Maria.' (Ott 2015: 162)

The final argument against deriving split topicalization by subextraction out of a regular DP comes from gapless splits, under which both the topicalized constituent and the constituent in situ contain a full DP; see (23)–(24).

(23) **Seltene Raubvögel** hat Jürgen nur **ein paar Bussarde** gesehen.
rare birds.of.prey has Jürgen only a couple buzzards seen
'As for rare birds, Jürgen only saw a couple buzzards.'

(24) **Zeitungen** liest Maria nur **die 'junge Welt'**.
newspapers reads Maria only the young world
'As for newspapers, Maria reads only 'Junge Welt'. (Ott 2015: 165)

Thus, I conclude that the nominal constituent in the base position and the topicalized constituent are two autonomous noun phrases, which are, however, both associated with a single base position. Ott (2012, 2015) further notes that the topicalized noun phrase is always property-denoting (see (25)) and, on this basis, concludes that the topicalized constituent is an NP. He suggests that the constituent remaining in situ is a DP that, in some—but notably not all—cases contains an elided noun.[3]

(25) a. **Ein neues Auto** kann ich mir leider **kein richtig schickes**
a new car can I me unfortunately no really fancy
leisten.
afford
'As for a new car, I unfortunately cannot afford a really fancy one.'

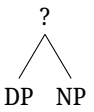
b. ***Das Auto** kann ich mir nur **das neue von BMW** leisten.
the car can I me only the new by BMW afford
Intended: 'As for the new car, I can only afford the new one from BMW.'
(Ott 2015: 170)

Combined with the earlier conclusion that split topicalization in German involves movement, this implies that the topicalized NP merges with a DP in its base position, but this constituent is not preserved until the end of the derivation. The data thus present a clear case of a forced ex-situ effect.

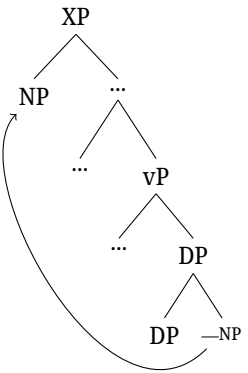
Ott (2012, 2015) provides an analysis of this phenomenon that is based on the labeling algorithm developed by Chomsky (2013, 2015), which was summarized in section 5.3.2. This analysis builds on the assumption that labeling applies under Minimal Search, which fails to find a unique label if two phrases that do not agree with each other are merged. In this case, one of the merged phrases must undergo further movement, and the remaining one provides a label. The structures below show how this approach applies to split topicalization in German. In (26), the DP and the NP merge, but no label can be found. (27) shows that the DP provides a label after the NP has moved out.

3 Ott contends that NP must function as a predicate of the DP and that the interpretation is possible only if the constituents have these labels. This has implications for the analysis of prepositions and indefinite articles, which can be part of the topicalized constituent: prepositions are suggested to be a morphological realization of lexical cases, and indefinite articles must be N-level elements.

(26) Unlabelable structure

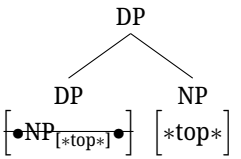


(27) Movement and labeling



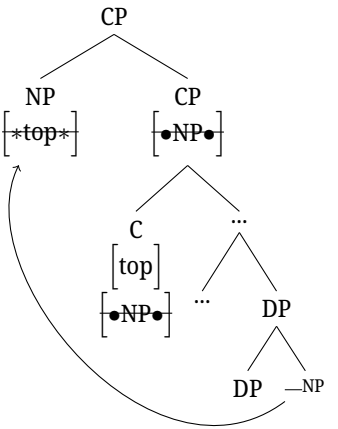
While this analysis derives split topicalization in German, it cannot be extended to the obligatory ex-situ position in Moksha relative clauses, as shown in section 5.3.2, even though they exhibit a very similar pattern. The approach proposed for Moksha, by contrast, applies to the split topicalization data. The only necessary assumption is that once the DP is built, it can select for another NP only if this NP has an unchecked [∗top∗] probe; see (28).

(28) Merge



The active [∗top∗] feature is then checked by a higher head (e.g., the C head) that also attracts the NP to its specifier; see (29).

(29) Movement



6.3.2 Relative pronouns

Another instance of forced ex-situ effects comes from relative pronouns. As noted by Aoun & Li (2003), some relative pronouns in English typically do not form a constituent with an overt noun; see (30)–(31).

(30) a. the boy **who** was late

b. *__Who__ boy was late?

(31) a. the reason why he left

b. *Why reason did he leave?

The same observation was made for German by Heck (2005); see (32)–(33).

(32) a. die Freunde, **denen** ich vertraue
ART friends which.PL.DAT I trust
'friends that I trust'

b. *Ich habe **denen** Freunden vertraut
I have which.PL.DAT friends trust
'I trusted my friends.'

(33) a. das Problem, **das** du gesehen hast
ART problem which.N you seen have
'the problem that you saw'

b. ?das Problem, **was** du gesehen hast
ART problem what you seen have
'the problem that you saw'

c. *Du hast **was** Problem gesehen?
you have what problem seen
'What problem did you see?'

If it can be shown that these relative clauses are derived by raising, then their derivation must include a step in which a relative pronoun merges with the head of the relative clause, thereby building a constituent that is illegitimate in the resulting structure, as shown above. For German, Heck (2005) suggests that relative clauses, as in (32)–(33), show connectivity with a position inside the relative CP. He, however, uses variable binding as a diagnostic, while in Chapter 4 I have argued that variable binding is unreliable for diagnosing the structure of relative clauses. In what follows, I present data from Moksha showing that relative pronouns that do not form a constituent with a noun in the resulting structure are also grammatical in raising relative clauses.

Example (34) shows that *kijə* 'who' can be used as a relative pronoun in relatives with internal case.

(34) NOM ← GEN
Loma-tʹnʹə **[ki-t** erʹɛ-j̊-tʹ maɻtə-nək] mon tɛči
person-DEF.PL who-PL live-PST.3-PL with-POSS.1PL I today
izʹ-inʹə nʹɛjə.
NEG.PST-PST.3O..1SG.S see.CN
'Today I didn't see people who lived with us.'

The data in (35) illustrate that *kijə* cannot form a constituent with a noun in correlatives.

