CROSS-LINGUISTIC EFFECTS OF SUBJECTHOOD, CASE, AND TRANSITIVITY IN SYNTAX AND SENTENCE PROCESSING

by

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Abstract

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The definition of a grammatical 'subject', and the properties an argument must have to be characterized as a subject is long debated (e.g., Comrie, 1975; Keenan, 1976). This thesis investigates the relationship between subjecthood, case marking, and transitivity, from both a typological perspective and from an in-depth study of the ergative Polynesian language Niuean. I present two original experimental studies of sentence processing in Niuean, which show that processing of long-distance dependencies and resolution of anaphoric pronouns is affected by agentivity, case marking of arguments, and predicate transitivity. Coupled with formal syntactic analysis, these findings support a view in which a subject is defined as the most agentive verbal argument present in a clause, and further reveal syntactic effects of the *distribution* of the case marking borne by each argument. Case distribution (known as 'unmarkedness' in syntactic literature) and subjecthood are argued to be two *distinct* factors which, together, influence how accessible an argument is in both syntactic operations and in sentence processing.

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~ For mum and dad ~

Contents

Abbreviations

1	first person
2	second person
3	third person
ABS	absolutive
ACC	accusative
AF	agent focus
AOR	aorist
AP	antipassive
APPL	applicative
ASP	aspect
AUX	auxiliary
CAUS	causative
CLS	classifier
COMPL	completive
COP	copula
DAT	dative
DEP	dependent clause
DESI	desiderative
DET	determiner
DIR	direct
DUR	durative
ERG	ergative
EV	eventive
FEM	feminine
FUT	future
GEN	genitive
IMP	imperfective
INCOMPL	incompletive
INDEF	indefinite
INF	infinitive
INS	instrumental
INTRANS	intransitive
ITV	intransitive suffix
LOC	locative
MASC	masculine
NCL	noun classifier
NEG	negative
NEUT	neuter
NFUT	non-future
NML	nominalizer
NOM	nominative
NPST	non-past
OBJ	object
OBL	oblique
PERF	perfective
PL	plural
POSS	possessive
PRED	predicate
PREP	preoposition
PRES	present
PRO	pronoun
PROG	progressive
PROSP	prospective
PST	past
PTCP	participle
PUNC	punctual
Q	question marker
REFL	reflexive
REL	relative clause
RN	Relational noun
RP	resumptive pronoun
RT	root
SBJ	subject
SG	singular
SUF	suffix
TNS	tense
TRANS	transitive
TV	transitive suffix

Chapter 1

Introduction

This thesis investigates the relationship between subjecthood, case marking, and transitivity, from both a typological perspective and from an in-depth study of the ergative Polynesian language Niuean. I present two original experimental studies of sentence processing in Niuean, which show that processing of long-distance dependencies and resolution of anaphoric pronouns is affected both by case marking of arguments and by predicate transitivity. Coupled with formal syntactic analysis, these findings support a view of subjecthood as defined by agentivity of an argument in relation to other arguments present, and further show that grammatical operations are sensitive to the *distribution* of the case marking borne by each argument. Case distribution (known as 'unmarkedness' in syntactic literature) and subjecthood are argued to be two distinct factors which, together, determine how accessible an argument is in a syntactic representation. Broadly speaking, we find that arguments typically most accessible – both in processing and with respect to grammatical operations - are (i) those whose case morphology has the widest distribution within the language (i.e., *unmarked* arguments), (ii) those which are thematically more agentive, and (iii) arguments of the main predicate (i.e., directly selected for either by the lexical predicate itself, or by higher light verbal structure).

The structure of this chapter is as follows: Section 1.1 discusses the characteristics of subjecthood, taking into account agentivity of different types of arguments. Section 1.2 introduces typological differences in the case-marking of different arguments, focusing on ergative languages, in which agentivity and case do not co-vary. Section 1.3 presents an overview of the core aspects of the generative syntactic framework, focusing on movement operations. Generative theories of subjecthood and ergativity are overviewed in Section 1.4 and 1.5, respectively. Section 1.6 introduces the concept of accessibility and discusses formulations of accessibility as hierarchies of grammatical function and case. Finally, Section 1.7 provides an outline for the thesis.

1.1. Properties of a subject

Verbs vary in how many arguments they require. Intransitive verbs (also known as 'one place predicates') have only one obligatory argument, which is typically labelled a 'subject' (e.g., 1), whereas transitive verbs (also known as 'two place predicates') have two arguments: they require an object in addition to a subject (e.g., 2).

(1) **She**$_{\text{SUBJECT}}$ ran
(2) **She**$_{\text{SUBJECT}}$ kicked **him**$_{\text{OBJECT}}$

The definition of 'subject' has long been debated (see Comrie, 1975; Keenan, 1976). Based upon (1) and (2), one could define 'subject' as the semantic agent of a sentence. In (1) 'she' is the agent of the 'running' event, and in (2), 'she' is also the agent of the 'kicking' event. This definition immediately runs into problems, however, when other types of sentence are considered. In the sentences with intransitive verbs in (3) and (4), the single 'subject' argument is not a semantic agent, but rather, a semantic *patient*, or undergoer. In (3) 'the ship' undergoes the 'sinking' event, and likewise, in (4), 'she' is the patient of the 'kicking' event.

(3) **The ship**$_{\text{SUBJECT}}$ sank.
(4) **She**$_{\text{SUBJECT}}$ was kicked.

In view of this, the definition of 'subject' needs to be revised: to accommodate (3) and (4), the subject can perhaps be defined as the *most* agentive argument of a verb. This is true of all sentences with intransitive verbs such as (1), (3), and (4), because the only argument present must necessarily be the most agentive argument present. In the transitive sentence in (2), the 'she' is more agentive than the co-argument 'her'; thus, the label of 'subject' would therefore be afforded to 'she'. I therefore tentatively adopt this definition for the purposes of further discussion, and take 'subject' of a clause to be the most agentive verbal argument present.

There exist various grammatical properties – listed in (5) - that are recognised as being afforded *only* to the subject of a sentence.

(5) Properties of subjects (Manning, 1996; Aldridge, 2004; a.o.)
The subject typically:
a. Acts as the antecedent of a reflexive pronoun;
b. Is the addressee in an imperative;
c. Is controlled as null PRO in an embedded infinitive;
d. Is the argument that triggers verb agreement;

e. Is the most easily displaced argument.

In English, it is always the subject of a sentence which displays the properties in (5). Concerning (5a), the subject of a transitive predicate always acts as a binding antecedent in instances where the object is reflexive, as in (6a): the object cannot bind the subject, as in (6b).

(6) Binding: Subject binds object

a. **He**$_i$ saw ***himself***$_i$**.**

b. *_**Himself**_$_i$ saw **he**$_i$.

Concerning (5b), the subject always acts as the addressee in imperative constructions, as in (7).

(7) Imperatives: Subject = null addressee

a. **(You)** Eat your greens!

b. **(You)** Sit down!

Concerning (5c), an obligatorily controlled null ("PRO") argument is always the subject of an embedded clause (8a, b). This means that, in a sentence like 'Liam wanted to chase Peter', the null subject of the embedded verb 'chase' (termed 'PRO') has the same reference as the overt subject of the matrix verb 'want' ('Liam'). Non-subjects cannot act as null PRO, as in (8c).

(8) Controlled PRO: Only a subject can be controlled PRO in an embedded infinitive

a. Alice$_i$ wants [***PRO***$_i$ to leave].

b. Liam$_i$ wants [***PRO***$_i$ to chase Peter]

c. *Liam$_i$ wants [Peter to chase ***PRO***$_i$]

Concerning (5d), the subject is always the argument which controls verb agreement; the object cannot control verb agreement. Consider the contrast in (9): in (9a) the verb *know* bears third singular *-s* agreement, in accordance with the singularity of the subject *the reporter*. When *the reporter* is the object, as in (9b), third singular agreement is absent (we assume in this case that the verb agrees with the second person subject *you*, but since second person agreement in English is null, the verb is bare).

(9) Verb agreement: Only the subject triggers agreement

a. The reporter knows you.

b. You know(*-s) the reporter.

Concerning (5e), the subject can undergo syntactic displacement. Displacement is a core property of natural language, wherein an element of a sentence surfaces in a position different to

where it is interpreted. Displacement occurs in relative clauses (10a), *wh* questions (10b), and fronting operations (10c). In all environments, the subject can be freely displaced (notice in 10a and 10b, however, that subject displacement is vacuous, meaning that there are no elements linearly intervening between the *wh* word and its gap site).

(10) Displacement: The subject can be freely displaced

a. **Relative clause**

The reporter [who ___ SUBJECT attacked the senator].

b. ***wh* question**

Which reporter ___ SUBJECT attacked the senator?

c. **Fronting**

It is this reporter that ___ SUBJECT attacked the senator.

Unlike the other properties listed in (5), displacement in English does not apply *only* to the subject of the sentence: the object, too, can be displaced (e.g., *The reporter [who(m) the senator attacked ___ OBJECT]*, Which reporter did the senator attack ___ *OBJECT*?, *It is the reporter that the senator attacked ___ OBJECT*). Based upon both typological and within-language processing studies, however, it is argued that subject displacement proceeds more easily than object displacement (to be discussed shortly).

In English, therefore, all the properties in (5) apply to the subject, or the most agentive verbal argument in the sentence. There is however, an alternative characterization: the subject in English also bears *nominative* case. In such languages, the subject of a verb, regardless of whether the verb is transitive (wherein the agent is typically denoted as A) or intransitive (wherein the single argument is denoted as S), surface with the same morphological form. Patients, or objects, of transitive verbs (denoted as O), on the other hand, are marked differently. This kind of system is known as a NOMINATIVE-ACCUSATIVE (NOM-ACC) alignment: the subject bears nominative case, and an object is marked as accusative. Two well-known nominative-accusative languages exemplified below: in English (11), morphological case distinctions surface on pronouns only; both the subject of a transitive verb (11a; see also 1) and the subject of an intransitive verb (11b; see also 2) are realized in the nominative pronominal case form ‘he’, while the object of a transitive verb in (11a) is realized as the accusative pronoun ‘me’. In Japanese (12) – as in many other languages – full noun phrases bear case suffixes: the nominative suffix *ga* indexes both the agent

of a transitive verb (12a) and single argument of an intransitive verb (12b), while the suffix *o* indexes the object of a transitive verb, as in (12a).

(11) English (see also 1 & 2)

a. Transitive
[He]$_A$ saw **[me]**$_O$
NOM **ACC**

b. Intransitive
[He]$_S$ ran
NOM

(12) Japanese (Comrie, 2013:1)

a. Transitive
[Taroo ga]$_A$ **[Ziroo o]**$_O$ mi ta
Taro NOM **Ziro** **ACC** see PST
'Taro saw Ziro.'

b. Intransitive
[Taroo ga]$_S$ tui ta
Taro NOM arrive PST
'Taro arrived.'

While the examples in (11) and (12) show unique morphological forms for both nominative and accusative, nominative is most often morphologically *unmarked* whereas accusative has distinct morphological marking. For example, in Māori (13), the accusative object is marked with prenominal *i*; in Quechua (14), the accusative object is marked with the suffix *-ta*. In both Maori and Quechua, the subject bears no morphological (nominative) case marking.

(13) Maori (Harlow, 2007: 119)

a. Transitive
Ka hoko [te matua]$_A$ **[i ngā tīkiti]**$_O$
PRES buy the parent.NOM **ACC** **the tickets**
'The parent buys the tickets.'

b. Intransitive
Kua taemai [he ope]$_S$
PST arrive a party.NOM
'A (visiting) party has arrived.'

(14) Quechua (Gallagher, 2012, via Coon, 2013: 4)

a. Transitive
[misi]$_A$ **[yaka-ta]**$_O$ ujya-rqo-n
cat.NOM **water**-**ACC** drink-PST-3SG
'The cat drank water.'

b. Intransitive
[misi]$_S$ punyu-rqo-n
cat.NOM sleep-PST-3SG
'The cat slept.'

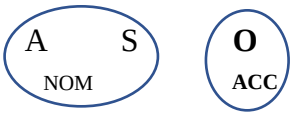
Languages in which the reverse hold – (i.e., nominative is morphologically marked but accusative unmarked) are extremely rare: in a *World Atlas of Language Structures (WALS)* survey of 52 nominative-accusative languages with case marking on full NPs (Comrie, 2013), only 6 are reported as having marked nominative case (vs. unmarked accusative). Accusative is thus considered the 'dependent' case, because it typically only surfaces in the presence of a second unmarked argument. Thus, since nominative case and subjecthood co-vary[1], the properties in (5) also hold of the nominative argument. This raises the question of whether a 'subject' should be defined as the *most agentive* argument or as the *nominative* argument. In other words, what property allows for an argument to hold the attributes in (5): subjecthood or nominative case? This question is best addressed by considering languages in which subjecthood and case do *not* co-vary, namely, ERGATIVE-ABSOLUTIVE languages; I turn to this now.

1.2. Subjecthood in ergative languages

In ERGATIVE-ABSOLUTIVE (ERG-ABS) languages, case morphology and subjecthood do not co-vary. The subject of a transitive verb is marked ergative, while the subject of an intransitive verb and the object of a transitive verb is absolutive. Here, absolutive is the *unmarked* case, while ergative is the *marked*, or dependent case. In ergative languages, therefore, intransitive subjects pattern with transitive objects in terms of case marking. This contrasts with nominative languages, in which intransitive subject pattern with transitive subjects. These two major alignment systems[2] are illustrated in (15).

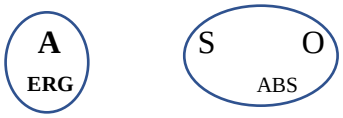
(15) Alignment types

a. NOMINATIVE-ACCUSATIVE



(unmarked) **(marked)**

b. **ERGATIVE-ABSOLUTIVE**



(marked) (unmarked)

Examples of ergative-absolutive alignments are shown in (16) and (17): in Basque (16), the suffix *-k* marks the subject of a transitive verb only, while intransitive subjects and transitive objects are

[1] Some nominative-accusative languages, such as Icelandic, show exceptions to this broad typological generalization: with certain verbs in Icelandic, the subject bears "quirky" (or dative) case, while the object bears nominative case.

[2] Other, rarer, types of alignment include tripartite (A, S and O all marked differently; e.g., Nez Perce) and neutral (A, S and O all marked the same way; e.g., Mandarin Chinese); see Song (2001) for an overview.

morphologically unmarked. Similarly, in Samoan (17), the prenominal marker *e* indexes the transitive subject only. The intransitive subject and the transitive object are, like in Basque, unmarked.

(16) Basque (Santesteban et al., 2010: 1)

a. Transitive
[Medikua-k]$_A$ [pirata]$_O$ beldurtzen du
doctor-ERG pirate.ABS frighten AUX
'The doctor frightens the pirate.'

b. Intransitive
[Pirata]$_S$ abiatzen da
pirate.ABS depart AUX
'The pirate departs.'

(17) Samoan (fieldnotes)

a. Transitive
Sā kiki **[e le teine]$_A$** [le polo]$_O$
PST kick ERG DET girl DET ball.ABS
'The girl kicked the ball.'

b. Intransitive
Sā asulu [le teine]$_S$
PST fall DET girl.ABS
'The girl fell.'

Ergative alignments are typologically less widespread than nominative alignments; Dixon (1994:2) estimates that ergativity plays a role in approximately 25% of the world's languages. Ergativity is a common hallmark of Austronesian and Australian languages, and languages of the Americas and the Caucasus. Ergative alignments in which the absolutive argument is morphologically *marked* are known to be extremely rare (see Chapter 6 for full discussion).

We also see variation in alignment of intransitive subjects. Two types of intransitive verbs are typically distinguished: the single argument of *unaccusative* verbs (e.g., *freeze, arrive, fall*) behaves semantically like a patient (i.e., object of a transitive verb), while the single argument of *unergative* verbs (e.g., *dance, cry, work*) behaves semantically like an agent (i.e., subject of a transitive verb). In some ergative languages, this distinction corresponds to a difference in case

marking[3]. Whereas unaccusative subjects mostly surface as absolutive in all ergative languages, alignment of unergative subjects is subject to variation: in so-called 'strict' intransitive languages (terminology from Aldai, 2008), *all* intransitive subjects are marked absolutive, hence unergative subjects align with unaccusative subjects. In 'active' intransitive languages (terminology from Bittner & Hale, 1996), all agentive subjects are marked ergative, while patientive subjects are absolutive. Unergative subjects therefore align with transitive subjects; as illustrated by Kashmiri in (18): the agentive subject of 'cry' in (18a) is ergative, while the patientive subject of 'break' is absolutive.

(18) Kashmiri (Wali and Koul 1997, via Woolford 2013: 20)

a. Unergative
Tse voduth
you.**ERG** cry.2SG
'You cried.'

b. Unaccusative
Shi:shɨ phuṭ
glass.**ABS** broke.3SG
'The glass broke.'

Ergative-marked intransitive arguments will be important in Chapter 2. Beyond that, the focus of this thesis is on the ergative language Niuean, which has the strict alignment pattern in which all intransitive arguments appear as absolutive.

A further point of variation is how alignments are expressed. In all examples thus far, case morphology appears on (or adjacent to) the NP (the 'dependent') itself; this is known as 'dependent marking'. However, it is also possible for a language to express its alignment via verbal morphology; this is known as 'head marking'. Head Marking is a hallmark of Mayan languages (which are generally ergative in their alignment), as exemplified by Ch'ol (Cholan–Tzeltalan) in (19): the transitive agent of (19a) is indexed on the verb by the 3rd singular marker *y-*, while the transitive patient of (19a) and the intransitive argument in (19b) are indexed via a null third person suffix. Notice that there is no case marking on the noun phrases themselves.

(19) Ch'ol (Coon et al., 2014: 16-28, approx.)

a. Transitive
Tyi **y**-il-ä-**Ø** [x-'ixik]$_A$ [jiñi wiñik]$_O$
ASP **3ERG**-see-TV-**3ABS** CLS:DET-woman CLS:DET man
'The man saw the woman.'

[3] Some nominative languages also distinguish between unergative and unaccsuative subjects in terms of case marking; see e.g., Partida Peñalva (2018), for discussion of Mazahua (Oto-Manguean).

b. Intransitive
Tyi ts'äm-i- **Ø** [x-'ixik]$_A$
PRFV bathe-ITV-**3ABS** CLS:DET-woman
'The woman bathed.'

To summarize, nominative-accusative and ergative-absolutive alignments can be said to differ on two major grounds: (*i*) the alignment of the intransitive argument, which patterns with the transitive patient in ERG-ABS systems, and with the transitive agent in NOM-ACC systems; (*ii*) the choice of marked argument in a transitive clause: ERG-ABS systems mark the *agent*, while NOM-ACC systems mark the *patient*. This has led many to ask: what is the subject in an ergative language? One possibility is that the ergative argument is the subject, because it is the most agentive verbal argument. A second possibility, however, is that the absolutive argument is the subject, because it has *unmarked* case. To examine this question, I turn to the properties listed earlier in (5) as being attributed to 'subjects' (repeated below). As will be demonstrated, some properties - namely, acting as the antecedent of a reflexive, addressee of an imperative, and controlled PRO in an infinitive - hold of the ergative argument. The other two properties – namely, the triggering of verb agreement and displacement – hold more commonly of the absolutive (i.e., unmarked) argument. I now discuss each property from (5) in turn.

1.2.1. Antecedent for reflexive pronoun: ergative

Just as nominative agents bind accusative patients, ergative agents also bind absolutive patients, and not vice versa, as exemplified by Q'anjob'al (Mayan) in (20): the first-person ergative binds the third person absolutive, as in (20a) and not vice versa, as in (20b)[4].

(20) Q'anjob'al reflexives (Clemens et al., 2015: 435)

a. ✓ ERG binds ABS
X-ø-w-il hin-b'a
ASP-**3.ABS-1.ERG**-see 1.POSS-self
'I saw myself.'

b. ✗ ABS binds ERG
*X-in-y-il hin-b'a
ASP-**1.ABS-3.ERG**-see 1.POSS-self
Intended: 'I saw myself.'

[4] Due to limits in availability of data from a single individual, multiple languages are used to illustrate the five properties.

The Polynesian language Tongan also illustrates this pattern. Tongan allows both V(erb)-S(ubject)-O(bject) and V(erb)-O(bject)-S(ubject) order, and pronouns may be interpreted as either pronominal or reflexive, depending upon their configuration. In Tongan, the ergative argument may bind the absolutive argument, resulting in a reflexive interpretation, as in (21a). However, the absolutive argument cannot bind the ergative argument, even in VOS constructions where it has linear precedence (21b). Instead, the ergative particle must be interpreted as a pronominal subject.

(21) Binding in Tongan (Otsuka, 2005: 250)

a. ✓ ERG binds ABS
Na‘e fili ‘e Sione$_i$ ‘a ia$_i$ pē
PST choose ERG Sione ABS 3.S only
‘Sione chose himself/him.’

b. ✖ ABS binds ERG
Na‘e fili ‘a Sione$_i$ ‘e ia$_{*i/j}$ pē
PST choose ABS Sione ERG 3.S only
‘He/*himself chose Sione.’

In no ergative language has it thus far been shown that the absolutive argument can bind an ergative argument.

1.2.2. Imperative addressee: ergative

As illustrated by Yup’ik, ergative arguments also serve as the addressee of imperatives (22a) (as indeed do absolutive arguments if the verb is intransitive; (22b).

(22) Yup’ik (Payne, 1982, via Aldridge, 2004: 55)

a. Ergative transitive addressee
Ner-ci-u
eat-2PL-3S
‘(You all) eat it.’

b. Absolutive intransitive addressee
Inar-ci!
lie.down-2PL
‘(You all) lie down!’

In no ergative language in the absolutive patient known to function as the addressee of an imperative.

1.2.3. Subject of infinitive (controlled as null PRO): ergative

Finally, the ergative argument behaves as the subject with respect to obligatory control: in embedded transitive clauses, it is the ergative argument, as opposed to the absolutive, which is controlled as a null PRO. This means that, in sentences like 'I wanted to see you', the null PRO subject of the embedded verb 'see' has the same reference as the overt subject of the matrix verb ('want'). This is exemplified in Kaqchikel (Mayan) (23). Notice that, in (23b), the embedded controlled argument is indexed by ergative verbal agreement.

(23) Kaqchikel control (Coon et al., 2014: 23)

a. No control (baseline)
X-at-in-tz'et
ASP-3.ABS-1.ERG-see
'I saw you.'

b. ERG argument controlled
X-inw-ajo' [x-at-in-tz'et]
ASP-1.ERG- want ASP-3.ABS-**1.ERG**-see
'I wanted to see you.'

For Dyirbal (Pama-Nyungan, Australian), however Dixon (1972, 1994) claims that only ABS arguments in Dyirbal can be controlled as PRO. Legate (2008) contests this, arguing that the relevant examples show no evidence of control. Beyond this, no ergative language has, to my knowledge, been argued to disallow control of ergative PRO arguments.

To summarize, the ergative argument behaves akin to a nominative argument with respect to binding, imperatives, and control, and thereby exhibits three of the properties typically afforded to subjects. The three remaining properties, however, hold most commonly of the absolutive object instead.

1.2.4. Target for verb agreement: absolutive

If, in ergative languages, the ergative argument is treated as the subject as per (5), we expect that it should consistently be the most accessible argument for agreement. In languages such as Hindi-Urdu (24), however, only absolutive arguments can trigger verb agreement. This means that, in a transitive sentence (24a), the verb agrees in phi (i.e., person, number, and gender)-features with the absolutive patient instead of with the ergative agent. The single argument of an intransitive verb, as expected, also triggers agreement, as in (24b).

(24) **Hindi (Mahajan 1990: 74-78)**

a. Raam-ne roTii khayii.
Ram.MASC-ERG bread.**FEM.ABS** eat.PERF.**FEM.3SG**
'Ram ate bread.'

b. Siitaa aayii.
Sita.**FEM.ABS** arrived.PERF.**FEM.3SG**
'Sita arrived.'

However, it is not the case that *all* ergative languages disallow ergative verb agreement. The situation in Hindi-Urdu can be contrasted with related Nepali, for example, in which ergative agents *do* trigger agreement (25a). In intransitive sentences such as (25b), agreement targets the absolutive argument, just as in Hindi-Urdu.

(25) **Nepali**

c. Meri-le luga dhui səkəki che.
Mary.**FEM-ERG** cloth.MASC.PL wash PERF.**FEM.3SG**. be.**FEM.3SG**.
'Mary has washed the clothes.' (Chandra & Udaar, 2015: 65)

d. keti dherai degureki tshe.
girl.**FEM.ABS** much run.PERF PRES.**FEM.3SG**
'The girl has run a lot.' (Li 2007: 1465)

Languages in which only ergative arguments can trigger phi-agreement are, however, unattested (see Bobaljik, 2008 for more discussion). Thus, typologically speaking, absolutive arguments more commonly trigger phi-agreement.

1.2.5. Most easily displaced argument: absolutive ('syntactic ergativity')

Recall that displacement occurs when an element of a sentence surfaces in a position different to that in which it must be interpreted. In (26), for example, the *wh* word *who* is said to be displaced, because it must be interpreted as the direct object of the verb *see*.

(26) **Who*i*** did Doreen see ___*i*?

In a subset of morphologically ergative languages, the ergative argument is unable to undergo displacement. In contrast, the absolutive argument (whether transitive patient or intransitive subject) can be freely displaced. This phenomenon is known as *syntactic ergativity*. In syntactically ergative languages, relativization (§ 1.2.5.1), *wh* questioning (§ 1.2.5.2), and fronting (§ 1.2.5.3)

of the ergative argument is ungrammatical[5]. In non-syntactically ergative languages (§ 1.2.5.4), however, ergative arguments *can* be freely displaced.

1.2.5.1. Relative clauses

Whereas syntactically ergative languages typically allow for relativization of an absolutive argument, the ergative subject cannot be relativized. This is exemplified by West Greenlandic in (27).

(27) West Greenlandic (Bittner, 1994: 55-58)

a. ✓ABS subject relative clause
miiqqa-t [___ sila-mi pinnguar-tu-t]
child-PL.ABS ___ outdoors-LOC play-REL.INTRANS-PL
'The children who are playing outdoors'

b. ✓ABS object relative clause
miiqqa-t [Juuna-p ___ paari-sa-i]
child-PL.ABS Juuna-ERG ___ look.after-REL.TRANS-3SG.PL
'The children that Juuna is looking after'

c. ✖ ERG subject relative clause
*angut [__ aallaat tigu-sima-sa-a]
man.ABS gun.ABS take-PERF-REL.TRANS.3SG
'The man who took the gun'

The intended meaning of (27c) can be expressed via use of an antipassive construction (27d). Antipassive[6] predicates are formally intransitive (notice the use of the intransitive marker in the addition to the anitpassive marker in in d), but both a notional subject and object are present in the construction. The agent is absolutive, and the patient is expressed as an oblique object, which triggers no verbal agreement.

d. Antipasstive subject relative clause
angut [__ aallaam-mik tigu-si-sima-su-q]
man.ABS gun.INS take.AP-PERF-REL.INTRANS-SG
'The man who took the gun'

[5] Some languages exhibit syntactic ergativity in only a *subset* of these environments; see Chapter 2 for discussion of partial syntactic ergativity.

[6] Antipassives are only one of several strategies used to express the meaning that cannot be expressed because ergative displacement leads to ungrammaticality. Other strategies include use of a resumptive pronoun at the ergative gap site (as in Tongan, see Chapters 2 and 3), nominalization of the *v*P (as in Roviana, see Corston, 1996), and antiagreement (Ouhalla, 1993), whereby the argument-verb agreement pattern is altered when an ergative argument is displaced (as in Halkomelem Salish; Wiltschko, 2006). Mayan languages also use a language-specific construction known as AGENT FOCUS (see chapter 2). See Polinksy (2016) for more discussion.

1.2.5.2. *wh* questions

Syntactically ergative languages also typically exhibit a ban on ergative *wh*-questions but do allow absolutive *wh*-questions. This is exemplified below by Kanamarí.

(28) Kanamarí (Katukinan; Queixalos, 2010, via Asssmann et al. 2015: 6)

a. ✓ABS subject *wh* question
Hanian tu waokdyi-nin?
who Q arrive.here-DUR
'Who is arriving here?'

b. ✓ABS object *wh* question
Hanian tu Nodia nah=hoh-nin?
who(m) Q Nodia ERG=call-DUR
'Whom is Nodia calling?'

c. **✖ ERG subject wh question**
*Hanian tan na=dyuman tahi yu?
who here ERG=spread water Q
'Who spread water here?'

As in West Greenlandic, a transitive subject *wh* question must take the form of an antipassive.

d. Antipassive subject *wh* question
Hanian tan wa-dyuman tahi yu?
who here AP-spread water Q
'Who spread water here?'

1.2.5.3. Fronting

Syntactic ergativity is also found in head-marking ergative languages (i.e., languages in which case alignment is registered on the verb) and is widespread within the Mayan family. Many Mayan languages exhibit fronting, in which a focused argument appears to the left of the aspect marker and verbal stem. In syntactically ergative Mayan languages such as Mam (29), however, only absolutive arguments can be fronted.

(29) Mam (England, 1989, via Assmann et al., 2015: 7)

a. ✓Fronting of ABS subject
xiinaq$_i$ s-uul [__$_i$]
man DEP.ASP.3SG.ABS-arrive.here
'It was the man who arrived here.'

b. ✓Fronting of ABS object
qa-cheej$_i$ xhi kub' t-tzyu-ʔn [xiinaq] [__$_i$]
PL-horse DEP.3PL.ABS DIR 3SG.ERG-grab-DIR man
'It was the horses that the man grabbed.'

c. **✖ Fronting of ERG subject**
*xiinaq$_i$ chi kub' t-tzyu-ʔn [__$_i$] [qa-cheej]
man 3PL.ABS DIR 3SG.ERG-grab-DIR PL-horse
'It was the man who grabbed the horses.'

The meaning of (29c) is typically expressed via an antipassive or an agent focus construction (see Footnote 6 and Chapter 2 for further details).

1.2.5.4. The absence of syntactic ergativity

In a similar way to agreement, however, in which not all ergative languages disallow agreement with ergative agents, it is also not the case that *all* ergative languages exhibit syntactic ergativity. In languages such as Basque (30), both ergative and absolutive arguments can freely undergo displacement.

(30) Basque (Rebuschi, 2006:6)

a. **✓ABS object relative clause**
[gizon-ak ___ irakurri du] liburu-a
man-SG.ERG ___ read AUX book-SG.ABS
'The book that the man has read'

b. **✓ERG subject relative clause**
[___ liburu-a irakurri du] gizon-a
___ book-SG.ABS read AUX man-SG.ABS
'The man that has read the book'

Furthermore, languages within the same family can vary according to whether or not they are syntactically ergative. While the Mayan languages Q'anjob'al and Mam (see earlier) are syntactically ergative, genetically related Ch'ol is not (31): both ergative and absolutive arguments can be displaced.

(31) Ch'ol (Coon et al., 2014: 16)

a. ✓ABS object *wh* question
Maxki$_i$ tyi y-il-ä-Ø [__$_i$] jiñi wiñik?
who ASP 3ERG-see-TV-3ABS DET man
'Who did the man see?'

b. ✓ERG subject *wh* question

Maxki$_i$ tyi y-il-ä-Ø jiñi wiñik [__$_i$]?
who ASP 3ERG-see-TV-3ABS DET man
'Who saw the man?'

Similarly, while the Polynesian language Tongan is syntactically ergative (see Otsuka, 2010), its close relative – and the topic of much of this dissertation - Niuean, is not.

It has been observed, however, at least since Dixon (1979), that no *nominative* languages exhibit displacement restrictions on transitive agents, to the exclusion of intransitive arguments and transitive patients. This means that every syntactically ergative language is also morphologically ergative – but, as attested by Basque and Ch'ol - not vice versa. Ergative arguments can, in some languages, undergo displacement; typologically speaking, however, absolutive arguments are more freely displaced than ergatives.[7] In Chapter 4 of this dissertation, I show that long distance dependencies of absolutive objects are also favoured in processing over dependencies of ergative subjects in Niuean.

1.2.6. The dual face of subjecthood in ergative languages

In ergative languages, the ergative subject consistently displays *some* the properties of subjecthood listed in (5): it binds an absolutive reflexive object, is the addressee in an imperative, and is controlled in an embedded infinitive. The other two properties – verb agreement and displacement- more commonly hold for the absolutive argument. This division in properties of subjects in ergative languages is discussed extensively by Manning (1996), who categorises 'subjecthood' as a two-fold property. Manning distinguishes two type of subjects, each of which are sensitive to different syntactic processes. The properties of binding, imperative addressee, and obligatory

[7] A small number of syntactically ergative languages exhibit an absolutive coordination pattern. Dyirbal (Pama-Nyungan, Australian) is perhaps one of the best-known examples of such a language. In addition to the restrictions on displacement of an ergative argument, Dyirbal also exhibits non-nominative coordination, wherein which only an absolutive argument (whether a subject as in 32a, or an object as in 32b) - may act as an antecedent in the first conjunct to a pro-dropped null argument in the second conjunct. The null argument must also be either an absolutive subject (a) or object (b).

(32) Dyirbal (Dixon, 1994: 155)

a. [Nguma banaganyu] [yabu-nggu burali]
father-ABS return mother-ERG see
'Father returned and mother saw (him).' (Not: 'Father returned and (he) saw mother.')

b. [Nguma yabu-nggu buran] [banaganyu]
father-ABS mother-ERG saw returned
'Mother saw father and (father) retuned.' (Not: 'Mother saw father and (mother) returned.')

An analogous pattern also found in Tongan (Polynesian); See Chapter 7.

control characterise *thematic* level subjects (termed "a(rgument)-subject" by Manning). Meanwhile, the properties of verbal agreement and displacement characterise "gr(ammatical) subjects". In ergative languages (in particular, those which exhibit syntactic ergativity), therefore, ergative arguments constitute a-subjects but not gr-subjects. Meanwhile, transitive absolutive patients can be considered as a-objects but gr-subjects. As Aldridge (2004: 4) remarks: "…the notion of the subject cannot be translated directly onto ergative systems […] there is no single grammatical function that corresponds to subject. Rather, the grammatical properties generally associated with nominative subjects tend to be divided between the ergative and absolutive roles in ergative languages. Therefore, neither ergative not absolutive can be said to exhaustively possess the typical properties of subjects."

This twofold characterization succeeds if the term 'subject' is indeed intended to capture both the thematic and grammatical properties of a given argument. In this dissertation, however, I will assume that a subject is best characterized by referring to thematic properties alone, and characterize it as *the most agentive verbal argument*. As a result, only the properties of binding, imperative addressee, and obligatory control can be considered reliable diagnostics of subjecthood. Verb agreement, meanwhile, is determined *both* by subjecthood, and by a related, but distinct factor: *unmarkedness*. Generally speaking, in nominative languages like English, subjecthood and unmarkedness typically co-vary; thus, an argument which behaves as a subject is an unmarked (i.e., nominative) argument. Conversely, every argument which triggers verb agreement necessarily behaves as a subject. In ergative languages, this covariance breaks down. In some languages, ergative agents control agreement due to their status as subjects. Meanwhile, in other languages, absolutive arguments control agreement due to their being unmarked. Displacement, on the other hand, is not a direct result of either subjecthood or unmarkedness but arises epiphenomenally from architectural properties of clausal structure (see Chapter 7). Unmarked arguments are, nonetheless, favoured in the processing of displacement.

The following section discusses generative theories of subjecthood and ergativity, laying out the background for how these phenomena are treated in generative syntactic theory.

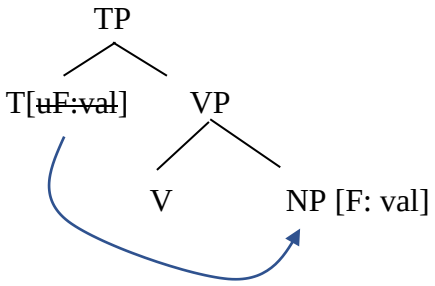
1.3. The generative syntactic framework

The syntactic formulations in this thesis follow the standard generative minimalist framework. The phrasal representations shown and discussed are intended as means of both *(i)* understanding, and representing in a consistent manner, the relationships between different elements of a sentence, and *(ii)* explaining within this framework why certain grammatical phenomena are observed or not. The following section provides a brief overview of two formal representations of syntactic phenomena; first, relations between (often non-adjacent) elements of a sentence (e.g., verb agreement), which are formalized via AGREE, and second, displacement, which is represented via *movement*.

1.3.1. Agree

Agree is a formal relation between a syntactic *probe* and a syntactic *goal* (Chomsky, 2000), typically established via c-command (Reinhart, 1976). Under a formal feature sharing approach, an Agree relation is established between a goal bearing a semantically *interpretable* feature (e.g., an NP with interpretable phi-feature *F*) and a c-commanding probe which has a matching *uninterpretable* feature (e.g., T^0 with uninterpretable *uF*) which needs to be valued in order for the relevant derivation to converge (i.e., be interpretable), as in (33). Here, an Agree relation is established between T^0 and NP, and *uF* becomes valued by *F*, such that it is no longer uninterpretable.

(33) Agree: c-command and feature sharing



Since the formal generative mechanisms involved are not the main focus of this thesis, I do not show all interpretable and uninterpretable features which trigger Agree, but nonetheless assume that such features are present in the structural representation.

1.3.2. Movement

The property of displacement in natural language – wherein an element of a sentence must be interpreted in a position different to that in which it surfaces (e.g., 34) – is represented via movement. Consider the object *wh* question in (34).

(34) **Who$_i$** did Doreen see **___$_i$**? [= (26)]

In generative syntax, a displaced 'filler' element such as *who* in (34) is represented as having undergone movement from the gap site, in which it was merged and at which it must be interpreted, to its surface position. Movement in *wh* questions, relative clauses, and fronting environments (see again § 1.2.5) is known as *A-bar movement*. In linear processing, displacement requires that the sentence parser must retain a displaced filler such as *who* in working memory as the rest of the sentence unfolds, until the gap site is located, and the A-bar dependency can be formed. I refer to this phenomenon as *A-bar movement* throughout this dissertation.

Generative theory also posits a second type of movement, known as *A-movement*. A-movement is said to take place when an element undergoes displacement from its merge position to a place in which it checks either case or the E(xtended) P(rojection) P(rinciple) (Chomsky, 1982): usually, this movement is to Spec, TP. In (35), for example, the passive subject *the ball* is said to have undergo A-movement from the object position of the verb *kick* to the subject position of the sentence.

(35) **The ball$_i$** was kicked **___$_i$**

In linear processing, A-dependencies can be theorized to invoke the same mechanisms as are involved in the processing of A-bar dependencies, but in the reverse order. In the processing of A-bar dependencies, the presence of the A-bar *filler* prompts the parser to actively seek the gap site. In the processing of A-dependencies, the presence of the *gap site* prompts the parser to identify the filler from the preceding word string. In (35), the gap is encountered when the parser realises that the transitive verb kick lacks the patient, or object, required by its thematic frame. This prompts a search of the preceding string *the ball was kicked* to identify the filler *the ball*, and an A-dependency is formed between *the ball* and the object site of *kicked*. In keeping with generative tradition, I refer to this phenomenon as A-movement throughout this dissertation.

1.4. Theories of subjecthood

Generative syntactic theory has long made a distinction between *thematic* and *derived* subjects. A thematic subject can be described as the agent or initiator of the verbal action. In the sentence 'The boy kicked the girl', *the boy* is both the subject and the agent of the action of kicking, while *the girl* is both the object and the patient of the kicking event. Recall from earlier discussion, however, that subjecthood and agentivity do not always correlate, however. In a passive sentence (e.g., 36), the patient of the event (the girl) is the subject. The agent is optionally expressed as an oblique *by*-phrase.

(36) English passive
The girl was kicked (by the boy).

Certain intransitive verbs also have inherent passive-like properties, in the sense that their sole arguments are semantic patients, but also subjects. These are known as unaccusative verbs (e.g., 37). They can be contrasted with intransitive verbs whose sole argument is both the semantic agent and the subject, known as unergative verbs (e.g., 38). The subject of a passive or an unaccusative verb is known as a derived subject: it is afforded its subject-status by virtue of something besides its semantic relationship to the verb.

(37) English unaccusatives
a. *The ship* sank.
(cf. The pirate sank **the ship.**)
b. *The parrot* died.
c. *The rock* fell.

(38) English unergatives
a. *The ballerina* danced.
b. *The woman* worked.
c. *The boy* skied.