(35) *[**Ki-t** **loma-tʹnʹə** / ***kijə** **loma-tʹnʹə** erʹɛ-j̊-tʹ maɻtə-nək]
who-PL person-DEF.PL who person-DEF.PL live-PST.3-PL with-POSS.1PL
mon tɛči izʹ-inʹə nʹɛjə
I today NEG.PST-PST.3O.1SG.S see.CN
Intended: 'Today I didn't see people who lived with us.'

The same restriction is attested in questions; see (36).

(36) *Ki-t loma-t'n'ə / *kijə loma-t'n'ə er'ɛ-j̊-t' maṛtə-n't'ə?
who-PL person-DEF.PL who person-DEF.PL live-PST.3-PL with-POSS.2PL
Intended: 'Who lived with you?'

Another pronoun showing the same pattern is *kozə* 'where'. The data in (37) show that it can be used in relatives with ICA.

(37) NOM ← DAT
Oš-t'i **[kozə** min' vandi moļ'-t'amə] stroja-f
village-DEF.SG.DAT where we tomorrow go-NPST.1PL build-PTCP.RES
kimgotuvə-c'ə vek-t' ezdə.
sixteen-ORD century-DEF.SG.GEN in.ABL
'The village where we are going tomorrow was build in the sixteenth century.'

This pronoun, however, cannot be used in correlative clauses (see (38)) or in questions (see (39)).

(38) *[**Kozə** **oš-t'** min' vandi moļ'-t'amə] son
where village-DEF.SG.DAT we tomorrow go-NPST.1PL PRON.3SG
stroja-f kimgotuvə-c'ə vek-t' ezdə.
build-PTCP.RES sixteen-ORD century-DEF.SG.GEN in.ABL
Intended: 'The village where we are going tomorrow was build in the sixteenth century.'

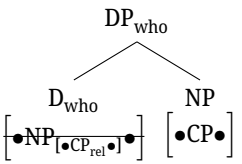
(39) ***Kozə** **oš-t'i** / ***kozə** **vastə-t'i** min' vandi
where village-DEF.SG.DAT where place-DEF.SG.DAT we tomorrow
'Where we are going tomorrow?'
moļ'-t'amə?
go-NPST.1PL

To sum up, the data show that the relative pronouns 'who' and 'where' in Moksha can be used in raising relative clauses. Since the raising derivation includes a step in which a head noun phrase is merged with a relative pronoun inside the relative CP, this means that these pronouns can, in principle, form a constituent with a noun. The data from correlative clauses and questions show that such a constituent is

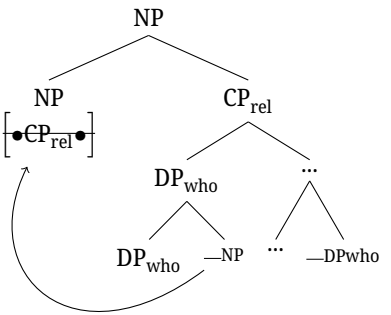
never grammatical in the final structure. Relative pronouns are thus yet another case of forced ex-situ effects.

The data follow from the proposed account involving second-order selection features if the pronouns 'who' and 'where' in Moksha select for NPs with an active [•CP•] feature. Structure (40) shows the first step in the derivation, where the pronoun merges with the noun. The merge feature ensures that the NP moves out, yielding the structure in (41). Note that the relative pronoun also moves to the left of the relative clause.

(40) Merge

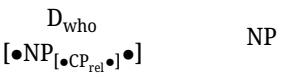


(41) Movement



If the NP does not have an active merge feature, as is the case in correlatives and questions, then the selection requirement of the pronoun cannot be fulfilled; see (42). As a result, the relevant pronouns cannot merge with NPs that are intended to remain in situ.

(42) Merge is not possible



Recall also that in section 5.2.2 I assumed that, in fact, all relative pronouns select for an NP with an unchecked merge feature. I suggested that this is required to ensure that the merge feature on the NP is not discharged before it is merged with the relative pronoun. At the same time, the data in (43) and (44) show that the regular relative pronoun *kona* 'which' can be used in correlatives and in questions.

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

(44) **Kona jalga-z'ə-n'd'i** mon t'aš-n'ə-n'?
which friend-1SG.POSS.SG-DAT I write-FREQ-PST.1SG
'To which friend I have been writing?'

A major difference between correlatives and questions, on the one hand, and externally-headed relative clauses, on the other hand, is that in the latter the relative pronoun is also marked for case; see (45).

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

I suggest that the relative pronoun *kona* 'which' can, in principle, have one of two feature stacks. In the first case, it selects for an NP with an active merge feature and has an unvalued case probe; see (46). Relative pronouns with these features are used in externally-headed relative clauses. In the second case, the relative pronoun selects simply for an NP and does not have a case probe (see (47)). It is then used in correlatives and questions.

(46) Case probe
$$D_{which}\left[\begin{array}{l}\bullet NP_{[\bullet CP_{rel}\bullet]}\bullet \\ *case:\_*\end{array}\right]$$

(47) No case probe
D_{which}
[•NP•]

Note that, in addition to the features illustrated above, feature stacks also include probes targeting the corresponding C heads, such as, for instance, [∗Q∗] in questions and [∗rel∗] in externally-headed relative clauses. This excludes the use of (46) in questions, as well as (47) in headed relative clauses.[4]

6.3.3 Big-DP analysis

The next case of forced ex-situ effects comes from the Big-DP analysis of movement resumption and clitic doubling. According to this approach, syntactic objects such as resumptive pronouns and clitics are base-generated as attached to a DP, even though this constituent is never attested in the resulting structure. In this section, I briefly review some of the arguments suggested in favor of this approach and sketch an analysis of why the constituent required at an intermediate stage of the derivation never appears on the surface.

I begin with resumption. Example (48) illustrates a resumptive pronoun in Hebrew. Here, the pronoun *ʔoto* can optionally appear in the base position of the noun phrase, which surfaces in some other position in the sentence.

(48) Ha-ʔiš še-raʔiti (ʔoto).
the-man that-I.saw him
'the man that I saw.' (Shlonsky 1992: 444)

Analyses of resumption differ in whether a syntactic object whose position is occupied by the resumptive pronoun is base-generated in this position (see Aoun, Choueiri, & Hornstein 2001, Boeckx 2003, Klein 2016) or elsewhere (see Sells 1984, McCloskey 1990, Adger & Ramchand 2005).