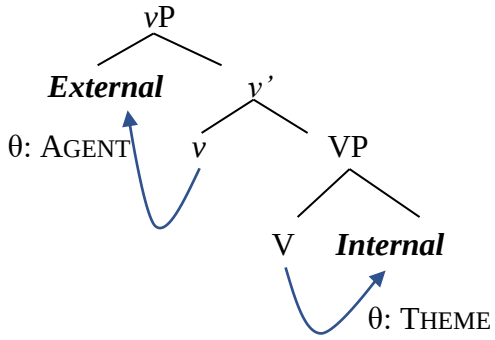
While the sentences in (37) and (38) have identical surface (Subject-Verb) order, an experimental study by Friedmann, Taranto, Shapiro, and Swinney (2008) has shown that in English, unergative and unaccusative subjects are treated differently with respect to lexical priming. Specifically, unaccusative subjects act as faster post-verbal primes than unergative subjects, suggesting that unaccusative subjects are lexically activated after the verb (i.e., in the canonical object position) during sentence processing. This is taken as evidence that unaccusative subjects, in contrast to unergative subjects, are treated on some level as thematic *patients*, despite

their passing the tests for subjecthood outlined in (5). A further study by Koring, Mak, and Reuland (2012) show that it is the *syntactic status* of the unaccusative argument (i.e., its base position relative to the verb; to be discussed shortly), rather than the semantic theta role (patient versus agent), which causes its post-verbal reactivation: Koring et al. used the visual-world paradigm to investigate the processing of verbs such as 'sparkle' in which the subject not thematically agentive (like an unaccusative), but is nonetheless argued to be merged externally to the verb (like an unergative). They found that subjects of unaccusative verbs and of 'mixed' verbs such as 'sparkle' were re-activated post-verbally, whereas subjects of unergative verbs were reactivated during processing of the verb itself. Most recently, Momma, Slevc, and Phillips (2018) find that, during sentence production, *verbs* are planned before unaccusative subjects, passives subject, and transitive objects are uttered, but not before unergative or transitive subjects are uttered. This illustrates how unaccusative (and passive) subjects behave like transitive objects, and distinctly from unergative and transitive subjects. The following subsection discusses how this distinction is formalized in generative theory.

1.4.1. Structural superiority and Spec, TP

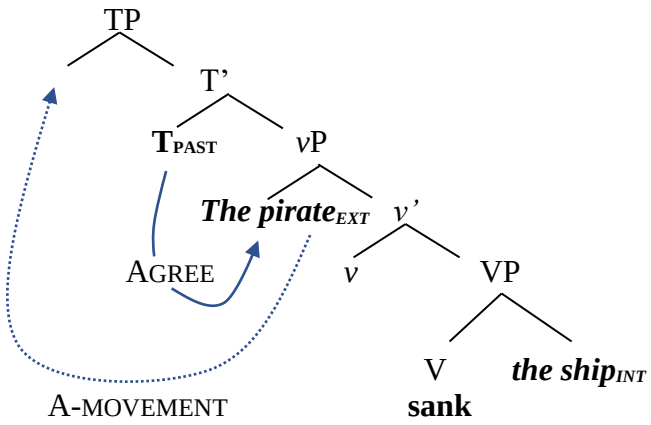
The direct objects of transitive verbs and the subjects of passives/unaccusative verbs (i.e., semantic *patients/themes*) are given uniform treatment in generative argument structure and theta-theory: both are merged as the complement of the selecting lexical verb. Under the Split-VP hypothesis (Chomsky, 1995; Kratzer, 1996; Marantz, 1997, i.a.), transitive and unergative subjects (semantic *agents*) are introduced externally to the VP, in a light *v*P projection (which also introduces semantics related to agentivity/causation of an event). Transitive/unergative subjects are therefore known as external arguments, whose (agent) theta role is assigned by v^0. Unaccusative/passive subjects and direct objects are known as internal arguments, whose theme theta role is assigned by V^0 itself. This is schematized in (39).

(39) **The Split-VP argument structure**

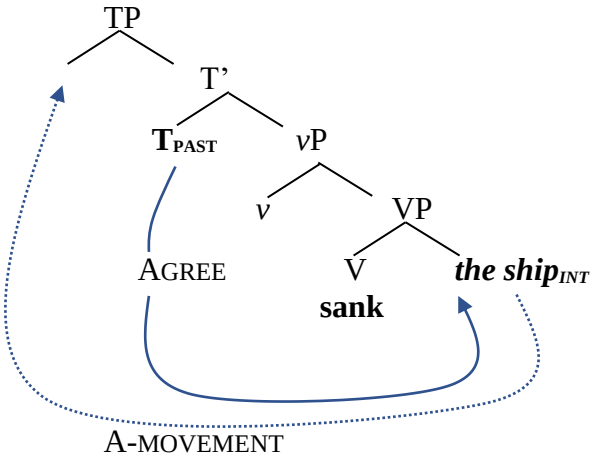


As shown in (39), external arguments are more structurally prominent than internal arguments. If we assume that the most structurally prominent argument at the *v*P level – namely, that which is most agentive - is endowed with the properties of subjecthood; therefore, any external argument will be interpreted as a subject. An internal argument will be interpreted as a subject only if there is no external argument present (i.e., in a passive or unaccusative sentence). This *v*P (i.e., thematic) level of subjecthood corresponds to Manning's (1996) "a-subject": the highest argument at the thematic level will have the properties (a)-(c) of (5) (i.e., it can bind reflexive pronouns, and functions as the addressee of an imperative and as controlled PRO). Subsequently, the introduction of higher functional structure (i.e., TP/IP) corresponding to tense semantics and inflection is responsible for deriving a grammatical subject: when T^0 is merged above *v*P, it forms an Agree relation with the *closest* argument within its c-command domain. This is the agent/external argument in a transitive sentence, as shown in (40a), and the theme/internal argument in a passive or unaccusative, as in (40b). Thus, the argument probed by T^0 is always the argument which is structurally highest within the *v*P and is thus *always the most agentive argument* of a predicate. In many languages (including English), this formal relationship between T^0 and the most agentive argument requires that argument to *A- move* to the specifier of TP (this accounts for why the subject of a passive or unaccusative precedes the verb in the surface word order, as in (40b)), creating an A-dependency between the moved argument and the gap site.

(40) **a. TP and subjecthood: Transitive ('The pirate sank the ship')**



b. TP and subjecthood: Unaccusative ('The ship sank')



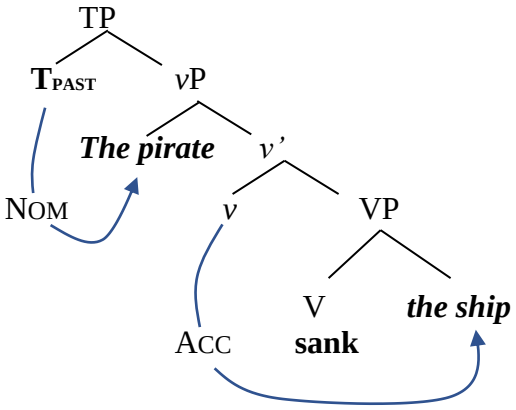
The argument in spec, TP is typically treated as the 'subject' with respect to grammatical operations such as ϕ-agreement and movement, as per (d) and (e) of (5). Thus, the higher argument at the level of functional (TP-level) structure corresponds to Manning's (1996) notion of "grammatical subject". It is argued that, in some ergative-absolutive languages, the absolutive argument, instead of the ergative argument, occupies Spec, TP (e.g., Bittner & Hale, 1996), with the result that the absolutive behaves as the subject with respect to (5d) and (5e); see pages 2-3. The syntax of ergative and absolutive case will be discussed in detail shortly.

1.4.2. Nominative and accusative case

In abstract Case theory (Vergnaud, 1977; Chomsky, 1980), case marking on nouns (and/or verb agreement) is a morphological realisation of *nominal licensing* in the syntactic representation. This

constitutes an Agree relation between the relevant NP and some other functional or lexical licensing head (e.g., V^0, v^0, T^0, P^0 etc.), the purpose of which is to ensure that every noun in the sentence may be appropriately interpreted at the semantic interfaces (with respect to some other element of the grammar, such as Tense). T^0 is viewed as having a licensing function. In nominative-accusative languages, (finite) T^0 assigns nominative case to the closest case-less NP, namely, the subject of either a transitive or an intransitive verb. In a transitive sentence, v^0 assigns accusative case to the object.

(41) **Nominative and accusative case assignment**



Note that in unaccusative and passive constructions, no external argument is present: the single intransitive NP is an internal argument. As formalized in Burzio's (1986) generalization, the licensing properties of v^0 co-vary with its role in introducing an external argument: if an external argument is introduced (i.e., in a transitive or an unergative construction), v^0 has an ACC case value, able to be assigned to an object, if present. If v^0 does not introduce an external argument, it has no case value; the single internal argument of an unaccusative or passive is licensed by T^0 and hence surfaces as nominative.

1.5. Theories of ergativity

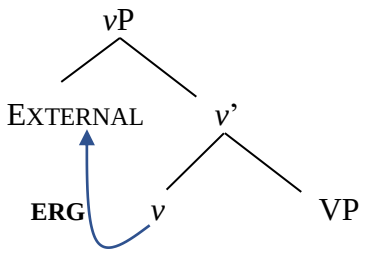
There is currently no consensus in the generative literature on how ergative case marking is derived, or even whether a unified analysis is possible, given the variation in ergative patterning. At the very least, however, what ergative languages have in common is their distinct treatment of transitive subjects compared with intransitive subjects/object, even though languages may vary greatly on the extent to which their grammars embrace this distinction. There are two major

approaches to ergative case in generative literature: the first type of approach treats ergative as an inherent case (§ 1.5.1); the second type of approach treats ergative as a dependent case (§ 1.5.2).

1.5.1. Inherent ergative

In (41), both nominative and accusative are *structural* cases[8]: they are assigned, via c-command, by virtue of the position of an NP in relation to the relevant licensing head. Ergative case, however, is commonly treated as an *inherent* case (i.e., it is dependent upon thematic role) as opposed to structural case (e.g., Aldridge, 2004, 2008; Anand & Nevins, 2006; Coon, 2013; Laka, 2006; Legate, 2002, 2008, 2012; Massam, 2006; Nash, 1996; Woolford, 1997, 2006). This means that the transitive subject is assigned ergative case along with its external (e.g., agent) theta role, in spec *v*P, under a Spec-Head relation, as in (42)[9].

(42) Inherent ergative

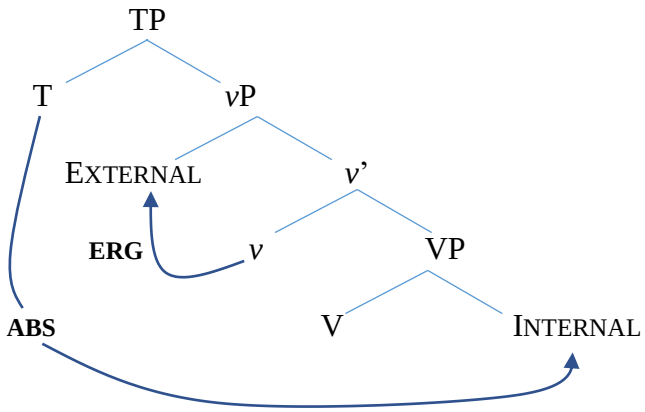


When T^0 is merged, it assigns absolutive case to the closest case-less NP, as in (43): the object/internal argument. The transitive subject, having been case licensed by v^0 is now 'defective', and thus does not act as an intervener between T^0 and the object (Legate 2002, 2008; Aldridge, 2004). In this way, absolutive is essentially nominative (this theory is often referred to as the 'ABS=NOM' approach; see Murasugi, 1992; Bittner & Hale, 1996; Ura, 2001; Legate, 2008).

[8] A number of other approaches treat ergative as a structural case, assigned in a similar manner to nominative case (cf. Hale & Kayser, 1993). In recent years, this has been the treatment of ergative case in Basque (e.g., Rezac et al. 2014, Preminger 2012; Tollan, 2013). These two approaches are not necessarily at odds with each other, as ergative may well be an inherent case in some languages and a structural case in others.

[9] This predicts that ergative case will never appear on a *derived* (e.g., unaccusative, passive) subject (see Marantz, 1991); see Deal (to appear), however, for evidence against this prediction.

(43) ABS=NOM



Under a second approach (Aldridge, 2004; Legate, 2002, 2008), absolutive case is not an abstract case, but a morphological default for both nominative and accusative case. In intransitives, absolutive = nominative, and is assigned by T^0 to the (intransitive) subject. In transitives, absolutive = accusative, assigned by v^0 to the object[10]. The uniform (null) morphological spellout for nominative and accusative cases is governed by the "Elsewhere" Condition (Anderson, 1979; Kipasrsky, 1973; Halle & Marantz, 1993; et seq.). This approach is sometimes referred to as absolutive=default (ABS=DEF).

An important difference between ABS=DEF and ABS=NOM is the way in which the direct object is licensed: in an ABS=NOM language, direct objects and intransitive subjects are both licensed by (finite) T^0 (see e.g., Aldridge, 2004 for Seediq (Formosan); Coon et al., 2014 for Q'anjob'al (Mayan); Tollan, 2018 for Samoan (Polynesian)). In an ABS=DEF language, they are licensed differently: intransitive subjects are licensed by T^0, and direct objects by v^0. (cf. e.g., Aldridge, 2004 for Tagalog; Coon et al., 2014 for Ch'ol). The difference in licensing operations make predictions regarding distribution of absolutive arguments in non-finite environments: in ABS=DEF languages, intransitive subjects should not surface (as absolutive) in non-finite clauses, although direct objects may, whereas in ABS=NOM languages, no absolutive arguments of any kind should appear in non-finite clauses (see e.g., Legate, 2008; Coon et al., 2014; Collins, 2016).

If we consider subjecthood in view of this proposed division of ergative-absolutive languages in terms of absolutive case assignment, it has been argued that languages which exhibit syntactic ergativity (i.e., in which the absolutive argument behaves as the subject as per property

[10] A third type of system has also been identified in which absolutive has a single locus which is lower than T^0; see e.g., Massam (2006) for analysis of Niuean, and Otsuka (2000) for Tongan.

(5e), such as West Greenlandic and Q'anjob'al) correspond to those in which the absolutive argument consistently undergoes A-movement to Spec, TP and is thus structurally superior to the ergative argument at this level (i.e., ABS=NOM languages; see Bittner & Hale, 1996). Languages which lack syntactic ergativity (e.g., Ch'ol, Basque), by contrast, constitute ABS=DEF languages, wherein the ergative subject always superior to the absolutive object (although neither argument moves to Spec, TP). The view that syntactic ergativity results from A-movement of the absolutive argument is explored further in Chapter 6 of this thesis.

With regards to phi-agreement (recall that it is the grammatical subject which triggers verbal phi-agreement, as per property (5e)), it is *not* typically argued that the absolutive argument in languages like Hindi-Urdu (see again 24) A-moves to Spec, TP. Nonetheless, it has been claimed that an Agree relation - which is responsible for phi-agreement - exists between T^0 and the absolutive argument (see e.g., Coon 2016) in Hindi-Urdu. In contrast, no such Agree relation is ever established between the T^0 and the *ergative* argument, which accounts for why ergatives do not trigger verbal phi-agreement.

1.5.2. Dependent ergative

A second major approach to morphological case in the generative tradition is known as 'dependent' case theory (DCT). Under DCT, abstract nominal licensing does not correspond to morphological case marking. Instead, morphological *ergative* and *accusative* cases are assigned configurationally (i.e., post-syntactically) to a nominal in the presence of a second, non-oblique nominal in some local domain (e.g., Marantz, 1991; Baker & Bobalijk, 2017)[11]. If a language marks the higher of these two NPs (e.g., the *agent* of a transitive clause), then its alignment will be ERG-ABS; if the lower of these two NPs is marked (e.g., the *patient* of a transitive clause), then alignment is NOM-ACC. In this way, morphological case is a reflection not of the position of a nominal in relation to some lexical/functional head, but rather its position in relation to another nominal. This is shown in (44).

[11] Deal (2013) also argues that ergative case in Nez Perce (Sahaptian) is a morphological realization of transitive object agreement.

(44) Dependent case parameter

Number of NPs in domain	Dependent case parameter	Morphological Marking	Alignment yielded
1 (intransitive)	(None)	Unmarked	**NOM/ABS**
2 (transitive)	Higher NP	Ergative + unmarked	**ERG-ABS**
	Lower NP	Unmarked + accusative	**NOM-ACC**

In support of DCT, Baker and Bobalijk (2017) present data from Shipibo (Panoan). In Shipibo, an unaccusative subject surfaces with ergative case in the presence of a second, applicative noun phrase (45b), instead of absolutive, when no other NP is present (45a). The key point, according to Baker and Bobalijk, is that ERG in (45b) cannot be inherent, since "the fruit" is a derived subject (i.e., not an external argument).

(45) Shipibo (Baker & Bobalijk, 2017: 116)

a. Unaccusative
Kokoti-ra joshin-ke
fruit-EV ripen-PERF
'The fruit ripened.'

b. Applicative of unaccusative
Bimi-*(n)-ra Rosa joshin-xon-ke
fruit-*(ERG)-EV Rosa ripen-APPL-PERF
'The fruit ripened for Rosa.'

This being said, data from other languages suggests that competition between two nominals is not (universally, at least) the sole prerequisite for ergative case. First, as noted by Baker and Bobaljik, ergative case surfaces on unergative subjects in many languages (e.g., Basque, Hindi-Urdu, Kashmiri). Second, the case array of two NPs in an ERG-ABS language is not necessarily ERG-ABS. In Niuean, for instance, two NPs may surface as absolutive (46), so long as neither is agentive; in Warlpiri (Pama-Nyugan), ergative marking may surface in the presence of a second dative-marked nominal (47).

(46) Niuean (Massam, via Baker & Bobalijk, 2017: 120)
Ne faka-kofu aki e vaka e tau lauakau
PST CAUS-cover with ABS canoe ABS PL leaf
'The canoe was covered with leaves.'

(47) **Warlpiri (Hale, 1982, via Levin, 1983: 158)**
Ngarrka-ngku karla karli-ki warri-rnl
man-ERG PRES boomerang-DAT seek-NPST
'The man is looking for a boomerang.'

In sum, while case morphology may serve a function of ensuring anti-identity between different nominals in a sentence, it also arguably seems to reflect some deeper semantic or grammatical properties of the relevant arguments (see Tollan, 2018 for further discussion).

1.6. Accessibility

'Accessibility' is a term used to refer to the ability of an argument to undergo syntactic operations such as A-bar movement and verb agreement. If a particular argument is able to undergo A-bar movement, for example, it is said to be 'accessible' with respect to that operation. Based on a typological survey of relative clauses in forty-nine languages, Keenan and Comrie (1977; 1979) propose an implicational universal known as the 'Accessibility Hierarchy'. They claim that the subject is the most easily relativizable grammatical element, followed by the (direct) object, and in turn by more thematically peripheral DPs, as in (48).

(48) **The Accessibility Hierarchy (Keenan and Comire, 1977: 66)**
Subject > Direct object > Indirect object > Oblique > Genitive > Object Complement

If a given language permits object relative clauses, the hierarchy in (48) poses that it should also permit subject relative clauses, but not vice-versa. The Accessibility Hierarchy is commonly generalized to other analogous A-bar movement constructions such as *wh* questions and fronting for focus or topicalization; see e.g., MacLaughlin (1995).

Keenan and Comrie's Accessibility Hierarchy for A-bar movement was been adopted (in a simpler format) in Moravcsik's (1978) typological survey of phi-agreement. According to Moravcsik , the argument most accessible for verb agreement is the subject. The subject is more accessible than the object, which is in turn more accessible than lower grammatical functions such as an indirect object, as per (29).

(49) **Accessibility hierarchy for agreement (Moravcsik, 1978)**
Subject > direct object > indirect object > adjunct

The same implicational universal proposed by Keenan and Comrie for movement also applies to agreement: if a given language permits, for example, object-verb agreement, then it also necessarily permit subject-verb agreement, but not vice versa. In English, for example, the verb may agree only with the subject, and not with the object or any lower argument.

1.6.1. Accessibility in nominative languages

For nominative languages like English, the idea that the subject is the most accessible grammatical entity fits with the notion of the subject being the most agentive argument of a predicate, as presented in Section 1.4: because the most agentive argument is necessarily the structurally *highest* argument, it would follow that the most agentive argument is most easily probed by the syntactic heads responsible for the relevant syntactic operations. As concerns phi-agreement, if a probe such as T^0 or Agrees with only *one* NP, it will necessarily be the *closest* or structurally most superior NP in the *v*P domain; namely, the subject. For A-bar movement, the picture is more complex: under the standard minimalist assumption that movement is driven by features, it should follow that any head bearing a [+wh] feature which is c-commanded by an A-bar probe (e.g., C^0) should be accessible to that probe. In this view then, *any* argument in the c-command domain of C^0 - in any language -should be accessible. Alternatively, Keenan and Comrie's (1977) Accessibility Hierarchy's may follow from usage principles: because a subject is structurally higher than an object, an object is necessarily more nested within other structural phrases (e.g., VP) than a subject is. Following this line of reasoning, the ordering of the hierarchy in (48) corresponds to structural nesting: the subject is the least structurally nested element, and an object complement is most structurally nested. Thus, subjects are most accessible for A-bar movement because their structural position is less nested within other structural units than lower arguments, and thus, a subject A-bar gap site is more easily identifiable than a gap site of an argument lower on the hierarchy.

Turning back to generative theory, one way to frame this notion within minimalist principles would be to posit that arguments *lower* on the Accessibility Hierarchy are inaccessible to A-bar probes by virtue of *phase boundaries*. It is standardly assumed that syntactic derivations are built in units, or phases. Typically, CP, *v*P, and DP are minimally considered phase boundaries. Within a phase, all material except for the element in specifier position is said to be *invisible* to higher syntactic probes. Thus, the more structurally nested an argument is, the more likely it is to be embedded within phase boundaries, making it inaccessible to A-bar probes.

In sum, accessibility follows from structural superiority, which, in nominative languages, is commensurate with agentivity: the more agentive an argument is, the most structurally superior it is, and thus, the more accessible it is. As subjects are always the most agentive arguments, they are most structurally superior, and therefore most accessible.

1.6.2. Accessibility in ergative languages

As Keenan and Comrie (1977) note, ergative-absolutive languages present a problem for the Accessibility Hierarchy. This is because the ergative agent, which is parallel to a nominative agent in terms of being the notional subject (under the definition presented in this dissertation: the most agentive argument), is not the most easily displaced argument. This is because many ergative languages exhibit syntactic ergativity, wherein the ergative argument cannot undergo A-bar movement. Rather, the absolutive argument is, like the nominative subject, most easily displaced.

As discussed in Section 1.2.4, ergative arguments are also less accessible than absolutive argument for phi-agreement. In many Indo-Aryan languages such as Hindi-Urdu, it is the absolutive object, as opposed to the ergative subject, which triggers phi-agreement on the verb, as in (24) (repeated below).

(24, repeated) **Hindi (Mahajan 1990: 74-78)**

Raam-ne roTii khayii.
Ram.MASC-ERG bread.**FEM.ABS** eat.PERF.**FEM.3SG**
'Ram ate bread.'

In view of this observation, the accessibility hierarchy for agreement in (49) has, in recent years, been reformulated to make reference to morphological case, as opposed to function. Bobaljik (2008) proposes the revised hierarchy in (50), according to which the most accessible arguments are unmarked arguments (i.e., nominative and absolutive nouns), followed by dependent-marked arguments (i.e., ergative and accusative nouns), followed by oblique-marked arguments and adjuncts. Thus, in any language in which ergative (or accusative) arguments are accessible for agreement, absolutive (or nominative) arguments necessarily are also, but not vice versa.

(50) **Morphological case accessibility hierarchy (Bobaljik 2008: 11, adapted)**
Unmarked case (nominative, absolutive) > dependent case (ergative, accusative) > lexical/oblique case (dative)

Returning to Keenan and Comrie's (1977, 1979) original hierarchy, Deal (2017) proposes that the hierarchy in (50) also regulates A-bar movement, given that the typological landscape comprises many syntactically ergative languages, but no mirror-image languages in which the absolutive argument alone is subject to a ban on movement (i.e., would-be 'syntactically absolutive' languages). In this way, movement is governed according to (50) instead of the original hierarchy in (48): if only one type of noun phrase is accessible for A-bar movement in any given language, it is necessarily the unmarked (i.e., nominative or absolutive) argument.

Morphological accessibility is the main topic of discussion in Chapter 2, in which I eventually propose that the hierarchy in (50) does indeed regulate phi-agreement, but that restrictions on A-bar movement of ergative subjects is, in fact, not directly governed either (50) or by its original formulation in (48). In Chapter 6, I present a novel approach to syntactic ergativity which does not encompass a hierarchy of case or grammatical function.

In this thesis, I show that *both* of formulations of the Accessibility Hierarchy – as in (48)/(49) and (50) are valid and indeed required to account for both typological and experimental data. On the one hand, *subjects* are most accessible by virtue of being the most agentive and therefore structurally highest arguments. I will also argue – in Chapter 6 – that *unmarked* arguments are more accessible than marked arguments by virtue of distributional properties. In nominative languages, unmarkedness and subjecthood co-vary, such that the hierarchies in (48)/(49) and (50) converge. In ergative languages, however, this is not the case: subjects are, on the one hand, most accessible as per (48)/(49), while absolutive argument are most accessible as per (50).

1.7. Outline of the thesis

The goals of this thesis are to explore what properties an argument must have to be considered a 'subject', and what it means for an argument to be 'unmarked'. The thesis comprises six further chapters plus a concluding chapter.

Chapter 2 presents an overview of theories syntactic ergativity. I then examine the role of morphological case in determining accessibility of arguments for phi-agreement and A-bar movement. It has been proposed that both agreement and movement are governed by the morphological accessibility hierarchy presented in (22) (see Bobaljik, 2008 for agreement, and

Deal, 2016; 2017 for movement), according to which the most accessible arguments are unmarked arguments, followed by dependent-marked arguments. I consider data from languages which allow intransitive ergative subject in certain environments, which show that agreement and movement are not analogous with respect to morphological case. I argue that only agreement is governed directly by case morphology; movement restrictions on the other hand, arise due to other factors not directly related to case marking, although both case and transitivity can be shown to contribute indirectly to dependency formation possibilities (syntactic ergativity is revisited in Chapter 6).

Chapter 3 presents an overview of the structure and demographics of Niuean (Polynesian), the (ergative-absolutive) language which will be the focus of the following two chapters. I discuss the basic syntax of Niuean, considering word order, case marking, pseudo-noun incorporation, and transitivity of different predicate types.

Chapter 4 examines these issues from the perspective of sentence processing, looking at the 'subject advantage' in the processing of filler-gap dependencies in Niuean. Results reveal that processing of nominal arguments depends on both case marking and transitivity. Specifically, there is a preference for dependencies that involve absolutive argument (that are unmarked) over ergative and obliques (marked arguments). Independently, there is a preference subjects of intransitive verbs over subjects of transitive verbs (even when case marking is controlled for), and for objects of transitive verbs over intransitive verbs. The implications of these results for theories of dependency formation is discussed.

Chapter 5 focuses on anaphora resolution. I present a second original study, examining the roles of case marking and argument structure in the resolution of anaphoric object pronouns in Niuean. This study shows that there is an overall preference for an object pronoun in to co-refer with a subject pronoun from a preceding conjunct; however, this preference is affected by case and transitivity. This shows that choice of reference is based upon case and argument structure, in addition to grammatical function.

Chapter 6 discuss the implications of the findings of Chapters 4 and 5 for processing theory and generative syntactic theory, in view of the typological landscape. I consider how the notion of subjecthood should be reconciled with accessibility in terms of morphological case, and argue that unmarkedness stems not from overt case morphology, but rather from how different case forms are distributed within a language.

Chapter 7 focuses once again on syntactic ergativity. I argue for a modification to current accounts, proposing that the problem with ergative A-bar dependencies stems from the type of movement which the ergative argument would have to undergo in relation to the absolutive argument, and the resulting difficulties that would be encountered in forming an ergative dependency.

Chapter 2

Agreement and movement

This chapter focuses on movement (a.k.a. 'A-bar movement' or 'extraction') and phi-agreement in ergative languages, beginning with a discussion of existing generative theories of phi-agreement and syntactic ergativity (i.e., the inability of the ergative argument to undergo A-bar movement in certain ergative languages; see Chapter 1). I then consider languages which exceptionally allow for intransitive ergative subjects in particular syntactic contexts, and show that agreement and movement are in fact not truly analogous with respect to the accessibility of the ergative argument; in other words, agreement and movement are not the same with respect to morphological case. I argue that these facts are best captured by an analysis of syntactic ergativity in which the properties of the absolutive argument play an important role in restrictions of the ergative argument to undergo movement. The chapter is organised as follows: Sections 2.1 and 2.2 discuss theories of phi-agreement and syntactic ergativity, and Section 2.3 focuses on languages which allow for intransitive ergative subjects.

2.1. Phi-agreement

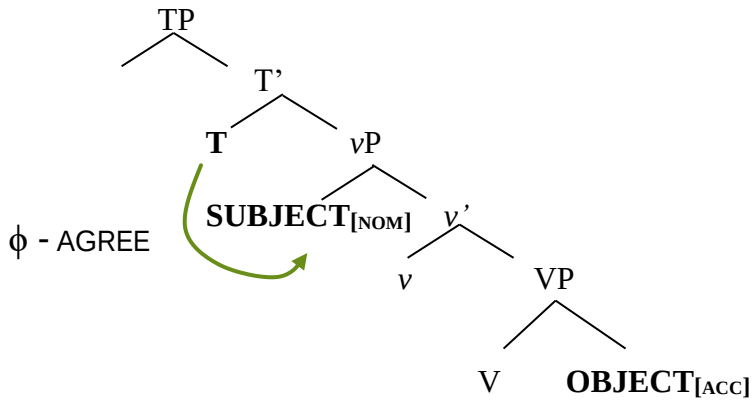
Phi (ϕ)-agreement is a descriptive label for the observation that, in many languages, featural properties of a nominal (usually person, number, and gender) influence the inflectional form of the verb. In English, for example, third person singular subjects such as 'the reporter' in (1) trigger third person singular agreement with the verb (realised as the suffix -s).

(1) Phi-agreement in English

The reporter knows you

In generative syntax, phi-agreement is represented as an Agree relation (see Chapter 1) between a lexical or functional head, and the relevant target nominal. The functional head responsible is commonly T^0 (see Coon, 2017, for discussion of agreement with lower heads such as v^0). In English, for example, T^0 agrees in phi-features with the highest nominal within its c-command domain (i.e., the nominative subject, shown in 2), which, in (1), is 'the reporter'.

(2) Phi-agreement in English



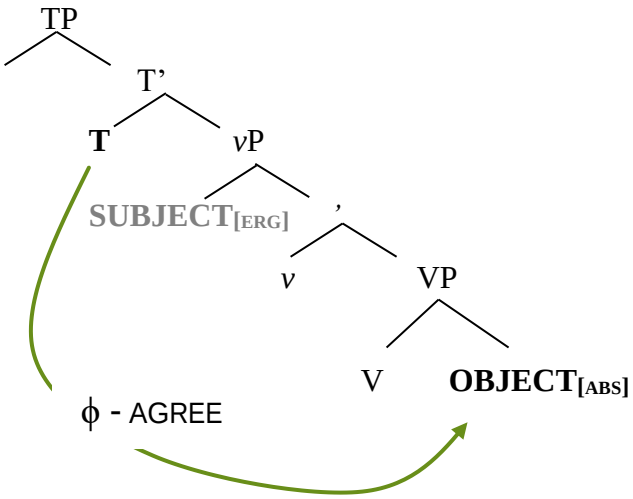
Recall from Chapter 1 that, in certain ergative languages like Hindi-Urdu, the ergative subject cannot trigger phi-agreement. In transitive sentences with an ergative subject, the verb agrees with the absolutive object, as in (3).

(3) Hindi (Mahajan 1990: 74-78)

Raam-ne roTii khayii.
Ram.MASC-ERG bread.**FEM.ABS** eat.PERF.**FEM.3SG**
'Ram ate bread.'

It is proposed that, in languages like Hindi-Urdu, the Agree probe on T 'skips' the ergative subject and seeks instead the highest unmarked nominal within its c-command domain (e.g., Mahajan, 1990; Woolford, 2000; see discussion in Coon, 2017), as shown in (4).

(4) Phi-agreement in Hindi-Urdu (Coon, 2017: 109, approx.)[1]



[1] Although Hindi-Urdu is head-final, head-initiality is shown in (4) for ease of comparison with (3).

Similarly, Bobaljik (2008) proposes that agreement probes in languages like Hindi-Urdu are only capable of agreeing with nominals bearing unmarked case; in other words, they are 'blind' to arguments with ergative or lexical case.

2.2. Syntactic ergativity

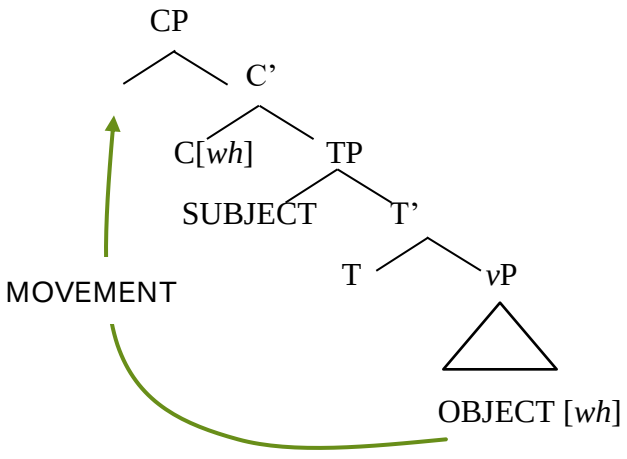
Recall that *wh* movement typically involves a *wh* phrase appearing at a place in a sentence which is not the location at which it must be interpreted. In the English example in (5), the *wh* phrase 'who' is interpreted as of the verb 'visit'.

(5) *wh* dependency in English

Who did Alice visit__?

Recall further that sentences of the type in (5) involve A-bar movement: in (5), the *wh* phrase 'who' is said to have moved from its base position (as the object of 'visit') to its surface position (at the leftmost edge of the clause). This operation is said to be triggered by a probe on a functional head in the left periphery; typically, C^0. The *wh* nominal targeted by this probe moves to spec, CP (and thus, in English, appears at the leftmost edge of the clause). This is illustrated in (6).

(6) A-bar movement



The nominal which is targeted by C for *wh* movement is the highest nominal in its c-command domain which bears a *wh* feature (i.e., is a *wh* word). Thus, the subject is not targeted in (6) because it lacks the relevant *wh* feature.

Finally, recall that, in certain ergative languages, only absolutive arguments can undergo movement. Movement of an ergative argument is ungrammatical; this phenomenon is known as

'syntactic ergativity' (in order to move a transitive subject, a different strategy is required; see footnote 6). Syntactic ergativity is illustrated in (7) with examples from West Greenlandic: absolutive arguments can be relativized (7a, b), whereas ergative arguments cannot.

(7) Syntactic ergativity in West Greenlandic (Bittner, 1994: 55-58)

a. ✓ABS subject movement
miiqqa-t [___ sila-mi pinnguar-tu-t]
child-PL.ABS ___ outdoors-LOC play-REL.INTRANS-PL
'The children who are playing outdoors'

b. **✓ABS object movement**
miiqqa-t [Juuna-p ___ paari-sa-i]
child-PL.ABS Juuna-ERG ___ look.after-REL.TRANS-3SG.PL
'The children that Juuna is looking after'

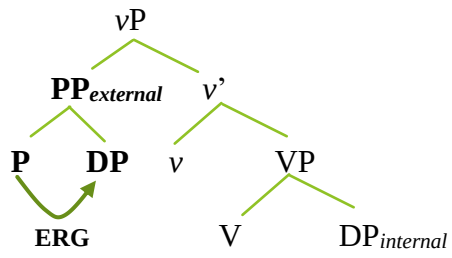
c. **✖ ERG subject movement**
*angut [__ aallaat tigu-sima-sa-a]
man.ABS __ gun.ABS take-PERF-REL.TRANS.3SG
'The man who took the gun'

Theories of syntactic ergativity fall into one of two main groups. The first of these places the burden of explanation on the properties of the ergative argument itself. The second derives syntactic ergativity from case licensing and/or movement of the absolutive co-argument. I discuss each of these in turn.

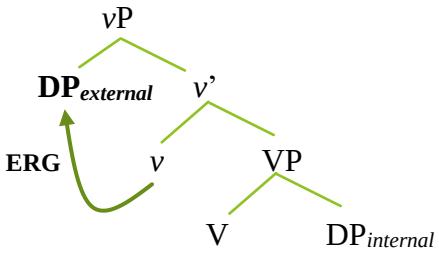
2.2.1. Syntactic ergativity arises from properties of the ergative

Polinsky (2015, 2016), following Stepanov (2004), and Markam and Graschenkov (2012), argues that, in syntactically ergative languages, the transitive subject (external argument, merged in spec, *v*P) is not an DP but a PP, in which the semantic contribution of the prepositional head is either source ('from'), cause ('by'; 'because of'), or similar. In purely morphologically ergative languages, however, the ergative argument is a DP, and is assigned inherent ergative case by v^0.

(8) a. Ergative as a PP (= syntactic ergativity)



b. Ergative as a DP (= no syntactic ergativity)



Polinsky claims that syntactically ergative languages do not allow Preposition Stranding or Pied-Piping, meaning that the ergative DP is effectively trapped within the PP, and cannot undergo movement. As such, movement of the ergative argument is banned. In languages without syntactic ergativity, the ergative subject is an DP, just like the subject in nominative languages, and can therefore undergo movement. As Polinsky notes, a major advantage of this proposal is that it accounts for the close parallels between passives and ergatives (see Comrie, 1978): ergative languages do not tend to have grammatical passives.

Alternatively, Deal (2016, 2017) proposes an account of syntactic ergativity based upon 'Case Discrimination' (which is compatible with both inherent and dependent accounts of ergative case). Deal's claim is that the ability of an DP to undergo A-bar movement is determined by its morphological marking, coupled with language-specific parameters as to which morphological arguments are made accessible to movement operations. Deal proposes that accessibility for movement is governed according to the morphological accessibility hierarchy in (9), originally proposed by Bobaljik (2008) to capture phi- agreement patterns.

(9) Morphological case accessibility hierarchy (Bobaljik, 2008: 11)

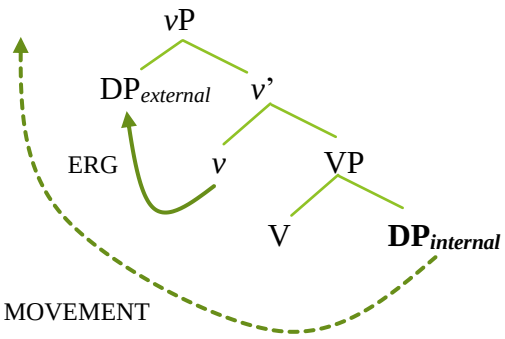
Unmarked case (nominative, absolutive) > dependent case (ergative, accusative) > lexical/oblique case (dative)

The more marked a nominal is in any given language, the more likely it is that the nominal will be inaccessible for A-bar movement. In languages which are morphologically ergative only, both unmarked and dependent-marked arguments are visible to A-bar movement probes in the syntax. In syntactically ergative languages, however, only unmarked arguments may be targets for movement: anything lower on the hierarchy is inaccessible. Thus, in the same way in agreement probes are 'blind' to ergative arguments in Hindi-Urdu (see Section 1), so are A-bar probes blind to ergative *wh* phrases in languages such as West Greenlandic.

2.2.2. Syntactic ergativity arises from case licensing of the absolutive

The second major approach to syntactic ergativity derives the relevant ban on A-bar movement not from the properties of the ergative subject, but rather, from the properties of its absolutive co-argument. In several approaches, it is proposed that the absolutive object moves past the subject in transitive clauses, such that the object is the most structurally superior element (e.g., Aldridge, 2004; Bittner & Hale, 1996; Campana, 1992; Coon et al., 2014; Ordóñez, 1995). I refer to this as *Absolutive Inversion* (schematized in 10).

(10) Absolutive Inversion

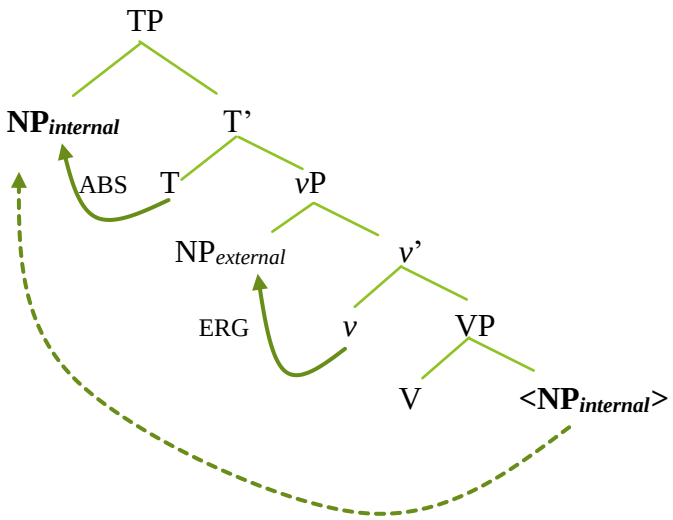


Absolutive inversion means that the ergative argument is somehow prevented from undergoing movement (i.e., for *wh*-question formation/relativization/focusing) past the – now higher – absolutive DP. A key question is, why does Absolutive Inversion take place? The various accounts differ in this respect. Aldridge (2004) claims that transitive v^0 bears an [EPP] feature, which requires the absolutive object to move to its outer specifier, past the ergative subject, which is in the inner specifier. When the verb is intransitive, v^0 does not have an [EPP] feature, and movement of the absolutive argument to spec, *v*P does not take place. However, Aldridge's proposal of an EPP feature, while constituting a formal derivational account of the movement, still does not explain why the movement takes place. The precise syntactic nature such an EPP feature is as yet unknown, and, as such, it is unclear (i) why only some ergative languages should have this feature, (ii) why it is not present for intransitive verbs, or (iii) why nominative-accusative languages should lack it.

Other authors claim that Absolutive Inversion takes place in order for the object to be case licensed by T^0 (e.g., Campana, 1992; Ordóñez, 1995; Coon et al., 2014). The subject has already had its

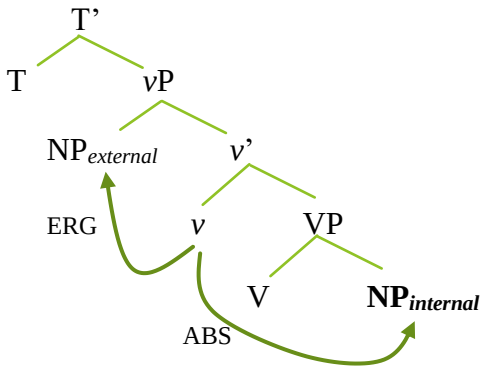
case licensing need met, having received inherent ergative case from v^0. The absolutive argument, however, needs to move to receive case and subsequently traps the ergative argument *in situ* (11).

(11) Absolutive case licensing



In a language *without* syntactic ergativity, the object is case licensed by v^0, and does *not* need to move; absolutive inversion does not take place, as in (12).

(12) No Absolutive Inversion



This proposal has been recently advanced by Coon et al. (2014) as an account of syntactic ergativity in Mayan languages. Coon et al. draw upon a correlation within the Mayan family, first recognised by Tada (1993), between the *presence/absence of syntactic ergativity* and the *linear position* within the verbal complex of the absolutive morpheme. In syntactically ergative Mayan languages, such as Q'anjob'al, the absolutive marker is pre-verbal: in (13a) it is attached to the aspect marker *max*. Conversely, in languages which lack syntactic ergativity, such as Ch'ol (13b), this morpheme is post-verbal.

(13) Mayan absolutive markers (Coon et al., 2014: 13)

a. Q'anjob'al (syntactically ergative)

(i) Max-**ach** y-il-a'
ASP-**2ABS** 3ERG-see-TV
"She saw you"

(ii) Max-**ach** oq'-i
ASP-**2ABS** cry-ITV
"You cried"

b. Ch'ol (not syntactically ergative)

(i) Tyi y-il-ä-**yety**
ASP 3ERG-see-TV-**2ABS**
"She saw you"

(ii) Tyi uk'-i-**yety**
ASP see-ITV-**2ABS**
"You cried"

Coon et al. propose that, in languages such as Q'anjob'al, ABS is assigned *high*, by T^0, requiring movement of the absolutive object, past the ergative subject. This movement subsequently 'traps' the ergative argument in situ, as in (10). The difference between high and low case positions (relative to the verb) derives the differences in the position of the absolutive morpheme.

Like Coon et al., Assmann et al. (2015) also argue that ungrammaticality of ergative A-bar movement arises due to the presence of the absolutive co-argument in Mayan languages. Unlike Coon et al., however, their proposal does not assume absolutive inversion (i.e., the absolutive argument does not move). The crux of Assmann et al.'s analysis is that A-bar movement of the ergative argument bleeds case assignment to the absolutive argument, leaving it caseless, and causing the derivation to crash; movement of the ergative argument *per se* is unproblematic. This, they argue, is due to the relative *timing* of the fundamental structure-building operations Merge/Move and Agree. In ergative languages, Merge/Move applies before Agree. In order to undergo movement, the ergative argument must move, through T^0, to a clause-peripheral position. However, this movement takes places *before* T^0 is able to assign case to the absolutive object via Agree. When the ergative argument moves through T^0, it robs T^0 of its absolutive case feature, leaving the object caseless. In nominative-accusative languages, however, the timing of Merge/Move and Agree is reversed: Agree applies first. This means that any argument in a nominative language is case-licensed before movement takes place; as such, no movement restrictions arise.

To summarize this section: while some accounts derive syntactic ergavitiy from properties of the ergative argument (e.g., Polinsky, 2016; Deal, 2017), others argue that the ban on movement arises due to the absolutive co-argument (e.g., Aldridge, 2004; Coon et al., 2014; Assmann et al., 2015).

Syntactic ergativity is discussed in greater detail in Chapter 7, in which I identify a number of unresolved issues with these approaches.

2.3. The role of the absolutive object in agreement and movement

It has long been recognised that certain types of noun phrases are more widely able to trigger agreement and undergo movement as compared with others. This ability of an argument to undergo a syntactic operation is known as 'accessibility' (see Chapter 1). Most recently, accessibility has been defined as a hierarchy of morphological case (Bobaljik, 2008; Deal, 2017), in which *unmarked* arguments are most accessible for agreement (Bobaljik, 2008) and A-bar movement (Deal, 2017), followed by dependent-marked arguments, followed by oblique-marked arguments (i.e., *unmarked* > *marked* > *oblique*). In this section, I discuss a previously unobserved difference between movement and phi-agreement, as concerns accessibility of ergative DPs. To this end, I present novel data from ergative languages that allow ergative marking on *intransitive* subjects in certain environments (e.g., Mayan languages, Hindi-Urdu, Basque), I show that the absolutive object plays a crucial role in the (in)accessibility of an ergative argument with respect to *movement*, but not with respect to *agreement*, and argue that morphological accessibility fundamentally governs agreement only. This has key consequences for theories concerning the source and nature of syntactic ergativity, namely by showing that restrictions on the movement of an ergative DP – in contrast to restrictions on agreement of an ergative DP - do not necessarily arise from properties of the ergative alone, but are triggered by an absolutive co-argument

Section 2.3.1 lays out the details of morphological accessibility (Bobalijk, 2008), and its background as an earlier hierarchy based upon grammatical function (Keenan & Comrie, 1977). In Section 2.3.2, I present data from languages with intransitive ergative subjects, demonstrating a difference between movement and agreement. The implications explored in Section 2.3.3, and Section 2.3.4 discusses languages which exhibit syntactic ergativity in only a subset of A-bar environments.

2.3.1. Background: accessibility by morphological case

Based upon a typological survey of relative clause formation, Keenan and Comrie (1977; 1979) observed that subject relative clauses are typologically more common than object relative clauses. They proposed a universal implicational - the 'Accessibility Hierarchy' - which states that, for

every language, the grammatical subject is the most accessible target for relativization, followed by the direct object, as shown in (14). The Accessibility Hierarchy is commonly generalized to other A-bar movement operations such as *wh* question formation (see e.g., MacLaughlin, 1995); thus, if a given language allows for a direct object to undergo movement, it necessarily also allows for movement of the subject, but not vice versa.

(14) Accessibility Hierarchy (Keenan & Comrie 1977: 66)

subject > direct object > indirect object > oblique > genitive > object complement

The hierarchy in (14) was adopted in Moravcsik's (1978) typological survey of phi-agreement,[2] in which the DP most accessible as a target for agreement is also the subject. The same implicational universal proposed for movement also applies to agreement: if a given language permits, for example, object-verb agreement, then it also necessarily permit subject-verb agreement, but not vice versa.

In recent years, the hierarchy in (15) has been recast as a hierarchy of morphological (m-) case, as opposed to grammatical function. Drawing upon the definitions of m-case of Marantz (1991), Bobaljik (2008) argues that the most accessible DPs for phi-agreement are not necessarily subjects, but rather that agreement is governed by the hierarchy in (15), in which *unmarked* DPs are more accessible than dependent-marked DPs, which are more accessible than oblique DPs.

(15) Morphological case hierarchy (Bobaljik 2008: 11, adapted)

unmarked case (nominative, absolutive) > dependent case (ergative, accusative) > lexical/oblique case (dative)

Much of Bobaljik's justification for (15) draws upon ergative-absolutive languages, which dissociate unmarked case and subjecthood: in transitive sentences, the subject bears dependent (ergative) case, while the object bears unmarked (absolutive) case. Bobaljik notes that, across ergative languages, the argument bearing absolutive is most accessible as a target for phi-agreement. As noted by Mahajan (1990), the ergative subject in Hindi-Urdu cannot trigger verb agreement (see again 3); the verb agrees in phi-features with the absolutive object instead. Only if the subject is absolutive (e.g., in intransitive clauses) does it trigger verb agreement.[3] Agreement

2 Moravcsik's hierarchy (*subject > direct object > indirect object > adjunct*) is not identical to that of Keenan and Comrie in terms of the lower arguments; however, my focus here is on the contrast between the subject and object, which is consistent for both formulations of the hierarchy.

3 See also Polinsky and Potsdam (2001), who report an analogous pattern for Tsez (Caucasian).

in Hindi-Urdu is therefore not governed by grammatical function, but by morphological case: the verb agrees only with absolutive DPs. As discussed in Bobaljik (2008), the situation in Hindi-Urdu can be contrasted with related Nepali, in which ergative DPs *do* trigger agreement (16a). In intransitive sentences such as (16b), agreement targets the absolutive DP, just as in Hindi-Urdu.

(16) Ergative agreement in Nepali

a. Meri-le luga dhui səkəki che.
Mary.**FEM-ERG** cloth.MASC.PL wash PERF.**FEM.3SG**. be.**FEM.3SG**.
'Mary has washed the clothes.' (Chandra & Udaar, 2015: 65)

b. keti dherai degureki tshe.
girl.**FEM.ABS** much run.PERF PRES.**FEM.3SG**
'The girl has run a lot.' (Li 2007: 1465)

In Nepali, therefore, both unmarked and dependent case-marked DPs are accessible: agreement targets the structurally highest DP bearing either dependent or unmarked case (the ergative subject in 24a; the absolutive subject in 24b). In Hindi-Urdu, only unmarked DPs are accessible: absolutive DPs alone (the object in 23a; the subject in 23b)[4] may participate in verbal agreement. Languages in which only dependent case-marked DPs are accessible for agreement are unattested (see Bobaljik, 2008).

Extending Bobaljik's account, Deal (2017) proposes that accessibility in A-bar movement is also governed by the hierarchy in (15). The absolutive-only agreement scenario in Hindi-Urdu, in which the absolutive – but not the ergative – argument can trigger agreement, is paralleled in 'syntactically ergative' languages, in which the absolutive but not the ergative argument may undergo A-bar movement. This is shown for Q'anjob'al (Mayan) in (17)[5].

(17) Syntactic ergativity in Q'anjob'al (Coon et al. 2014: 15)

a. ✓***wh*** **movement of ABS object**
Maktxel$_i$ max-Ø y-il-a' [naq winaq] **[t$_i$_]**?
who ASP-3ABS 3ERG-see-TV the man
'Who did the man see?'

4 Hindi-Urdu exhibits split ergativity in non-perfective aspects, whereby both the subject and the object may surface as absolutive. In such cases, the higher of the two DPs (i.e., the subject) triggers agreement, in a manner analogous to Nepali in (4a); see Mahajan (1990).

5 Ergative and absolutive affixes are often referred to in Mayan literature as 'Set A' and 'Set B' markers respectively, since these markers index person and number features in more than just case-contexts (e.g., Set A marking indexes nominal possessors). For cross-linguistic consistency, I use ERG and ABS glosses for all Mayan examples in this chapter.

b. ✓***wh*** **movement of ABS subject**
Maktxel$_i$ max-Ø way-i **[t$_i$_]**?
who ASP-3ABS sleep-ITV
'Who slept?'

c. × ***wh*** **movement of ERG subject**[6]
***Maktxel$_i$** max-Ø y-il-a' **[t$_i$_]** [ix ix]?
who ASP-3ABS 3ERG-see-TV the woman
'Who saw the woman?' (Grammatical as: 'Who did the woman see?')

By contrast, the related Mayan language Ch'ol is not syntactically ergative: both ergative and absolutive arguments may undergo movement (18).

(18) Movement of ERG and ABS in Ch'ol (Coon et al., 2014: 15-16, approx.)

a. ✓***wh*** **movement of ABS object**
Maxki$_i$ tyi y-il-ä-Ø **[t$_i$__]** jiñi wiñik?
who ASP 3ERG-see-TV-3ABS the man
'Who did the man see?'

b. ✓***wh*** **movement of ABS subject**
Maxki$_i$ tyi wäy-i- Ø **[t$_i$_]?**
who ASP sleep-ITV-3ABS
'Who slept?'

6 The ban on movement of the ergative argument in sentences like (17c) can be circumvented by use of one of two constructions in which the semantic agent is not the subject of a transitive clause: an antipassive, or a construction specific to Mayan languages known as AGENT FOCUS. The antipassive, illustrated for Q'anjob'al in (d), is generally construed as a detransitivization of formerly transitive predicate, as shown by the intransitive suffix on the verbal stem. In (d), the subject surfaces as absolutive (and can therefore be extracted), and the object is realised as an optional oblique argument. The lexical root is immediately followed by the antipassive morpheme.

(d) Q'anjob'al antipassive (Coon et al., 2014: 42)
Maxtxel$_i$ max-Ø maq'-**waj**[-i] (OBL y-in no tx'i)?
who ASP-3ABS hit-**AP**-ITV 3POSS-RN CLF dog
'Who hit the dog?'

The Agent Focus construction differs from the antipassive in that the object is not demoted: it is not marked as oblique and is cross-referenced by absolutive person marking. The verb, however, is suffixed by the same intransitive marker as in (d) (in contrast to the transitive suffix in 17a, c), and no ergative marking is present. As in (d), the subject can be extracted. An example from Q'anjob'al is shown in (e) (note that there is variation throughout the Mayan family in terms of the contexts in which the Agent Focus construction can be used).

(e) Q'anjob'al Agent Focus (Coon et al., 2014: 43)
Maxtxel max-ach il-on-i?
who ASP-2ABS see-**AF**-ITV
'Who saw you?'

c. ✓ ***wh* movement of ERG subject**[7]
Maxki$_i$ tyi y-il-ä-Ø jiñi wiñik **[t$_i$__]?**
who ASP 3ERG-see-TV-3ABS the man
'Who saw the man?'

Deal's (2016) account of syntactic ergativity proceeds as follows: in languages such as Q'anjob'al, which ban extraction of the ergative subject, the syntactic probe which triggers A-bar movement (e.g., C^0) can only agree with a goal bearing unmarked (i.e., absolutive) case (see also Otsuka, 2010). In a language such as Ch'ol, however, both unmarked and dependent (i.e., ergative)- marked DPs are accessible to an A-bar probe and as such, both may undergo movement. In this way, A-bar movement in Q'anjob'al mirrors agreement in Hindi-Urdu: only unmarked arguments are accessible. In the same vein, movement in Ch'ol is analogous to agreement in Nepali: both unmarked and dependent-marked arguments can be targeted.

In what follows, I show that movement and agreement are in fact *not truly analogous* with respect to the morphological case hierarchy in (15), despite surface similarities. As concerns movement, the absolutive object can be shown to play a crucial role in the restriction upon extraction of ergative subjects: in split ergative environments in certain Mayan languages, the ergative argument may be extracted in the absence of an absolutive object, but not otherwise. In contrast, the absence of an absolutive object does not render the ergative subject a viable target for phi-agreement in an absolutive-only agreement language such as Hindi-Urdu. I propose that the hierarchy in (15) regulates accessibility for *agreement only*; A-bar movement is not governed by the same principles (see Chapter 7 for further discussion of A-bar movement). The next section focuses on the behaviour of intransitive ergative DPs; I discuss syntactic ergativity in split ergative Mayan languages, before turning to phi-agreement in active ergative languages.

2.3.2. Intransitive ergatives

This section focuses on a subset of ergative languages which allow ergative marking on certain types of intransitive subjects. This patterning may arise under number of circumstances: First, in so-called 'active' ergative languages (e.g., Hindi-Urdu, Georgian, Kashmiri, western dialects of Basque), wherein subjects of both transitive and unergative verbs are marked as ergative (in

7 *wh* questions in Ch'ol question strings are globally ambiguous when the object is third person (both ERG subject or ABS object interpretations are possible; compare 18a and c); this ambiguity disappears, however, when the object is first or second person (see Coon et al., 2014).

contrast to objects of transitive verbs and subjects of unaccusatives, which are absolutive); second, in languages in which ergative case is retained when the transitive object is caseless, and third, in languages with split ergative clause types (typically with non-perfective aspects), wherein all subjects - transitive or intransitive - bear ergative case; this resulting alignment is known as an 'extended ergative' pattern (Dixon, 1979). In environments such as these, differences in the behaviour of transitive and intransitive subjects offer insight into how the characteristics of the ergative subject are impacted by the presence of an absolutive co-argument. I first examine movement, drawing upon a number of previous observations from existing literature which collectively show that syntactic ergativity in Mayan languages does not hold in the absence of an absolutive object. I then discuss phi-agreement, introducing novel data from Hindi-Urdu and Basque, which shows that agreement, unlike movement, is *not* affected by the absence of an absolutive object.

2.3.2.1. A-bar movement

Here I discuss several previously-observed contrasts in the behaviour of transitive and intransitive ergative DPs in syntactically ergative Mayan languages, focusing on extended ergative patterning in Ixil, bare objects in K'ichee', and reflexive objects in Q'anjob'al.

2.3.2.1.1. Extended ergativity in Ixil

Syntactic ergativity in Ixil (Mamean) is exemplified in (19): A-bar fronting of the absolutive object for (sentential) negation is possible, while fronting of an ergative subject is not.

(19) Fronting in Ixil (Ayres, 1981: 130)

a. ✓**fronting of ABS object**
Ye'l **in** kat et-il **in**
NEG **1SG** PUNC 2ERG.PL-see **1ABS**
'You (pl.) didn't see me'

b. ✗ **fronting of ERG subject**
*Ye'l **in** kat **w**-il ex
NEG **1SG** PUNC **1ERG**-see 2ABS.PL
'I didn't see you (pl.)'

Ixil also exhibits a split ergative pattern: while an ergative-absolutive alignment pattern is observed in the perfective aspect (as in 19 and 20, below), non-perfective aspects yield an extended ergative

pattern (Dixon, 1979), whereby all subjects – transitive (21a) and intransitive (21b) – are indexed by the ergative person marker (see e.g., Zavala Maldonado, 2017 for discussion of aspect-based splits in Mayan).

(20) Ixil perfective (Ayres, 1981: 128)

a. Transitive
W-il axh
1ERG-see **2ABS**
'I saw you'

b. Intransitive
Ok in
enter **1ABS**
'I entered'

(21) Ixil imperfective (Ayres 1981: 129)

a. Transitive
In w-il axh
DUR **1ERG-**see 2ABS
'I am seeing you'

b. Intransitive
In w-ok-e'
DUR **1ERG-**enter-SUF
'I am entering'

There is much debate in the Mayanist literature, however, as to the status of the 'ergative' markers in (21). Coon (2013) argues extensively that clausal complements of non-perfective aspect markers are in fact nominalizations (contra Buenrostro 2007, who maintains that such complements are fully verbal). Under this analysis, the 'ergative' prefix in (21) is a *genitive* prefix (ergative and genitive are syncretic throughout Mayan). Alternatively, this prefix could, based on the patterning in (21), also be analysed as a nominative marker (see e.g., Zavala Maldonado 2017). Irrespective of whether the 'ergative' marker in (21) is best analysed as genitive,[8] ergative, or nominative, a contrast obtains between transitive and intransitive predicates as concerns subject extraction. Crucially, while the transitive subject in (22a) cannot be fronted, the intransitive subject in (22b) *can* be fronted (see Assmann et al., 2015 for further discussion of these and other examples).

(22) Fronting in Ixil imperfective (Ayres, 1981: 130)

a. **✗ fronting of transitive ERG subject**
*Ye'l **in** in **w**-il ex
NEG **1SG** IMP **1ERG-**see 2ABS.PL
'I'm not seeing you (pl.)'

b. **✓fronting of intransitive ERG subject**
Ye'l **in** in **w**-ok-e'
NEG **SG** IMP **1ERG-**enter-SUF
'I'm not entering'.

[8] In recent literature, genitive case has, too, been treated as a 'dependent' case; see e.g., Sigurðsson & Šereikaite (2018).

Thus, the ban on movement of ergative subjects in Ixil no longer holds in the absence of an absolutive object. This shows that the ability of an argument to undergo movement is conditioned not by its case marking alone, but also by the syntactic context, namely the presence or absence of a co-argument.

2.3.2.1.2. Caseless objects: K'ichee' and Q'anjob'al

While no *bona fide* active ergative languages (e.g., Hindi-Urdu, Georgian, Kashmiri, western dialects of Basque) are known to exhibit syntactic ergativity (see Sheehan, 2014), K'ichee' (K'ichean) offers a notable approximation to an active patterning in a syntactically ergative language. In K'ichee', when the transitive object is bare (i.e., determinerless), ergative subject case marking is retained; this contrasts with other ergative languages, such as Niuean (Polynesian), in which subjects of transitive verbs with bare objects appear with absolutive case (see e.g., Massam, 2001)[9]. Following Massam (2001), Coon et al. (2014) propose that bare objects of this type do not receive – or require – case of any kind. Thus, there is no absolutive argument in a sentence like (23b).

(23) K'ichee' (Larsen, 1988: 342)

a. Full object: ERG subject[10]
X-u-ram **lee chee'** lee achih
ASP-3ERG-cut **DET tree** DET man
'The man cut the tree'

b. Bare object: ERG subject
X-u-q'aj **chee'** lee kaqiiq'
ASP-3ERG-dig **tree** DET wind
'The wind broke trees'

As observed by Aissen (2011), and further discussed by Coon et al. (2014), ergative subjects cannot undergo movement in K'ichee' in the presence of a full object (24a), but can when the object is bare (24b).

9 See Clemens and Coon (2018) for further discussion of bare objects in Mayan, and comparisons with languages such as Niuean.
10 The third person singular absolutive marker is null throughout Mayan.

(24) *wh* questions in K'ichee' (Aissen, 2011: 12)

a. ✖ Movement of ERG with ABS object (~ transitive subject movement)
*Jachiin x-u-loq' **rii uuq**?
who ASP-3ERG-buy **DET cloth**
'Who bought the cloth?'

b. ✓Movement of ERG with bare object (~ intransitive subject movement)
Jachiin x-u-loq' **uuq**?
who ASP-3ERG-buy **cloth**
'Who bought cloth?'

A similar contrast is observed in Q'anjob'al. As discussed by Pascual (2007) and Coon et al. (2014), the ban on movement of ergative subjects in Q'anjob'al (cf. 17c) no longer holds when the object is a reflexive, as in (25).[11]

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11 Aissen (2017) presents data which are problematic for an analysis of reflexives as caseless; namely, their incompatibility in non-finite clauses and in the 'incorporation antipassive'. As noted by Aissen, objects in such environments are always caseless (26), as evidenced by their inability to appear with D^0 elements.

(26) Q'anjob'al caseless object constructions (Pascual 2007, via Aissen, 2017: 752)

a. Non-finite complement clause
K'am mak x-y-i-toq u-etow [say-oj (*ixim) ixm]
NEG who CP-3ERG-take-DIR 3ERG-with seek-INF CLS:DET corn
'He didn't take anyone with him to look for (*the) corn'

b. Incorporation antipassive
K'am=to ch-in 'uk'-wi (*an) an
NEG=CL ASP-1ABS drink-AP CLS:DET liquor
'I don't drink liquor'

Aissen argues that, if reflexive objects are indeed caseless, they should appear in precisely these environments. As shown in (27), however, this is not so.

(27) Q'anjob'al reflexive objects in caseless object constructions (Aissen 2017: 752)

a. Non-finite complement clause
*Max s-cheq-toq ix heb' naq winaq [kol-oj s-b'a]
ASP 3ERG-send-DIR PRO:FEM PL CLS:DET man help-INF 3ERG-self
'She sent the men to help each other'

b. Incorporation antipassive
*Chi loze-wi s-b'a ix
ASP feed-AP 3ERG-self PRO:FEM
'She feeds herself'

The incompatibility of reflexive objects in such environments can, however, be accounted for without reference to lack of caselessness: reflexive objects as in (27) - unlike those in (26) – must be *bound* by a local antecedent. Thus, I propose that ungrammaticality in (27) is in fact due to a violation of Condition A, wherein the reflexive objects lack *local* binding antecedents. In (27a), the reflexive antecedent is not situated in the same embedded clause as the object itself, and, under the standard view that clause boundaries constitute phasal domains, it is entirely expected that binding would be disrupted in this environment (notice further that there is no ergative agreement prefix on the embedded verb *kol* 'help' in 27a, suggesting that, even if an embedded null PRO subject is present for thematic purposes, it is invisible for agreement and may therefore, be also invisible for binding purposes). This approach can also account for (27b): Coon (to appear: 25) shows for Chuj that the antipassive verb root and caseless NP complement can give rise to idiomatic meaning, proposing that the caseless object in the incorporation antipassive combines with the verbal root internal to the first phase boundary, in which 'special meaning' is computed (Arad, 2003). The incompatibility of a reflexive in these environments therefore likely arises from a phasal disruption of the antecedent-anaphor binding relationship, which again violates Condition A.

(25) ✓**Movement of ERG subject in Q'anjob'al reflexive (Coon et al., 2014: 56)**

Maktxel max **y**-il **s-b'a**? (compare ungrammaticality of 17c)
who ASP 3**ERG**-see **3ERG-self**
'Who saw herself?'

Coon et al. (2014) note that, while word order in Q'anjob'al is usually VSO, VOS word order is obligatory with reflexives[12]. They argue that the reflexive object is caseless, since it is dependent upon the subject for its meaning and must remain adjacent to the verb. Thus, the contrast in Q'anjob'al between (17c) and (25) is akin to the contrast between (24a) and (24b) in K'ichee': ergative subjects may undergo movement only in the absence of a full, absolutive-licensed object. Just as in Ixil, then K'ichee' and Q'anjob'al[13] also exhibit a contrast between (ill-formed) movement of a transitive ergative subject, and (well-formed) movement of the ergative in the absence of an absolutive co-argument.

2.3.2.1.3. Summary and discussion

Data from Ixil, K'ichee', and Q'anjob'al illustrate that the presence of an absolutive object impacts movement of the ergative subject: while ergative arguments cannot undergo movement when a case-requiring object is present, the absence of a case-licensed object circumvents this restriction. Thus, the inability of ergative arguments to undergo movement in syntactically ergative languages cannot be directly attributed to the properties of the ergative case. As discussed by Coon et al. (2014) and Assmann et al. (2015), these observations call for a theory of syntactic ergativity which ties A-bar movement of the ergative subject with A-movement of the object.[14] This is consistent with the idea that movement asymmetries of unmarked DPs (e.g., absolutive) versus dependent-marked DPs (e.g., ergative) are seemingly not a result of the morphological case hierarchy of (15). However, it is also possible that morphological markedness as per (15) is determined on a relational basis. This would mean that an ergative DP is treated as 'marked' for the purposes of accessibility only if an unmarked competitor argument is also present (within some domain).

[13] See also Hou (2013) for discussion of a similar pattern in Chuj (Greater Q'anjob'alan)

[14] These two accounts differ in how they instantiate this correlation: according to Coon et al. (2014), movement of the object, for case checking purposes, prevents the ergative subject from undergoing further movement; for Assmann et al. (2015), movement of the ergative subject blocks subsequent case assignment to the object. My immediate goal here is not to differentiate between these two accounts, but rather, to assess whether the Mayan facts may still be captured with an accessibility-based account of movement restrictions.

Conversely, in the absence on an absolutive DP, the ergative – now, the *least* marked DP - is treated as formally 'unmarked' and is therefore accessible for movement.

The scenario outlined above establishes a key prediction regarding phi-agreement: if morphological markedness is relational, then the contrast between movement of ergative DPs in the presence versus absence of an absolutive object should be paralleled in agreement in languages such as Hindi-Urdu (see again example 3), because such agreement is such languages is also sensitive to case marking of argument. Crucially, this means that absence of an absolutive co-argument should therefore render an ergative DP a viable target for agreement in Hindi-Urdu. My goal for the following part of this chapter is to assess the corresponding facts in languages like Hindi-Urdu, in which an ergative subject cannot trigger agreement, in order to determine whether such (lack of) agreement is affected by transitivity. If so, then this would strongly suggest that the morphological case hierarchy in (15) can be fundamentally construed as relational scale. A relational approach to (15) will, however, be ultimately rejected: as will be shown, the movement facts discussed in this section are not paralleled in absolutive-only agreement languages.

2.3.2.2. Phi-agreement

This section assesses agreement in languages in which ergative subjects cannot trigger agreement *and* which have active alignments, wherein subjects of both transitive and unergative verbs are marked ergative. Like many Indo-Aryan languages, Hindi-Urdu meets these criteria: ergative subjects do not trigger agreement (see again 3), and - in perfective aspects - ergative case can mark unergative subjects (28). Agreement in such constructions, however, is always 3SG masculine, regardless of the phi-features of the subject; the 3SG feminine subjects in (28) do not trigger feminine agreement.

(28) Default agreement in Hindi-Urdu unergatives (Kinza Mahoon, p.c.)[15]

a. Anya-ne chik-**ha**/*-hi.
Anya.FEM-ERG scream- **MASC** /*-FEM
'Anya screamed'

b. Anya-ne muskurah-**a**/*i.
Anya.FEM-ERG smiled- **MASC** /*-FEM
'Anya smiled.'

[15] Novel data presented in this section are drawn from consultant work with native speakers. I am indebted to Kinza Mahoon for judgements of Hindi-Urdu, and to Saioa Lazarra for judgements of Basque.

As is the case in many languages, 3SG masculine agreement in Hindi-Urdu is the agreement *default* (Bhatt, 2005), arising through the failure of an agreement probe to target any nominal whatsoever (see Preminger 2011, 2014). The masculine agreement marking in (28) can therefore be taken to indicate *lack* of agreement. The most straightforward conclusion to be drawn is that unergative subjects that are marked ergative in Hindi-Urdu are not targets for phi-agreement. There is, however, an alternative possibility, namely that the 3SG masculine verbal morphology in (28) does not reflect default agreement, but rather, agreement with a covert absolutive cognate object (see Hale & Keyser 1993, a.o.). This alternative seems unlikely, however, since the cognate objects of the verbs in (12) are themselves feminine: when overt, as in (29), feminine agreement surfaces.

(29) **Overt FEM cognate objects (Kinza Mahoon, p.c.)**

a. Anya-ne (bhurhi awaz se) **chik** chik-**hi**/*-ha.
Anya.FEM-ERG (big voice with) scream.**FEM**.**ABS** scream-**FEM**/*-MASC
'Anya screamed a (loud) scream.'

b. Anya-ne (xubsurat si) **muskurahaat** muskurah-**i**/*-a.
Anya.FEM-ERG (beauty with) smile.**FEM.ABS** smiled-**FEM**/*-MASC
'Anya smiled a (beautiful) smile.'

Thus, if the verbal agreement in (28) were agreement with a covert cognate object, we would expect it to be feminine as opposed to masculine. The masculine agreement which surfaces on unergative verb forms can therefore be taken to be true default agreement. As such, the absence of an absolutive object in Hindi-Urdu does not render the single ergative argument a viable target for agreement.

The pattern for Hindi-Urdu, wherein unergative subjects that are marked ergative do not trigger agreement, is widespread within the Indo-Aryan family, as exemplified by Kashmiri (30) and Marathi (31): notice that, while the verbs (30a) and (31a) phi-agree with nominative unergative subjects, they do not phi-agree with ergatives (30b, 31b) Indeed, Bhatt (2007: 19) notes that "agreement with ergative subjects […] as a last resort" is unattested in Indo-Aryan.

(30) Agreement in Kashmiri unergatives[16] (Wali & Koul 1997: 153)

a. NOM subject: ϕ-agreement	**b. ERG subject: no ϕ-agreement**
bI nots-us.	Me nots.
1SG.NOM dance.PST-**1SG**	1SG.ERG dance.PST
'I danced.'	'I danced.'

(31) Agreement in Marathi unergatives (Dhongde & Wali 2009: 181-2)

a. NOM subject: ϕ-agreement	**b. ERG subject: no ϕ-agreement**
Lili həsl-i.	Lili-ne həsaw-ə.
Lili.FEM.NOM laugh.PERF-**FEM**	Lili.FEM-ERG laugh.DESI-**NEUT**
'Lili laughed.'	'Lili should laugh'

Finally, consider Basque. Unlike in Indo-Aryan, ergative arguments in Basque generally *do* trigger agreement. In transitive constructions such as (32), the clause-final auxiliary phi-agrees with both the ergative subject and the absolutive object. Both unmarked and dependent marked arguments are thus (simultaneously) accessible.

(32) Agreement in Basque transitives (Fernández & Albizu 2000: 4)
Ni-k hi aurkitu **h**-ind-u-**da**-n
I-**ERG** you.**ABS** find **2S.ABS**-EP-have-**1S.ERG**-PAST
'I found you'

However, Basque exhibits a pattern known as "ergative displacement" (see e.g., Laka, 1993, et seq.), in which a morphosyntactically ergative DP exceptionally triggers absolutive agreement (33). Ergative displacement arises when (i) tense is non-present and, (ii) the ergative DP is 1st or 2nd person, and (iii) the absolutive DP is 3rd person. Thus, under these conditions, the ergative argument can be said to be *inaccessible* for ergative agreement (and must trigger absolutive agreement instead).

(33) Ergative movement in Basque[17] (Fernández & Albizu 2000: 4)
Ni-k hura aurkitu **n**-Ø-u-en
I-ERG he/she.ABS find **1S.ABS**-3S.ABS-have-PAST
'I found him/her'

Basque also exhibits an active alignment: subjects of unergative verbs bear ergative case marking, and typically trigger normal ergative agreement, as in (34).

[16] The distribution of verb agreement in Kashmiri differs from that of pronominal enclitics, which cross-reference absolutive, ergative, and dative arguments (see Wali & Koul, 1997, for discussion and examples).
[17] See Albizu and Eguren (2000) for arguments that ergative DPs which trigger 'displaced' agreement are morphosyntactically ergative DPs, as opposed to absolutive DPs.

(34) Unergatives in Basque (Saioa Lazarra, p.c.) [18]

a. Ni-**k** dantzatu d-u-t
I-**ERG** dance PREF-have-1S.ERG
'I dance'

b. Ni-**k** abestu d-u-t
I-**ERG** sing PREF-have-1S.ERG
'I sing'

Preminger (2012) argues - on the basis of long-distance agreement phenomena, iterative constructions, and absence of certain cognate DPs - that unergative verbs in Basque lack implicit objects: by this analysis, the sentences in (34) are not covertly transitive. Now consider again displaced agreement: if the lack of ergative agreement in constructions such as (33) is dependent on the presence of an absolutive co-argument, then ergative displacement should *not* apply to subjects of unergative verbs. However, absence of an absolutive object makes no difference in this regard: a 1st/2nd person unergative subject in a non-present tense still cannot trigger regular ergative agreement (35). Instead, the same 3rd person absolutive agreement prefix surfaces as for the transitive subject in (33).

(35) Unergative ergative movement (Saioa Lazarra, p.c.)

a. Ni-k dantzatu **n**-u-en/*z-u-t-en
I-ERG dance **1S.ABS**-have-PAST/*PREF-have-1S.ERG.PAST
'I danced.'

b. Ni-k abestu **n**-u-en/*z-u-t-en
I-ERG sing **1S.ABS**-have-PAST/*PREF-have-1S.ERG.PAST
'I sang.'

The agreement facts in Basque thereby yield the same conclusion drawn from Indo-Aryan: absence of an absolutive co-argument does not trigger ergative agreement. Following from these observations, the strong typological generalization to be made is that no language should exhibit verbal phi-agreement with ergative arguments, *only* in the absence of an absolutive object. This generalization sits in contrast with the Mayan movement data in Section 3.2.2, in which the absence of an absolutive object allows for *extraction* of the ergative. I turn now to the implications of this contrast.

2.3.2.3. Implications and extensions

By examining the behaviour of intransitive ergative subjects, I show that movement and agreement are not analogous with respect to the morphological case hierarchy. While the restriction on movement of ergative subjects in Mayan languages consistently does not hold in the absence of an

[18] Specifically, western and central dialects have Split-S alignments; subjects of unergative verbs in eastern dialects receive absolutive case, like other intransitive subjects.

absolutive object, ergative subjects in Hindi-Urdu and in Basque "ergative disaplcement" configurations consistently do not trigger agreement, regardless of whether an absolutive co-argument is present or not. Several options remain open as to the best formal characterization of these facts. One possibility is that movement and phi-agreement are simply parametrized differently with respect to (22): movement is regulated on a morphologically relational basis, whereas agreement is not. While this type of explanation cannot be refuted on empirical grounds, it is an unsatisfying outcome as it leaves unresolved the question of *why* movement and agreement are parametrized differently.

A more favourable alternative is an approach in which (15) governs only one of movement or agreement. To this end, there are two options are spelled out in (36).

(36) Where does the hierarchy apply?

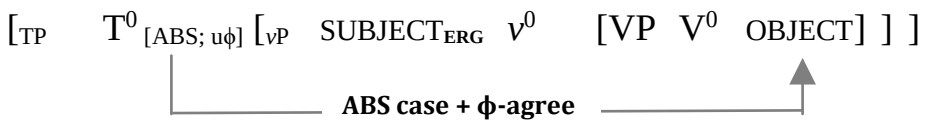
Option A: The hierarchy in (15) regulates A-bar movement (i.e., is relational), and phi-agreement is not regulated by morphological accessibility.

Option B: The hierarchy in (15) regulates phi-agreement (i.e., is absolute), and A-bar movement is not regulated by morphological accessibility.

Let us consider Option A first. If accessibility regulates movement, it must be optionality-based, and as such, (apparent) accessibility in phi-agreement in languages like Hindi-Urdu is derived by another means. Consider once again the difference between Hindi-Urdu and Nepali: in Hindi-Urdu, only unmarked (absolutive) DPs may trigger verb agreement; in Nepali, both unmarked and dependent (ergative)-marked DPs are accessible, and agreement targets the highest DP bearing either ergative or absolutive case. This point of variation could potentially be derived with existing syntactic principles, without cause for reference to an abstract hierarchy: suppose that absolutive case and phi-agreement in Hindi-Urdu are the result of a *single* syntactic probe-goal operation (e.g., between T^0 and a transitive object). In this way, only the absolutive argument can be targeted for agreement, since agreement is parasitic upon case assignment (see Coon, 2017 for arguments that ergative agreement in Ch'ol Mayan is parasitic on inherent ergative case assignment by v^0). This scenario is schematized in (37)[19].

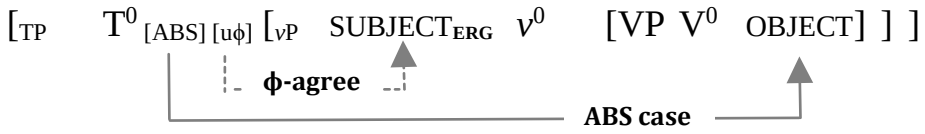
19 Although Hindi-Urdu and Nepali are T^0-final, I show T^0 as head-initial in (37) and (38) for readability purposes.

(37) **Absolutive case and agreement in Hindi-Urdu**



In Nepali, however, case and agreement constitute distinct syntactic operations. This is shown in (38), in which T^0 probes twice: to assign absolutive case to the closest caseless-DP (i.e., the object), and to phi-agree with the closest DP (i.e., the subject).