Evidence in favor of movement comes from the fact that a DP can show connectivity effects with the position filled by a resumptive pronoun. One such data point comes from Condition C violations and was studied by McCloskey (1990) for Irish and later by Shlonsky (1992) and Boeckx (2003) for Hebrew. Hebrew data are presented in (49)–(50). The first example does not involve movement but shows that

4 I further assume that the feature deriving movement to the left in correlatives differs from the one in headed relative clauses.

the epithet can c-command a coreferent pronoun without ungrammaticality. The second example shows that if the same position is filled by the resumptive pronoun corresponding to the noun phrase higher in the sentence, this leads to ungrammaticality. This result is expected if the resumptive pronoun marks the launching position of a movement dependency and the DP was, in fact, present in this position earlier in the derivation. Example (50) is then ungrammatical due to a Condition C violation: the epithet c-commands the coreferent DP in the base structure.

(49) Yidaʕ ʔet **ha-ʔidiot$_i$** [še ha more yaxšil **ʔoto$_i$**].
I.informed ACC the-idiot that the teacher will.flunk him
'I informed the idiot that the teacher will flunk him.' (Boeckx 2003: 20)

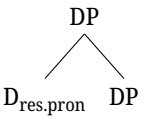
(50) *Ze ha **baxur** [še yidaʕti ʔet **ha-ʔidiot$_i$** [še ha more yaxil **ʔoto$_i$**]].
this.is the guy that I.informed ACC the-idiot that the teacher will.flunk him
'This is the guy that I informed the idiot that the teacher will flunk.'

Note that example (50) shows a dependency into an island structure, which could in principle be the reason for the ungrammaticality. Example (51), however, shows that such dependencies in Hebrew are generally grammatical in the presence of a resumptive pronoun.

(51) Raʔiti ʔet **ha-yeled** [ʔašer/ʔe-ha-cayad harag ʔet ha-arie [ʔašer/še-radaf **ʔaxarav**]].
saw.I ACC the-child COMP-the-hunter killed ACC the-lion COMP-chased after.him
'I saw the child that the hunter killed the lion that chased (him).' (Boeckx 2003: 20)

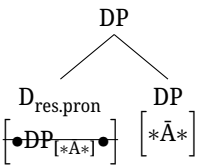
Thus, there are data confirming that a displaced DP and a resumptive pronoun occupy the case position before movement. One of the approaches that allows for this is the Big-DP analysis (see Aoun et al. 2001, Boeckx 2003, Daskalaki & Mavrogiorgos 2013). According to this approach, the resumptive pronoun and the DP are merged together in their base position, forming the Big DP; see (52).

(52) Big DP

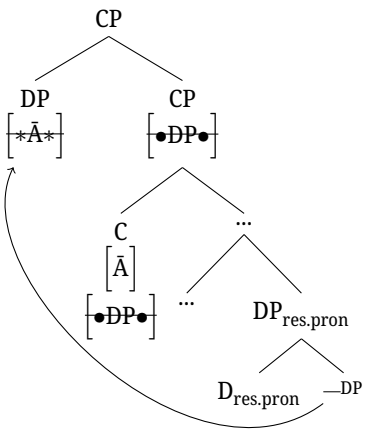


A common criticism of this approach is that the resumptive pronoun and the noun phrase never appear as a constituent on the surface. From the perspective advocated here, this is not a drawback but rather another instance of a forced ex-situ effect. The data are captured if the resumptive D head selects for DPs with an active Ā-probe; see (53). This probe indicates that the DP will undergo movement (see (54)), so that the constituent in (52) will never surface.

(53) Forced ex-situ for big DP



(54) Movement



The Big-DP approach is not restricted to resumptives but also applies to clitic doubling (see Uriagereka 1995, Roberts 2010, and Nevins 2011). The phenomenon is il-

lustrated in (55) with data from Rioplatense Spanish. In this example, the object is represented by both a proper name and a preverbal pronoun.

(55) **Lo** vimos a Juan.
Him we.saw a Juan
'We saw Juan.' (Jaeggli 1986: 32)

Similarly to resumptive pronouns, approaches to clitic doubling differ in whether the phenomenon involves movement or not. One of the arguments in favor of the movement approach was presented by Anagnostopoulou (2003) for clitic doubling in Greek and is repeated in (56)–(57). The data in (56) show that variable binding in Greek is sensitive to c-command (at least in such simple sentences).

(56) a. **Kathe mitera$_i$** sinodhepse to pedhi **tis$_i$**.
every mother-NOM accompanied the child.ACC hers
'Every mother accompanied her child.'

b.?*I mitera **tu$_i$** sinodhepse to **kathe pedh$_i$**.
the mother.NOM his accompanied the every child-ACC
'His mother accompanied every child.' (Anagnostopoulou 2003: 207)

The example in (57) constitutes a minimal pair with example (56b) and differs in the presence of the clitic. The clitic enables the bound variable interpretation that was ruled out in (56b).

(57) I mitera **tu$_i$** *to* sinodhepse to **kathe pedh$_i$**.
the mother.NOM his CL.ACC accompanied the every child-ACC
'His mother accompanied every child.' (Anagnostopoulou 2003: 207)

Given that agreement usually has no effect on binding, these data suggest that clitic doubling involves movement to a position that c-commands the subject, at least in its base position inside the vP. As a result, the analysis of clitic doubling requires the base generation of the doubled clitic and the DP in the same position. This once again produces a structure that does not appear on the surface and thus instantiates a forced ex-situ effect. The account based on second-order selection features can derive this effect if DPs can select for the clitic D head only if the latter has an active feature that needs to be discharged and leads to movement. As clitic doubling has been related to interpretive effects (see Suñer 1988, Anagnostopoulou 1994), I suggest that the doubled clitic bears a corresponding information-structure probe (e.g., a topic probe) that must be discharged in a higher position.

6.3.4 Wager-class verbs

The final instance of a forced ex-situ effect comes from wager-class verbs (see Postal 1974, Kayne 1981, i.a.). These verbs are attested in a number of languages and are peculiar in that they allow for an overt subject of an embedded infinitival clause only if this subject undergoes further movement. The phenomenon is illustrated in (58) from French and (59) from English. The sentences in (58a) and (59a) show that overt subjects of infinitival clauses are ungrammatical if they follow the main clause verb. The sentences in (58b) and (59b) show that the corresponding examples are grammatical if the subjects undergo Ā-movement.