(38) **Absolutive case and agreement in Nepali**



If we examine the Nepali facts more closely, however, a proposal along these lines ultimately does not hold up. While ergative-marked subjects can control phi-agreement in Nepali, dative-marked subjects cannot, as shown in (39). The verb agrees with the absolutive object instead.

(39) **Object agreement in Nepali (Bickel & Yādava, 2000; via Bobaljik, 2008: 21)**

malāī **timī** man parch-**au**. (*parch-**u**)
1SG.DAT **2SG.ABS** liking occur.NPST-**2SG** (occur.NPST-**1SG**)
'I like you.'

Thus, agreement in Nepali does not consistently target either the unmarked (absolutive) argument *or* the highest argument (i.e., the subject). As proposed by Bobaljik (2008), however, this state of affairs can be accounted for with reference to the morphological case hierarchy, if we say that Hindi-Urdu and Nepali can be said to differ in which types of case are accessible. In Hindi-Urdu, only unmarked arguments can be targeted; in Nepali, unmarked and dependent-marked argument can be targeted, but nothing lower. This is schematized in (40).

(40) **Accessibility in Hindi-Urdu and Nepali (Bobaljik, 2008: 21, approx.)**

Hindi-Urdu: Unmarked > ~~Dependent > Lexical~~

Nepali: Unmarked > Dependent > ~~Lexical~~

Since phi-agreement in Hindi-Urdu and Nepali truly does appear to be governed by accessibility (as per Bobalijk, 2008), I set aside Option A. I argue now in favour of Option B; namely, that A-bar movement is not regulated by accessibility (i.e., contra Deal, 2017). Rather, the demonstrable role of the absolutive object in the inability of the ergative argument to undergo movement supports

theoretical proposals which posit that *absolutive case assignment* and *ergative A-bar movement* cannot co-occur in syntactically ergative languages (e.g., Bittner & Hale, 1996; Coon et al., 2014; Assmann et al., 2015).

Further typological support for Option B - and more specifically the view that syntactic ergativity arises from factors besides the Accessibility Hierarchy - comes from consideration of reverse movement asymmetries in nominative-accusative languages. Since both ergative and accusative are dependent cases, and therefore occupy the same place on the hierarchy in (15), the accessibility-based approach to syntactic ergativity predicts the existence of 'syntactic accusativity', namely languages where accusative arguments cannot undergo A-bar movement. Indeed, Deal (2017) discusses two nominative-accusative languages which may be construed as syntactically accusative. However, when considering a wider range of languages we find that syntactic accusativity is not as prevalent as syntactic ergativity. Polinsky (2015) reports data compiled by Comrie (2008), and Comrie and Kuteva (2008), listing 32 ergative languages of which 12 (37.5%) show no syntactic ergativity, while the remaining 20 (62.5%) are syntactically ergative. If we return to the relative clause data surveyed by Keenan and Comrie (1977: 76-79), upon which their formulation of the original Accessibility Hierarchy is based, we find a difference between ergative and accusative languages. Of the 39 nominative-accusative languages surveyed by Keenan and Comrie,[20] 12 (30.8%)[21] can be construed as syntactically accusative in either one of two ways: (i) allowing for relativization of the subject, but not of the direct object (or indeed any lower arguments), or (ii) requiring a pronoun at the gap site for direct objects (and lower arguments), but not for subjects (see Keenan & Comrie 1977: 94); see Appendix A. The remaining 27 languages (69.2%) do *not* exhibit syntactic accusativity. These counts are summarized in Table 1.

	NOM-ACC	**ERG-ABS**
× Movement of dependent-marked DP	12 (30.8%)	20 (62.5%)
✓ Movement of dependent-marked DP	27 (69.2%)	12 (37.5%)
Total number of languages	39	32

TABLE 1: PROPORTIONS OF SYNTACTIC ACCUSATIVITY VS. SYNTACTIC ERGATIVITY

20 Keenan and Comire survey 49 languages in total. Of these, ten are known to either have an ergative alignment, or an Austronesian voice-marking system (for which alignment is debated): Basque, Hindi-Urdu, Iban, Javanese, Malagasy, Malay, Minang-Kabu, Tagalog, Toba Batak, and Tongan. These languages are thus excluded from the following analysis.

The proportion of ergative languages which exhibit syntactic ergativity (62.5%) thereby appears to be greater than the proportion of accusative languages with syntactic accusativity (30.8%). A chi-square test for equality of proportions reveals that this difference is indeed significant (χ^2= 5.92, df = 1, p = 0.014). Thus, there is reason to believe that the relative rarity of syntactic accusativity by comparison with syntactic ergativity is not a typological accident. The prevalence of syntactic ergativity compared with accusativity hereby provides further support for the conclusion that morphological accessibility is not the fundamental source of restrictions on A-bar movement of an ergative argument. It should be noted, however, that these theories have been argued to run into problems when faced with languages which are syntactically ergative only in a *subset* of A-bar environments (for example, in *wh* questions but not in relative clauses), which Deal's (2016, 2017) accessibility-motivated account suggests a solution for. In the following section, therefore, I focus specifically on syntactic ergativity, and offer some suggestions as to how these competing theories may be reconciled in view of the typological landscape discussed in this section.

2.3.3. Partial syntactic ergativity and the wider typology

Here I consider a typological challenge for any broad approach to syntactic ergativity: the existence of languages which exhibit a ban on ergative A-bar movement only in some environments (this is possibly indicative of a change-in-progress from a syntactically ergative to a non-syntactically ergative language). Polinsky (2016) notes that the ergative argument in Chukchi cannot undergo relativization (41b), while the absolutive argument can (41a). Chukchi is therefore syntactically ergative as concerns relative clauses.

(41) Relative clauses in Chukchi (Polinsky, 2016: 13)

a. ✓Relativization of absolutive object
[**t$_i$**__ ənpənačg-e kənnə-lʔ-ən] milger$_i$
old man-ERG buy-PTCP-ABS gun.ABS
'the gun that the old man bought'

b. ✖Relativization of ergative subject
*[**t$_i$** __ milger kənnə-lʔ-ən] ənpənačg-ən$_i$
gun.ABS buy-PTCP-ABS old man-ABS
'the old man who bought the gun'

In *wh* questions, however, both the ergative and the absolutive argument can undergo movement, as in (42).

(42) *wh* questions in Chukchi (Polinsky, 2016: 13)

a. (Baseline declarative)
ənpənačg-e milger kun-nin
old man-ERG gun.ABS buy-AOR.3SG.SBJ.3SG.OBJ
'The old man bought a gun.'

b. ✓Absolutive object question
Req-ən$_i$ ənpənačg-e [**t$_i$**__] kun-nin?
what-ABS old man-ERG buy-AOR.3SG.SBJ.3SG.OBJ
'What did the old man buy?'

c. ✓Ergative subject question
Mikəne$_i$ [**t$_i$**__] milger kun-nin?
who.ERG gun.ABS buy-AOR.3SG.SBJ.3SG.OBJ
'Who bought a/the gun?'

Chukchi is therefore syntactically ergative with respect to relative clauses, but not *wh* questions. If we are to assume that the mechanisms which underlie movement are the same for relativization[22] as for *wh* questions, then the contrast between (41b) and (42c) poses a challenge for approaches to syntactic ergativity which rely on a unified theory of movement for relative clauses and *wh* questions. Since *wh* movement in ergative subject questions (42c) yield the same surface SOV order as declarative sentences (cf. 42a), however, one may wonder whether ergative *wh* questions involve movement at all. Polinsky (2016) presents two arguments that they do: firstly, Chukchi does not typically allow *wh*-in-situ questions, and secondly, ergative *wh* phrases are disallowed in relative clauses or in adjunct islands, which suggests that they obligatorily undergo movement. If (42c) does indeed involve movement, then why is this movement allowed, in contrast to (41b)? Deal (2017) proposes that an accessibility-based approach to syntactic ergativity can account for the contrast in Chukchi. According to Deal (see also Otsuka, 2010), the A-bar probe responsible for *wh* movement is not case discriminating: both absolutive and ergative DPs are accessible as targets. In relative clauses, however, the A-bar probe is case discriminating: only absolutive arguments are accessible, and the ergative argument therefore cannot be targeted for relativization.

22 Standard generative approaches to relativization posit that relative clauses such as Chukchi in (41), which do not involve an overt *wh* phrase, involve movement of a null *wh* 'operator', which is coreferential with the head noun.

The reverse situation to Chukchi has been observed in Kaqchikel (Mayan). In an experimental production study, Heaton et al. (2015) and Heaton (2017) find that Kaqchikel exhibits syntactic ergativity in *wh* questions (43a), but not in relative clauses (43b).

(43) Movement of ergative arguments in Kaqchikel

a. ✗ ergative *wh* question (Coon & Henderson, 2017: 150)
*Achike$_i$ x-Ø-u-löq' ri äk' [t$_i$__]?
who COMPL-ABS3S-ERG3S-buy DET chicken
'Who bought the chicken?'

b. ✓ergative relative clause (Heaton et al., 2015: 39)
ri chin$_i$ [ri n-Ø-u-tij re wotz'otz' t$_i$___]
DET man REL INCOMPL-ABS3S-ERG3S-eat DET pork.rind
'the man who is eating the pork rind'

Deal's (2016, 2017) accessibility-based account of syntactic ergativity is able to account for partial syntactic ergativity in a way which previous proposals do not (e.g., Bitter & Hale, 1996; Aldridge, 2004; Coon et al., 2014; Assmann et al., 2015). However, recent accounts of related syntactic phenomena could potentially be extended to capture such distinctions such as (41) vs. (42), and (43a) vs. (43b). In Kaqchikel (44), for instance, it been observed that syntactic ergativity in *wh* questions is seemingly voided when an adverb intervenes between the *wh* filler and the verbal complex (Erlewine, 2016; Henderson and Coon, 2017).

(44) ✓Ergative *wh* movement with preverbal adverb (Erlewine, 2016: 439)

Achike **kanqtzij** x-Ø-u-tëj ri wäy? [cf. 51a]
who **actually** COMPL-ABS3S-ERG3S-eat DET tortilla
'Who actually ate the tortilla?'

Based upon corpus data and several language-internal diagnostics, Henderson and Coon (2017) propose that questions such as (43a) and (44) involve fundamentally different structures. Whereas (43a) involves (attempted) prototypical ergative *wh* movement, (44) comprises a biclausal structure and does not involve ergative subject movement at all. According to Henderson and Coon, the adverb *kanqtzij* ('actually') acts as the main predicate of (44), and embeds a lower relative clause containing a null pronoun which is coindexed with the *wh* filler. Crucially, copula verbs, relative pronouns, complementizers, and third person pronouns are all null in Kaqchikel,

such that biclausal and monoclausal structures may appear string identical.[23] A schematization of the structures of (43a) and (44) is shown below in (45).

(45) *wh* questions Kaqchikel (Henderson & Coon, 2017: 167, adapted)

a. × Monoclausal *wh* question (attempted ergative wh movement)

*Achike$_i$ [x-Ø-u-löq' ri äk' [t$_i$__]]? [=51a]
who COMPL-ABS3S-ERG3S-buy DET chicken
'Who bought the chicken?'

b. ✓Biclausal *wh* question (no ergative movement)[24]

Achike$_i$ [$_{REL}$ Ø kanqtzij [Ø *pro*$_i$ x-Ø-u-tëj ri wäy]]? [=52]
who REL actually COMP PRO COMPL-ABS3S-ERG3S-eat DET tortilla
'Who actually ate the tortilla?' (lit. 'Who is it that actually he ate the tortilla?')

Henderson and Coon posit a similar structure to (45b) for relative clauses which also exhibit a preverbal adverb, and seemingly allow for extraction of the ergative argument. This is shown in (46); notice crucially that, as with *wh* questions like (45b), the ergative argument does not actually undergo movement.

(46) Biclausal relative clauses (Henderson & Coon, 2017: 159, 162; adapted)

ri winäq$_i$ [$_{REL}$ ri Ø kan qitzij [Ø *pro*$_i$ n-Ø-n-ya'
DET person REL COP truly truth COMP PRO INCOMPL-ABS3S-ERG3S-give
ru-q'ij ri Dios]]
3POSS DET God
'the person who truly presents God's valor'
(lit. 'The person who it is that he truly presents God's valor').

This could be extended to relative clauses such as (43b), if such structures can be analysed as simply containing a null existential matrix predicate which embeds a complement clause, with the meaning of 'the X who is such that (s)he….', as illustrated below in (47).

(47) Biclausal relative clause structure

ri chin$_i$ [ri Ø [Ø *pro*$_i$ n-Ø-u-tij re wotz'otz']]
DET man REL COP COMP PRO INCOMPL-ABS3S-ERG3S-eat DET pork.rind
'the man who is eating the pork rind'
(lit. 'The man who it is that he is eating the pork rind')

23 Henderson and Coon further note that relative pronouns, resumptive pronouns and complementizers can also appear in overt forms, and indeed do so in precisely the same environments in which null elements are posited in their analysis, which lends further support to the proposal.
24 Respumtive pronouns are preverbal in Kaqchikel.

In this way, instances of partial syntactic ergativity in Kaqchikel and other Mayan languages (see Douglas et al., 2017) may arise due to structural differences across different types A-bar constructions, such that movement does not actually take place in all relevant environments.

The extent to which an analysis of the type proposed for Kaqchikel may be extended beyond Mayan – and in particular to *wh* questions in Chukchi – remains an open question. More broadly speaking, the degree to which ergativity can be treated as a syntactically homogenous phenomenon has been strongly disputed (see e.g., Johns 1996, among many others). It follows from this syntactic ergativity, too, may not be amenable to a single analysis. Thus, while accessibility is at the very least not directly responsible for syntactic ergativity in the Mayan languages discussed earlier, one cannot rule out the possibility that movement indeed is governed directly by morphological case in at least *some* languages, both ergative and accusative (as per Deal, 2017). It is, however, arguably not the most *dominant* cause of restrictions on ergative A-bar movement, particularly in view of the contrast in proportions of syntactically accusative and syntactically ergative languages.

2.4. Conclusion

This chapter has presented a background of how movement and agreement are represented in formal syntax. I then discussed a radical difference between restrictions on A-bar movement and phi-agreement in ergative languages, based up data from languages in which ergative case marks intransitive subjects in certain contexts. It has previously been proposed that both movement and agreement are regulated by the morphological accessibility hierarchy in (15), and repeated below (see Bobaljik, 2008 for phi-agreement, and Deal, 2017 for A-bar movement).

(49) Morphological accessibility hierarchy (Bobaljik, 2008: 11, adapted) [=(15)]

unmarked case (nominative, absolutive) > dependent case (ergative, accusative) > lexical/oblique case (dative)

By way of the morphological accessibility hierarchy, an ergative (i.e., dependent marked) DP is less accessible than an absolutive (i.e., unmarked) DP. Accessibility has been proposed as the source of absolutive only phi-agreement in languages such as Hindi-Urdu (Bobaljik, 2008), and of absolutive-only A-bar movement (otherwise known as syntactic ergativity) in languages such as

Q'anjob'al (Deal, 2017). If we consider the behaviour of intransitive ergative subjects in such languages, however, a difference emerges: in the absence of an absolutive object, an ergative subject can undergo A-bar movement (e.g., Ixil, K'ichee', Q'anjob'al), but cannot trigger phi-agreement (e.g., Hindi-Urdu, Basque). In Section 3.2.3, I discussed some implications of this asymmetry, and argue that it most logically points to the view that phi-agreement is governed by (35), but that A-bar movement is likely not. This provides strong support for theories of syntactic ergativity which correlate the ban on A-bar movement of the ergative argument with case licensing of the absolutive argument (e.g., Bittner & Hale, 1996; Aldridge, 2004; Coon et al., 2014; Assmann et al., 2015), or with movement of the absolutive argument for some other purpose (e.g., Aldridge, 2004). Finally, I outlined how languages with partial syntactic ergativity (e.g., Chukchi, Kaqchikel) might be accounted for within this picture, given that Deal's accessibility-based account of ergative movement restrictions can handle such data more easily than previous accounts.

The main contributions of this chapter are twofold: first, I demonstrate that phi- agreement and A-bar movement, despite showing some similarities with respect to morphological accessibility, are not truly analogous phenomena. Second, I argue that the 'accessibility' as per (15) governs the types of DP which may be targeted for agreement (as per Bobaljik, 2008), but that this account does not naturally extend to A-bar movement (i.e., contra Deal, 2017).

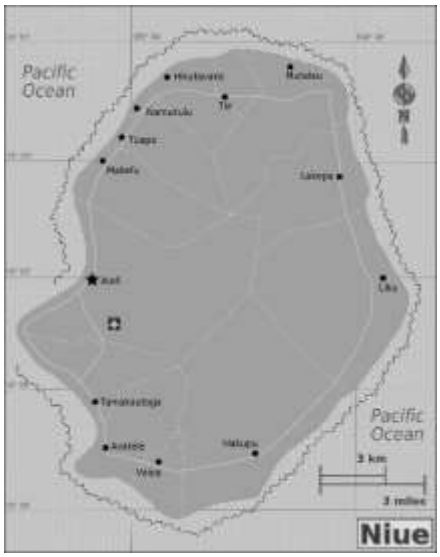
Chapter 3

Introducing Niuean

This chapter provides a background of the Niuean language in terms of its genetic affiliation, demography, and linguistic characteristics. I then discuss the nature of subjecthood and ergativity in Niuean.

3.1. Lineage and demographics

Vagahau Niue, or Niuean, is a Polynesian language spoken by approximately 6,700 people (Siosikefu & Haberkorn 2008, via Rolle & Starks, 2014) living primarily in Niue and in New Zealand. Niue (Fig. 1) is a self-governing island nation with an estimated population of around 1,611 (Statistics Niue, 2011), which is in free association with New Zealand. It is located approximately 2400km northeast of New Zealand, and east of the international date line. The majority of Niue's population are Niuean-English bilingual; Niuean has equal status with English, in accordance with Article 23 of the Niue Constitution and the Niue Education Act of 1989.



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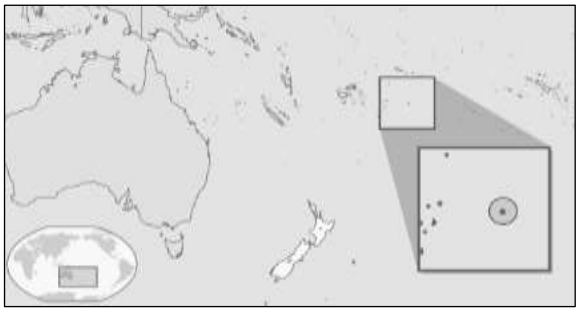


(Source: Wikimedia commons)

Figure 1: Map and location of Niue

Niuean is a member of the Polynesian language family, grouped within Oceanic. It is most closely related to Tongan, with which it shares around 70% of its basic vocabulary (source: Tāoga Niue, 2004). Pawley's (1966) subgrouping of Polynesian languages places Niuean and

Tongan together in the Tongic subgroup (more recently, Lynch et al., 2011 have included Niuafo'ou in this group), with other Polynesian languages listed as one of two Nuclear Polynesian subgroupings: Samoic-Outlier and East Polynesian (Fig. 2).

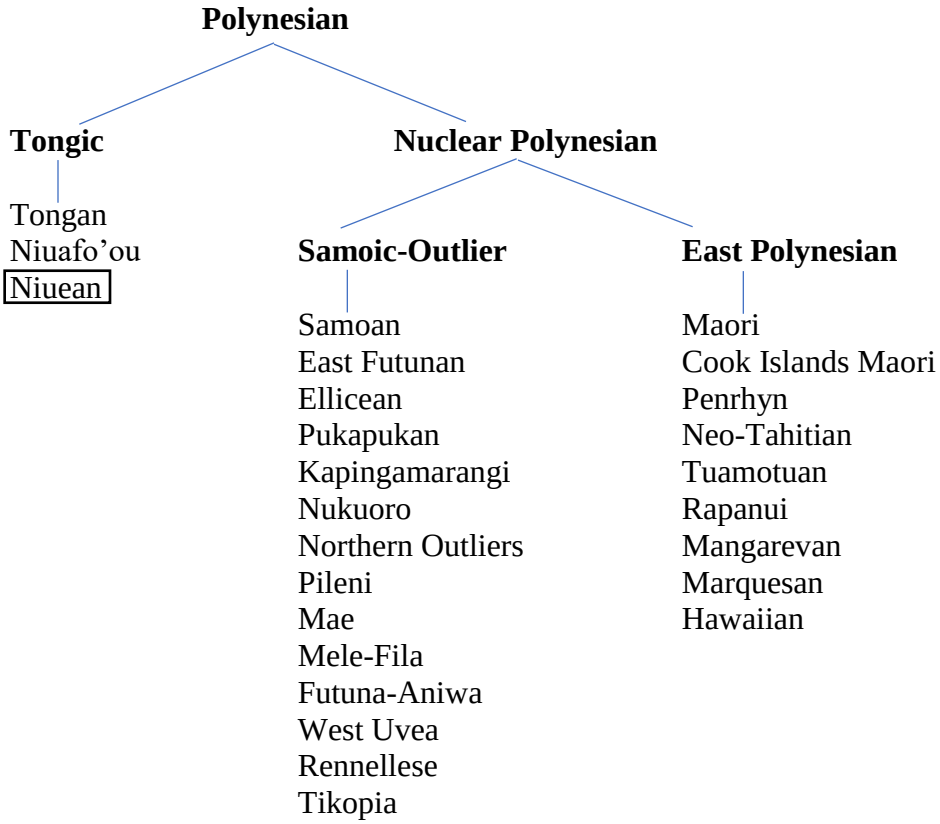


Figure 2: Polynesian language subgroupings (adapted from Pawley, 1966, via Chung, 1978; Lynch et al. 2011)

Polynesian languages form a subgroup of the larger Austronesian language family. Lynch et al. (2011) show Polynesian as belonging to the Eastern Malayo-Polynesian subgroup (Fig. 3).

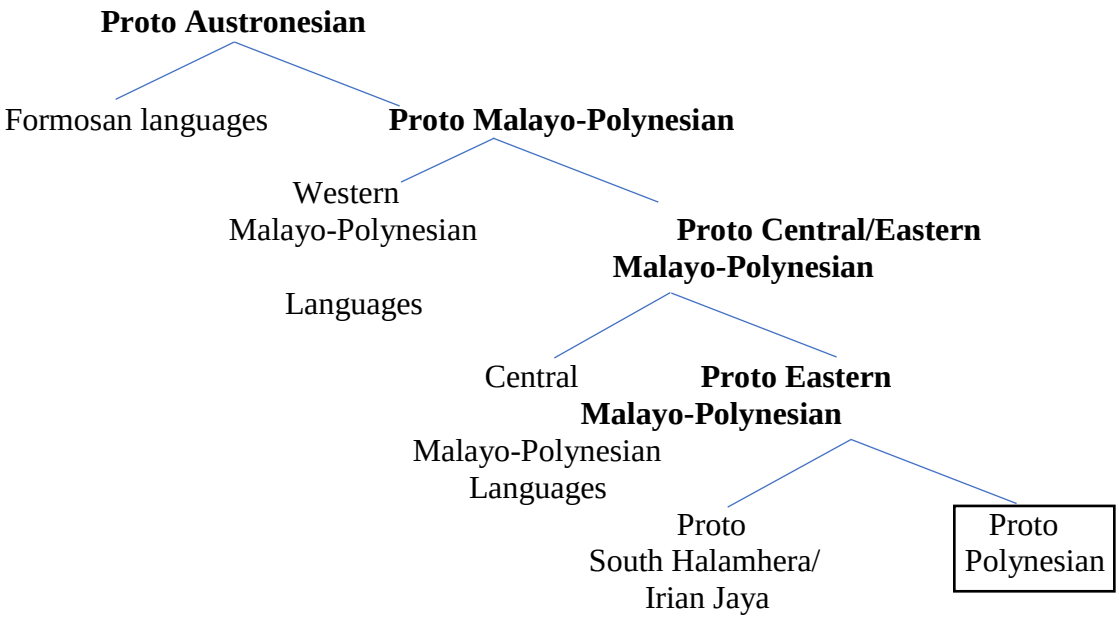


Figure 3: Austronesian language subgroupings (Lynch et al., 2011: 4, approx.)

3.2 Orthography and sound system

The phonemic inventory consists of ten consonants /p, t, k, m, n, ŋ, f, v, h, l/, and five vowels /i, e, a, o, u/ (Seiter, 1980). Each vowel surfaces in one of three variants: short, long, or rearticulated (i.e., doubled; see Rolle and Starks, 2014, for further details of vowel system). The language allows open syllables only (V, CV, VV, and CVV), and does not permit consonant clusters in syllable-initial position (Sperlich, 1997).

In the Niuean orthography, /ŋ/ is represented by <g>, and <t> is pronounced as [s] before front vowels. The orthography also distinguishes short vowels (e.g., <a>), long vowels (e.g., <ā>), and rearticulated vowels (e.g., <aa>).

3.3 Structural basics

Niuean word order is strictly V(erb)-S(ubject)-O(bject) with full noun phrases. A T(ense)-A(spect)-M(ood) marker appears verb-initially (e.g., 1)[1]. Adverbs and clitics appear post-verbally, in the order given shown in (2).

[1] All unreferenced Niuean data in this dissertation, are from my own fieldnotes. Data collection to place from November 2016 to May 2017 in Auckland, New Zealand, and on Niue.

(1) Niuean word order

Ne tutuli [he kulī] [e pusi].
TAM Verb Subject Object
PST chase ERG dog ABS cat
'The dog chased the cat.'

(2) Post-verbal elements (Seiter 1980: 2, approx.)
VERB – manner adverbs – directional adverbs – clitics

Niuean also allows non-verbal predicates, wherein a nominal predicate (3a), adjectival predicate (3b) or locative predicate (3c) appears clause-initially.

(3) Niuean non-verbal predicates (Massam, 2000: 227-230)

a. Ko e faiaoga a Mele.
PRED teacher ABS Mele
'Mele is a teacher.' (Massam, 2000: 227)

b. Kua tapu-telegia a ia
PERF scared-kick ABS he
'He is very sensitive.' (Sperlich, 1997, via Massam et al., 2011: 15)

c. Hā he fale a ia.
PRED in house ABS she
'She is in the house.' (Massam, 2000: 230)

Case alignment is predominantly ergative-absolutive. Niuean marks case on noun phrases (i.e., it is dependent-marking), and has different case morphemes for common noun and proper nouns/pronouns, as shown in Table 1.

	Ergative	**Absolutive**
Common nouns	he	e
Proper nouns/pronouns	e	a

Table 1: Niuean case morphemes (Massam, 2001a: 156)

The ergative-absolutive alignment of Niuean is exemplified in (4) and (5). Subjects of transitive verbs are marked ergative (4a, 5a), while objects of transitive verbs and subjects of intransitive verbs appear with absolutive marking (4b, 5b).

(4) Case marking on common nouns

a. Transitive
Ne kitia he nua e koti.
PST see ERG horse ABS goat
'The horse saw the goat.'

b. Intransitive
Ne poi e nua.
PST leave ABS horse
'The horse ran.'

(5) Case marking on proper nouns (Massam, 2001a: 155)

a. Transitive
Ko e tele e Sione a Sefa.
PRES kick ERG Sione ABS Sefa
'Sione is kicking Sefa.'

b. Intransitive
Ne tohitohi a Sione.
PST write ABS Sione
'Sione was writing.'

In addition to ergative and absolutive case, noun phrases in Niuean are marked with one of a number of different other case particles in different contexts, as shown in Table 2.

	Goal	**Locative**	**Instrumental**	**Comitative**	**Benefactive**	**Possessive**
Common nouns	ke he	he	aki e	mo e	ma e	he
Proper nouns/ pronouns	ki	i	aki a	mo	ma (ha)	a/ha

Table 2: Other case particles (Seiter, 1980: 37, approx.)

3.4 Pseudo-noun incorporation

While word order is typically VSO (6a), Niuean exhibits VOS word order with bare objects (6b). Massam (2001a) refers to this type of verb-object adjacency as "Pseudo-Noun Incorporation" (PNI); note that the object does not morphologically incorporate with the verb (hence "pseudo"). The subject in PNI constructions bears absolutive case, and the object must appear directly to the right of the verb, without any case marking. The object is interpreted as indefinite, non-individuated, and non-affected.

(6) VSO and VOS

a. VSO with absolutive object
Ne kitia he ika e feke.
PST see ERG fish ABS octopus
'The fish saw the octopus.'

b. VOS with bare object (= PNI)
Ne kitia feke e ika.
PST see octopus ABS fish
'The fish saw octopuses.'

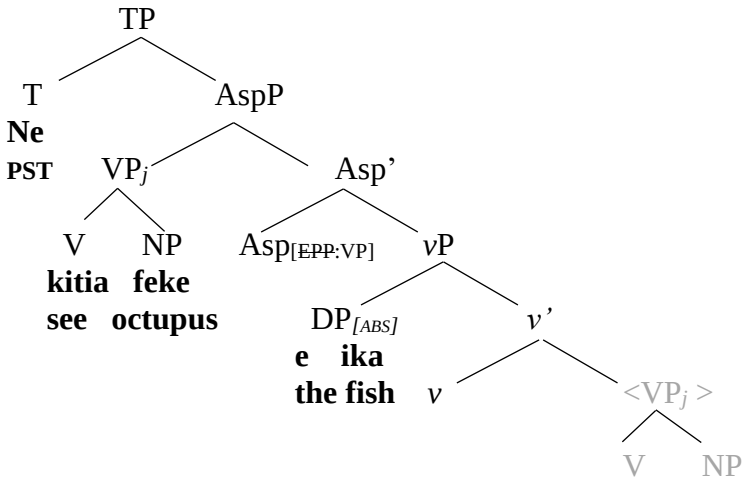
Massam (2001a) shows that the object in sentences like (10b) is a full NP as opposed to simply a nominal head (N^0). Evidence for this comes from VOS constructions in which the object – while still lacking a determiner – can be modified by an adjective (7), which would be unexpected if the object consisted of N^0 only.

(7) VOS with adjective modifying bare object (Massam, 2001a: 158)

Ne inu kofe kono a Mele.
PST drink coffe bitter ABS Mele
'Mele drank bitter coffee.'

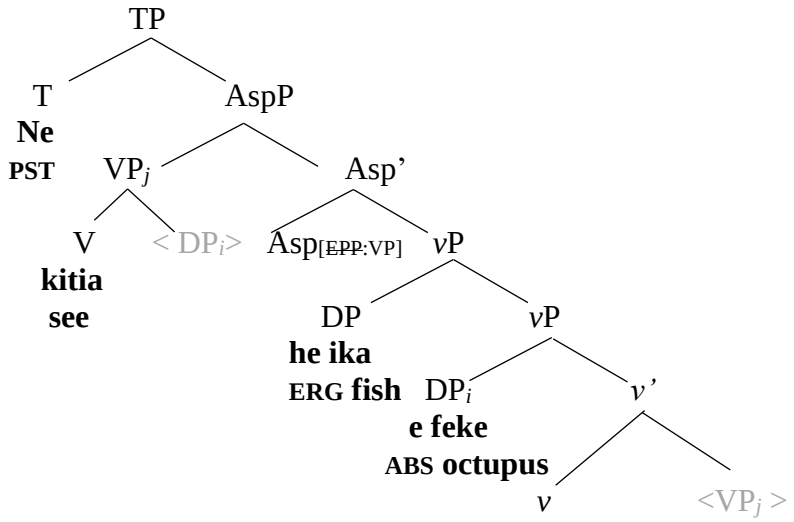
Massam argues that this construction is derived in the syntax via VP fronting to a projection below tense. Following Aldridge (2004), I label this as AspP. The structure of a PNI construction is shown in (8).

(8) Derivation of Niuean PNI



In sentences with VSO order such as (6a), the object – a DP requiring case as opposed to a caseless bare NP in (6b/7) – vacates the VP prior to (now-remnant) VP fronting, in order to have ABS case checked[2], as in (9).

(9) Derivation of Niuean VSO



Alternatively, Clemens (2014, to appear) argues in favour of a head movement account for both VSO and VOS word orders in Niuean. In both cases, only the verbal head (i.e., V^0) raises (to Asp^0, following from the schematization in 8 and 9). This straightforwardly derives VSO word order. As for VOS, Clemens proposes that bare NP object undergo prosodic re-ordering, such that it appears adjacent to the verb at PF in order to satisfy constraints on prosodic well-formedness. Nothing crucial in this dissertation hinges upon the precise analysis of PNI; however, PNI will serve as an important diagnostic for determining predicate types for the purposes of the experiments in Chapters 4 and 5, as discussed below.

3.5 Split ergativity and Middle verbs

Niuean is predominantly an ergative language: subjects of transitive verbs are typically marked ergative, and objects of transitive verbs are absolutive. Like many (if not all) ergative languages, however, Niuean also exhibits 'split ergativity' (see Silverstein 1976, Coon 2013), having a small number of two-place predicates which require an absolutive subject and an oblique-marked object instead of an ergative subject and an absolutive object. These verbs are referred to in Polynesianist

[2] Specifically, Massam (2001a) uses a dedicated AbsP projection to host the absolutive object.

literature as 'middle' verbs (see Chung, 1978) because they traditionally have been regarded as semi-transitive: they require both a subject and an object, but do not exhibit the ergative-absolutive case pattern associated with prototypical transitives. Some examples of Niuean middles are given in (10).

(10) Examples of Niuean middle verbs

a. Ne ono e pusi *(ke he lapiti).
PST see ABS cat OBL rabbit
'The cat saw the rabbit.'

b. Ne fakaaue e matua taane *(ke he tama).
PST thank ABS father OBL child
'The father thanked the child.'

c. Ne fifitaki e ika *(ke he magō).
PST copy ABS fish OBL shark
'The fish copied the shark.'

As with transitive ERG-ABS verbs, objects of middle verbs are able to pseudo-incorporate, as in (11), which suggests that, like the absolutive object in (6), the oblique objects in (10) are direct objects.

(11) ✓ Pseudo-noun incorporation with middle verbs

a. Ne ono lapiti e pusi.
PST see rabbit ABS cat
'The cat saw rabbits.'

b. Ne fakaaue tama e matua taane.
PST thank child ABS father
'The father thanked children.'

c. Ne fifitaki magō e ika.
PST copy shark ABS fish.
'The fish copied sharks'

Notice that, like intransitive verbs (see again 4b, 5b), middle verbs have absolutive subjects. Middle and intransitive verbs differ, however, in two ways. Firstly, middle verbs require an oblique object, whereas intransitive verbs do not: any oblique object following an intransitive subject, as in (12), is optional. Secondly, unlike objects of middle verbs, oblique objects of intransitive verbs cannot pseudo-incorporate, as in (13).

(12) Intransitive verbs with optional oblique objects

a. Ne poi e pusi (ke he lapiti).
PST run ABS cat OBL rabbit
'The cat ran (to the rabbit).'

b. Ne lologo e matua taane (ke he tama).
PST sing ABS father OBL child
'The father sang (to the child).'

c. Ne kakau e ika (ke he magō).
PST copy ABS fish OBL shark
'The fish swam (to the shark).'

(13) ✗ Pseudo-noun incorporation with intransitive oblique objects

a. *Ne poi lapiti e pusi.
PST run rabbit ABS cat
'The cat ran to rabbits.'

b. *Ne lologo tama e matua taane.
PST sing child ABS father
'The father sang to children.'

c. *Ne kakau magō e ika.
PST swim shark ABS fish
'The fish swam to sharks.'

The distinction between middle and intransitive verbs will be crucial to the design of the experiments presented in Chapters 4 and 5, because they allow for comparisons which isolate effects of case and transitivity. Comparing ergative-absolutive verbs to middle verbs isolates effects of case, while transitivity is held constant. Comparing middle verbs to intransitive verbs with oblique objects isolates the effect of transitivity, while case is held constant.

3.6 Subjecthood in Niuean

There has long been debate as to whether the absolutive or ergative argument should be considered the 'subject' of a transitive clause in Niuean. There are three main approaches to this issue. Under one approach, the absolutive argument is considered the subject, because all sentences contain an absolutive argument, whereas an ergative argument is not always present (Biggs,1974; Sperlich, 1994).

Under a second approach, the ergative is considered the subject (Seiter, 1980), since it passes standard tests for subjecthood[3]. According to the diagnostics for subjecthood outlined in Chapter 1, for instance, the ergative argument in Niuean behaves as a subject. The ergative argument can bind an absolutive object (but not vice versa) (14), can function as the addressee of an imperative (15) and can be controlled as PRO (16).

(14) ERG binds ABS
Kitia he tama fifine a ia nî he fakaata.
see ERG girl ABS her REFL in mirror
'The girl sees herself in the mirror.' (Seiter 1980, via Massam 2001b)

(15) ERG as addressee of imperative
Kai __ e ika!
eat __ ABS fish!
'Eat the fish!'

(16) ERG as controlled PRO
Kua lali a aui [ke ta __ e faloku].
PERF try ABS I comp play ABS flute
'I have tried to __ play the flute.' (Massam & Smallwood 1996)

Furthermore, movement of the ergative argument is not restricted in any way. Niuean is not syntactically ergative: both ergative and absolutive arguments can undergo A-bar movement in *wh* questions[4] (17) and relative clauses (18).

(17) *wh* questions in Niuean

a. ERG subject *wh* question
Ko hai ne kitia ___ e tama taane?
PRED who PST see ABS child boy
'Who saw the boy?'

b. ABS object *wh* question
Ko hai ne kitia he tama taane ___?
PRED who PST see ERG child boy
'Who did the boy see?'

c. ABS subject *wh* question
Ko hai ne lologo ___?
PRED who PST sing
'Who sang?'

[3] In addition, Seiter (1980) notes that the ergative argument also behaves as the subject with respect to a further three language-internal diagnostics: possessivization, genitive relativization, and *ni* marking.
[4] It is possible that movement in (17) and (18) does not target the argument itself, but rather, a null operator which is coindexed with the relevant argument.

(18) Relative clauses in Niuean (Longenbaugh & Polinsky 2016: 107)

a. ERG subject relative clause

e fifine [ne ofaofa ___ a Sione]
ABS woman PST love ABS Sione
'The woman who loves Sione'

b. ABS object relative clause

e fifine [ne ofaofa e Sione ___]
ABS woman PST love ERG Sione
'The woman who Sione loves'

c. ABS subject relative clause

e fifine [ne fano ___ ki Toga]
ABS woman PST go OBL Tonga
'The woman who went to Tonga'

Legate (2008) also takes this view, arguing further that absolutive case in Niuean is simply morphological syncretism of two distinct structural cases: nominative (when assigned to a subject), and accusative (when assigned to an object); see Chapter 1, Section 1.5.1. The object of a transitive sentence therefore has underlying accusative case, just as does the object of a transitive sentence in languages like English; as such, the ergative 'subject' is truly a subject. Meanwhile, the subject of an intransitive or middle sentence has underlying nominative case (see Chapter 6, for arguments against this approach).

Under a third approach, neither the ergative nor the absolutive argument can exhaustively be classified as the 'subject' (Massam, 2001b); rather, Niuean lacks a grammatical subject, because properties typically associated with subjects are shared by ergative and absolutive arguments. This view is supported by the fact that Niuean lacks typical 'superiority effects' found in many nominative languages like English. As shown in (19), both the ergative and the absolutive object arguments can undergo raising, unlike in English, in which raising is restricted to subjects only[5].

(19) Raising in Niuean (Seiter 1980; Massam 1985)

a. No raising (baseline)

To nākai toka e au [ke kai he pusi e ika].
FUT not let ERG I [COMP eat ERG cat ABS fish]
'I won't let the cat eat the fish.'

[5] Massam (1985) argues that the relevant movement in (19a, b) does not target the object position of the matrix clause. Rather, the raised DP remains in the embedded CP, occupying a CP-peripheral specifier position, from which it is assigned case via ECM (see Bejar & Massam, 1999 for 'Multiple Case Checking' theory).

b. Raising of ERG subject
To nākai toka e au **e** **pusi**$_i$ [ke kai ___$_i$ e ika].
FUT not let ERG I ABS cat COMP eat ABS fish
'I won't let the cat eat the fish.'

c. Raising of ABS object
To nākai toka e au **e** **ika**$_i$ [ke kai he pusi ___$_i$].
FUT not let ERG I ABS fish COMP eat ERG cat
'I won't let the cat eat the fish.'

It is further noted by Longenbaugh and Polinsky (2018) that Niuean lacks superiority effects in *wh* questions: in clauses with two *wh* words, either the ergative subject *wh* phrase or the absolutive object *wh* phrase can be fronted (while the other remains in situ); (20). Notice that the English translation of the latter is ungrammatical: an object *wh* phrase in English cannot be fronted in the presence of a clausemate subject *wh* phrase.

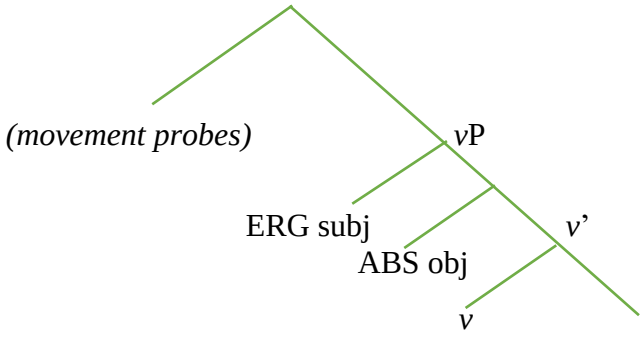
(20) Multiple wh words in Niuean (Longenbaugh & Polinsky, 2018: 9)

a. ERG subject *wh* fronting
Ko hai ne kai e heigoa?
PRED who PST eat ABS what
'Who ate what?'

b. ABS object *wh* fronting
Ko e heigoa ne kai e hai?
PRED what PST eat ERG who
'*What did who eat?'

Massam (2001b), and Longenbaugh and Polinsky (2018) propose that ergative and absolutive arguments in Niuean both occupy a specifier position of the *same* structural phrase (*v*P) and are thereby structurally equidistant from higher (A- or A-bar) movement probes in the syntax (21).

(21) Structural equidistance in Niuean (Longenbaugh & Polinsky 2018)



In sum, neither the ergative not the absolutive argument uniquely possesses all the properties associated with subjects: both the ergative and absolutive can undergo raising and A-bar movement, and no superiority effects arise.

3.7 Summary

This chapter has outlined some of the fundamental aspects of Niuean grammar, as well as providing discussion of verb transitivity and subjecthood in Niuean. The following two chapters present two original experimental studies of Niuean, looking at how the processing of *wh* questions and anaphora resolution are influenced by case and verb transitivity.

Chapter 4

The processing of *wh* questions in Niuean

In this chapter, I investigate how case marking, transitivity, and subjecthood affect sentence processing. I present the results of a processing study of *wh* questions in the ergative-absolutive Polynesian language Niuean. The design for this study takes as its starting point the observation that *subject dependencies* are processed more easily than *object dependencies*. This asymmetry, known as the 'subject advantage', is well attested in nominative-accusative languages such as English (see King & Just, 1991, a.o.), but is not so clear in ergative languages. Ergative languages constitute a vital test bed for the study of the subject advantage (see Carreiras et al., 2010; Polinsky et al., 2012, et seq.), because case (un)markedness and subjecthood do not co-vary: unlike in nominative languages, the subject does *not* consistently bear unmarked case. As such, the roles of grammatical function and case marking in the processing of *wh* dependencies can be isolated in an ergative language in a way that they cannot in a nominative language.

This chapter is structured as follows: Sections 4.1 through 4.3 present an overview of background literature: Section 4.1 focuses on the processing of *wh* dependencies and the well-attested 'subject advantage', Section 4.2 discusses previous studies of ergativity and 4.3 discusses previous studies of transitivity. This is summarized in Section 4.4. Sections 4.5 and 4.6 report the method and results of an original experimental study of *wh* questions in Niuean. Section 4.7 provides discussion of these results and considers the implications of these results for theories of processing and subjecthood.

4.1 Processing long distance dependencies

In constructions that involve filler-gap dependencies, such as *wh* questions and relative clauses (RCs), a displaced phrase ("filler") appears in a place in the sentence which is often not the location in which it must be interpreted ("gap"). Because gaps are usually silent, the parser must determine where the gap is located in order to form the dependency and arrive at the correct interpretation. For example, in (1) there is a dependency between *who* and the post-verbal site (after *see*), such that *who* can be analysed as the direct object of *see*.

(1) Who did Alice see__?

In real-time sentence processing, the parser seeks to associate a *wh* filler with a gap as quickly as possible; this is known as the Active Filler Strategy (Frazier, 1978). Numerous experimental studies have shown that, after identifying a filler, the parser actively seeks a gap site in the unfolding sentence and attempts to form a dependency at the first potential gap site it encounters. In (2), for example a filler-gap dependency is expected following the verb *see*, such that what can be analysed as the direct object of the sentence. When *the play* is encountered, however, it becomes apparent that the *wh* dependency cannot be formed here.

(2) Who did Alice see the play with__?

It has been suggested that the need for prompt dependency formation is due to limitations on working memory (e.g., Gibson, 1998): temporary storage of the *wh* filler is hypothesized to create a burden on working memory resources. As such, the parser is eager to discharge it from storage as quickly as possible. Much evidence for the Active Filler Strategy comes from self-paced reading studies (e.g., Stowe, 1984; a.o.). These studies found that, when an object (e.g., *the play* in 2 appears at the hypothesized gap site (e.g., following *see* in 2), a slow-down in reading time is observed (relative to the same place in baseline non-*wh* sentence). This is known as a Filled-Gap Effect: the parser anticipates a gap at which to form a dependency and is subsequently unable to do so.

4.1.1. The subject advantage

Recall from Chapter 1 the typological generalization made by Keenan and Comrie (1977) that the subject is the most easily relativizable grammatical element, followed by the direct object, and by more peripheral arguments and adjuncts, as the 'Accessibility Hierarchy' in (3).

(3) Accessibility Hierarchy (Keenan & Comrie, 1977: 66)

Subject > direct object > indirect object > oblique > genitive > object complement

Experimental studies have observed the typological subject-object asymmetry of the Accessibility Hierarchy to be paralleled in syntactic processing: it has been observed that subject RCs are processed more easily than object RCs. This processing asymmetry is known as the 'subject advantage'. The subject advantage has been shown to manifest in at least one of three ways: (i) Subject RCs are read faster than object RCs; (ii) questions pertaining to subject RCs are answered more accurately than questions pertaining to object RCs; and (iii) given a globally ambiguous RC

string, a subject interpretation is preferred to an object interpretation. The subject advantage has been attested in English (e.g., Fedorenko, Gibson, & Rohde, 2006; Ford, 1983; Gibson, 1998; Gordon, Hendrick, & Johnson, 2001; King & Just, 1991; Just & Carpenter, 1992), Dutch (e.g., Frazier, 1987; Mak, Vonk & Schriefers, 2002), German (e.g., Schriefers, Friederici & Kuhn, 1995), French (e.g., Frauenfelder, Segui & Mehler, 1980; Cohen & Mehler, 1996), Brazilian Portuguese (Gouvea, 2003), Japanese (e.g., Miyamoto & Nakamura, 2003), and Korean (e.g., Kwon, Polinsky & Kluender, 2006). Here, I give an overview of two exemplar studies of the subject advantage[1].

The subject-object asymmetry in RCs is illustrated in King and Just's (1991) self-paced reading experiment. In their study, participants read, word-by-word, sentences with either a subject RC (4a) or object RC (4b).

(4) a. The reporter that attacked the senator admitted the error publicly…. (subject RC).
b. The reporter that the senator attacked admitted the error publicly… (object RC).

After reading a sentence, participants were asked to recall the final word, and then to answer *True or False* to a statement relating to the sentence (e.g., 'The reporter attacked the senator'; 'The senator admitted the error', etc.). Longer reading times for object RCs were observed at the clause-final word (i.e., *senator* in the SRC; *attacked* in the ORC) and at the main verb (*admitted*). Word-final recall rate was also lower for sentences with object RCs than with subject RCs, and the 'True or False' comprehension task yielded higher accuracy for subject RCs compared with object RCs (although this effect was marginal). King and Just claim that object RCs pose higher demand upon working memory than subject RCs, due to their greater structural complexity (although they do not define 'greater structural complexity'). As such, subject RCs are processed more easily.

In English and Dutch, the subject advantage has also been observed with *wh* questions. Several studies of English (e.g., Hickok & Avrutin, 1996; Avrutin, 2000; Goodluck, 2005) have found that, with a complex *which NP* filler, object questions such as (5b) are more difficult to process than *subject* questions such as (5a).

[1] Furthermore, animacy has also been shown to play a role in subject-object processing asymmetries. Specifically, when the object is inanimate, object dependencies are processed almost as easily as subject dependencies; when the object is animate, however, processing difficulty associated with object dependencies increases (Mak, Vonk & Schriefers, 2002; 2006; Traxler, Morris & Seely, 2002; Traxler, Williams, Blozis & Morris, 2005; Gennari & MacDonald, 2008). Animacy is not shown to affect difficulty associated with subject dependencies.

(5) ***which*** **NP questions in English**

a. Subject
Which boy kicked the girl?

b. Object
Which boy did the girl kick?

This effect was also observed in a self-paced reading study of Dutch (Donkers, Hoeks & Stowe, 2011), in which subject and object *wh* questions are string identical, and thus globally ambiguous; as such, contextual support is needed to decide between a subject and object interpretation. Participants first read a context sentence (6), followed by a comprehension question. In their design, Donkers et al. crossed subject vs. object context biases with *wh* filler type in the following question (7); this included *who* ('wie') conditions, and *which* ('welke') *NP* conditions (they also included *which person* conditions which I do not discuss here).

(6) Donkers et al. (2011) context materials

a. Context to force subject reading
Terwijl de dronken bediende een dutje deed, zocht de nuchtere bediende de keizer in de kelder.

*While the drunken servant took a nap, the sober servant-**subj** looked for the emperor-**obj** in the cellar.*

b. Context to force object reading
Terwijl de dronken bediende een dutje deed, zocht de keizer de nuchtere bediende in de kelder.

*While the drunken servant took a nap, the emperor-**subj** looked for the sober servant-**obj** in the cellar.*

(7) Donkers et al (2011) *wh* questions (separate measurement regions indicated by dashes; contextual disambiguation region bolded)

Wie	heeft	de keizer	**gezocht**	in de kelder?
Who	*has*	*the emperor*	***looked.for***	*in the cellar*
Welke bediende	heeft	de keizer	**gezocht**	in de kelder?
Which servant	*has*	*the emperor*	***looked.for***	*in the cellar*

'Who/which servant looked for the emperor/did the emperor look for in the cellar?'

While the strings in (7) are ambiguous between whether the emperor looked for, or was looked for, the prior contexts in (6) force contextual disambiguation at the perfect participle *gezocht* (a subject interpretation following 6a; an object interpretation following 6b). At this region, the

authors found both (i) a main effect of question type, with object questions read slower than subject questions, and (ii) an interaction of *wh* type by question type, with *which NP* questions read slower than *who* questions in the object condition only (*which NP* object questions were read significantly slower than all other conditions). This indicates that object *wh* questions are more difficult to process than subject *wh* questions, and that *wh* type is sensitive to question type, with *which NP* being more difficult than *who* in object questions only. Participants also had to provide an answer to the question; in this measure, a main effect of question type was found, with object questions yielding significantly fewer correct responses than subject questions (there was no main effect of *wh* type and no interaction, however), again indicating that object *wh* questions are more difficult.

Donkers et al.'s study thus demonstrates how the same subject-object processing asymmetry observed for RCs also obtains in *wh* questions: just as subject RCs are processed more easily than object RCs, so are subject *wh* questions easier than object *wh* questions. Furthermore, a greater subject-object asymmetry is observed for *which NP* questions compared with who questions. This observation will play an important role in my eventual experiment design, in which I aim to test a potential subject-object asymmetry which may only be observable under highly sensitive measures.

4.1.2. Theories of the subject advantage

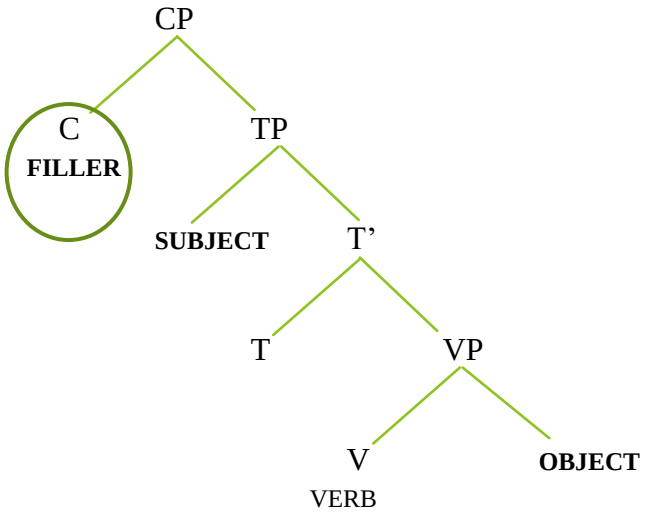
The source of the 'subject advantage' is long debated. The theories can be divided into two groups based on their typological predictions. On the one hand, there are theories that predict cross-linguistic uniformity, and more specifically that the subject advantage is a processing universal (see e.g., O'Grady, 1997; Hawkins, 1999; Lin & Bever, 2006; a.o.). On the other hand, there are theories that predict cross-linguistic variation in processing preferences: while some languages show an advantage for subjects, others are expected to show an advantage for objects, depending upon various features of their grammars (e.g., Wanner & Maratsos, 1978; Gibson, 1998; Grodner & Gibson, 2005; a.o.). Below, I discuss each set of theories in turn.

4.1.2.1. Theories that predict cross-linguistic uniformity

Theories that predict cross-linguistic uniformity typically claim that grammatical subjects are universally more accessible to the parser. The idea is that subjects are inherently more prominent during sentence processing, and as a result, subject dependencies are resolved more easily. The

prominence of subjects has been argued to be a result of either discourse or structural properties. For example, according to the Perspective Shift hypothesis (e.g., Bever, 1970; MacWhinney, 1977; a.o.), subjects constitute the perspective of a clause because they are more salient than objects in the mental representation. As such, processing an object dependency requires a shift in perspective, which consumes processing resources. A subject dependency, however, requires no such shift. Alternatively, according to phrase structure hypotheses, subject dependencies are easier to process because subjects are structurally superior to objects; this means that subject gaps are closer to the filler than object gaps (e.g., O'Grady et al., 2003). To illustrate this latter point, consider the structure in (8): the subject (in spec, TP) is less structurally embedded than the object, which (as the complement to V^0) is dominated by a greater number of syntactic nodes. From this it follows that the subject is more 'accessible' than the object (see again the hierarchy in 1) in at least two (related) ways: (i) accessing the syntactic position of the object requires the concomitant parsing of more phrasal structure, in which the object is embedded, than that which is required to access the position of the subject, and (ii) the structural distance between the filler and the subject is *shorter* than that between the filler and the object. This means that working memory resources are taxed less when resolving (short) subject dependencies than when resolving (longer) object dependencies.

(8) Structural superiority



Because the subject is structurally superior to the object, it is thereby more accessible both during processing, with subject dependencies computed more easily than object dependencies, and typologically, in terms of sentence formation possibilities, as observed by Keenan and Comrie

(1977; 1979) in their hierarchy in (3). Indeed, Keenan and Comrie (1977) suggest that the cross-linguistic abundance of subject relative clauses might stem from their lesser processing complexity as compared with other types of relative clause. Importantly, these hypotheses all predict that subjects are *universally* more accessible than objects, and that a subject advantage in processing should obtain for *every* language.

4.1.2.2. Theories that predict cross-linguistic variation

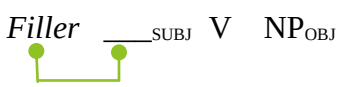
A second set of theories predicts that asymmetries in processing for filler-gap dependencies differ language–by–language, depending on grammatical properties such as the number of linearly-intervening discourse referents that need to be processed between the filler and the gap (e.g., Dependency Locality Theory: Gibson, 1998): the fewer intervening discourse reference between filler and gap, the easier the dependency is to process. This type of explanation predicts that object advantage should be observed in languages where object dependencies contain fewer intervening discourse referents than subject dependencies.[2]

For English, and indeed for the majority of languages which have thus far been studied in terms of sentence processing, the subject-universal hypothesis and word order theories, such as Dependency Locality, in fact *both* predict that subject dependencies should be easier than object dependencies. This is because in languages such as English the subject linearly precedes the object, meaning that a discourse referent (i.e., the subject) intervenes between the filler and object gap, but there no intervening element in a filler-subject gap dependency (see 9).

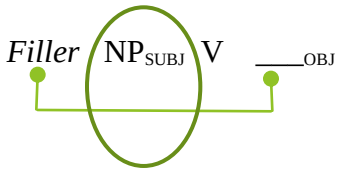
[2] Other word order-based theories make reference to word order within the filler-dependency string itself (e.g., MacDonald & Christianson, 2002). For instance, in an English subject relative clause or *wh* question, the word order is $S_{wh\ \text{filler}} - V - O$, which is the same as that of canonical declarative transitive clauses. In object filler-dependency constructions, however, word order is $O_{wh\text{-filler}} - S - V$, which differs from that of canonical sentences. It is this difference which is hypothesised as the source of the difficulty in processing object dependencies as compared with subject dependencies.

(9) SO word order

a. Subject dependency: no intervening referent

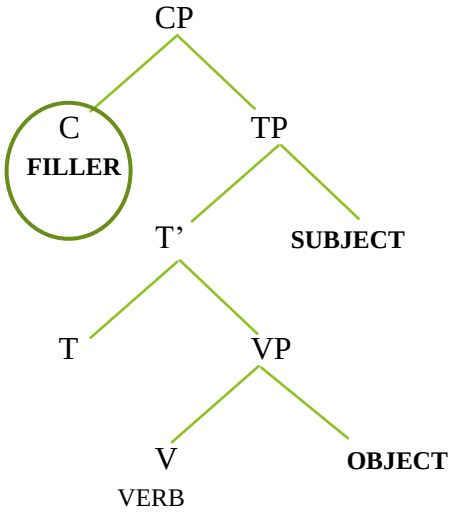


b. Object dependency: intervening referent



However, the subject in languages such as English is also (by default) structurally superior to the object; as such, one cannot disentangle the two types of interpretation of the observed subject advantage: a subject dependency could be favoured either because the subject gap is linearly closer to the filler than the object gap, and/or because the subject is inherently superior to the object. Consider, however, a language with canonical OS word order with a structure such as that shown in (10). The language represented in (10) exhibits VOS word order (note that, although this order is modelled here by way of a right-side TP specifier, this is only one of several possible ways in which VOS order is derived[3]).

(10) OS word order



[3] Others include VP fronting, right side topic, heavy NP shift and prosodic reordering; see Clemens (2014) and Clemens and Coon (2018) for full details of these proposals.

With regards to (10), subject-universal hypotheses predict that such a language should exhibit a subject advantage (as would indeed any language). Dependency Locality, however, predicts an advantage for objects, since the object is closer to the filler in terms of linear word order. Notice that the opposite scenario to that illustrated in (9) for an SO language obtains in a language with a structure as in (10): in a subject dependency, the object NP intervenes linearly between the filler and the gap, whereas there is no intervening NP in an object dependency, meaning that the latter should be easier to form.

Although the subject advantage has never been studied in an OS language to date (such languages would be e.g., Malagasy, Fijian, Palauan), the subject-universal and word order hypotheses have been tested against (generally verb-final) SO languages which have *prenominal* RCs, such as Korean, Mandarin, and Japanese (exemplified in 10). This means that, while the subject precedes the object in terms of linear order, the relative linear distance between a displaced argument and its gap is shorter for objects (11b) - than it is for subjects (11a). Notice, crucially that a subject dependency involves more intervening NPs than an object dependency.

(11) Prenominal relative clauses in Japanese (Miyamoto & Nakamura, 2003: 343)

a. Subject relative clause

[___$_i$ tosiyorino obaasan-o basutei-made miokutta] **onnanoko$_i$**.
___$_i$ elderly woman-ACC bus.stop-to accompanied **girl$_i$**

‘The girl who accompanied the elderly woman to the bus stop.’

b. Object relative clause

[tosiyorino obaasan-ga ___$_i$ basutei-made miokurra] **onnanoko$_i$**.
elderly woman-NOM ___$_i$ bus.stop-to accompanied **girl$_i$**.

‘The elderly woman who accompanied the girl to the bus stop.’

The word order hypotheses predict that (11b) should be easier to process than (11a), because the distance between the head noun *onnanoko ‘girl’* and the gap is shortest for (11b). The subject-universal hypotheses predict (11a) to be processed more easily, since subjects are universally more accessible than objects. Results from studies of prenominal RCs are, however, mixed. A subject advantage is reported for Korean (Kwon, Polinsky & Kluender, 2006). For Japanese, one study found a subject RC advantage (Miyamoto & Nakamura, 2003), whereas a second study found an object advantage (Ishizuka, Nakatani & Gibson, 2006). Lastly, for Mandarin, some studies have found a subject advantage (Lin & Bever, 2006; 2011; Lin, 2008; Wu, 2009) whereas others have

found an object advantage (Hsiao & Gibson, 2003; Lin & Garnsey,2011; Gibson & Wu, 2013). However, Vasishth, Chen, Li and Guo (2013) argue based on a meta-analysis of studies of Mandarin that the evidence overall points in favour of a subject advantage in the language. There is currently no consensus as to whether subject-object processing asymmetries are due fundamentally to word order or to universal prominence of subjects in processing.

It is also possible that the subject-object asymmetry is a result of multiple processing pressures (see Polinsky et al., 2012, and references therein for discussion) as opposed to a single constraint. This idea has been recently developed by Wager, Borja, and Chung (2018) based upon a study of relative clauses in the Austronesian language Chamorro. Unlike many other languages, Chamorro exceptionally has *both* prenominal and postnominal relative clauses. In two picture-matching experiments, Wagers et al. observe a preference for object dependencies in prenominal relative clauses, and a preference for subject dependencies in post nominal relative clauses. This suggests that preferences for dependency formation are indeed modulated by word order. However, the object advantage in prenominal relative clauses was found to be much *weaker* than the subject advantage in postnominal relative clauses. Furthermore, using a touch tracking methodology, Wagers et al. find that subject dependency responses are initiated earlier than object dependency responses (even in prenominal RCs, where an object dependency was ultimately preferred). Wagers et al. propose that there exists an overall, language-general subject advantage, which may, in certain circumstances, be *outcompeted* by other pressures such as word order. The subject advantage, according to Wagers et al., does not result from one single factor, but rather, is the result of a number of factors which may converge to a greater or lesser degree.

In sum, no single theory thus far can explain the full range of results of subject-object processing studies. Moreover, the aforementioned studies focus either on languages with a nominative-accusative alignment (e.g., English) or with a neutral alignment (e.g., Mandarin Chinese). I turn now to discussion of subject-object processing asymmetries in ergative-absolutive languages.

4.2. Literature review: Subject-object asymmetries in ergative languages

Recall from Chapters 1 and 2 that case and grammatical function align differently in ergative languages (compared to nominative languages): in transitive sentences, the *subject* bears ergative (dependent) case, while the *object* bears absolutive care (i.e., it bears the unmarked case). Intransitive subjects, meanwhile, are unmarked in both nominative and ergative languages. Properties typically associated with subjecthood in nominative languages are split between ergative and absolutive arguments in ergative languages (see again Chapter 1). In view of this, subsequent typological work has called for a reformulation of the Accessibility Hierarchy in (3), whereby accessibility is determined not by grammatical function, but by morphological case, as in (12) (Bobaljik, 2008; Deal, 2016). According to (12), the most accessible argument is not necessarily the subject, but rather, the unmarked argument. Dependent-marked arguments are less accessible.

(12) Morphological case accessibility hierarchy (Bobaljik, 2008: 11, adapted)
unmarked case (nominative, absolutive) > dependent case (ergative, accusative) > lexical/oblique case (dative)

Notice that both (3) and (12) posit subjects as being more accessible than objects in nominative-accusative languages such as English. Subjects necessarily bear unmarked nominative case, while objects bear dependent accusative case. Thus, the subject advantage in English could well be a processing correlate of either (3) or (12) (or both); nominative languages thus do not allow us to disentangle the effects of grammatical function and case morphology upon subject-object asymmetries. Ergative-absolutive languages, however, offer a window into how grammatical function and case might discretely contribute to asymmetries in processing of filler-gap dependencies (see Carreiras et al. 2010; Polinsky et al., 2012). By looking at processing of dependencies in ergative languages, we can potentially tease apart (3) and (12): firstly, does an ergative subject advantage obtain in an ergative language, or do these languages privilege unmarked arguments instead, resulting in an absolutive object advantage? Secondly, how does processing of unmarked arguments compare with marked arguments (assuming grammatical function can be held constant)?

To date, only a small number of studies have been conducted on filler-gap dependencies in ergative languages; I now discuss each of these in turn.

4.2.1. Basque

Basque is a language isolate spoken in the Pyrenees in Western Europe. It has SOV word order, and prenominal relative clauses. Ergative arguments are marked with the suffix *–(a)k*, as in (13a) and absolutive arguments (the object in 13a and the subject in 13b) are morphologically unmarked.

(13) Ergativity in Basque (Santesteban, Pickering & Branigan, 2010:1)

a. Transitive
Medikua-k pirata beldurtzen du
doctor-**ERG** pirate.**ABS** frighten AUX[4]
'The doctor frightens the pirate'

b. Intransitive
Pirata abiatzen da
Pirate.**ABS** depart AUX
'The pirate departs'

Carreiras, Duñabeitia, Vergara, de la Cruz-Pavía, and Laka (2010) conducted a self-paced reading study, in which participants read relative clauses such as in (14). Their study exploited the fact that the ergative marker *–(a)k* is homophonous with the absolutive plural marker. As such, the string in (14) is ambiguous between a (singular) ergative subject relative clause (15a) and a (plural) absolutive object relative clause (15b).

(14) RCs in Basque
Irakasle-ak aipatu dituen ikasle-ak
teacher-**AK** mention AUX student-**AK**
Erg SRC: "The student who mentioned the teachers";
Abs ORC: "The students whom the teacher mentioned".

(15) a. Ergative subject RC
[___$_i$ irakasle-ak aipatu dituen]$_{RC}$ ikasle-ak$_i$
[___ teacher-**ABS.PL** mention AUX] student-**ERG**
'The student who mentioned the teachers.'

[4] Auxiliaries in Basque comprise tense marking and agreement in person and number with all arguments present in the clause; I use a simplex AUX gloss here for readability.

b. Absolutive object RC
[irakasle-ak ___$_i$ aipatu dituen]$_{RC}$ ikasle-ak$_i$
[teacher-**ERG** ___ mention AUX] student-**ABS.PL**
'The students whom the teacher mentioned.'

When RCs like (14) serve as the subject of a sentence, the point of disambiguation between ergative subject RC and absolutive object RC interpretations occurs at the auxiliary verb (bolded in 16). A verb bearing singular subject agreement forces an ergative subject RC interpretation, as in (16a). A verb with plural subject agreement forces an absolutive object RC interpretation, as in (16b).

(16) a. Ergative subject RC
[___ irakasle-ak aipatu dituen] ikasle-ak lagunak **ditu** orain
[___ teacher-ABS.PL mention AUX] student-ERG friends **has.SG** now
'The student who mentioned the teachers has friends now.'

b. Absolutive object RC
[irakasle-ak ___ aipatu dituen] ikasle-ak lagunak **dira** orain
[teacher-ERG ___ mention AUX student-ABS.PL friends **are.PL** now
'The students whom the teacher mentioned are friends now.'

At the point of disambiguation (i.e., the auxiliary), Carreiras et al. observed significantly longer reading times in the ergative subject condition as compared with the absolutive object condition, indicating that (ergative) subject RCs are more difficult to process than (absolutive) object RCs during processing; thus, Basque has an object advantage (the same result was obtained in a second ERP study, in which the authors observed a larger P600 at the disambiguating auxiliary in ergative subject RCs compared with absolutive object RCs).

As discussed by Carreiras et al. (2010), the preference for object dependencies in Basque is compatible with at least two explanations. Firstly, because Basque has both SOV word order and prenominal RCs, the linear distance between the head noun and an object gap is shorter than the distance between the head noun and a subject gap. In this way, the result can be viewed as support for the Linear Order hypotheses. Alternatively, if subject-object processing asymmetries are a result of case markedness, the preference for object gaps in Basque is predicted by the morphological Accessibility Hierarchy in (12). Thus, Carreiras et al.'s results do not conclusively favour either linear order or morphological accessibility as the source of the object advantage. Further to this, two potential explanations of the results have been advanced by subsequent authors, of which neither is directly connected to differences between subjects and objects: Clemens et al.

(2015) suggest that the result may be due to frequency, noting that *–(a)k* is more commonly used in Basque as an ergative singular marker than as an absolutive plural marker (Austin, 2007). It is therefore possible that participants in Carreiras et al.'s study are likely to have committed to an ergative singular interpretation of the first word *irakasleak* ('*teacher(s)*'). In the absolutive object RC condition, this turns out to be the correct interpretation. In the ergative subject RC however, revision of this interpretation is required at the auxiliary verb (i.e., at the critical point of measurement); this would be expected to result in a longer reading time compared with the object RC condition, in which no such revision is necessary. A second issue noted by Clemens et al. (2015) is the transitivity of this critical auxiliary verb, which differs between the two conditions. In the ergative subject condition, *ditu* ('have') is transitive, whereas the *dira* ('be') in the absolutive object condition is intransitive. This adds a further confounding factor: dependencies involving *intransitive* verbs have been independently shown to be more acceptable than dependencies involving *transitive* verbs (e.g., Babyonyshev & Gibson, 1999; Jurka, 2013; Polinsky et al., 2013; see Section 4.3 for full discussion of these studies). Shorter reading times would be therefore expected at the auxiliary for Carreiras et al.'s object RC condition, which contains an intransitive auxiliary, compared with the subject RC condition, which contains a transitive auxiliary.

In sum, Basque has been shown to exhibit an object advantage in processing, which may be due to a shorter linear distance between the post-relative head noun and the object, the frequency of the ambiguous case marker or the (in)transitivity of the auxiliary verbs used.

4.2.2. Avar

Avar is a Nakh-Dagestanian language which, like Basque, has SOV word order and prenominal relative clauses. Polinsky, Gómez Gallo, Graff, and Kravtchenko (2012) conducted a self-paced reading study, in which participants read relative clauses such as in (17). They had three conditions: an ergative subject RC, an absolutive object RC, and an intransitive absolutive subject RC. Note that the latter included an oblique object, so that all RCs contained at the same number of noun phrases (the intransitive condition was not included in Carreiras et al.'s (2010) study on Basque).

(17) Avar relative clauses (Polinsky et al., 2012: 271-2)

a. Ergative subject RC

[___ ʕoloqanay yas repetici-yal-de yač:un yač'aray]$_{RC}$ **artistkai** bercinay yigo.
[___ unmarried girl.ABS rehearsal-OBL-LOC bring come]$_{RC}$ **actress.ABS** beautiful AUX
'The actress who brought the young girl to the rehearsal is pretty."

b. Absolutive object RC

[xalq'iyay artistka-yał ___ repetici-yal-de yač:un yač'aray]$_{RC}$ **yasi** bercinay yigo.
[people's actress-ERG ___rehearsal-OBL-LOC bring come]$_{RC}$ **girl.ABS** beautiful AUX
'The girl that the distinguished actress brought to the rehearsal is pretty.'

c. Absolutive (intransitive) subject RC

[**___** xalq'iyay artistka-yal-da ask'oy repetici-yal-de č':un yik'aray]$_{RC}$ **yasi** best'alay yigo.
[**___** people's actress-OBL-LOC near rehearsal-OBL-LOC stand be]$_{RC}$ **girl.ABS** orphan AUX
'The girl that stood next to the beautiful actress at the rehearsal is an orphan.'

The measure of interest was the reading times at the head noun of each RC (i.e., the sixth word in each condition; bolded). Here, the absolutive subject condition showed shorter reading times, indicating an advantage for (intransitive) absolutive subjects. However, reading times did not differ significantly between the ergative subject (17a) and absolutive object (17b) conditions, indicating no overall preference between ergative subjects and absolutive objects[5]. Thus, Polinsky et al. find the absolutive subject dependencies are easier to process than either ergative subject dependencies (or absolutive object dependencies). It should be noted, however, that this difference between ergative and absolutive subjects may be due to the *transitivity* of the verb rather than its case frame, because, even in nominative languages, dependencies involving intransitive verbs have

[5] Polinsky et al. (2012) adopt an approach to subject-object processing asymmetries in which the subject is fundamentally privileged (i.e., following subject-universal hypotheses;), and explain their results in terms of conflicting processing pressures. The ergative subject, they claim, is on the one hand *privileged* due to its status as a subject but, on the other hand, *disadvantaged* due to being marked with a dependent (i.e., ergative) case. When processing an absolutive object relative clauses, the presence of ergative case marking on the subject cues the parser to the fact that the clauses is transitive, and that a second (i.e., absolutive) argument must be expected and accommodated in the structural representation, and thus facilitates structure building. When processing an ergative subject relative clause, however, no such facilitatory effect obtains: there is no exponent of dependent case present in the sentence (the non-filler object appears in unmarked absolutive form), so ergative subject relatives are, by this token, expected to be more difficult than absolutive object relatives. In sum, the ergative subject dependency is on the one hand easier to process due to the its status as a subject, but on the other hand more difficult to process as a dependent-marked argument. In absolutive object relatives, the reverse holds: the absolutive object is more difficult to process as an object, but easier to process as an unmarked argument. Polinksy et al. suggest that these effects cancel each other out, leading to no observable differences between ergative subject relatives and absolutive object relatives. Intransitive absolutive subjects, on the other hand, are doubly privileged from both their status as a subject and their unmarked case form. This accounts for the faster reading times observed towards the end of absolutive subject relatives. There are some issues to note regarding Polinsky et al.'s account. First and most importantly, it is based upon a null result, which typically cannot be interpreted directly. Second, it is unclear how case cueing should necessarily benefit intransitive absolutive subjects, since no dependent (ergative or accusative) case is present in the relative clause which would inform the parser that an intransitive relative clause is in hand. Polinsky et al. note that the intransitive relative in (18c) contains a marked case in the form of oblique locative marking (on *xalq'iyay artistka 'people's actress'*), but this type of marking does not relate to the presence of an absolutive subject in the same manner as does ergative case ergative case with an absolutive object: because the absolutive subject is the subject of an intransitive verb, no other DPs are required by the argument frame of the predicate in hand. For example, an oblique locative may co-occur with an ergative subject, absolutive object, absolutive subject, or another locative DP (as in 18c).

been shown to be more acceptable than dependencies involving transitive verbs (e.g., Babyonyshev & Gibson, 1999; Jurka, 2013; Polinsky et al., 2013; to be discussed in Section 4.3).

To sum, effects of case marking upon the processing of subjects cannot be discerned by comparing ergative transitive subjects with absolutive intransitive subjects directly.

4.2.3. Mayan languages

Clemens, Coon, Mateo Pedro, Morgan, Polinsky, and Tandet (2015) studied the processing of RCs in two Mayan languages: Ch'ol and Q'anjob'al. In these languages, ergative alignment is expressed differently as compared with Basque and Avar: while the latter two languages are dependent-marking Mayan languages are head-marking (see Chapter 1, Section 1.2). The authors conducted a Sentence-Picture Matching task, with materials presented as auditory stimuli. After hearing each item, participants chose, between two images, the picture that best described the sentence they had heard. The (offline) dependent measures were (i) reaction time and (ii) accuracy.

For Ch'ol, the authors compared processing of four different RC types, all preceded by an instruction such as 'show', 'point to', or 'where is', as in (18). First, ABS (intransitive) subject RCs, as in (18a), second, transitive relatives which are globally ambiguous between an ERG subject and ABS object interpretation, as in (18b), third, ambiguous transitive RCs with semantic bias for an ERG subject interpretation, as in (18c), and fourth, ambiguous transitive RCs with semantic bias for an ABS object interpretation, as in (18d). Note that the third person absolutive exponent is null throughout the Mayan family.

(18) Ch'ol stimuli (Clemens et al., 2015: 441-2)

a. Intransitive subject RC
Baki añ jiñi chuch$_i$ [tsa'-bä tyijp'-i ___$_i$ tyi i-ty'ej koneju]?
where LOC DET squirrel [PERF-REL jump-ITV PREP 3.GEN-side rabbit]
'Where is the squirrel that jumped next to the rabbit?'

b. Ambiguous transitive subject/object RC
Päsbeñ jiñi poli$_i$ [wol-bä i-käch (___$_i$) jiñi solraru (___$_i$)].
show DET police PROG-REL 3.ERG-tie.up DET soldier
Subject: 'Show me the police officer that is tying up the soldier.'
Object: 'Show me the police officer that the soldier officer is tying up.'

c. Biased transitive subject RC
Tyaja jiñi alob$_i$ [wol-bä i-k'ok jiñi bu'ul ___$_i$]
find DET boy PROG-REL 3.ERG-pick DET bean
'Find the boy that is picking the beans.'
(Implausible: 'Find the boy that the beans are picking.')

d. Biased transitive object RC
Baki añ jiñi kajpej$_i$ [wol-bä i-jap ___$_i$ jiñi solraru]?
where LOC DET coffee PROG-REL 3.ERG-drink DET soldier
'Where is the coffee that the solider is drinking?'
(Implausible: 'Where is the coffee that is drinking the soldier?')

For Q'anjob'al, these same four conditions were used, as shown in (19 a-d). Q'anjob'al differs from Ch'ol, however, in terms of the dependency formation possibilities of ergative arguments. Unlike Ch'ol, Q'anjob'al is syntactically ergative, meaning that transitive ergative subject dependencies are ungrammatical. Instead, transitive subject RCs in Q'anjob'al require Agent Focus marking (see Chapter 2 for further discussion). The Agent Focus marker is, however, also *obligatorily* used in all non-finite environments (e.g., with the progressive aspect marker *lanan*). Thus, the RCs followed *lanan*, which requires use of the Agent Focus marker for all types of RC, and thereby permits a dependency of both the transitive subject and the transitive object. Thus, a further two conditions were included in the Q'anjob'al experiment: an unambiguous subject relative, as in (19e) and an unambiguous object relative, as in (19f). In these conditions, the RC follows the perfective aspect marker *max* – as opposed to progressive *lanan*, as in (19a-d) - such that syntactic ergativity arises. In these environments, an absolutive object dependency may be freely formed, but formation of a transitive subject dependency requires the Agent Focus marker, in addition to loss of ergative subject agreement on the verb stem (note that ergative agreement is not lost when the ergative argument is displaced from a progressive clause, as in 19 b, c, d). In this way, subject and object RCs in perfective aspects are syntactically disambiguated.

(19) Q'anjob'al stimuli (Clemens et al., 2015: 447-8)

a. Intransitive subject RC
Tx'ox ayin no' oq$_i$ [lanan s-way ___$_i$ s-pak'ilal no' chej]
show me DET coyote PROG 3.ERG-sleep 3.GEN-side DET horse
'Show me the coyote that is sleeping next to the horse.'

b. Ambiguous transitive subject/object RC
Say no' chej$_i$ [lanan s-tek'-on (___$_i$) no' wakax (___$_i$)]
find DET horse PROG 3.ERG-kick-AF DET cow
SR: 'Find the horse that is kicking the cow.'
OR: 'Find the horse that the cow is kicking.'

c. Biased transitive subject RC
Tx'ox ayin naq winaq$_i$ [lanan s-ol-hon ___$_i$ an keney]
show me DET man PROG 3.ERG-eat-AF DET banana
'Show me the man who is eating the banana.'
(Implausible: 'Show me the man whom the banana is eating.')

d. Biased transitive object RC
B'aytalil ay te' kapey$_i$ [lanan y-uk'-on cham pale ___$_i$]
where LOC DET coffee PROG 3.ERG-drink-AF DET priest
'Where is the coffee that the priest is drinking?'
(Implausible: 'Where is the coffee that is drinking the priest?')

e. Unambiguous transitive subject RC
Tx'ox ayin xal ixnam$_i$ [max jeq-on ___$_i$ cham icham]
show me DET old.woman PERF massage-AF DET old.man
'Show me the old woman that massaged the old man.'

f. Unambiguous transitive object RC
Tx'ox ayin cham doctori [max y-iq cham mexhtol ___i]
show me DET doctor PERF 3.ERG-carry DET teacher
'Show me the doctor that the teacher carried.'

Results for Ch'ol: For transitive semantically biased RCs, speakers responded faster and more accurately to biased subject relatives (18c) than to biased object relatives (18d). They also resolved the ambiguous RC (18b) with a subject interpretation more often than an object interpretation. These results reveal Ch'ol exhibits a subject advantage. In addition, however, Ch'ol speakers showed longer reaction time and lower accuracy in for intransitive subject RCs (18a) than for any other condition. Clemens et al. attribute this effect to stimulus length, namely that RCs in the intransitive condition were longer than those in the other three conditions.