(58) a. *Je croyais le **garçon** [être arrivé].
I believe the boy to.have arrived
'I believe the boy arrived.'

b. Le **garçon** que je croyais [être arrivé].
the boy that I believed to.have arrived
'The boy that I believe arrived.' (Kayne 1981: 357)

(59) a. *John wagered **Mary** [to have entered the room].

b. Mary, **who** Bill wagered [to have won the race]. (Pesetsky 1991: 16-17)

I assume that the infinitival T head does not assign nominative case, so that its subject must receive case from the verb of the higher clause. For case assignment from the higher clause, it is required that the DP moves to the object position there (see McCawley 1970, Postal 1974). Under these assumptions, the data on wager-class verbs can also be derived by second-order selection features: I suggest that wager-class verbs modified by infinitives select only for DPs with an active Ā-probe. This derives further movement of infinitival subjects.

Note that in the absence of an infinitival complement, direct objects of wager-class verbs can remain in situ:

(60) John wagered **his fortune** on the absence of c-selection. (Pesetsky 1991: 16)

This implies that such verbs can, in principle, select for DPs but must select for DPs with an active Ā-probe if they also select for a TP; cf. the two possible feature stacks in (61) and (62).

(61) V with a direct object

$$\begin{array}{c} \text{V} \\ \left[\bullet\text{DP}\bullet\right] \end{array}$$

(62) V with a TP complement

$$\begin{array}{c} \text{V} \\ \left[\begin{array}{l} \bullet\text{TP}\bullet \\ \bullet\text{DP}_{[*\bar{\text{A}}*]}\bullet \end{array}\right] \end{array}$$

Some languages also allow passivization to salvage the subject of an infinitive with wager-class verbs; see (63) from English.

(63) **Mary** was wagered [to have won the race]. (Pesetsky 1991: 16)

I suggest that since DPs do not need to receive case in the object position in this case, they also do not undergo raising to object but instead raise directly to their final position from their base position in the infinitival TP. As a result, this analysis is not available for Ā-moved phrases, because after Ā-movement they cannot receive case, and the derivation therefore fails.

6.3.5 Summary and the alternative

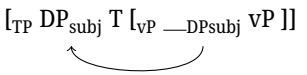
In this section, I have shown that the obligatory ex-situ position of a syntactic object found in relatives with ICA in Moksha is a well-attested effect. In particular, I have suggested that it is instantiated by the following phenomena: split topicalization, relative pronouns, resumptive pronouns, clitic doubling, and wager-class verbs.

Note that this list is far from complete. There are at least two further cases. One of them comes from quantifier floating; see (64). This case is considered by Ott (2012, 2015) as well as by Al Khalaf (2019) and follows from the analysis developed here if QPs select only for DPs with unchecked probes.

(64) **Den Kindern** habe ich **beiden** geholfen.
the children.DAT have I all.DAT both.DAT
'I helped both children.' (Ott 2015: 190)

Yet another phenomenon that can arguably be viewed as a forced ex-situ effect is the obligatory movement of subjects from Spec,vP to Spec,TP attested in some languages; see the schematic representation in (65).

(65) Subject movement



This case is discussed by Chomsky (2015), where it is suggested that his non-deterministic labeling algorithm can account for this movement without employing the conceptually unattractive [EPP]-feature. Since the approach pursued here assumes that all cases of Merge are feature-driven, it is not possible to exclude the probe attracting the DP to the higher position. An account based on secondary selection features is, however, also possible: it requires the assumption that the v head selects for DPs with an unchecked case feature (or with any active feature, as suggested in Chapter 5 for languages with ICA) and that, as a result of case assignment, DPs must move to T, which provides case.

I now return to this existing alternative approach to forced ex-situ placement of syntactic objects. It is based on Chomsky's recent labeling algorithm (see Chomsky 2013, 2015), which was summarized in section 5.3.2. Under this approach, the source of obligatory displacement is the inability to label a constituent unless one of the merged syntactic objects moves out, so that the remaining one can provide a label. There are two preconditions for the application of this approach. First, none of the merged syntactic objects may be terminal, because its category will be taken as a label. Second, the merged syntactic objects must not agree with each other, because a shared feature will serve as the label. In section 5.3.2, I have shown that these prerequisites are not fulfilled in the case of obligatorily displaced relatives with ICA in Moksha.

Similarly, not all of the phenomena considered in this section satisfy these requirements. The first requirement is violated by relative pronouns, resumptives, and clitics. They involve the Merge of a terminal with a phrase in the base structure, and consequently no problem for labeling is expected: the terminal provides the label in this case.

There is one scenario in which a terminal cannot provide a label: it is weak. In this case, however, movement of its complement, as required in derivations with relative and resumptive pronouns, is not expected to facilitate labeling, because the terminal will remain weak and unable to label. On the contrary, weak heads must be accompanied by additional material that strengthens them and allows them to label (see Chomsky 2015, Miyagawa, Wu, & Koizumi 2019, and Blümel 2022). Furthermore, while the connection between the presence of features on a head and its strength is not formalized, known cases of weak heads (e.g., roots and T heads in some languages) differ in that they have no features of their own and are strengthened by

gaining features via feature inheritance and agreement. In the cases discussed here, the relevant heads are D heads that have case and number features.

Next, raising to object, involved in the derivation of wager-class verbs, is discussed by Chomsky (2015: 10) and is explicitly suggested to raise no problems for labeling. On the contrary, raised direct objects are claimed to strengthen verbal roots and allow them to project.

As for the second prerequisite, merged phrases creating an unlabelable constituent share features in essentially all of the cases considered here. For instance, resumptives, relative pronouns, and clitics often have the same number and gender features as the noun phrase they merge with. In all of these cases, as well as in split topicalization, the merged syntactic objects share the same case feature. These shared features may, however, not count for Chomsky's labeling algorithm, because they are not necessarily acquired via Agree between the heads of the two merged phrases, but may instead be independently present on both or result from multiple agreement with a higher head (cf. Hiraiwa 2001). However, the assumption that only features shared via Agree between the heads of merged phrases count for labeling raises questions: it is unclear how the origin of the features can be traced. Agree and labeling cannot apply simultaneously, because labeling needs access to the outcome of Agree. But if labeling applies after Agree, it is impossible to determine the source of the features, at least under standard assumptions. It is thus unclear how the requirement for Agree before labeling by a shared feature can be implemented, and it also seems to contradict the general idea of this labeling algorithm, namely to reduce labeling to Minimal Search and third-factor principles (see also Murphy & Shim 2020 for arguments against labeling by a shared feature).