Results for Q'anjob'al: In terms of response time, Q'anjob'al speakers were, on average, fastest for intransitive RCs, followed by ergative subject RCs. Absolutive object relatives yielded the slowest average response time. This is indicative of a subject advantage, in which intransitive absolutive subject dependencies are also preferred over transitive ergative subject dependencies. In terms of accuracy, speakers performed better, on average, for intransitive RCs (19a) than for

transitives (note that this is different from the Ch'ol result – unlike in Ch'ol, the Q'anjob'al intransitive stimuli were not longer than the transitive stimuli), again showing a preference for intransitive absolutive subject RCs over other RC types. Furthermore, ambiguous transitives (19b) were resolved with a subject interpretation more than an object interpretation (consistent with the Ch'ol results), and for unambigious transitives (19e, f), speakers were more accurate for subject relatives (with Agent Focus marking) than for object RCs. This indicates that, Q'anjob'al, like Ch'ol, shows a subject advantage. There is also, however, some hint of an object advantage: for the biased transitives (19c, d), speakers were more accurate for the object condition than for the subject condition (compare Ch'ol, in which the reverse is attested). The authors suggest that this may be due to a speed-accuracy tradeoff: higher accuracy corresponds to lower response times. It is unclear why such a tradeoff would be observed only in this particular condition, however. Another possible explanation for this result is that the difference between Ch'ol and Q'anjob'al may reflect the fact that Q'anjob'al is syntactically ergative, while Ch'ol is not.

To summarize: Ch'ol and Q'anjob'al are shown to exhibit a subject advantage[6], with a possible hint that absolutive object dependencies are more privileged in syntactically ergative Q'anjob'al as compared with Ch'ol.

4.2.4. Niuean

Longenbaugh and Polinsky (2016) investigated processing of Niuean RCs using a similar type of Sentence-Picture Matching task used by Clemens et al. (2015) for Mayan (note that Niuean is dependent marking like Avar, and not head marking like Mayan). Their experiment involved three

[6] The authors further note that this result differs from the Polinsky et al.'s (2012) results for Avar, in which neither an ergative subject nor an absolutive object advantage was observed. They claim that the difference between Mayan and Avar is due to the distinction between head marking and dependent marking: the ergative alignment in Avar is expressed via marking on the relevant arguments, while ergativity in Mayan languages is marked by way of agreement on the verb (the nouns themselves are not marked for case). Clemens et al. propose that head marking is qualitatively different from dependent marking: agreement markers are less reliable than dependent markers as parsing cues, because agreement often does not carry as much information as dependent marking (the third person absolutive exponent in Mayan, for example, is in fact consistently null). It is therefore reasonable to expect that the parser will rely less upon agreement cues than upon dependent case cues (e.g., Fodor & Inoue, 2000). Clemens et al. draw upon previous experimental studies of German (e.g., Fanselow & Frisch, 2006) and Russian (e.g., Levy et al., 2013) which have demonstrated that, in the absence of reliable grammatical cues, the parser resorts to *subject-oriented* interpretations. In other words, the ergative alignment is less influential in determining processing preferences in head marking Mayan languages than it is in dependent marking languages like Avar.

conditions, as in (20): transitive ergative subject RCs (20a), transitive absolutive object relatives (20b), and intransitive absolutive subject RCs (20c). In each condition, the RC is preceded by the question marker *ko fē* (‘where is’).

(20) Niuean stimuli (Polinksy & Longenbaugh, 2016: 14)

a. Transitive subject RC
Ko fē e puti$_i$ [ne epoepo ___$_i$ e kuli]?
where ABS cat NFUT lick ABS dog
‘Where is the cat that is licking the dog?’

b. Transitive object RC
Ko fē e puti$_i$ [ne epoepo he kuli ___$_i$]?
where ABS cat NFUT lick ERG dog
‘Where is the cat that the dog is licking?’

c. Intransitive subject RC
Ko fē e tama fifine [ne mamali mogonei ___$_i$]?
where ABS girl NFUT smile now
‘Where is the girl who is smiling now?’

Materials were presented auditorily, and participants had to point to the correct referent. The dependent measures were (i) reaction time and (ii) response accuracy.

In terms of response time, absolutive intransitive RCs (20c) generated the fastest responses, indicating a processing advantage for intransitive absolutive subjects. There was no significant difference, however, between response times for ergative subject RCs (20a) and absolutive object RCs (210b). Participants responded most accurately in the object RCs condition, but this trend did not reach significance. As noted by the authors, the results for the Niuean study are similar to those obtained for Avar (Polinsky et al., 2012), namely an advantage for intransitive absolutive subject dependencies, and no difference between ergative subject dependencies and absolutive object dependencies.

4.2.5. Summary

This subsection has reviewed four experimental studies, which investigated whether ergative languages exhibit a subject advantage. A total of five languages have been studied: Basque (Carreiras et al., 2010); Avar (Polinsky et al., 2012); Ch’ol and Q’anjob’al (Clemens et al., 2015), and Niuean (Longenbaugh & Polinsky, 2016). Of these five, Ch’ol shows clearest evidence for a

subject advantage, with faster response times to ergative RCs compared with absolutive object RCs. In Basque, on the other hand, absolutive object dependencies were shown to be easier to process than ergative subject dependencies (Carreiras et al., 2010). Other studies have found that dependencies with intransitive absolutive subjects are easier to process than dependencies with ergative subjects, but also easier than dependencies with absolutive *objects* (Q'anjob'al Mayan: Clemens et al. 2015; Avar: Polinsky et al., 2012; Niuean: Longenbaugh & Polinsky, 2016). Note, importantly, that the difference observed between ergative and absolutive subjects may be due to a factor other than case, namely the *transitivity* of the verb dependencies involving *intransitive* verbs have been shown to be more acceptable than dependencies involving *transitive* verbs (e.g., Babyonyshev & Gibson, 1999; Jurka, 2013; Polinsky et al., 2013). I discuss this evidence now.

4.3. Literature review: Transitivity in processing

Studies of nominative-accusative languages (English, Japanese, German, Russian) – in which transitive and intransitive subjects both bear nominative case – have found that sentence processing is affected by the transitivity of the predicate. For English, Shapiro, Zurif, and Grimshaw (1987) found that processing of ditransitive verbs generates slower reaction times (to a secondary task) than mono-transitive verbs. In Japanese, acceptability of doubly-embedded sentences decreases for transitive verbs compared with intransitive verbs (Babyonyshev & Gibson, 1999), and in German (Jurka, 2013) and Russian (Polinsky, Gallo, Graff, Kravtchenko, Morgan, and Sturgeon, 2013), movement is judged as less acceptable when the verb is transitive. I discuss each of these studies in turn.

4.3.1. English

Shapiro, Zurif, and Grimshaw (1987) studied the effect of verb transitivity on processing by having participants listen to sentences of English while performing a secondary lexical decision task. Their key assumption was that performance on a secondary task *decreases* as sentence processing difficulty *increases* (e.g., Marslen-Wilson & Tyler, 1980, et seq.). Therefore, the worse the performance on the Lexical Decision task, the harder the sentence is to process.

On each trial, participants were presented with a Lexical Decision probe visually, while sentences were presented auditorily (the Lexical Decision probe was not related to the content of

the sentence). Crucially, in order to tap into processing of the verb, the lexical probe was presented immediately after the main verb was heard. Shaprio et al. manipulated the complexity of the argument structure of the main verb, comparing transitive verbs, which require two arguments (e.g., *secure, measure, solve*) with ditransitive verbs, which require three arguments (e.g., *send, donate, lend*). Participants reacted slower on the Lexical Decision task in the ditransitive conditions as compared with the transitive conditions. The authors therefore conclude that the more complex the argument structure of the verb (i.e., the greater the number of arguments that must be manipulated), the greater the processing load, as manifested here as a trade off with reaction time.

In sum, ditransitive verbs in English were found to cause more processing difficulty than mono-transitive verbs.

4.3.2. Japanese

Babyonyshev and Gibson (1999) studied acceptability of sentences in Japanese containing a pair of doubly nested clauses. Participants rated sentences such as (21) on a scale of 1 to 5. It was observed that doubly nested sentences such as (21a), which contain an embedded intransitive verb such as 'panic', were judged as more acceptable than doubly nested sentences such as (21b), which contain an embedded transitive verb such as 'break'.

(21) Japanese (Babyonyshev & Gibson, 1999: 434)

a. Intransitive double nesting
Wakai kyooju-ga [TA -ga [gakusei -ga konransita to] sengensita to] utagatta.
young professor-NOM [TA-NOM [students-NOM panicked that] announced that] doubted.
'The young professor doubted that the teaching assistant announced that the students panicked.'

b. Transitive double nesting
Kankyaku -ga [rajioanaunsaa -ga [yuumeina sukeetosensyu -ga sukeetogutu -o kowasita to] sengensita to] utagatta
Spectator-NOM [radio.announcer-NOM [famous skater-NOM skate-ACC broke that] announced that] doubted
'The spectator doubted that the radio announcer announced that the famous skater broke a skate.'

It remains an open question whether the observed difference in acceptability is due to verb valency or due to the number of nominals present: (21a) contains only three nominals (the subjects of each verb, whereas (21b) contains four (the subjects of each verb plus the direct object of the embedded transitive verb).

4.3.3. German

Jurka (2013) conducted a grammaticality judgement study of subject movement in German, looking specifically at the split '*was für* NP' ('*what kind of* NP') construction, in which the *wh* word was is displaced, while the remainder of the NP is stranded *in situ*. Intransitive (22a, b) and transitive (22c, d) subjects were compared across these levels.

(22) German (Jurka, 2013: 275)

a. Intransitive *was für*
Ich frage mich, **[was für ein Mann]** gestern am Nachmittag geschlafen hat?
I ask myself what for a man yesterday on.the afternoon slept has
'I wonder what kind of man slept yesterday afternoon.'

b. Intransitive split *was für*
Ich frage mich, **[was]** gestern am Nachmittag [**für ein Mann]** geschlafen hat?
I ask myself what yesterday on.the afternoon for a man slept has
'I wonder what kind of man slept yesterday afternoon.'

c. Transitive *was für*
Ich frage mich, **[was für ein Mann]** gestern am Nachmittag den Piloten gesehen hat?
I ask myself what for a man yesterday on.the afternoon the pilot seen has
'I wonder what kind of man saw the pilot yesterday afternoon.'

d. Transitive split *was für*
Ich frage mich, **[was]** gestern am Nachmittag **[für ein Mann]** den Piloten gesehen hat?
I ask myself what yesterday on.the afternoon for a man the pilot seen has
'I wonder what kind of man saw the pilot yesterday afternoon.'

Participants were asked to rate acceptability of the sentences such on a scale of 1 to 7. Results showed a main effect of subject split, with sentences rated lower in the *split was für* conditions (22b, d). However, there was also an interaction of subject split and verb type: in the *split was für* conditions, sentences were rated significantly worse when the verb was transitive, as in (22d) compared with intransitive, as in (22b). Jurka (2013: 276) concludes that "the fact that an additional theta role needs to be assigned can be assumed to be burdensome on the parser and thus cause a decrease in acceptability". As with Babyonyshev and Gibson's (1999) study, however, it remains an open question whether the difference in rating reflect verb valency or number of nominals present: the transitive sentences contain more nominals than the intransitive sentences.

4.3.4. Russian

Polinsky, Gallo, Graff, Kravtchenko, Morgan, and Sturgeon, (2013) conducted a grammaticality judgement study of embedded subject dependencies in Russian. Their study included both intransitive (23a) and transitive (23b) subject conditions, in which the *wh*-word *kakie* is fronted, and the remainder of the NP subject stranded.

(23) Russian (Polinsky et al., 2013: 300)

a. Intransitive subject
Kakie ty mečtaeš [čtoby ___ **aktjory** okazalis na scene]?
what.kind.of 2.SG dream COMP actors appeared on stage
'What kind of actors do you hope to appear on stage?'

b. Transitive subject
Kakie ty prosil [čtoby ___ **sotrudniki** blagodarili direktora]?
what.kind.of 2.SG asked COMP employees thanked director
'What kind of staff members did he ask to thank the director?'

Polinsky et al. report that transitive sentences were rated significantly worse than intransitives, as was the case in Jurka's (2013) study.

4.3.5. Summary

English, Japanese, German, and Russian are all nominative-accusative languages, and yet all show evidence that the verb valency affects responses to sentences. For English, Shapiro et al. (1987) find that ditransitive verbs carry a heavier processing burden than transitives; in Japanese, Babyonyshev and Gibson (1999) find that sentences with doubly nested transitive verbs to be rated worse than those with doubly nested intransitive verbs; in German (Jurka, 2013) and Russian (Polinsky et al., 2013), movement of *wh*-phrases from transitive subjects is judged as less grammatical than from intransitive subjects. Thus, it appears that transitivity plays a role in processing independently of case marking. As far as ergativity is concerned, findings that ergative transitive subjects are more difficult to process than absolutive intransitive subjects should therefore be interpreted with the proviso that this effect would be expected regardless of case marking differences between the two.

4.4. Literature review: summary and critique

Constructions with filler-gap dependencies (e.g., *wh* questions and RCs) require the parser to create a dependency between two elements of the sentence (i.e., the filler and the gap) which are not necessarily adjacent. Because gaps are usually silent, the parser must also determine the location of the gap in order to form the dependency. In studies of subject and object dependencies, it has been long observed that *wh* dependencies with a gap in subject position ("subject dependencies") are easier to process than those with a gap in object position ("object dependencies"). This so-called 'subject advantage' has been attested in English (e.g., King & Just, 1991), German (e.g., Schriefers, Friederici & Kuhn, 1995), Japanese (e.g., Miyamoto & Nakamura, 2003), Korean (e.g., Kwon, Polinsky & Kluender, 2006), and Dutch (e.g., Donkers, Hoeks & Stowe, 2011), among other languages. These findings have led to the hypothesis that the subject advantage is a language universal, attributing it to lack of shift in the semantic topic of the sentence (Bever, 1970), to a universal hierarchy of accessibility (Keenan & Comrie, 1977; Hale, 2003), or to properties of phrase structure (O'Grady, Miseon & Miho, 2003); see Hsiao and Gibson, (2003) and Carrieras, Duñabeitia, Vergara, de la Cruz-Pavía, and Laka, (2010), for discussion. Others attribute the subject advantage to properties of each specific dependency, such the number of linearly intervening discourse referents that need to be processed between the filler and the gap (e.g., Dependency Locality Theory: Gibson, 1998). This second type of explanation predicts more cross-linguistic variability; specifically, that object advantage should be observed in languages where object dependencies contain fewer intervening discourse referents than subject dependencies. Thus far, object advantage has been reported for Basque (Carrieras et al., 2010) and Mandarin Chinese (Hsiao & Gibson, 2003; Lin & Garnsey 2011; Gibson & Wu, 2013; but this finding is controversial; see Lin & Bever, 2006; 2011; Lin, 2008, Wu 2009, and Vasishth, Chen, Li & Guo, 2013, who report a subject advantage). Finally, there is also evidence that a language can exhibit a "mixed" pattern: In Chamorro (an Austronesian language spoken in the Mariana Islands), postnominal RCs exhibit subject advantage, whereas prenominal RCs exhibit object advantage (Wagers, Borja & Chung, 2018).

However, subjects and objects are not homogenous categories cross-linguistically. Most notably, in ergative languages, subjects do not have uniform case marking (recall that the subject of an intransitive sentence and the object of a transitive sentence is marked with absolutive case, whereas the subject of a transitive sentence is marked with ergative case). This contrasts with

nominative-accusative languages, in which subjects of both transitive and intransitive sentences are marked as nominative (and direct objects marked as accusative). Thus, the subject advantage in nominative languages (e.g., English, German, Japanese, Korean, Dutch) can also be interpreted as nominative (i.e., *unmarked*) dependencies being easier than accusative (i.e., *marked*) dependencies. This seems reasonable, because nominative arguments occur in more syntactic environments (both transitive and intransitive sentences) than accusative arguments (which occur only in transitive sentences). Thus, nominative arguments are presumably more frequent than accusative arguments. Indeed, it has been demonstrated – for relative clauses - that more frequent dependencies are easier to comprehend than less frequent dependencies (Gennari & MacDonald, 2009). If the 'subject advantage' actually reflects a preference for the more frequently-occurring case (nominative), we would expect absolutive dependencies in ergative languages to be easier than ergative dependencies, because absolutive, like nominative, occurs in both transitive and intransitive sentences, whereas ergative occurs in transitive sentences only.

As pointed out by Carreiras et al., (2010), ergative languages enable dissociation of subjecthood and case marking (see also Polinsky, Gómez Gallo, Graff & Kravtchenko, 2012). We have seen, however, that evidence thus far is incomplete. In Basque, absolutive object dependencies have been shown to be easier to process than ergative subject dependencies (Carreiras et al., 2010); however, because only *transitive* sentences were considered (i.e., those with ergative-absolutive case), this result could reflect an overall object advantage in Basque, as argued for Mandarin Chinese by Hsiao and Gibson (2003). Other studies of ergative languages have considered both transitive and intransitive sentences, finding that intransitive absolutive subject dependencies are easier to process than ergative subject dependencies, but also easier than absolutive object dependencies (Q'anjob'al Mayan: Clemens et al. 2015; Avar: Polinsky et al., 2012; Niuean: Longenbaugh & Polinsky, 2016). However, this difference between ergative and absolutive subjects may be due to the *transitivity* of the verb rather than its case frame. This seems reasonable because, even in nominative languages, dependencies involving *intransitive* verbs have been shown to be more acceptable than dependencies involving *transitive* verbs (e.g., Babyonyshev and Gibson, 1999; Jurka, 2013; Polinsky et al., 2013).

Thus, separating case and transitivity requires comparing (i) transitive sentences with marked (i.e., ergative) subjects with transitive sentences with unmarked (i.e., nominative, absolutive,) subjects, and (ii) transitive sentence with marked (i.e., accusative, oblique) objects

with transitive sentences with unmarked (i.e., nominative, absolutive) objects. This is the goal of the current study.

4.5. Experiment: *wh* questions in Niuean

The current study focuses on Niuean (Polynesian; see Chapter 3 for an overview of the language). The reason for choosing Niuean is that it allows separating effects of case and transitivity. This is because Niuean is 'split ergative' language (see Silverstein, 1976): while the majority of transitive verbs require ergative subjects and absolutive objects, as in (24a), a smaller number of transitive verbs require absolutive subjects and oblique objects (so-called 'middle' verbs), as in (24b).

(24) Transitive sentences in Niuean

a. Ergative-absolutive
Ne tutuli he pusi e lapiti
PST chase ERG cat ABS rabbit
'The cat chased the rabbit'

b. Absolutive-oblique
Ne fifitaki e pusi ke he lapiti
PST copy ABS cat OBL rabbit
'The cat copied the rabbit'

Subjects of intransitive verbs are also marked absolutive, as in (25). These verbs can appear with an optional oblique object, marked in the same way as (24b).

(25) Intransitive sentences in Niuean

Ne poi e pusi (ke he lapiti)
PST run ABS cat (OBL rabbit)
'The cat ran (to the rabbit)'

Transitive absolutive-oblique ('middle') verbs can be distinguished from intransitive verbs in two ways. First, intransitive verbs are grammatical without an oblique object whereas transitive ones are not: ungrammaticality of a sentence without an oblique object thus indicates that the verb is transitive; otherwise it is intransitive. Second, oblique objects of transitive verbs may pseudo-incorporate with the verb (Seiter, 1980; Massam, 2001), whereas oblique objects of intransitive verbs cannot. Pseudo-noun incorporation is a diagnostic of transitivity: only obligatory (i.e., direct) objects can pseudo-incorporate. Thus, if an oblique object may be pseudo-incorporated with the verb, then the verb is transitive; if not, then it is intransitive (see Chapter 3 for full discussion).

Comparing transitive ergative-absolutive and transitive absolutive-oblique clauses ('middles') isolates effects of case: how does processing of a marked (i.e., ergative) subject compare with that of an unmarked (i.e., absolutive) subject, and equally, how does a marked (i.e., oblique) object compare with an unmarked (i.e., absolutive) object, when transitivity is held constant? Second, comparing transitive absolutive-oblique clauses with intransitive absolutive-oblique clauses isolates effects of transitivity: how does processing of a clause with a transitive verb comparing with processing of a clause with an intransitive verb? Note that Niuean allows addition of an optional object to intransitive clauses, so the comparison involves clauses with the same number of nominals.

The present study examines filler-gap dependencies by testing processing of D-linked *wh* questions. D-linked *wh* fillers (i.e., *which* NP) are used as opposed to simple fillers (e.g., *who*) because it has previously been observed at a greater subject-object asymmetry obtains for D-linked *wh* questions as compared with non-D-linked *wh* questions (Donkers et al., 2011). Using D-linked questions thus ensures that the measure is as sensitive as possible. Three types of sentence are compared: transitive ergative-absolutive (Transitive-ERG), transitive absolutive-oblique (Transitive-ABS), and intransitive absolutive-oblique (Intransitive-ABS). Crucially, because Niuean word order is VSO independent of case frame (see again Chapter 3, Section 3.3), *wh* questions are temporarily ambiguous between subject and object questions; this ambiguity is resolved once the case marker of the non-displaced argument is encountered. In other words, the *wh* phrase and verb are the same in a subject question (Table 1, column a) and an object question (Table 1, column b). In terms of dependency locality (cf. Gibson, 1998), this means that the filler-gap dependency in an object *wh* question contains *one* intervening discourse referent (the non-displaced subject), whereas subject *wh* questions contain *no* intervening referents (as the subject immediately follows the verb). Under a theory of subject-object processing asymmetries which is based on linear distance, subject dependencies are therefore predicted to be consistently preferred over object dependencies.

	a. Subject question	b. Object question
1. Transitive-ERG	***Ko e pusi fē ne*** ***tutuli*** ***tūmau*** *e lapiti?* PRED cat which PAST chase always ABS rabbit 'Which cat always chased the rabbit?'	***Ko e pusi fē ne*** ***tutuli*** ***tūmau*** *he kulī?* PRED cat which PAST chase always ERG dog 'Which cat did the dog always chase?'
2. Transitive-ABS	***Ko e pusi fē n e*** ***fifitaki*** ***tūmau*** *ke he lapiti?* PRED cat which PAST copy always OBL rabbit 'Which cat always copied the rabbit?'	***Ko e pusi fē ne*** ***fifitaki*** ***tūmau*** *e kulī ki ai?* PRED cat which PAST copy always ABS dog RP 'Which cat did the dog always copy?'
3. Intransitive-ABS	***Ko e pusi fē ne*** ***poi*** ***tūmau*** *ke he lapiti?* PRED cat which PAST run always OBL rabbit 'Which cat always ran to the rabbit?'	***Ko e pusi fē ne*** ***poi*** ***tūmau*** *e kulī ki ai?* PRED cat which PAST run always ABS dog RP 'Which cat did the dog always run to?'

Table 1. Subject *wh*-questions (left column) and object *wh*-questions (right column) with each of the three types of verbs (questions differ in the verb alone); an adverb is also included to extend the local ambiguity. The temporarily-ambiguous string is bolded, and the disambiguating phrase is highlighted.

Because Niuean is used mostly in conversational settings, a reading study is not appropriate in this context (see Longenbaugh & Polinsky, 2016 for discussion). Stimuli were therefore presented auditorily, employing the visual-world eye tracking paradigm (Tanenhaus, Spivey-Knowlton, Eberhard, & Sedivy, 1995). To make both subject and object questions appropriate, listeners first heard a short discourse context that supported a subject or an object question equally: this was achieved by having two sentences with the same verb, and with a character from the same category playing the role of subject or object in the two sentences. In Table 2, for example, one cat was the subject in the first sentence and another cat was the object in the second sentence (or vice versa, as the order of context sentences was counterbalanced across items; see Materials). Participants had to "act out" the described events using four pictures on a display board (see Figure 1); they then heard the *wh* question and had to answer it by touching the correct picture. Because both interpretations were supported by the events in the context, any biases during the processing of the ambiguous part of the question (before disambiguating information from the non-displaced argument) would reflect syntactic dependency formation preferences.

1.	Transitive-ERG	*Ne tutuli tūmau he pusi uli e lapiti,* PAST chase always ERG cat black ABS rabbit 'The black cat always chased the rabbit,	*ti tutuli tūmau he kulī e pusi tea.* and chase always ERG dog ABS cat white and the dog always chased the white cat.'
2.	Transitive-ABS	*Ne fifitaki tūmau e pusi uli ke he lapiti,* PAST copy always ABS cat black OBL rabbit, 'The black cat always copied the rabbit,	*ti fifitaki tūmau e kulī ke he pusi tea.* and copy always ABS dog OBL cat white and the dog always copied the white cat.'
3.	Intransitive-ABS	*Ne poi tūmau e pusi uli ke he lapiti,* PAST run always ABS cat black OBL rabbit, 'The black cat always ran to the rabbit,	*ti poi tūmau e kulī ke he pusi tea.* and run always ABS dog OBL cat white and the dog always ran to the white cat.'

Table 2. Example sentences of three types: (1) Transitive-ERG has an ergative subject and a required absolutive object (i.e., it is an argument of the verb), (2) Transitive-ABS has an absolutive subject and a required oblique object (again, an argument of the verb), and (3) Intransitive-ABS has an absolutive subject and a non-required (optional) oblique object.

It was reasoned that the expectations listeners develop about how the question will continue will be reflected in looks to one or both of two images. First, the answer to the question (i.e., the black cat for a subject question; the white cat for an object question); this follows from studies by Sussman and Sedivy (2003), and Brown-Schmidt, Gunlogson, and Tanenhaus (2008), who found that, during processing of a question, listeners look most at an image associated with the predicted answer of the question. Second, the argument expected to follow the verb in the question (i.e., the rabbit for a subject question; the dog for an object question); it has been shown for declarative sentences that listeners look at images of what they predict an upcoming element of the sentence to be (Altmann & Kamide, 1999). Thus, looks to the black cat and/or the rabbit reflect a preference for a subject dependency, whereas looks to the white cat and/or the dog reflect a preference for an object dependency. Following Brown-Schmidt et al. (2008), these measures were combined; thus, looks to the black cat and/or the rabbit reflect a preference for a subject dependency, whereas looks to the white cat and/or the dog reflect a preference for an object dependency.

Figure 1. Example display board, which was coupled with the examples in Tables 1 and 2: The black cat is the subject in the first conjunct where the rabbit is the object, and the white cat is the object in the second conjunct where the dog is the subject.

4.5.1. Participants

Forty-six native speakers of Niuean (mean age: approx. 40; range: approx. 18-65) were recruited and on Niue Island (n = 36) and in Auckland and Christchurch, New Zealand (n = 10). They were tested in community settings; for example, in the home, workplace, or other public venues such as a café or an outdoor area. Like all Niuean speakers, they were Niuean-English bilinguals. Four participants were excluded from analysis because of auditory or equipment problems. Participants were paid $25 NZ.

4.5.2. Materials

Twelve experimental displays were created, each containing a pair of two animals of different colours (e.g., two cats) and two other animals (e.g., dog and rabbit). In constructing questions, two factors were manipulated in a 3 x 2 within-subjects design. Verb-type determined whether the verb was (i) transitive with an ergative-absolutive case frame (Transitive-ERG: Table 2.1), (ii) transitive with an absolutive-oblique case frame (Transitive-ABS: Table 2.2), or (iii) intransitive with absolutive case, to which we added a (non-obligatory) oblique object (Intransitive-ABS: Table 2.3). Thus, all sentence had two characters. Question manipulated whether the temporarily-

ambiguous question resolved as a subject question (Table 1, column a) or an object question (Table 1, column b).

Questions were preceded by a two-sentence context. Both sentences in the context had the same verb: in one the black cat, for example, was the subject, whereas in the other the white cat, for example, was the object – see Table 2. This context introduced two events that equally license a subject and an object question. To counteract order biases of the two conjuncts (e.g., that listeners might better encode the events from either the first or second conjunct), the order of context sentences was flipped in half the items: this means that for one half of the items, the animal that was the subject appeared in the first conjunct, and for the other half, it appeared in the second conjunct (and vice versa with the animal that was the object) . Items were created in consultation with, and recorded by, a native speaker of Niuean. To avoid any intonational cues which might potentially bias a speaker towards a subject or object interpretation, the ambiguous portion of the question was cross-spliced from subject questions into object questions using PRAAT. The locations of images were counterbalanced to counteract spatial biases associated with whereabouts each image was placed on the display board.

In order for each critical item (context plus *wh* question) to be presented in all 6 conditions, 6 lists were created following a modified Latin Square design, such that each participant was presented with each of the 12 items in one of the six conditions. Each participant saw each item once and saw an equal number of items in each condition.

Twelve additional fillers also had two context sentences followed by an equal number of (locally ambiguous) subject and object questions. Either two or three of the four referents in the display participated in the context story, such that there was always at least one distractor referent; the filler items for this experiment are the main topic of discussion in Chapter 5.

The resulting twenty-four trials were presented in a pseudo-randomized order, preceded by three practice trials (with no adjacent trials in the same condition). The design and duration of the study was developed to accommodate the fact that the population to be tested was the general public community, and not university undergraduate students who are more familiar with this type of testing procedure.

4.5.3. Procedure

The pre-recorded stimuli were played on a laptop over external speakers. Participants were asked to listen to the context story and "act out" the events described using the cards on the display. This was done to ensure that they remembered the events well enough to answer questions correctly. Next, they heard a *wh*-question and were asked to answer it by touching the corresponding card in the display. A digital camcorder positioned in the middle of the display recorded participants' eyes, along with the time-locked auditory stimuli; a second digital camcorder recorded participants' actions. Sessions lasted approximately 30 minutes.

4.6. Results

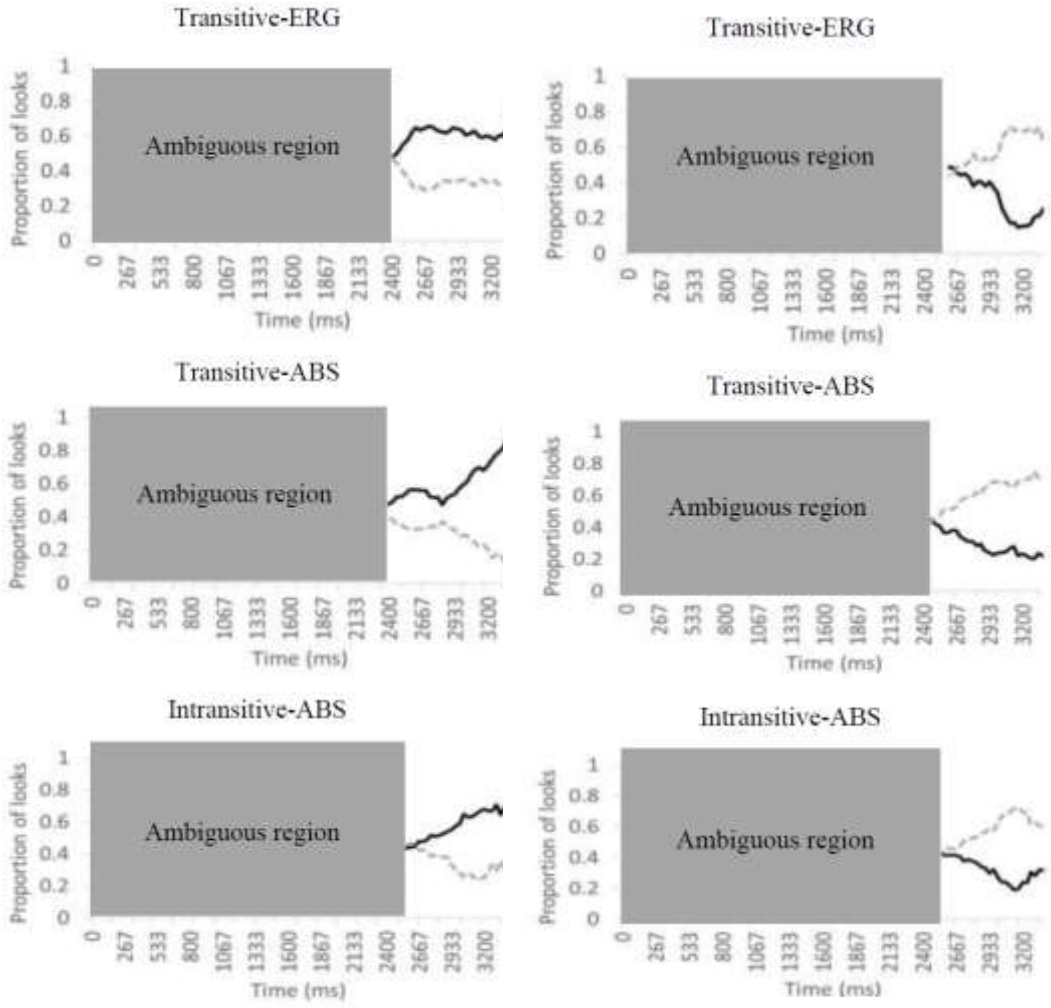
Eye movements during *wh* questions were coded frame-by-frame using Adobe Premiere Pro. Fixations were coded for which image participants were looking at. Forty-nine trials (or 9.7%) were excluded because no data was recorded (n = 11), or because the participant did not look at the images during the question (n = 38). Participants chose the correct answer on 432 out of 455 trials (95.6%); trials with an incorrect response were excluded from eye-movement analysis (n = 23), because we cannot reliably determine that the participant understood the item in the intended way.

Because questions vary in length depending on the verb used, the dependent variables were a *relative* duration (i.e., a *proportion*). For each trial, we calculated two dependent variables. The first was the duration the participant was looking at the *subject*-consistent images over the duration of the interval (either the non-displaced object, such as the rabbit, or the answer to the question, such as the black cat) – DV1. The second was the duration the participant was looking at the *object*-consistent images over the duration of the interval (the non-displaced subject, such as the dog, and the answer, such as the white cat) – DV2. We conducted two separate analyses with two dependent variables, because – while they are not completely independent – they are also not completely predictable from each other. This is because participants also looked away from the images at some places during presentation of the question; as such, the absence of looks to one set of images does not necessarily mean that the participant is looking at the other set. Because proportion variables are necessarily bounded at 0 and 1 (and thus cannot be used in linear regression in a non-transformed state), they were quasi-logit transformed (Jaeger, 2008), before being used as the dependent variable in mixed-effects linear regression with crossed random effects for participants

and items (Baayen, Davidson & Bates, 2008), using the *lme4* package (R 3.4.4: Bates, Maechler, Bolker & Walker, 2015).

The predictors verb-type and question were contrast-coded using centered Helmert contrasts. The first coefficient, CASE, contrasted Transitive-ERG questions with Transitive-ABS questions and Intransitive-ABS questions (CASE coefficient: 2/3). The second coefficient, TRANSITIVITY, contrasted Transitive-ABS questions with Intransitive-ABS questions (TRANSITIVITY coefficient: 1/3). We used parsimonious models (Bates, Kliegl, Vasishth & Baayen, 2015), starting with the maximal random effects structure that converged, and simplifying it by removing random slopes that did not significantly improve the model. Full model details are provided in the Appendix.

The goal of the first analysis is to verify that when processing a subject question, participants indeed look to the subject-consistent images, and during an object question, they look to the object-consistent images. To this end, we analyzed eye-movements during the disambiguating region (i.e., 200 ms after the onset of the case marker of the non-displaced argument to question end): at this point the question is unambiguously asking about either a subject or an object. For subject-consistent images (DV1), these received more attention in subject questions than object questions, as shown in Figure (2a). This main effect was significant (.56 vs. .31; β = -2.6705, *SE* = 0.3701, t = -7.22, $p < .0001$); there were no effects of verb-type (*p*s > .949) and no interactions (*p*s > .143). For object-consistent images (DV2), these received more attention in object than subject questions, as shown in Figure (2b). This main effect was again significant (.58 vs. .30; β = 3.2051, *SE* = 0.3710, t = 8.64, $p < .0001$); there were no effects of verb-type (*p*s > .292) or interactions (*p*s > .260). This analysis verifies that, when hearing a question, listeners indeed look at the answer or the non-displaced argument consistent with that question.



a. *Subject questions* *b. Object questions*

Figure 2: Proportion of fixation to subject-consistent images (black lines: e.g., black cat and rabbit) and object-consistent images (dashed grey lines: e.g., white cat and dog), during the disambiguating region of subject questions (a; left column) and object questions (b; right column).

We can now examine the processing of the *ambiguous* region (200 ms after verb onset to 200 ms after the offset of the adverb: mean length 1173 ms); 32 trials in which participants did not look at the images during this interval were excluded. For subject-consistent images (DV1), there were fewer looks in Transitive-ERG than in the Transitive-ABS and Intransitive-ABS conditions (.41 vs. .48; β = -1.0310, *SE* = 0.5236, *t* = -1.97, *p* = .0497), indicating that ERG subjects receive less attention than ABS subjects; the two ABS conditions did not differ (.47 vs. .49; β = -0.1566, *SE* = 0.6129, *t* = -0.26, *p* = .7985). For object-consistent images (DV2), there were *more* looks in Transitive-ERG than in the ABS conditions (.50 vs .41; β = 1.1846, *SE* = 0.5360, *t* = 2.210, *p* =

.0277), indicating that ABS objects receive more attention than OBL objects; the OBL objects did differ (.44 vs .38; $\beta = 0.7048$, $SE = 0.6275$, $t = 1.123$, $p = .2621$). With both dependent variables, neither the main effect of question nor the interactions were significant (ps > .32), confirming the ambiguity of this interval.

We can therefore collapse over question and examine the proportions of fixations to subject-consistent and object-consistent images for each verb type during the ambiguous portion of the question – see Figure 3 (plots for fixations to each of the four images separately can be found in the Appendix). In Transitive-ERG questions (top panel), we observe a preference for *object*-consistent images, suggesting that an ABS object question is preferred over an ERG subject question; in Transitive-ABS questions (middle panel), we observe no preference between subject and object-consistent images, and in Intransitive-ABS questions (bottom panel), we observe a preference for *subject*-consistent images, suggesting that an ABS subject question is preferred over an OBL object question. Since these differences are manifested at the verb, we further examined the pattern in this interval using planned comparisons.

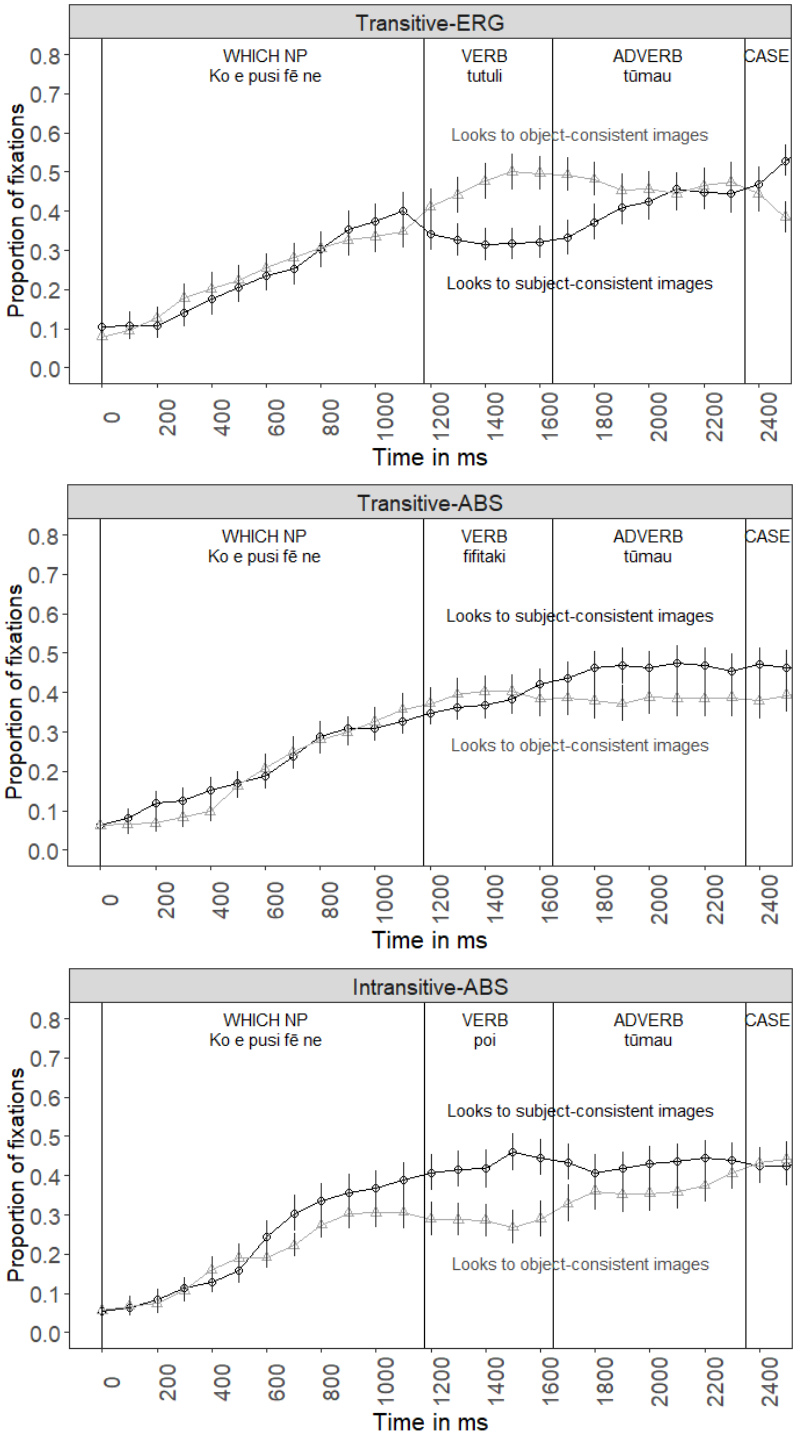


Figure 3. Proportion of fixation to subject-consistent images (black circles: e.g., black cat and rabbit) and object-consistent images (grey triangles: e.g., white cat and dog), from the onset of the question (at 0 ms) to the onset of the disambiguating case information (2351 ms), plus the 200 ms it takes to program and launch a saccade. Other speech events marked on the plot are the verb (at 1178ms) and the adverb (at 1646 ms). Data is presented for each of the three predicate types (Transitive-ERG, Transitive-ABS, Intransitive-ABS), collapsed across the question manipulation, as the temporarily-ambiguous region of the question is identical before the case marker, as affirmed by the absence of effects of question and interactions.

The first comparison, between Transitive-ERG and Transitive-ABS, isolates the effect of case. For subject-consistent images (DV1), there were fewer looks to ERG in Transitive-ERG than Transitive-ABS (.36 vs .44; β = -2.1738, *SE* = 0.8882, *t* = -2.45, *p* = .0148), indicating that ERG subjects are less preferred than ABS subjects. For object-consistent images (DV2), there were now *more* looks in Transitive-ERG than to Transitive-ABS (.50 vs .44; β = 2.3458, *SE* = 0.8917, *t* = 2.631, *p* = .00889), indicating that ABS objects are preferred to OBL objects. Thus, absolutive arguments – whether subjects or objects – are preferred over marked arguments (i.e., ergative subject and oblique objects).

The second comparison, between Transitive-ABS and Intransitive-ABS, isolates the effect of transitivity. For subject-consistent images (DV1), there were numerically fewer looks in Transitive-ABS than Intransitive-ABS; this difference, however, did not reach significance (.44 vs .49; β = 1.6698, *SE* = 0.8984, *t* = 1.859, *p* = .0638). For object-consistent images (DV2), there were significantly more looks in Transitive-ABS than Intransitive-ABS (.44 vs .34; β = -2.5361, *SE* = 0.9022, *t* = -2.811, *p* = .00521), indicating that obligatory OBL objects are preferred to non-obligatory objects. Given that transitivity reflects whether a verb requires an object, it is unsurprising that the effect of transitivity manifests in looks to object-consistent images.

Finally, in order to compare the subject vs. object *advantage* across verb types (i.e., whether subject or object dependencies are preferred for each condition), we computed the subject vs. object *biases* by verb type, taking as our dependent variable the (quasi-logit transformed) proportion of looks to subject-consistent images minus the (quasi-logit transformed) proportion of looks to object-consistent images (DV3).The subject bias in Transitive-ERG was significantly *lower* than Transitive-ABS (β = -4.5054, *SE* = 1.6682, *t* = -2.701, *p* = .0072), whereas the subject bias in Intransitive-ABS was significantly *higher* than Transitive-ABS (β = 4.2143, *SE* = 1.6875, *t* = 2.497, *p* = .012). Finally, note that the intercept of the model is also relevant (β = 0.1118, *SE* = 0.8358, *t* = 0.134, *p* = .89604): it provides no evidence that the language exhibits an *overall* bias

4.7. General discussion and implications

These results show, first, that Niuean exhibits no overall bias with respect to dependency formation. This result differs from previous findings for other languages (e.g., English), which show an advantage for either subject dependencies or object dependencies (e.g., subject dependencies in English), and is not immediately compatible with theories which predict a

universal subject advantage (e.g., Bever, 1970; Keenan & Comrie, 1977; O'Grady, Miseon & Miho, 2003). The results are also not compatible with theories that appeal to linear distance as governing dependency formation, such as the Dependency Locality Theory (Gibson, 1998) which predicts an overall subject advantage: because Niuean has VSO word order, the non-displaced subject appears *within* the object dependency, but the non-displaced object is *outside* the subject dependency, such that a subject advantage should consistently obtain. Instead, we find two effects: an effect of case, whereby absolutive dependencies are preferred over dependencies with other cases (ergative, oblique), and an effect of transitivity, whereby obligatory objects (i.e., of transitive verbs) are preferred over non-obligatory objects (i.e., of intransitive verbs), independent of case.

The results extend previous findings about dependency formation in ergative languages. They are consistent with the absolutive object advantage found in Basque (Carreiras et al., 2010), and with the intransitive absolutive subject advantage found in Avar (Polinsky et al., 2012), Q'anjob'al (Clemens et al., 2015), and in an offline study of Niuean (Longenbaugh & Polinsky, 2016). However, the current study is the first to (i) *isolate* the effect of case marking (by separating it from transitivity), finding that absolutive arguments are preferred *independent of subject or object status*, and (ii) demonstrate an effect of *transitivity* in an ergative language, which is independent of case. The latter effect is consistent with findings in nominative languages which show a preference for dependencies with intransitive verbs over transitive verbs (Babyonyshev & Gibson, 1999; Jurka, 2013; Polinsky et al., 2013).

While these findings are not immediately consistent with a universal subject advantage, some have argued, that all absolutive arguments in Niuean, including objects of ergative-absolutive verbs might, in fact, be subjects (Biggs, 1974; Sperlich 1997; Massam, 2001). However, many properties standardly associated with subjecthood do not hold of absolutive objects. For example, it is the *ergative* argument that acts as (i) the antecedent of a reflexive pronoun, (ii) the addressee in imperatives, and (iii) the inferred actor in embedded infinitives (Seiter, 1980; see also Chung, 1978; Levin & Massam, 1985). Some properties associated with subjecthood indeed hold of *both* the ergative and the absolutive arguments. For example, questions with two *wh*-phrases allow for different ordering of those phrases (Longenbaugh & Polinsky, 2016), and the phenomenon of 'raising' whereby an argument in a matrix clause is also interpreted in an embedded clause, applies to both ergative and absolutive arguments (e.g., Seiter, 1980; Massam, 1985). Importantly,

however, no properties associated with subjecthood hold only of absolutive objects and not of ergative subjects.

These results are consistent with a frequency-based account if we assume that a *wh* phrase that is not morphologically marked for case is taken by default to be absolutive, because absolutive appears in more syntactic environments (i.e., as the subject of an intransitive verb, the subject of a middle verb, and the object of a transitive ergative-absolutive verb), and is therefore presumably the most frequent case: ergative case appears only in transitive sentences, and oblique case appears only in middle sentences or when an optional object is added to an intransitive verb. This strategy would account for absolutive subject dependencies being preferred over ergative subject dependencies, and absolutive object dependencies being preferred over oblique object dependencies.

This strategy, however, does not explain the full pattern of results, because it does not extend to the contrast observed between obligatory and non-obligatory oblique objects (i.e., the effect of transitivity). Interestingly, processing differences between obligatory and non-obligatory arguments have been widely demonstrated in environments that do not involve long-distance dependencies; specifically, in the processing of arguments (obligatory elements) versus adjuncts (non-obligatory elements) (e.g., Clifton, Speer & Abney, 1991; Liversedge, Pickering, Branigan & van Gompel, 1998; Schutze & Gibson, 1999; Boland, 2005; Rissman, Rawlins & Landau, 2015). It is possible that the effects of case and transitivity indeed arise from two separate processing strategies. I propose, however, that the two may be unified under a single processing strategy, where the parser prefers dependencies *that are more likely to materialize*. This strategy would lead the parser to prefer absolutive dependencies over ergative or oblique dependencies, because absolutive arguments appear in more syntactic environments and are therefore more likely (this strategy would also lead to nominatives being preferred over accusatives). The same strategy would lead the parser to prefer a dependency with an *obligatory* argument (which has to be included with the verb) over a dependency with a non-obligatory nominal which may not be included in the sentence. In other words, the parser prefers dependencies of case and of thematic role which has the widest distribution in the language: absolutive case has a wider distribution than ergative or oblique case, and obligatory arguments have a wider distribution than non-obligatory arguments. This means that the 'subject advantage' found for nominative languages such as English is better characterized as a nominative case advantage: the parser prefers dependencies of

nominative-marked argument over dependencies of accusative-marked arguments, because nominative case has a wider syntactic distribution than accusative case. Thus, the so-called 'unmarked' argument is preferred in processing.

4.7.1. Cross-linguistic implications

Recall the two formulations of the Accessibility Hierarchy, (repeated below). The first is based upon grammatical function, wherein the *subject* is the most accessible argument (26a); the second is based upon morphological case, wherein the *unmarked* (nominative or absolutive) argument is most accessible (26b). The results of this study support a model in which processing can be said to mirror the hierarchy of morphological case in (26b). In short, the generalization is one in which the *unmarked* (nominative or absolutive) argument is privileged during processing, as opposed to the *subject* per se.

(26) Accessibility Hierarchy

a. Grammatical function (Keenan & Comrire, 1977: 66)

Subject > direct object > indirect object > oblique > genitive > object complement

b. Morphological case (Bobaljik 2008: 11)

Unmarked case (nominative, absolutive) > dependent case (ergative, accusative) > lexical/oblique case (dative)

If the advantage for the unmarked argument in dependency processing is indeed due to the *distribution* of the arguments within a language (wherein the parser plans for a dependency of an unmarked argument to maximize chances of successfully locating the dependency), further questions arise as to potential cross-linguistic variation in terms of how this parsing strategy is implemented in other languages. In Niuean, the absolutive argument can be regarded as the argument with the widest distribution in the sense that there is always an absolutive nominal present in every sentence (see Biggs, 1974; Sperlich, 1997). This is not true of other ergative languages, however. Notably, Mayan languages exhibit a type of split ergativity wherein ergative case marking is retained on intransitive subjects in certain environments, and no absolutive argument is present (see Chapter 2, Section 2.2 for full discussion). In non-perfective aspects in

Ch'ol (30a) and Q'anjob'al (27b), both transitive and intransitive subjects are cross-referenced with *ergative*[7] case marking on the verb.

(27) Intransitive ergative subjects in Mayan

a. Ch'ol (Coon, 2013: 133)
Mi **k**-majl-el
IMP **ERG**-go-NML
'I go'

b. Q'anjob'al (Mateo-Toledo, 2003, via Coon 2013: 176)
Lanan **s**-jay naq unin
PROG **ERG**-arrive NCL boy
'The boy is arriving'

Imanishi (2014) argues that ergative case (and not absolutive case) is, in fact, the "default" case in Mayan syntax. If the ergative argument in Mayan can be regarded as the argument with the widest distribution (i.e., the unmarked argument), then Clemens et al.'s (2015) finding that ergative subject dependencies are preferred over absolutive object dependencies in Ch'ol and Q'anjob'al is consistent with a theory in which the unmarked argument is favoured in processing.

A further question concerns languages which have a neutral case alignment (i.e., no case marking), such as Mandarin and Chamorro[8]: do such language have 'unmarked' arguments at all? If certain languages do not have unmarked arguments, then what other parsing strategies are used in the resolution of long-distance dependencies? It is entirely possible that the parser defaults either to (i) a subject advantage, as argued for Mayan by Clemens et al. (2015), or (ii) an advantage for the shortest dependency (specifically, that with the fewest intervening NPs), as argued for Mandarin by Hsiao and Gibson (2003), and for Basque by Carreiras et al. (2010). Indeed, Wagers et al. (2018) argue in favour of a cross-linguistic subject advantage which can, in certain

[7] There is debate in the Mayanist literature as to the status of the clausal complement of non-perfective aspect markers. While some authors (e.g., Buenrostro 2007) claim that such complements are fully verbal, others (e.g., Coon 2013; Coon & Carolan 2017, a.o.) argue that non-perfective aspect markers are themselves predicates, which take a nominalized clausal complement. Under this analysis, the 'ergative' prefix in (29) and (30) is really a possessive prefix (ergative and genitive morphemes are syncretic throughout the Mayan family). Whatever the status of the Set A prefix in (29), however, there is unequivocally no absolutive argument present in the clause.

[8] Both subjects and direct objects in Chamorro bear unmarked case (see Chung, 1998: 50); in this way, the language has a neutral surface alignment pattern. Chamorro has, however, been argued to exhibit hallmarks of an ergative alignment pattern in its pronominal system (e.g., Gibson, 1980) and in subject-verb agreement (e.g., Chung, 1981). Chung (1998) nonetheless concludes that there is insufficient evidence for definitively classifying Chamorro as ergative.

circumstances, be outcompeted by other pressures such as word order; thus, an object advantage obtains in environments such as in Chamorro prenominal RCs.

4.7.2. Active Filler Strategy

The results of the study of Niuean also have a bearing on Filled Gap Theory (Frazier, 1978). Niuean has strict VSO word order and yet, for ergative-absolutive sentence in Niuean, we find object advantage. This is not consistent with the 'Active Filler Strategy' (Frazier, 1978), in that the first available gap site (which, in ergative-absolutive sentences would be the ergative subject gap) is, in fact, *not* necessarily the preferred site for dependency formation, even though such a filler-gap dependency would result in a perfectly well-formed *wh* question. This bears resemblance to the unresolved issue of subject filled gap effects (or lack thereof) in English. In English, subject *wh* gaps are pre-verbal, and adjacent to the filler (e.g., *I wonder who__ saw the play*). Thus, since the subject dependency site is the first available gap site, one might expect to find subject filled gap effects when this position is occupied (e.g., *I wonder who Alice saw the play with __).* Stowe (1986), for example, did not observe a filled gap effect at this site, while finding a robust filled gap effect at the site of the direct object later in the sentence. To account for this, it has been proposed by Lee (2004) that, because the gap occurs immediately after the filler, the parser simply does not have enough time to develop expectations for where the gap should occur (see also Wagers & Pendleton, 2016). In the current study of Niuean, however, both subject and object gaps are *post-verbal* (unlike English where only object gaps are post-verbal). Indeed, comparison of dependency preferences across three different predicate types indicates that distance between the filler and the first available gap (also the subject gap) does not directly influence the dispreference for this particular gap site observed with certain verb frames. Thus, it seems that the parser does not unreservedly seek the first available gap.

Furthermore, the amount of attention weighted towards a potential gap site depends upon the argument frame of the verb: transitivity effect found for absolutive-oblique sentences suggests that the *degree* of preference for a post-verbal dependency site varies according to argument frame. If, for example, the verb is transitive (requiring both a subject and an object), then the parser expends more resources in planning for an object dependency than if the verb is intransitive (and thus, only a subject is required).

4.8. Summary

This chapter has focused on the privilege for subjects in sentence processing: previous studies have found that, in languages such as English, subject dependencies are processed more easily than object dependencies. In ergative-absolutive languages, however, subjects are not uniformly case-marked. A novel study of the processing of *wh* questions in Niuean suggests that the preference in dependency formation is not necessarily for the subject, but for the unmarked argument (which in languages like English coincides with subjecthood). Furthermore, verb transitivity is found to play a role in dependency formation preferences: dependencies of obligatory arguments are preferred over those of non-obligatory adjuncts. These results suggest that preference for a gap site depends upon verb argument structure and case frame.

In the following chapter, I present a second original study which investigates how subjecthood and transitivity affect pronoun resolution in Niuean.

Chapter 5

Pronoun resolution in Niuean

A key aspect of language production and comprehension involves associating an entity or concept with a referring expression. Referring expressions vary greatly in their complexity, from being highly descriptive (e.g., *the black dog that chased the rabbit*) to less descriptive (e.g., *the dog*) to pronominal (e.g., *it*). Notably, anaphoric pronouns such as *it* can logically refer to more than one antecedent from a preceding context. The first conjunct of the sentence in (1), for example, contains two noun phrases (*the dog* and *the rabbit*), either of which may be interpreted as the referent of the pronoun *it* in the second conjunct.

(1) [The cat chased the dog] and [the lion bit *it*].

This chapter examines the interpretation of ambiguous pronouns; specifically, I investigate the influences of case marking and transitivity in the resolution of anaphoric pronouns like *it*. The structure of the chapter is as follows: Section 5.1 reviews the relevant literature, outlining the role of accessibility in pronoun resolution. An original experimental study is presented in Section 5.2, and its wider implications are discussed in Section 5.3.

5.1. Accessibility in pronoun resolution

Interpreting sentences requires identifying the intended referent for referring expressions. Many referring expressions are linguistically ambiguous, and so a choice must be made between two or more candidate antecedents. One type of referring expression that has received much attention in the literature is anaphoric pronouns. In (1), for example, *she* could refer either to *Alice* or to *Hannah*.

(1) Alice invited Hannah to go horse riding, and ***she*** packed a picnic to bring along.

The choice of referent for a pronoun like *she* has been widely argued to be determined according to accessibility, meaning that certain entities are more salient in discourse than others (Ariel, 1990; Gundel, Hedberg & Zacharski, 1993). Arnold (2010: 188) refers to accessibility as "the property of information that makes it easier to access, independent of ambiguity considerations". The more accessible an entity such as *Alice* or *Hannah*, the more likely it is that

that entity will be (i) referred to using a pronoun by a speaker in following discourse, and (ii) interpreted by a listener as the referent for an ambiguous pronoun. Accessibility is determined by both discourse-related properties such as *givenness* (i.e., old, or *given*, referents are more likely to be referred to using pronouns than discourse-new referents) and *recency* (i.e., referents mentioned more recently are more likely to be referred to with a pronoun than referents mentioned less recently). Accessibility is also influenced by syntactic prominence (see Arnold, 2010 for discussion), meaning that certain arguments are perceived as more accessible than others. All else being equal, a subject of a preceding sentence is more likely than any other argument to become the referent of a pronoun in a following sentence. This role of the grammatical subject in determining how a pronoun gets interpreted was established in a series of self-paced reading studies by Gordon, Grosz, and Gillom (1993; see also Ariel, 1990; Gundel, Hedberg & Zacharski, 1993, a.o.). Gordon et al. found that sentences in which the subject from previous discourse is *not* realised as a pronoun are read slower compared with sentences in which it is, but that sentences in which a non-subject from previous discourse is not realised as a pronoun do not show this same effect. This has been termed the 'repeated-name penalty' which is found for subjects, but not for non-subjects. They further showed that this effect of subjecthood is independent of whether the subject is the first mentioned entity or not. Gordon et al. conclude that the grammatical subject provides an important link to the previous sentence. Gordon et al.'s findings are formalized within Centering Theory (Grosz, Joshi, & Weinstein, 1995), which posits that nominal entities in a sentence are ranked according to their grammatical function, as in (2). In this hierarchy, the subject outranks the objects, and is therefore more likely to be realised as a pronoun than the object is. I will henceforth refer to this notion as "subject prominence".

(2) Ranking according to grammatical function (Grosz et al., 1995:15)

subject > object > other

Going back to (1), *she* is more likely to be construed as referring to *Alice*, the subject, than to *Hannah*, the object. Note that, further to effects of subject prominence, the thematic roles of referents have been shown to be relevant to pronoun interpretation (see Kehler, Kertz, Rohde & Elman, 2008): since *Alice* is the semantic agent of *invite* in the first sentence, *she* is more likely to be interpreted as referring to *Alice*, because *she* is subsequently the semantic agent of *packed* in the second sentence.

Various other factors have been shown to influence the choice of antecedent. One which has received particular attention in the literature is "parallel function" or "parallelism" (Sheldon, 1974; Grober, Beardsley & Caramazza, 1978; Smyth, 1992; 1994; Chambers & Smyth, 1998, a.o.). The original formulation of this phenomenon (e.g., Sheldon, 1974) was that the syntactic position of the *pronoun* influences choice of referent from the preceding clause. Thus, speakers and listeners were claimed to prefer for pronouns to refer to an antecedent in a preceding clause which has the same grammatical function as the pronoun in the following clause. Notice that in (1), the pronoun *she* is the subject of its clause, such that it exhibits parallel function with *Alice* in the preceding clause. The preference for *she* to co-refer with *Alice* as opposed to *Hannah* could be view as a result either of the status of *Alice* as the subject of its clause (as discussed above), or as the result of parallelism in shared grammatical function (i.e., subject) of *she* and *Alice*. The distinct effects of parallelism are evident when object pronouns are considered. The preference in (3) is for the object pronoun *her* to co-refer with the object of the preceding clause (Hannah), as opposed to the subject (Alice), such that the pronoun and its antecedent match in grammatical function.

(3) Alice invited Hannah to go riding, and Sue asked ***her*** to go swimming.

Smyth (1992; 1994) introduced a critical refinement to the original parallel function account by noting that the parallelism effect obtains primarily when the sentences containing the antecedent and pronoun share the same global constituent structure and are connected with *and then*, favouring a temporal interpretation of the connective over a causal one. In a series of experiments designed to test parallelism against subject prominence, Chambers and Smyth (1998) observe a strong bias for a pronoun to co-refer with an antecedent which has the same grammatical function: a pronoun in object position tends to be interpreted as coreferential with an antecedent in object position. Likewise, a pronoun in subject position is more likely to be interpreted as coreferential with a subject antecedent. This is not to say, however, that subject do not exhibit any overall preference: Chambers and Smyth (1998) also observe that the parallelism bias is significantly stronger for subject pronouns than for object pronouns, indicating that subjects are nonetheless more salient than objects, parallelism notwithstanding.

The question remains open, however, as to whether *case* – independently of grammatical function - also exerts a bias in the resolution of anaphoric pronouns. Recall that case and subjecthood coincide in nominative languages such as English: both transitive and intransitive

subjects are marked with nominative case, and objects are marked with accusative case. In ergative languages such as Niuean, however, subjecthood and case do not co-vary: transitive subjects are marked ergative, while intransitive subjects and transitive objects are marked absolutive. Thus, in a language like Niuean, we can ask whether an absolutive object pronoun would receive a preceding case-matched absolutive antecedent interpretation, *independent of the subject or object status of that antecedent*, or whether a subject referent is preferred, irrespective of case. In what follows, I present the first study to investigate the role of *case parallelism* in the resolution of anaphoric pronouns, looking at whether listeners prefer an antecedent that matches in case with the pronoun. Furthermore, because ergative case is tied to verb transitivity, it also allows us to consider whether parallelism biases are weaker when the object is an indirect object as opposed to an obligatory argument of the verb, while simultaneously controlling for case (note that, in languages previously investigated in pronoun resolution studies, effects of transitivity have not been considered).

5.2. Experiment: Pronoun resolution in Niuean

As detailed in Chapters 3 and 4, most transitive verbs in Niuean have an ergative-absolutive case frame (4), wherein the subject is marked ergative and the object is marked absolutive. Subjects of intransitive verbs (5) are absolutive. An optional oblique object may be added to these types of verbs.

(4) Niuean transitive (ergative-absolutive)
Ne tutuli he kulī e lapiti.
PST chase ERG dog ABS rabbit
'The dog chased the rabbit.'

(5) Niuean intransitive (absolutive)
Ne poi e kulī (ke he lapiti).
PST run ABS dog (OBL rabbit)
'The dog ran (to the rabbit).'

A smaller number of Niuean transitive 'middle' verbs require an absolutive subject and an obligatory oblique-marked object, as in (6).

(6) Niuean middle (absolutive-oblique)
Ne fakaalofa e kulī ke he lapiti.
PST pity ABS dog OBL rabbit
'The dog pitied the rabbit'.

Here, I consider the Niuean anaphoric pronoun, *ia*. *Ia* is a third-person pronoun which may refer to any animate (either human or non-human)[1] argument from a preceding sentence, and can be marked as ergative, absolutive, or oblique, according to its relevant grammatical function, coupled with the case frame verb with which it appears. In the second conjunct in (7) for example, *ia* is the ergative subject of the verb *gagau* ('bite').

(7) Ambiguous ergative subject pronoun *ia*
[Ne tutuli he kulī e lapiti], [ti gagau **e** **ia** e pusi]
[PST chase ERG dog ABS rabbit] [and bite **ERG 3SG** ABS cat]
'The dog chased the rabbit, and **it**[2] bit the cat'.

Note that here, subject prominence, GF parallelism, and case parallelism *all* predict that, *he kulī* ('the dog'), would be the preferred referent of *ia*: it is the subject, it matches in grammatical function with *ia*, and it matches in (ergative) case with *ia*. If ergative case were to mark the *object* in the first conjunct, the theories would make divergent predictions: subject prominence and GF parallelism would predict a preference for a subject referent, and case parallelism would predict preference for an object referent. Because ergative case never appears on objects in Niuean, however, such a scenario cannot be tested. The theories do make divergent predictions however, when *ia* is marked *absolutive*. In the second conjunct in (8), for example, *ia* is the absolutive object of the *gagau* ('bite'). Notice that the first conjunct has an ergative-absolutive case frame, like in (7).

(8) Ambiguous object pronoun *ia*
[Ne tutuli he kulī e lapiti], [ti gagau he leona a **ia**]
[PST chase ERG dog ABS rabbit] [and bite ERG lion ABS **3SG**]
'The dog chased the rabbit, and the lion bit **it**'.

For (8), subject prominence predicts that the *subject* (the dog) should be the preferred antecedent. On the other hand, GF parallelism predicts that *ia* should match in grammatical function with its referent – that is to say, the *object* (the rabbit) should be the preferred referent. Added to this, the

[1] *Ia* is typically used to refer to a person and would thus be translated as English *he/she*; see (i) and (ii) below.
(i) Ne taute e **ia** e motokā (i) neafi.
PST fix ERG 3SG ABS car on yesterday
'He/she fixed the car yesterday' (Seiter 1980: 30, approx.)
(ii) Ne nākai fano kehe a **ia**.
PST NEG go away ABS 3SG
'He didn't go away' (Seiter, 1980: 14)

[2] Because *ia* refers to an animate entity, English 'it' is not an optimal translation; however, I translate *ia* as *it* in the sentences presented in this chapter so as not to stumble the English reader.

ergative-absolutive case marking of Niuean presents a third scenario: that *ia* should match in *case* with its referent. This would also mean that the absolutive argument (the rabbit) should be the preferred referent. Thus, for absolutive objects pronouns, subject prominence predicts a preference for subject antecedents, while both GF parallelism and case parallelism predict a preference for object pronouns.

GF and case parallelism make differing predictions, however, when absolutive *ia* is the subject, such as in the intransitive second conjunct in (9). Notice that, like in (7) and (8), the first conjunct has an ergative-absolutive case frame.

(9) Ambiguous absolutive subject pronoun *ia*
[Ne tutuli he kulī e lapiti], [ti tihe a **ia**]
[PST chase ERG dog ABS rabbit] [and sneeze ABS **3SG**]
'The dog chased the rabbit, and **it** sneezed.

For (9), subject prominence and GF parallelism both predict that the subject of the first conjunct, the dog, would be the preferred referent. Case parallelism, however, predicts that the absolutive object, the rabbit, would be preferred, as it matches in case with absolutive *ia*.

Let us briefly summarize the predictions for when the *first conjunct* has an ergative-absolutive case frame. When *ia* is an ergative subject of the *second conjunct*, all three accounts make the same prediction: that the preferred referent will also be an ergative subject. In view of this, the current study focuses on resolution of anaphoric *ia* with *absolutive case* only: when *ia* is the absolutive object of the second conjunct, subject prominence predicts a preference for a subject antecedent regardless of case and grammatical function. GF parallelism and case parallelism predict preference for an object antecedent. Finally, when *ia* is the absolutive subject of the second conjunct, subject prominence and GF parallelism predict a subject antecedent preference, while GF parallelism predicts an object antecedent preference.

Now consider the predictions when the case frame of the *first* conjunct is not ergative-absolutive, but is absolutive-oblique, as in (10). In (10a), the second conjunct contains an absolutive object pronoun, whereas in (10b), it contains an absolutive subject pronoun.

(10) First conjunct is absolutive-oblique

a. Pronoun in second conjunct is absolutive *object*

[Ne fakaalofa e kulī ke he lapiti], [ti gagau he leona a **ia**]
[PST pity ABS dog OBL rabbit] [and bite ERG lion ABS **3SG**]
'The dog pitied the rabbit, and the lion bit **it'**.

b. Pronoun in second conjunct is absolutive *subject*

[Ne fakaalofa e kulī ke he lapiti], [ti tihe a **ia**]
[PST pity ABS dog OBL rabbit] [and sneeze ABS **3SG**]
'The dog pitied the rabbit, and **it** sneezed.'

Once again, subject prominence predicts a preference for a subject antecedent across the board, irrespective of case or grammatical function. As for case parallelism and GF parallelism, however, the predictions from (8) and (9) are reversed. When *ia* is an absolutive object (cf. 8), case and GF parallelism make *differing* predictions: case parallelism predicts a preference for absolutive subject antecedent (i.e., with matching case), while GF parallelism predicts a preference for an object antecedent (i.e., with matching grammatical function). When *ia* is an absolutive subject, case and GF parallelism make the *same* predictions: that the preferred antecedent with would be the (both case matching- and grammatical function matching-) absolutive subject.

Finally, let us consider the role of verb transitivity. Comparing transitive verbs such as *fakaalofa* ('pity'), as in (6), with intransitive ones such as *poi* ('run'), as in (5), which have identical absolutive-oblique case frames, allows us to ask whether choice of referent for an ambiguous pronoun in a following conjunct influenced by whether object is an obligatory (as in 6) or optional (as in 5).

(5, repeated) Intransitive absolutive-oblique
Ne poi e kulī (ke he lapiti).
PST run ABS dog (OBL rabbit)
'The dog ran (to the rabbit).'

(6, repeated) Transitive absolutive-oblique
Ne fakaalofa e kulī ke he lapiti.
PST pity ABS dog OBL rabbit
'The dog pitied the rabbit'.

Given the role of transitivity in the processing of *wh* questions (see Chapter 4), it is reasonable to assume that transivtivity may also influence pronoun resolution. If we consider GF parallelism, we might expect a stronger bias for a transitive obligatory object referent, as compared with an intransitive optional object, when the second conjunct is also transitive. When the second conjunct is intransitive, we could expect a stronger bias for intransitive subject than for a transitive subject. Under subject prominence and case parallelism, however, transitivity should make no difference in referent choice: the absolutive argument, or subject should be consistently chosen as the referent.

A summary of the predictions of each account for each sentence type combination is given below in Table 1.

Antecedent sentence:	ABS Pronoun is *subject* in intransitive sentence	ABS Pronoun is *object* in transitive sentence
Transitive-ERG	✓ Subject prominence ✓Grammatical parallelism × Case parallelism	✓ Subject prominence × Grammatical parallelism × Case parallelism
Transitive-ABS	✓ Subject prominence ✓Grammatical parallelism ✓Case parallelism	✓ Subject prominence × Grammatical parallelism ✓Case parallelism
Intransitive-ABS	✓ Subject prominence ✓Grammatical parallelism ✓ Case parallelism	✓ Subject prominence ×Grammatical parallelism ✓ Case parallelism

Table 1: How the pronoun relates to the **subject** of the previous sentence across sentence types

The current study investigates resolution of anaphoric absolutive *ia* in sentences such as those discussed above. Two factors are crossed: (i) Antecedent type: the argument structure and case frame of the sentence in the first conjunct, and (ii) Pronoun position: whether *ia* is the subject or the object of the second conjunct. With regards to (i), I compare the three sentence types, as in Table 1 (note that these are the same three sentence types that were compared in previous experiment on *wh* questions in Chapter 4): transitive verbs which take an ergative-absolutive case frame (Transitive-ERG), transitive ('middle') verbs which require an absolutive subject and an obligatory absolutive object (Transitive-ABS) and intransitive verbs which require an absolutive subject, to which an (optional) oblique object was added to ensure that all sentences have two characters (Intransitive-ABS). Transitive-ABS and Intransitive-ABS verbs were differentiated via two diagnostics: whether or not the oblique object is obligatory, and whether or not it can be pseudo-incorporated with the verb; see Chapter 3 for full details. Comparing Transitive-ERG

sentences with Transitive-ABS sentences isolates the role of case: to what degree do listeners prefer that the referent of an absolutive pronoun bear the same (absolutive) case, whether subject or object, when transitivity is held constant? Meanwhile, comparing Transitive-ABS with Intransitive-ABS sentences isolates the role of transitivity: does the degree of preference for a subject (or object) referent differ according to whether or not the object is obligatory?

The second manipulation targets the sentence in which the pronoun appears. Two types of sentences are compared: intransitive verbs, in which *ia* is the absolutive *subject*, and transitive (ergative-absolutive) verbs, in which the *ia* is the absolutive *object*. The resulting six conditions are displayed in Table 2.

	First conjunct	Second conjunct
Transitive-ERG	*Ne tutuli* ***he kulī e lapiti,*** PAST chase **ERG dog ABS rabbit** 'The dog chased the rabbit,	***SUBJECT pronoun*** *ti tihe* ***a ia***. and sneeze **ABS 3SG** and it sneezed.'
Transitive-ABS	*Ne fakaalofa* ***e kulī ke he lapiti***, PAST pity **ABS dog OBL rabbit**, 'The dog pitied the rabbit,	
Intransitive-ABS	*Ne poi* ***e pusi ke he lapiti,*** PAST run **ABS dog OBL rabbit**, 'The dog ran to the rabbit,	
Transitive-ERG	*Ne tutuli* ***he kulī e lapiti,*** PAST chase **ERG dog ABS rabbit** 'The dog chased the rabbit,	***OBJECT pronoun*** *ti gagau* ***he leona a ia***. and bite **ERG lion ABS 3SG** and the lion bit it.'
Transitive-ABS	*Ne fakaalofa* ***e kulī ke he lapiti***, PAST pity **ABS dog OBL rabbit**, 'The dog pitied the rabbit,	
Intransitive-ABS	*Ne poi* ***e pusi ke he lapiti,*** PAST run **ABS dog OBL rabbit**, 'The dog ran to the rabbit,	

Table 2. The six conditions: sentences with Transitive-ERG, Transitive-ABS, and Intransitive-ABS as the first conjunct crossed with the pronoun position (subject or object) in the second conjunct.

The verbs in this study were chosen purely according to their case frame and argument structure. It is known, however, that the coherence relationship between two events (e.g., *chasing* and *biting*, *pitying* and *biting*, etc.) affects the interpretation of the pronoun (Kehler, 2002; Kehler et al., 2008 a.o.). Due to the fact that, in Niuean, a change in case frame and argument structure almost always

entails a change in the type of event described by the verb, it was not possible to create materials that control for event type while manipulating only the case frame and argument structure. A further related factor therefore also not controlled for in this study was the thematic roles of the arguments, which is also known to affect how pronouns are interpreted (see e.g., Stevenson, Crawley, & Kleinman, 1994; Arnold, 2001; 2010; Rohde & Kehler, 2013).

The procedural set up of this experiment follows that of the *wh* question experiment presented in Chapter 4: because Niuean is mostly used in conversational settings, a reading study is not appropriate (see Longenbaugh & Polinsky, 2016 for discussion). The stimuli were therefore presented auditorily, and participants were asked to "act out" the described events using pictures on a display board, as shown in Figure 1. In this setup, their actions revealed how they interpreted the pronoun. To ensure that all four corners of the display board hosted an image, either one (when the pronoun was the object, and the second conjunct was thus transitive) or two (when the pronoun was the subject, and the second conjunct was thus intransitive) referents would be redundant in the events described; participants were told in advance that not all four referents would necessarily participate (in Figure 1, for example, the cat does not participate in the events); see Materials.

Figure 1: Example display board, which was coupled with the examples in Table 2.

5.2.1. Method

5.2.1.1. Participants

Forty-six native speakers of Niuean (mean age: approx. 40; range: approx. 18-65) were recruited and tested in community settings on Niue Island (n = 36) and in Auckland and Christchurch, New Zealand (n = 10). Like all Niuean speakers, they were Niuean-English bilinguals. Three participants were excluded from analysis because of auditory or equipment problems. Participants were paid $25 NZ. Because this study was run together with the study of *wh* questions from Chapter 4, the same participants who took part in the *wh* question study also, simultaneously, took part in this study.

5.2.1.2. Materials

Twelve experimental displays were created, each containing four animals. In constructing contexts, two factors were manipulated in a 3 x 2 design: Antecedent type determined whether the verb in the first conjunct was (i) Transitive-ERG, (ii) Transitive-ABS, or (iii) Intransitive-ABS; see again Tables 1 and 2. Pronoun position manipulated whether the verb in the second conjunct was intransitive absolutive (i.e., contained an absolutive *subject* pronoun; Table 1), or transitive ergative-absolutive (i.e., contained an absolutive *object* pronoun; Table 2); the goal of the study was to determine how these pronouns are interpreted as a function of Antecedent type

To ensure that participants would devote sufficient attention to the task of pronoun resolution, and to dovetail with the procedure from the *wh* question study, each two-sentence context was followed by a comprehension question: half of the comprehension questions were about the first conjunct; the other half were about the second conjunct. Of the questions about the first conjunct, half were about the subject and half were about the object. Of the questions about the second conjunct, half were about the subject and half were about the object, with the exception of those in subject pronoun position conditions, which were about single argument of the intransitive verb (i.e., the subject). Items were created in consultation with, and recorded by, a native speaker of Niuean. The locations of images were counterbalanced to counteract spatial biases associated with whereabouts each image was placed on the display board.

Using a modified Latin-square design, two items were assigned to each condition; each participant saw each item once. Twelve additional fillers had non-ambiguous context sentences

which did *not* contain a pronoun, each consisting of two conjuncts; these were followed by an equal number of subject and object questions, of which half were about the first conjunct and half were about the second conjunct: these twelve fillers were the critical items from the *wh* question study presented in Chapter 4. The resulting twenty-four trials were presented in a pseudo-randomized order (with no adjacent trials of the same condition), preceded by three practice trials.

5.2.1.3. Procedure

The procedure for this study was identical to the procedure for the study of *wh* questions in Chapter 4. Participants were asked to listen to each story and, after hearing each conjunct, act out the events described using the cards on the display. Next, they answered a question about the story by touching one of the cards. The pre-recorded stimuli were played on a laptop over external speakers. Sessions lasted approximately 30 minutes. A digital camcorder was positioned beside the display board to record participants' actions.

5.2.2. Results

Each trial was coded for the image selected by the participant as the referent of the anaphoric pronoun *ia*: either the *subject* or the *object* of the first conjunct. Four trials (or 0.8%) were excluded due to equipment problems.

The dependent variable was whether or not participants selected the subject from the first conjunct as the referent of the pronoun in the second. The proportions of subject referent selection per condition are shown in Table 3.

	ia as ABS subject pronoun	***ia*** as ABS object pronoun	TOTAL
Transitive-ERG	74/86 (86%)	63/85 (74.1%)	137/171 (80.1%)
Transitive-ABS	77/86 (89.5%)	68/84 (81.0%)	145/170 (85.3%)
Intransitive-ABS	69/85 (81.2%)	76/86 (88.4%)	145/171 (84.8%)
TOTAL	220/257 (85.6%)	207/255 (81.2%)	

Table 3: Proportions of choice of subject from the first conjunct (either Transitive-ERG, Transitive-ABS, or Intransitive-ABS) as the referent for anaphoric *ia* (either in subject or object position) in the second conjunct.

On average, participants selected the subject of the previous sentence on 427 out of 512 trials, or 83.4% of the time: overall, the subject of the first conjunct is the preferred referent for *ia*. Crucially, this subject bias is seen across all conditions.

We also asked how the manipulations changed the choice of the antecedent. A logistic mixed-effects regression model was fitted to the data, with crossed random effects for participants and items (Baayen, Davidson & Bates, 2008), using the *lme4* package (R 3.4.4: Bates, Maechler, Bolker & Walker, 2015). The predictors Antecedent type and Pronoun position were contrast-coded using centred Helmert contrasts. The first coefficient, CASE, contrasted Transitive-ERG sentences with Transitive-ABS sentences and Intransitive-ABS sentences (CASE coefficient: 2/3). The second coefficient, TRANSITIVITY, contrasted Transitive-ABS sentences with Intransitive-ABS sentences (TRANSITIVITY coefficient: 1/3). As with the *wh* question study in Chapter 4, we used parsimonious models (Bates, Kliegl, Vasishth & Baayen, 2015), starting with the maximal random effects structure that converged, and simplifying it by removing random slopes that did not significantly improve the model. Full model details are provided in the Appendix.