All in all, I conclude that Chomsky's labeling algorithm in its current form does not capture all attested cases of forced ex-situ. In contrast, all known cases of forced ex-situ effects can be derived by second-order selection features.

6.4 Labeling: An outlook

The proposal in this book assumes the projection-by-selection labeling algorithm and shows that, despite its arguable simplicity, it allows us to account for non-trivial syntactic effects such as projecting movement and forced ex-situ effects. In this final section, I take a step back and discuss labeling procedures in general. In section 6.4.1, I review four alternative labeling proposals: label-less syntax, pursued by Collins (2002), Seely (2006), Collins & Seely (2020); the non-deterministic labeling algorithm by Chomsky (2013, 2015); exocentric labeling by Adger (2012); and the feature percolation approach suggested by Zeijlstra (2020). I will not be able to do full justice to each of these proposals, but I outline their main ideas as well as some of the issues

that arise. Then, in section 6.4.2, I briefly review the main criticisms and problems of the projection-by-selection labeling algorithm. As a result, I conclude that this labeling algorithm has better empirical coverage and is conceptually superior to the alternatives.

6.4.1 Alternative labeling proposals

6.4.1.1 Labelless syntax

Throughout this book, I have assumed that labeling is an inherent part of syntactic computation. An alternative, developed by Collins (2002), Seely (2006), Collins & Seely (2020), as well as more recently by Narita (2011, 2014), is that labels are not needed and that the distinction between heads and their dependents, arguably required for determining how a derivation proceeds, can be established by other means.

Here, I consider one such model suggested by Collins (2002). In this model, Merge is assumed to be driven by features, but labeling as such is absent and is replaced by three principles. The first is the Locus Principle, given in (66). It ensures that all unsatisfied selection features of a syntactic object are checked before another syntactic object with active features can be drawn from the numeration.

(66) Let X be a lexical item that has one or more probes/selectors. Suppose X is chosen from the lexical array and introduced into the derivation. Then the probes/selectors of X must be satisfied before any new unsaturated lexical items are chosen from the lexical array. Let us call X the locus of the derivation. (Collins 2002: 46)

Note that the Locus Principle, in its current form, raises problems for branching specifiers, which must be constructed in parallel with the main projection line. Also, by excluding the selection of syntactic objects before all their selection features are discharged, the principle rules out projecting movement, in favor of which I argued in the previous chapter. Let us, however, put these difficulties aside and proceed to the other two principles of label-less syntax.

The second principle is Minimality, given in (67), and it is accompanied by the intervention condition in (68).

(67) Minimality:
Let P be a probe and G be a matching goal. Then P and G satisfy minimality if there is no G' matching P such that P asymmetrically c-commands G' and G' asymmetrically c-commands G. (Collins 2002: 51)

(68) If X selects Y (where Y is a lexical category), then *X Z Y where Z intervenes between X and Y, and Z is any lexical category (±V, ±N). (Collins 2002: 52)

These principles correctly derive that the constituent in (69a) is legitimate, while the constituents in (69b–c) are not. In (69a), the determiner selects for a noun, and its sister is indeed a noun. In (69b), the determiner does not find the noun, because it is simply not present in its sister. The structure in (69c) is slightly more interesting: *city* is contained in the sister of the determiner, but it is not immediately dominated by the sister node, so the verb *destroy* intervenes and correctly blocks this structure.

(69) a. { the, destruction }

b. *{ the, destroy }

c. *{ the, { destroy, { the, city } } }

The problem arises with the constituents in (70a-b), which are incorrectly predicted to be possible. In (70a), the adjective subcategorizes for a noun that is indeed immediately dominated by its sister. In (70b), Collins (2002) assumes that the noun *cities* does not contain a null determiner and consequently is local enough for the checking of the selection feature on the determiner.

(70) a. *{ beautiful, { the, city } }

b. *{ the, { destroy, cities } }

Thus, the Minimality and Intervention conditions in (67)–(68) together ensure that the goal of selection is immediately dominated by the sister node rather than simply embedded in it. They cannot restrict which of the two syntactic objects immediately dominated by the sister must fulfill the selection requirement, and this is instead accomplished by the third principle, given in (71).

(71) Accessibility Condition:
A lexical item X (and the features it contains) is accessible without search to a syntactic operation if X contained the probe/selector for the last operation in the derivation. (Collins 2002: 55)

Collins (2002) claims that this principle is required independently of labeling, but it turns out to be crucial for distinguishing correct constituents from illegitimate ones and allows us to exclude both impossible structures in (70a–b). In particular, in (71a), the determiner discharges its selection feature when merged with the noun, so that the determiner (not the noun) must be targeted by the next Merge step. The

Accessibility condition also excludes search into complex specifiers, as, for instance, in (72), and ensures that it is the inflected verb that is visible to further selection here, not the equally deeply embedded determiner. As a result, the further distribution of a constituent is always determined by a syntactic object that has checked its selection feature in the preceding Merge step.

(72) a. { that, { the, boys }, { see, { their, friend } } }

b. *{ know, { the, boys }, { see, { their, friend } } }

It seems, however, that while significantly improving the empirical coverage of the model, the Accessibility condition also introduces backtracking and essentially reinvents labeling: a syntactic object that has checked its probe in the previous step of the derivation is recorded and temporarily acts as a label for the whole constituent. A possible objection—that the model still differs from proper labeling in that it requires memory of only one previous derivation step—turns out to be invalid once actual derivations involving agreement are considered. In (72), for instance, the subject must receive case before the derivation can proceed further with the Merge of the C head. Given that case assignment involves satisfying the probe on the subject, the Accessibility condition, as it stands, entails that it is the subject that is accessible without search, because its probe was checked in the last operation. The constituent thus must have the distribution of a DP, contrary to the facts. Complicating the definition and assuming that only some feature-checking operations count for accessibility implies that the memory of the last checked subcategorization feature remains in the derivation for a number of subsequent steps and is thus equivalent to creating a temporary label. As a result, the model effectively reinvents labels.

6.4.1.2 Non-deterministic labeling

The next labeling algorithm is the non-deterministic labeling procedure proposed by Chomsky (2013, 2015) and extensively discussed since then; see Epstein et al. (2014, 2020), Boškovič (2016), Ginsburg (2016), Rizzi (2016), Hayashi (2020), Moro & Roberts (2020), Nakashima (2020), Blümel (2022), Ke (2022), McInnerney (2022), among others. Since one existing analysis of forced ex-situ effects relies on this labeling algorithm, I have already considered this approach earlier in the book and have shown that it does not account for all known cases of forced ex-situ. Here, I once again summarize the central aspects of this proposal, but from a more general perspective rather than with a focus on the account of forced ex-situ effects. In doing so, I consider this algorithm as it was suggested by Chomsky (2013, 2015), abstracting away from various, mutually incompatible modifications proposed in the literature cited above.

The algorithm is summarized in (73). Labeling is assumed to apply under Minimal Search, the output of which depends on the phrase-structural status of the merged syntactic objects.

(73) Labeling algorithm:

a. If syntactic object = {H, XP}, labeling algorithm will select H as the label.

b. If syntactic object = {XP, YP}, Minimal Search is ambiguous, locating the heads X, Y of XP, YP, respectively. There are two ways in which syntactic object can be labeled:
   (i) Modify syntactic object so that there is only one visible head (i.e., one of the phrases moves out).
   (ii) X and Y are identical in a relevant respect, providing the same label, which can be taken as the label of the syntactic object.

c. If syntactic object = {H, H}, one of them is a root and the other provides the label.

Chomsky (2015) further complicates the model by introducing the notion of a weak head. Weak heads cannot label unless they are strengthened, for instance, by agreement.

I would like to point out four, in my view, pressing problems of this labeling algorithm (see also the discussion by Adger 2012).

First, Chomsky (2013, 2015) state that labeling takes place at the phase level, as part of the Transfer operation. This means that labels are practically absent from syntactic computation, and at the stage where Merge applies, none of the merged syntactic objects has a label. Together with the fact that Merge is free (i.e., not feature-driven) under this approach, this leaves no mechanisms to preclude the building of illegitimate syntactic structures. Distinguishing correct syntactic structures from illegitimate ones then relies solely on output conditions that still remain to be formulated.

Second, the approach undergenerates: it allows {XP, YP} constituents to persist until the end of the derivation only if the heads of the two phrases agree with each other. As suggested by Hayashi (2020), this makes incorrect predictions for languages without agreement and for specifiers that regularly do not agree (for instance, indirect objects or nominal arguments).

Third, in addition to the technical problems noted in (6.3.5), labeling by a shared feature incorrectly predicts that the behavior of a constituent differs depending on the presence of the specifier and, moreover, on the features of the specifier. For instance, traditional TPs are here replaced by ⟨2PL,2PL⟩ or ⟨3SG,3SG⟩, depending on the

φ-features on the subject. Nevertheless, TPs seem to behave uniformly for LF and PF processes, independently of their specifiers' φ-features.

Fourth, the algorithm is intended as a conceptual simplification that allows labeling to be reduced to Minimal Search, but in fact it lacks a unified labeling procedure. The algorithm falls into a number of individual cases, and the choice of label in each of them is stated by a separate rule. Note also that even labeling in the simplest {H, XP} case does not follow from the atomic nature of heads, but faces complications in head movement and requires further assumptions about what counts as a head (see Rizzi 2016).

6.4.1.3 Exocentric labeling

The next proposal I consider is the exocentric labeling algorithm developed by Adger (2012). It relies on the following assumptions. First, there is no distinctness condition on Merge, so that Self Merge is possible:

(74) Self Merge: Merge(X, Y), X = Y, → {X, X} = {X}. (Adger 2012: 19)

Second, there are no functional heads, and the lexicon is divided into CLex and RLex, as defined in (75).

(75) a. RLex = {√1, ..., √n}, the set of LIs (roots)

b. CLex = $\{l_1, \ldots, l_n\}$, the set of category labels (Adger 2012: 21)

Merge applies to roots in RLex and to the outputs of earlier Merge steps, while labels are supplied from CLex. The choice of label is determined by the set of Label Transition Functions Λ, as in (76), and by the labeling algorithm in (77).

(76) Λ = CLex x CLex ={⟨N, D⟩, ⟨V, v*⟩, ⟨D, v*⟩ ... }

(77) a. Transition Labeling
If α, β ∈ γ, then Label(γ) = some L∈CLex, such that there are (possibly nondistinct) f and g ∈ Λ such that f(Label(α)) = g(Label(β)) = L.

b. Root Labeling
Label(√x) = some L ∈ {N, V, A} (Adger 2012: 21)

The first part of the algorithm in (77a) states that the label for a constituent α, β is determined by the Label Transition Function Λ, and it is the label that can be supplied for both α and β independently. Given the simplistic Λ in (76), a sample derivation is presented in (78).

(78) a. Self Merge √jump = {√jump, √jump} = {√jump}

b. Label({√jump}) = V

c. Self Merge √Lilly = {√Lilly, √Lilly} = {√Lilly}

d. Label({√Lilly}) = N

e. Self Merge {√Lilly} = { {√Lilly}, {√Lilly} } = { {√Lilly} }

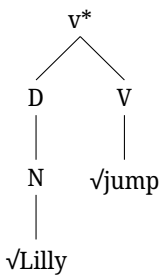
f. Label({ {√Lilly} }) = Cl because there are f and g ∈ Λ such that f(N) = g(N) = D (f and g nondistinct = ⟨N, D⟩)

g. Merge {√jump} and { {√Lilly} } = { {√jump}, { {√Lilly} } }

h. Label({ {√jump}, { {√Lilly} } }) = v* because there are f and g ∈ Λ such that f(N) = g(N) = v* (f = ⟨D, v*⟩ and g = ⟨V, v*⟩)

The resulting structure is shown in (79).

(79) v*P structure



The resulting model differs radically from the one assumed in this book in that Self Merge creates vacuous structure, while labels introduce new information. The implications of this intricate proposal are discussed in detail by Adger (2012). All in all, however, this approach to labeling gives up the idea that labels are reducible to features on syntactic objects that build the constituent, a task that projection-by-selection, in my view, successfully fulfills.

6.4.1.4 Feature percolation

The final algorithm that I consider here was suggested by Zeijlstra (2020). The conceptual premise of this approach is that since the Merge of two syntactic objects creates a set, its label must be the unification of formal features from the two merged syntactic objects:

(80) Labeling by unification

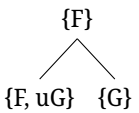
Developing this elegant idea, Zeijlstra (2020) considers and provides an account of various syntactic configurations. In what follows, I discuss the main algorithm and show that it involves some unmotivated assumptions about which features percolate to the top node, so that the approach is ultimately not conceptually superior to the projection-by-selection algorithm. Second, I consider in more detail cases in which a syntactic object is selected before all of its merge features are discharged. These cases are explicitly allowed under this approach, but, as I suggest, they lead to unwanted empirical consequences due to the percolation of all unchecked features. I also show that this analysis excludes projecting movement, in favor of which I argued in the previous chapter.

Zeijlstra (2020) assumes that Merge is feature-driven and suggests that a label is formed by all features of the merged syntactic objects except for those features that participate in a dependency resolved after this Merge step; see the rule in (81).

(81) Let A and B be two sets of formal features. If A merges with B, for any pair ⟨[F]–[uF]⟩ such that [F]∈A and [uF]∈B, or [F]∈B and [uF]∈A, neither [uF] nor [F] percolates; all other features do percolate. (Zeijlstra 2020: 39)

This rule states that the selection feature responsible for a given Merge step, as well as the selected categorial feature, do not project; see (82).

(82) Projection

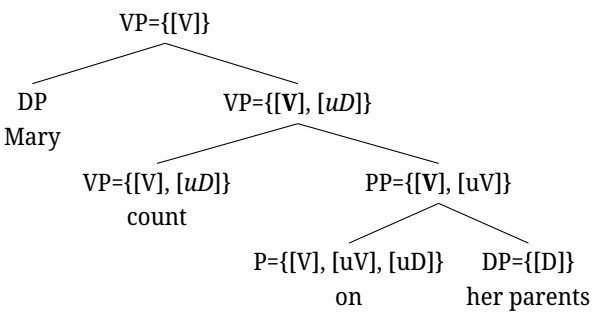


Zeijlstra (2020) points out that this approach to labeling is conceptually superior to projection-by-selection, because the latter needs to stipulate where the projected features come from. However, the algorithm in (81) also includes a rather unmotivated assumption that the category of the selected syntactic object does not contribute to the label: while this categorial feature is targeted by selection, it is clearly not deleted afterward and remains accessible for further syntactic operations such as agreement or movement. Furthermore, in addition to the categorial feature of

the selected syntactic object, the algorithm must exclude the projection of its other formal (but not active) syntactic features, such as, for instance, φ-features. While I contend that the algorithm remains fairly simple, it still contains a number of stipulations, just like projection-by-selection.

Let us explore how this model would derive projecting movement argued for earlier. Projecting movement requires it to be possible for a syntactic object to be selected before its own selection features are checked. Zeijlstra (2020) explicitly includes such cases to derive PP arguments of verbs. He assumes that PPs always project the category of the selected syntactic object, V in this case.[5] Used as arguments, PPs can select verbs but project the V features, thereby not altering the category; see (83). Note that the verb here has an active Merge feature that percolates upward and is then discharged in the next step.

(83) PP arguments (Zeijlstra 2020: 48)

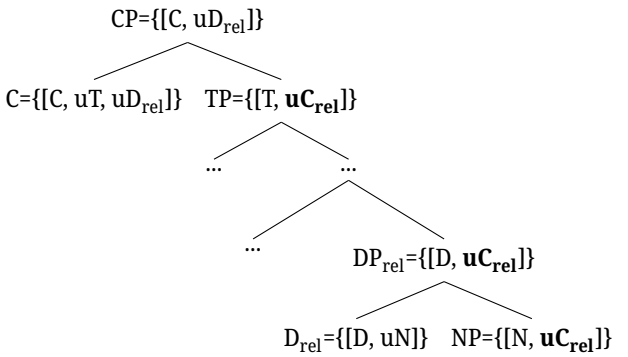


I would like to suggest that the possibility of discharging selection features after the syntactic object that projects a categorial feature has changed makes incorrect empirical predictions: it allows arguments of syntactic objects to be merged at any distance from their selector.

In addition, despite the possibility of delayed discharge of selection features, the approach does not account for projecting movement, which I have argued is necessary in the derivation of raising relative clauses. Projecting movement is blocked here because the uC_{rel} feature on the NP percolates upward and is checked once the C head is merged into the structure. After this, there is no trigger for movement of the head noun and projection of its categorial feature in the landing site.

5 Zeijlstra (2020) derives this by using the so-called supercategories that can acquire more specific categorial features from the syntactic objects they merge with.

(84) No projecting movement



6.4.2 Arguments against projection-by-selection

In this final section, I consider existing arguments against the projection-by-selection labeling algorithm. In doing so, I rely on the recent work by Zeijlstra (2020) (see also Adger 2012), where unsolved and pressing problems of projection-by-selection are cataloged; see the list in (85) (though the order is different here). I consider each of these points in turn.

(85) Problems of projection-by-selection (see Zeijlstra 2020):

a. Adjunction

b. Free ordering

c. C-selection vs. s-selection

d. Mutual selection

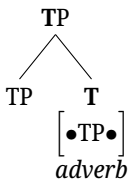
e. Differences between (long-distance) Agree and local selection

f. Motivation

The first suggested problem concerns adjuncts. They differ from arguments in that their presence is optional. It also appears that adjuncts select what they can merge with but do not provide a label. For instance, the T head is fully well-formed without any adjuncts, so that it seems to be a requirement of T-level adjuncts that they be merged with the T head. At the same time, it is still the T head that provides the label. These facts are widely discussed, and there are numerous proposals for how adjunction can be incorporated; see Frey & Gärtner (2002), Fowlie (2017), and Müller (2022),

among others. Notably, Zeijlstra (2020) develops a solution under his alternative labeling algorithm, but it also resolves the issue for projection-by-selection. Zeijlstra (2020) proposes that adjuncts do indeed select and that their category provides a label, but that adjuncts must themselves be of the same category as the syntactic object they select. As a result, adjunction does not alter the label of the previous phrase, even though the actual label comes from a different syntactic object; cf. (86).

(86) V with a direct object



One consequence of such an approach is that, instead of the familiar categories, the category of an adjunct should always match the category of its host. This, however, also leads to further complications with adjuncts that can merge with syntactic objects of different categories, as in (87).

(87) a. $[_{VP}\ [_{VP}$ meet Mary] $[_{PP}$ in the park]]

b. $[_{NP}\ [_{NP}$ man] $[_{PP}$ in the park]] (Zeijlstra 2020)

Zeijlstra (2020) suggests a way out by assuming that the category a syntactic object projects can arise as the result of agreement with a syntactic object it has just merged with. This allows a traditional PP to be a DP if it is merged with a DP and a VP if it is merged with a VP.

In this work, however, I pursue yet another approach that allows adjunction to be accommodated under the projection-by-selection labeling algorithm: I assume that the presence of some features in feature stacks is optional (cf. edge features that are freely available on phase heads according to Chomsky (2008)). This means that, for instance, verbs can enter the derivation with a feature stack that includes [•AdvP•], [•PP•], or neither of these features. The presence or absence of a feature in a given stack then leads to the presence or absence of an adjunct. This arguably simple solution to the problem leads to a very general issue for the approach I pursue in this work: how do ordered feature stacks arise?

There are again several ways to approach this question. One option is to assume that feature stacks are simply part of the lexicon. Each syntactic category is then associated with a number of feature stacks that can enter the numeration together with it. The use of different feature stacks then leads to different effects in

the derivation. Another option is that feature stacks are composed at the start of the derivation in accordance with certain principles that are yet to be explored (cf. Müller 2020). This implies that order—and thus, essentially, structure in the derivation—comes not only from Merge, which applies to syntactic objects from the Numeration, but that there are other means of creating structure as well. This is not necessarily a bad outcome (pace Adger 2010). First, nothing in principle argues against this seemingly different structure-building operation in fact being Merge as well, with the only difference being that, by applying in a different component of the grammar, it yields a somewhat different result. Second, syntactic theory in fact includes a number of operations besides Merge. For instance, Agree is clearly not reducible to Minimal Search alone, but also includes copying of a value or deactivation (also known as deletion) of the checked probe. Movement is also not just internal Merge, but also includes the creation of a copy of the displaced syntactic object. Furthermore, the concept of the numeration itself presupposes that syntactic objects with their features are selected from the lexicon and placed in the numeration. In general, the idea recently entertained by Chomsky (2015) that linguistic phenomena are reducible to the simplest computational operation, Merge, and to third-factor principles is conceptually attractive, but at least at the current stage it is far from accounting for the variety of linguistic phenomena and instead significantly reduces the empirical coverage of the model.

Returning to the criticisms of projection-by-selection, the second problem raised by Zeijlstra (2020) is that projection-by-selection itself does not determine the order in which syntactic objects must be merged, which may allow arguments to be merged in any order, thereby freely exchanging specifiers with complements. This problem is resolved by assuming that merge features are ordered, as discussed above.

The third problem is that, at least in some cases, syntactic selection appears to be very broad; see, for instance, (88), where the verb in English can select for a DP, a CP, or a PP.

(88) a. [$_{VP}$ know [$_{DP}$ Mary]]

b. [$_{VP}$ know [$_{PP}$ about Mary]]

c. [$_{VP}$ know [$_{CP}$ that Mary has left]] (Zeijlstra 2020)

One solution entertained by Zeijlstra (2020) is that known syntactic categories may be more general than originally thought, so that DPs and CPs share a feature that can then be targeted by selection. Here, I assume another approach: as I have already suggested for adjunction, syntactic objects are not associated with a single unique

feature stack but can correspond to somewhat different feature stacks, so that some verbs can indeed have selection features for objects of different categories.

The fourth issue pointed out by Zeijlstra (2020) is mutual selection. When a preposition is merged with a DP, it is, on the one hand, a requirement of the preposition to select a DP, but, on the other hand, the DP also needs case from the preposition, i.e., in some sense selects for it. While dependency relations between merged syntactic objects can indeed be bidirectional, this is not problematic, as typically one of the dependencies must be formalized as categorial selection and the other as Agree. Also, the case probe on the DP does not have to be valued by the case on P but can be valued by any syntactic object that has a suitable case feature.

This leads us to the fifth problem: the difference in locality between the checking of merge and agree features. Merge features must be checked very locally, under sisterhood, while the discharge of agreement probes is also possible across some distance. One option is that merge and agreement features are ontologically different, as is essentially implied by the [•F•] and [∗F∗] notation. At the same time, bullets and asterisks might be viewed as purely notational devices, and the observed differences in locality may follow from the type of the sought feature and defective intervention. Merge features search for a category that all syntactic objects have. As a result, if the closest syntactic object (i.e., the sister) cannot check the feature, its categorial feature intervenes and prevents further probing to find a goal. Merge features can then be reformulated as agree features selecting for a category; see, e.g., [∗cat:DP∗].

The final criticism of projection-by-selection is conceptual: there seems to be no deep reason why a syntactic object that selects should also be the one that provides a label. Note, however, that the algorithm is in principle compatible with the idea that labeling applies under Minimal Search. Unlike in the case of Agree, in the case of labeling, search always finds two syntactic objects, and the choice between them is made on the basis of their properties: a syntactic object that checks its categorial selection feature as a result of this Merge step provides the label. The search for this specific property remains unmotivated, but, as I have shown above, all existing labeling algorithms require assumptions specific to the labeling procedure. I therefore conclude that, like other syntactic operations such as Merge and Agree, labeling requires its own principles specific to human language.

6.5 Summary

In this chapter, I have investigated the consequences and further applications of the proposal presented in the previous chapter. I began by discussing late merge and showed that it shares with projecting movement the assumption that syntactic

objects can themselves be selected before all their selection features are satisfied. I suggested that the delayed valuation of merge features in the case of late merge can follow from the ordering of the relevant selection feature after a probe that is checked only later. I then turned to second-order merge features and demonstrated that forced ex-situ effects are a widespread phenomenon and that the proposed analysis based on second-order selection features can be extended to other attested data.

As both projecting movement and the account of forced ex-situ effects are enabled by the projection-by-selection labeling algorithm, I then discussed labeling procedures more generally and reviewed some existing alternatives and criticisms of projection-by-selection. I conclude that, combined with the assumption that features are organized in ordered stacks, the projection-by-selection algorithm is superior to the alternatives both in its empirical coverage and conceptually.

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https://doi.org/10.1515/9783112225868-008