There were no significant main effects of Antecedent type (*p*s > .135), meaning that the choice of the subject or object as the referent of ambiguous *ia* did not differ overall according to the case frame of the verb. There was also no main effect or of Pronoun position (.86 vs .81; β = 0.4676, *SE* = 0.2926, z = 1.598, p = .11): the choice of the subject or object as the referent of ambiguous *ia* did not differ according to whether *ia* was a subject pronoun or an object pronoun. However, the overall interaction of Antecedent type by Pronoun position was significant (*F (2)* = 9.26; *p* = .0098), meaning that the proportions of subject antecedent choice for the pronoun differed between whether the pronoun was in subject or object position as according to antecedent sentence type.

Planned comparisons were thus conducted for the three levels of Antecedent type, with Transitive-ABS coded as the reference level for each comparison. When the pronoun was in subject position, there was no difference between proportions of subject referent choice in Transitive-ERG compared with Transitive-ABS (.86 vs. .9; β = 0.05358, *SE* = 0.62140, z = .086, *p* = .931), and a marginal difference between Transitive-ABS and Intransitive-ABS (.9 vs. .81; β = -1.06637, *SE* = 0.60512, z = -1.762, p = .078): a first conjunct subject referent for a second conjunct subject pronoun is marginally less preferred when the verb in the first conjunct is intransitive (and the object is thus optional) compared with when it is transitive (and the object is obligatory.

When the pronoun was in object position, however, we find that proportions of subject referent choice are significantly lower in Transitive-ERG condition than the Transitive-ABS condition (.74 vs. .81; β = -1.3624, *SE* = 0.5642, z = -2.415, *p* = .0157). This isolates the effect of case, showing that a first conjunct subject referent for a second conjunct object pronoun is less preferred when the first conjunct subject is ergative than when it is absolutive. Proportions of subject referent choice are higher in the Intransitive-ABS condition compared with the Transitive-ABS condition (.88 vs. .81; β = 1.6041, *SE* = 0.6532, z = 2.456, *p* = .0141). This isolates the effect of transitivity, showing that a first conjunct subject referent for a second conjunct object pronoun is more preferred when the verb of the first conjunct is intransitive (and the object is optional) compared with when it is transitive (and the object is obligatory).

Further planned comparisons were conducted for each level of Pronoun position. Here, there was no effect of Pronoun position in either Transitive-ERG or Intransitive-ABS (*p*s > .194) and a marginal effect in Transitive-ABS (β = 1.0311, *SE* = 0.5683, z = 1.814, *p* = .0696), meaning that a first conjunct subject referent was marginally less preferred when the pronoun in the second conjunct is the object compared with the subject.

5.2.3. Discussion

The results show, firstly, that there is a preference for a subject referent for an ambiguous anaphoric pronoun in Niuean, with a subject referent chosen 83.4% of the time. This subject preference is not, overall, affected by predicate type, or by whether or not the pronoun is in subject or object position. If we consider once again the three accounts of pronoun resolution discussed earlier – subject prominence (i.e., accessibility-based accounts of pronoun resolution), GF parallelism, and case parallelism – only subject prominence predicts such a consistent subject preference. Recall that, under subject prominence, subjects are more accessible than objects, and are therefore more likely to be chosen as a referent for a pronoun.

The consistent effect of subjecthood may be due, in part, however, to the nature of the task: because participants only heard the second conjunct after they had 'acted out' the first conjunct, some effects of parallelism may have been obscured by the interruption created by this[3]. A further

[3] A further factor which may have influenced the results is the fact that Niuean exhibits radical pro-drop (see Massam, Peter & Wang, 2012; Massam, 2019, for discussion). As such, overt pronouns may be interpreted as having emphasis. Crucially, however, the pronouns were overt in all conditions in this study; as such, any effects of emphasis are expected to surface across all conditions.

important point to note is that effects of different thematic relations (cf. Kehler et al. 2008), and the resulting "propositional congruence" of the stimuli (cf. Oehrle, 1981) could not be controlled for in this task, because differences in verb case frame and transitivity cannot be extricated from simultaneous changes in verb meaning. For example, in the Intransitive-ABS condition the majority of verbs involved motion of the subject towards the (optional) object (e.g., *poi (ke he)* 'run (to)', *totolo (ke he)* 'crawl (to'), *kakau (ke he)* 'swim (to)'), whereas the Transitive-ABS condition did not involve motion verbs, because no such verbs allow a transitive absolutive-oblique frame. Niuean has extremely few verbs which allow more than one case frame, and, even in such instances, a change in case frame is accompanied by a change in the thematic roles of the subject and object. Thus, any further differences attributed to grammatical function, case or transitivity parallelism effects could also reasonably be due to differences in changes in thematic relations or propositional congruence created by each verb type. Bearing this in mind, I now consider effects of antecedent sentence type.

Notably, we find a difference between antecedent sentence type when the pronoun is in *object* position (i.e., when the second conjunct is transitive). Here, there is a stronger preference for a subject antecedent when the subject of the first conjunct is absolutive (in Transitive-ABS) compared with when it is ergative (in Transitive-ERG): this suggests an effect of *case*. A subject antecedent is more preferred still when the verb in the first conjunct is intransitive compared with transitive, such that the object of the first conjunct is non-obligatory as opposed to direct: this suggests an effect of *transitivity*). Such differences cannot be fully explained by subject prominence, as, although the preferred referent is consistently the subject, the *degree* of subject preference differs according to predicate type: such variation is not directly predicted by any such theory which makes reference to a hierarchy of accessibility. Instead, the varying degree of subject preference constitutes two novel effects.

First, the difference between Transitive-ERG and Transitive-ABS reveals a novel effect of case parallelism, shown for this first time in this study. There is a stronger preference for a subject antecedent when the subject matches in *case* with the target object pronoun, (i.e., when both are absolutive), than when the subject does not match in case with the target pronoun (i.e., when the subject is ergative).

Second, the difference between Transitive-ABS and Intransitive-ABS reveals a further effect of transitivity: a subject is a more likely referent for an ambiguous object pronoun when the verb in the first conjunct is intransitive, such that any object in that same conjunct is non-obligatory. This latter effect can be subsumed under theories of grammatical function (e.g., Smyth, 1994; Chambers & Smyth, 1998, a.o.), because all absolutive objects (including absolutive object pronouns) are, like oblique objects of Transitive-ABS verbs, obligatory arguments. In this way, the likelihood of selecting an entity realised as the *object* in the first conjunct as the referent for an object pronoun in a following conjunct *increases* when the oblique object in the first conjunct is, like the absolutive object in the second conjunct, obligatory.

On the other hand, when the pronoun is a *subject*, we find no significant differences between predicate types. Thus, effects of case parallelism and transitivity are limited only to object pronouns. This may be due to the fact that, in these conditions, influences of both subject prominence and grammatical function parallelism support a scenario in which a subject pronoun is understood to refer to a subject antecedent, and these influences simply override any effects of case. Effects of case and transitivity are also not influential enough to override the *overall* subject preference. It seems that, when parallelism affects are reduced (or absent), listeners default to a subject preference, as expected under subject prominence.

5.3. General Discussion and further implications

This study shows an overwhelming overall subject bias: the preferred referent for an anaphoric pronoun – whether in subject or object position – is, for Niuean speakers, a subject from prior discourse. Interestingly, this contrasts with the findings for *wh* questions in Chapter 4, which demonstrated an overall advantage for the *absolutive* argument. The contrast between these two studies is most apparent when we consider the ergative-absolutive condition: in the *wh* question study, the absolutive object is preferred over the ergative subject (i.e., the *unmarked* argument is preferred), whereas in the current pronoun study, the ergative subject is preferred over the absolutive object (i.e., the *subject* is preferred). It may be that the preference for unmarked arguments overrides any potential preference for subjects in *wh* dependency formation; this is possibly because dependency formation involves *anticipation* of an upcoming gap. Planning for a gap of an unmarked argument increases the chances of correctly predicting the gap (as there is an unmarked argument present in *all* sentences of Niuean; see Chapter 4 for full discussion). In

contrast, pronoun resolution involves establishing a relationship with an element *already* encountered previously in a sentence. Thus, there is no need to utilise the same kind of predictive strategy required for the planning of *wh* dependencies. In sum, it is possible that unmarked arguments are advantaged from the perspective of planning strategies in processing, but that subjects are favoured in other circumstances.

In spite of the overall subject bias, however, the current study is the first to provide evidence that case marking and transitivity also play a role in the choice of antecedent for an ambiguous pronoun: when comparing across predicates types in the object condition, we find that the *strength* of the subject preference is influenced by case marking and by transitivity. Ergative (i.e., marked) subjects are less preferred compared with absolutive (i.e., unmarked) subjects, and transitive subjects are less preferred compared with intransitive subjects. Notably, this pattern follows the same direction as in the *wh* questions study, in which dependencies of absolutive arguments were preferred compared with dependencies of ergative or oblique arguments (the effect of case), and dependencies of obligatory argument were preferred compared with dependencies of optional adjuncts (the effect of transitivity).

Ultimately, the results of the current study are consistent with the hierarchy posited in Centering Theory (see 2, repeated below), in which the subject is more likely than the object to be realised as a pronoun in following discourse.

(2 repeated) Ranking according to grammatical function (Grosz et al., 1995:15)

subject > object > other

However, this study crucially reveals that subjects do not behave as a homogenous category with respect to pronoun resolution. Recall the effect of case found when comparing Transitive-ERG with Transitive-ABS in the object pronoun condition: subjects with absolutive case (i.e., *unmarked* subjects) are more likely to be the antecedents of an anaphoric pronoun as compared with subject with ergative case (i.e., *marked* subjects). Following from this result, the hierarchy in (5) can be recast as in (11): unmarked subjects are more accessible than marked subjects, which are in turn more accessible than objects and other grammatical entities.

(11) Ranking according to case and grammatical function

unmarked subject > marked subject > object > other

Turning to the wider typological landscape, it is interesting to note that the hierarchical ranking in (5) is analogous to the grammatical function-based accessibility hierarchy for long distance dependencies (Keenan & Comrie, 1977), and also to the hierarchy that governs agreement (Moravcsik, 1978): in both of these, the subject is the most accessible entity for the relevant syntactic operations, followed by the object. Recall from discussion in Chapters 1 and 2, however, that the grammatical function-based hierarchy has since been recast in terms of morphological case. To account for the full range of cross-linguistic verb agreement patterns, Bobaljik (2008) proposes the hierarchy in (12), wherein arguments with unmarked case, irrespective of grammatical function, are typologically the most likely to trigger agreement.

(12) Morphological case Accessibility Hierarchy (Bobaljik 2008: 11)

Unmarked case (nominative, absolutive) > dependent case (ergative, accusative) > lexical/oblique case (dative)

Recall further that this hierarchy characterizes agreement patterns in ergative languages such as Hindi-Urdu, where earlier grammatical function-based hierarchies do not: the verb consistently agrees only with the absolutive argument, whether subject (13a) or object (13b). The ergative subject does not trigger agreement.

(13) Verb agreement in Hindi-Urdu (Mahajan, 1990: 74-78)

a. Absolutive subject

Siitaa aayii.
Sita.**FEM.ABS** arrived.PERF.**FEM.3SG**
'Sita arrived.'

b. Absolutive object

Raam-ne roTii khayii.
Ram.MASC-ERG bread.**FEM.ABS** eat.PERF.**FEM.3SG**
'Ram ate bread.'

When *both* arguments are absolutive, however, as in non-perfective clauses (14), grammatical function is relevant in determining which is the target for agreement: as per the early hierarchy of grammatical function, it is the *subject* with which the verb agrees.

(14) Two absolutive arguments in Hindi-Urdu (Mahajan, 1990: 72)

Siitaa kelaa khaatii thii
Sita.**FEM.ABS** banana.MASC.ABS eat.IMP.**FEM.3SG** be.PST.**FEM.3SG**
'Sita (habitually) ate bananas.'

Thus, when two arguments are *equally* ranked for (unmarked) case, the argument which triggers agreement is that which is highest ranked in terms of grammatical function (i.e., subject > object).

An analogous situation arises in neighbouring language Nepali. In Nepali, both ergative and absolutive arguments are accessible for verb agreement. In a clause containing both an ergative and an absolutive argument, it is the (ergative) subject which triggers verb agreement, as opposed to the (absolutive) object (15a). An absolutive argument triggers verb agreement only if it is the single argument of an intransitive verb, as in (15b). Thus, in Nepali, both case and grammatical function are relevant in determining which argument is the target for verb agreement.

(15) Verb agreement in Nepali

a. Ergative subject
Meri-le luga dhui səkəki che.
Mary.**FEM-ERG** cloth.MASC.PL wash PERF.**FEM.3SG**. be.**FEM.3SG**.
'Mary has washed the clothes.' (Chandra & Udaar, 2015: 65)

b. Absolutive subject
keti dherai degureki tshe.
girl.**FEM.ABS** much run.PERF PRES.**FEM.3SG**
'The girl has run a lot.' (Li 2007: 1465)

According to Bobaljik (2008), both unmarked arguments and dependent-marked arguments are accessible for verb agreement in Nepali; thus, the argument which is highest ranked for grammatical function is the one which triggers agreement. Verb agreement patterns are therefore akin to the findings of the current pronoun resolution study, in that *both* grammatical function and case marking are relevant determinants of the accessibility of a noun phrase.

5.4 Summary

This chapter has examined effects of subjecthood in terms of anaphoric pronoun resolution. I have presented a novel experimental study of pronoun resolution in Niuean – the first study of this kind to examine an ergative-absolutive language – which reveals that subjecthood is the most influential factor in determining the choice of referent for an ambiguous anaphoric pronoun in this language. This differs from the *wh* question study in Chapter 4, in which case unmarkedness was the most influential factor in determining *wh* dependency formation preference. There are, however, commonalities between the two studies: both reveal effects of verb transitivity on subject-object asymmetries, and both show an effect of case, wherein unmarked subjects are preferred as

compared with marked subjects. In the following chapter, I discuss how subjecthood and unmarkedness relate to one other.

Chapter 6

Cross-linguistic effects of Unmarkedness

Recall from Chapters 1 and 2 the Accessibility Hierarchy, which was first formulated as a grammatical function-based hierarchy, as in (1), to account for the typological prevalence of subject relative clauses and subject-verb agreement, and later re-cast as a hierarchy of morphological case, as in (2) to account for absolutive agreement patterns and syntactic ergativity.

(1) Accessibility by grammatical function (Keenan & Comrie, 1977:66)

Subject > Direct object > Indirect object > Oblique > Genitive > Object Complement

(2) Accessibility by morphological case (Bobaljik, 2008: 11)

Unmarked case > dependent case > lexical/oblique case

If the lower end of the hierarchy is accessible in any given language, then it follows that all elements higher are also accessible. For example, if indirect objects are accessible, then so too must be direct object and subjects. If dependent case-marked arguments are accessible, then so too must be arguments which bear unmarked case.

The previous two chapters have explored the roles of case and transitivity in two aspects of sentence processing: in the formation of *wh* dependencies (Chapter 4), in which unmarked arguments are privileged, and in the resolution of anaphoric pronouns (Chapter 5), in which subjects are privileged. The goal of the current chapter is to consider the implications of these findings for syntactic theory. I begin by discussing how subjecthood and unmarkedness are connected to each other, considering unmarkedness from a typological perspective. Finally, I explore the issue of what it means for a syntactic operation to target a certain syntactic case.

6.1. Can subjecthood be reduced to unmarkedness?

Given that accessibility (a.k.a. the ability of an argument to undergo a syntactic operation) is now typically defined in terms of morphological case, as according to the hierarchy in (2), and the most accessible argument is the unmarked argument, I now consider the question of whether a 'subject' should be defined as the unmarked argument. In nominative languages such as English, this issue

is relatively uncontroversial: the unmarked argument is also necessarily the subject according to all the diagnostics discussed in Chapter 1 (i.e., is most able to undergo A-bar movement, acts as the antecedent of a reflexive pronoun, as the imperative addressee, and as controlled PRO). In ergative languages such as Niuean, however, the notional subject, the ergative argument, is (usually) *not* considered as "unmarked". On the other hand, absolutive arguments – which *are* considered as unmarked - also do not exhaust the aforementioned diagnostics. As Aldridge (2004: 4) notes, "…the notion of the subject cannot be translated directly onto ergative systems […] there is no single grammatical function that corresponds to subject. Rather, the grammatical properties generally associated with nominative subjects tend to be divided between the ergative and absolutive roles in ergative languages. Therefore, neither ergative not absolutive can be said to exhaustively possess the typical properties of subjects."

To put it simply, this thesis very much re-affirms this view: subjecthood cannot be reduced to unmarkedness. An unmarked argument is not necessarily a 'subject', and a marked argument is not necessarily a non-subject. In some languages, unmarkedness and subjecthood align; in other languages, they do not. To affirm the relevance of both (un)markedness *and* subjecthood as *independent* properties in determining accessibility, consider again the results of the Niuean anaphora resolution study presented in Chapter 5. This study investigated the likelihood of an argument in the preceding context (e.g., *the cat* or *the dog* in the English sentence in 3) to be chosen as the antecedent for a linguistically ambiguous pronoun (e.g., *it* in 3).

(3) [The cat chased the dog] and [the lion bit *it*].

Recall from Chapter 5 that the ambiguous Niuean pronoun in the second conjunct ('*ia'*) was always marked with absolutive case: either as the subject of an intransitive verb or the object of a transitive ergative-absolutive verb. The first conjunct consisted of either (a) a transitive verb with an ergative-subject and absolutive object, (b) a transitive verb with an absolutive subject and an oblique object, or (c) an intransitive verb with an absolutive subject and a (non-obligatory) oblique object. The table in 1 (repeated from Chapter 5) shows the proportions of *subject* referent selection per verb type. Notice, crucially, that all values are above 50% - thus, the subject was always more likely to be chosen than an object, regardless of the case frame of the verb; in other words, regardless of whether it is marked (as in the Transitive-ERG condition) or unmarked (as in both

the ABS conditions). Thus, the subject is consistently the most accessible noun phrase in terms of pronoun resolution choice.

	ia as ABS subject pronoun	***ia*** as ABS object pronoun	TOTAL
Transitive-ERG	74/86 (86%)	63/85 (74.1%)	137/171 (80.1%)
Transitive-ABS	77/86 (89.5%)	68/84 (81.0%)	145/170 (85.3%)
Intransitive-ABS	69/85 (81.2%)	76/86 (88.4%)	145/171 (84.8%)
TOTAL	220/257 (85.6%)	207/255 (81.2%)	

Table 1: Proportions of choice of subject from the first conjunct as the referent for anaphoric *ia* in the second conjunct.

Independently of the consistent subject preference, we also see effects of case markedness: unmarked (i.e., absolutive) subjects are more preferred as a referent than marked (i.e., ergative) subjects. This confirms that subjecthood and (un)markedness are *two disparate* components, *both* of which entail greater accessibility of an argument. We have seen, in the *wh* question study of Chapter 4, that *unmarked* arguments hold a privileged status over marked arguments, independent of subjecthood, in *wh* dependency formation preferences (recall: the absolutive argument was preferred in the Transitive-ERG condition). Equally, the pronoun resolution study exemplifies how subjects can also hold a privileged status over objects, independently of markedness (here: the ergative subject is preferred even in the Transitive-ERG condition). When subjecthood is held constant, as across the two transitive conditions in the pronoun resolution experiment (recall that both sentence types had a subject and an obligatory object), we observe effects of markedness, with unmarked subjects preferred. Similarly, when markedness in held constant, we see effects of subjecthood, with subjects privileged over objects. This latter point is nicely illustrated by Hindi-Urdu phi-agreement patterning: recall that phi-agreement in Hindi-Urdu can only target the absolutive argument. When *both* the subject and object are absolutive, as in non-perfective clauses such as (4), then it is the *subject* which triggers phi-agreement. Thus, both subjecthood and unmarkedness determine which argument triggers agreement.

(4) Two absolutive arguments in Hindi-Urdu (Mahajan, 1990: 72)
Siitaa kelaa khaatii thii
Sita.**FEM.ABS** banana.MASC.ABS eat.IMP.**FEM.3SG** be.PST.**FEM.3SG**
'Sita (habitually) ate bananas.'

What makes nominative languages different from ergative languages is that, in nominative languages, both markedness and subjecthood co-vary: the privileges associated with being

unmarked and being the subject hold of the same argument. In ergative languages, they do not: the unmarked argument is *not* necessarily the subject. In sum, subjecthood and unmarkedness are two separate and distinct effects.

6.2. Considering '(un)markedness' cross-linguistically

In Chapter 4, we saw that so-called unmarked arguments are preferred compared with marked arguments with respect to *wh* dependency formation, and in Chapter 5, that unmarked subjects are preferred compared with marked subject in object pronoun resolution. Similarly, it was discussed in Chapter 2 how – at least, in ergative languages - unmarked arguments are more accessible with respect to *wh* displacement and phi-agreement than marked arguments. Nonetheless, when we refer to an argument as being 'unmarked' or 'marked', it is typically unclear whether 'markedness' is an artefact of morphology or of syntax, or of both. In this section, I define (un)markedness as a *distributional* property of a case, wherein morphology serves as a tool to categorise different case types, and degree of morphological exponence of a case follows (mostly) from its syntactic distribution. I argue that the unmarked case is the case which occurs in the largest number of syntactic environments (wherein 'environment' is defined as a syntactic argument position). As such, the unmarked argument is the argument whose case has the widest syntactic distribution.

6.2.1. Distribution and morphology

Recall from Chapter 1 that, in both nominative-accusative and ergative-absolutive languages, one case form is normally more likely to be morphologically marked than the other. In nominative-accusative languages, accusative case often has overt morphological form, while nominative case is often null. As an example, consider Maori in (5), in which the accusative case marker is realised as *i*.

(5) Maori (Harlow, 2007: 119)
Ka hoko [te matua] **[i ngā tīkiti].**
PRES buy the parent.NOM **ACC the tickets**
'The parent buys the tickets.'

In ergative-absolutive languages, absolutive case is usually not marked overtly, while ergative case is overt. As an example, consider the example from Samoan in (6), in which the ergative case marker is realised as *e*.

(6) Samoan (fieldnotes)
Sā kiki **[e le teine]** [le polo].
PST kick **ERG DET girl** DET ball.ABS
'The girl kicked the ball.'

The reverse scenarios – in which nominative is overt while accusative is null, and absolutive is overt while ergative is null – are extremely rare, if attested at all. In a *WALS* survey of 52 nominative-accusative languages with case marking on full NPs (Comrie, 2013), only 6 are reported as having marked morphologically nominative case and unmarked accusative case (see again Chapter 1). With respect to ergative-absolutive languages, only one such language – Nias, spoken in Sumatra – is reported as having morphologically marked absolutive and unmarked ergative (Brown, 2001, via Comrie, 2013). We do, however, find both nominative-accusative languages, such as Lativian in (7), and ergative-absolutive languages, such as Tongan in (8), in which *both* cases have overt morphology.

(7) Latvian (Mathiassen, 1997, via Comrie, 2013)
[Bērn-s] zīmē **[sun-i].**
child-NOM draw.PRES.3SG **dog-ACC**
'The child is drawing a dog'

(8) Tongan (Otsuka, 2010: 322)
Na'e fili **['e Sione] ['a Mele].**
PST choose **ERG John ABS Mary**
'John chose Mary'

If we consider the nominative argument ('bērn') as the unmarked argument in Latvian, and the absolutive argument ('Mele') as the unmarked argument in Tongan (as is indeed standard), we are making reference not to morphology, but to how a particular case is distributed across a language: nominative is regarded as syntactically unmarked in Latvian because it is the case form which also surfaces when the verb is intransitive, and only one argument is present, as exemplified in (9). Absolutive is syntactically as unmarked in Tongan for this same reason, as demonstrated in (10).

(9) Latvian intransitive (Mathiassen, 1997, via Comrie, 2013)
[Putn-s] lidoja.
bird-NOM fly.PST.3SG
'The bird was flying'

(10) Tongan intransitive (Otsuka, 2010: 318)

Na'e kata **['a Sione].**
PST laugh **ABS John**
'John laughed'

In this way, markedness is a *distributional* label: the 'unmarked' is the case which occurs most frequently in terms of verb argument structure. In particular, the unmarked case is the case that is present *both* in transitive and intransitive sentences. As such, morphology serves primarily as a means by which to distinguish between different cases, with exponence following from syntactic distribution: the distributionally unmarked case has lowest morphological exponence (and is, in many languages, null).

This view of (un)markedness receives support from the experimental study of *wh* dependencies in Niuean presented in Chapter 4. Crucially, recall that preference for the absolutive argument in real-time dependency formation is observed *in the absence of any informative morphological cues*: because Niuean is VSO, and *wh* fillers are not marked for case, no case marking information is available either prior to or during the interval (i.e., the verb and adverb) in which the preference for absolutive argument is observed. Thus, the observed absolutive preference does not arise due to morphological cues: instead, I propose that this preference arises from absolutive arguments having a larger distribution, compared with ergative- or oblique-case arguments. Because every sentence contains an absolutive argument, planning for an absolutive dependency maximizes the chances of correctly predicting the gap site.

Nonetheless, defining the unmarked argument as the argument that occurs in every sentence is problematic at a typological level: while it is true that an absolutive argument indeed occurs in every sentence in Niuean, there are other languages in which this generalization does not hold. I now consider each of these types of language in turn.

6.2.2. Tripartite languages

Tripartite languages present a problem for the proposal that 'unmarkedness' should be defined in distributional terms because an unmarked argument is not present in every sentence. As an example of this type of alignment, consider Nez Perce (Sahaptian). In intransitive sentences, the single argument is morphologically unmarked, as in (11a). In transitive sentences, however, both arguments bear as distinct case marker: the subject is marked ergative, and the object is marked

with accusative, or 'object' case, as in (11b). Thus, the (morphologically) unmarked case form of an intransitive subject is absent from transitive sentences.

(11) Nez perce (Deal, 2010: 77)

a. *Intransitive*
Hi-pním-se [pícpic].
3SUBJ-sleep-IMP cat
'The cat is sleeping.'

b. *Transitive*
[Ki-**nm** picpíc-**nim**] pee-p-ú' [cu'yéem-**ne**].
this-**ERG** cat-**ERG** 3/3-eat-PROSP fish-**OBJ**
'This cat will eat the fish.'

While the single argument of the intransitive in (11a) is *morphologically* unmarked, the question remains as to which of the three core case types of Nez Perce – unmarked, ergative, and object case – is unmarked distributionally (i.e., has the widest distribution). Indeed, it seems that the morphologically-unmarked case that appears in intransitive sentences has a wider distribution than ergative or object case: Nez Perce also has an antipassive[1] construction, which is characterized by a lack of portmanteau transitive agreement (see the preverbal marker *pee* in 11b) and the appearance of subject agreement in its place (Rude, 1985). Crucially, in antipassives constructions, both the subject and the object are *unmarked*, as in (12). In contrast, ergative case only occurs in sentences in which object case is present, and object case only appears when an ergative subject is present (Deal, 2010).

(12) Antipassive in Nez Perce (Deal 2010: 83)

[pit'íin] hi-'yáax-na [pícpic].
girl 3SUBJ-find-PERF cat
'The girl found her cat.'

It is therefore the morphologically unmarked argument in Nez Perce which appears to have the widest distribution in the language: both the subject and object of an antipassive appear in this form, as does the subject of an intransitive. Thus, Nez Perce does indeed seem to have a distributionally unmarked argument; however, its distribution is not such that it is present in *every* sentence.

[1] Nez Perce antipassives are also known as 'caseless clauses' in Deal (2010).

6.2.3. Split-S languages

In Split-S languages, intransitive subjects are marked differently according to whether the single argument of the verb is a thematic patient (i.e., with unaccusative verbs) or a thematic agent (i.e., with unergative verbs). Here I consider two examples of Split-S languages: western dialects of Basque, which is typically classified as an ergative-absolutive language, and Mazahua, which is typically classified as a nominative-accusative language (Knapp, 2008; 2011; López Reynoso, 2016, a.o.; see Partida Penalva, 2017 for discussion).

6.2.3.1. Western Basque

In Basque, subjects of transitive sentences are marked with the ergative case suffix *-k*, while objects of transitive are absolutive (null), as in (13).

(13) Transitive: ERG-ABS (Santesteban, Pickering & Branigan, 2010: 1)

[Medikua-k] [pirate] beldurtzen du.
doctor-ERG pirate.ABS frighten AUX
'The doctor frightens the pirate.'

In western dialects of the language, however, intransitive subjects do not receive uniform case marking: subjects of unergative verbs are marked ergative (14a) and subjects of unaccusative verbs are absolutive (14b) (this contrasts with eastern dialects of Basque, in which all intransitive subjects surface as absolutive).

(14) Intransitive (Aldai, 2008: 5)

a. Unergative: ERG subject

[Peru-k] dantzatu du.
[Peter.ERG] danced AUX
'Peter danced.'

b. Unaccusative: ABS subject

[Peru] erori da.
[Peter.ABS] fall AUX
'Peter has fallen.'

Given that both ergative and absolutive case are present in transitive clauses, and either can surface on the subject of an intransitive (depending upon the verb type), it is unclear which case in western Basque has the widest distribution. Similar to Nez Perce, however, consideration of other sentence types suggests that western Basque indeed *does* have an unmarked argument: as observed by Laka

(2006), in certain types of split ergative environments (namely, clauses with progressive aspect), both the subject and object of a transitive verb receive absolutive case (15). Furthermore, Rezac, Albizu, and Etxeparre (2010) note that, when a clause is non-finite, the subject is always absolutive: ergative case marking is systematically absent in this context: this is demonstrated in (16).

(15) Basque progressive clause (Laka, 2006: 173)

[Emakumea] [ogia] jaten ari da.
Woman.ABS bread.ABS eat PROG AUX
'The woman is eating the bread.'

(16) Basque non-finite clause (Rezac et al., 2010: 4)

Zer ikusi duzu? [Miren] [pianoa] jotzen
what.ABS seen AUX [Miren.ABS] [piano.ABS] playing
'What did you see? Miren playing the piano

Taking into account these additional sentence types suggests that that the distributionally unmarked argument in Basque is the absolutive, which is also the *morphologically* unmarked argument .

However, Constructions with root modal verbs constitute some counter-evidence to the idea that absolutive is the distributionally unmarked case: as discussed by Rezac et al. (2010), subjects of predicates with root modals are always marked ergative; this includes unaccusative subjects, as in (17).

(17) Basque ergative with root modals (King, 2009: 468)
[Nagusia-k] etorri behar du
[the.boss-ERG] come must AUX
'The boss must come'

Further detailed analysis is required to determine whether the absolutive argument is truly the distributionally unmarked argument across all dialects of Basque; I note for the present purposes simply that this cannot be established simply by considering canonical transitive and intransitive sentences alone.

6.2.3.2. Mazahua

Mazahua (Oto-Manguean) is a head-marking language, meaning that alignment is expressed via verbal agreement. Arguments themselves are not case marked, and are typically pro-dropped, as in the transitive sentence in (18). The subject agreement marker, which precedes the verbal stem,

encodes tense information as well as phi-features, whereas the object agreement marker, which appears after the verbal stem, encodes phi-features only.

(18) Mazahua transitive (Partida Penalva, 2017: 7)

ɾí-zeŋgwa-**ts'ɨ**
1.PRES-greet-**2**
'I greet you'

Similar to western dialects of Basque, intransitive subjects in Mazahua do not behave as a unified class with respect to agreement. Subjects of unergative verbs are cross-referenced by the same agreement as subjects of transitive verbs (19a), whereas subjects of unaccusative verbs are cross-referenced by the same agreement as objects of transitive verbs (19b).

(19) Mazahua intransitives (Partida Penalva, 2017: 6-7)

a. Unergative: subject agreement

ɾí-βɨɣɨ
1.PRES-run
'I run'

b. Unaccusative: object agreement

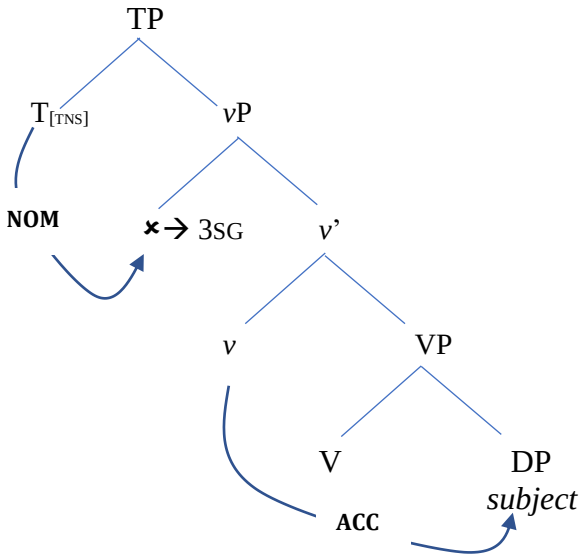
ò-tõɣɨ-**zɨ**
3.PST-faint-**1SG**
'I fainted'

Mazahua has been considered to have a nominative-accusative alignment, coupled with a Split-S system (Knapp, 2008; 2011; López Reynoso, 2016, a.o.). Partida Penalva (2017) proposes that transitive and unergative subject agreement constitutes assignment of nominative case by T^0, assigned to all external arguments, whereas object and unaccusative subject agreement spells out accusative case, assigned by v^0 to all internal arguments (regardless of whether an external argument is present). This raises the question of which case is the distributionally 'unmarked' case in Mazahua (note that, unlike in Basque, in which ergative case is marked by a suffix whereas absolutive is null, nominative and accusative case in Mazahua both have overt morphological spell-out).

It is possible, however, to argue that *nominative* is the distributionally unmarked agreement form. This is because in (19b) that the verbal stem is prefixed by a "subject" agreement marker, which encodes tense and has third person agreement features (in other words, it does not cross-reference the features of the unaccusative subject). As shown by Partidia Penalva (2017), the

nominative agreement prefix is *always* present, such that tense information may be encoded. In unaccusative sentences, however, it appears with *default* third person agreement features. Partidia Penalva argues, following Preminger (2011), that this arises due to the *failure* of the T^0 probe in such constructions to find a target for case assignment: the unaccusative subject is assigned (accusative) case by v^0, and there is no other argument present to receive nominative case. Tense agreement is therefore spelled out with default (third singular) phi-features. This structure is illustrated in (20) (note that, although Mazahua has VOS word order, I represent the position of an external argument as a left-branching specifier for readability; see also Partidia Penalva, 2017).

(20) Default third person agreement in unaccusatives



There are, however, reasons against designating the nominative as the unmarked argument on the basis of the agreement prefix in unaccusatives: as shown in (20), nominative case fails to be assigned. Thus, it can be said that the agreement prefix in (19b) does not spell out nominative case at all but serves merely as a tense marker. Since nominative case is not present in unaccsuatives, can any argument be made for considering nominative as the unmarked case? Given that the prefix associated with nominative case has the widest distribution of the two agreement markers as the prefix present in every sentence, I suggest that this be considered as the unmarked agreement marker.

6.2.3.3. Summary: Split S

Based upon the distribution of case marking in transitive and intransitive predicates, Split S languages appear not to have an unmarked argument. If we probe deeper, however, there is evidence that the argument termed 'absolutive' or 'nominative' could nevertheless be considered to be distributionally unmarked. One method for testing this proposal would involve testing which argument – if any – is favoured with respect to the processing of long-distance dependencies. If, as demonstrated for Niuean in Chapter 4, unmarked arguments are privileged in dependency formation, then processing studies of this type may be used as a diagnostic for unmarkedness in languages where it is otherwise unclear.

6.2.4. Summary: what is 'unmarkedness'?

This section has explored what it means for a case, such as nominative or absolutive, to be "unmarked". Unmarkedness is defined here as a *distributional*, as opposed to a morphological, property of a case. The unmarked case of a given language is the case which appears in the *largest set of environments*, whereby an 'environment' is defined as a *syntactic argument position*. For Niuean, this is also the case that marks subjects of all intransitive verbs (i.e., absolutive), and thus appears in every sentence. Cross-linguistically, however, an unmarked case does not necessarily mark all intransitive subjects (as in e.g., Basque and Mazahua), or appear in every sentence (as in e.g., Nez Perce). Morphological markedness, I suggest, follows from distributional markedness: the less restricted an environment a case appears in, the less likely it is to have overt morphological exponence.

6.3. Why are syntactic operations sensitive to case?

Having defined unmarked case as the case which has the widest syntactic distribution, several related questions remain open. Firstly, if we say that an unmarked argument is most accessible, what does it mean for an argument bearing a particular case to be 'accessible'? Secondly, if unmarked case is the case with the largest syntactic distribution, why are syntactic operations such as phi-agreement are sensitive to distribution?

The plot so far is as follows: in view of data from ergative languages - in which subjecthood and unmarked case do not covary - the morphological case hierarchy in (2) is typically adopted in

lieu of the grammatical-function based hierarchy in (1) (See Chapters 1 and 2). In Chapter 2, I proposed that A-bar movement is not governed by the hierarchy in (2), but that phi-agreement is. Thus, phi-agreement is sensitive to markedness of an argument: the less marked an argument is, the more accessible it is to syntactic operations. In other words, an argument with unmarked case is *better able* to act as a target for phi-agreement than an argument with marked case. If unmarkedness is a *distributional* property of a case, as I propose, the question that remains is this: why is phi-agreement, or indeed any other syntactic operations sensitive to (2), dependent upon how a particular case marking is syntactically *distributed*? For example, *why* is it that tense agreement in a language like Hindi-Urdu can only target an unmarked argument?

There are two seemingly independent – but arguably related – ways to consider this issue. The first is from the perspective of the narrow syntax; the second relies upon the intersection distributional properties of the different arguments with non-syntactic cognitive principles. Let us consider first the *syntactic* perspective: it is observed that there is a correlation between distributional unmarkedness and morphological unmarkedness, with distributionally unmarked arguments having the least morphological marking, and more distributional marked arguments having more morphological marking. In this vein, it is well-established in syntactic literature that certain DPs comprise more structure than others: some DPs consist of only a DP layer, while others have a further layer - for example, K(ase)P (see e.g., Bittner & Hale, 1996) or PP. This is especially evident, for example, with French causative constructions, in which a contrast is found between transitive and intransitive verbs (see Richards, 2010 for full discussion). Specifically, the causee of an intransitive verb (*Paul* in 21a) is morphologically *unmarked* (but bears syntactic accusative case), whereas the causee of a transitive verb is marked with the preposition *à* (Paul in 21b): as such, it is said to bear dative (a.k.a. oblique) case.

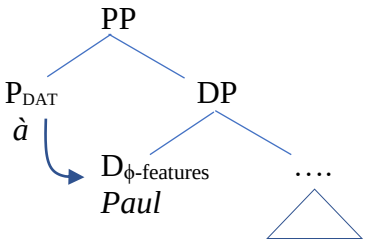
(21) Causative constructions in French (Kayne, 2004: 193)

a. Intransitive: unmarked causee
Jean a fait manger Paul.
Jean AUX make.3SG eat.INF Paul
'Jean has made Paul eat.'

b. Transitive: *à* marked causee
Jean a fait manger la tarte à Paul.
Jean AUX make.3SG eat.INF DET tart to Paul
'Jean has made Paul eat the tart.'

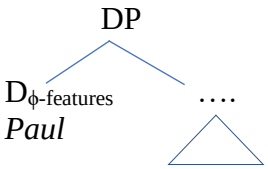
Preminger (2014) argues that dative-marked DPs such as *à Paul* in (21b) comprise more structure than morphologically unmarked DPs like *Paul* in (21a). Specifically, dative DPs are structurally enclosed in a dedicated PP layer, in which dative case is assigned by P^0 to the DP, as in (22).

(22) Structure of PP datives (Preminger, 2014: 137)



Preminger further argues, following Abels (2003, among others), that PP constitutes a phase domain; as such, the phi-features of the D^0 head are *not visible* to higher syntactic probes. As such, they become *inaccessible* for syntactic operations such as agreement, as per Chomsky's (2001) 'Activity Condition', which states that XPs which have no uninterpretable features, such as the PP in (24), are *inactive*. This state of affairs contrasts with simple DPs, such as *Paul* in (21a), which consist only of a DP layer, as in (23). As such, the phi-features of the D^0 head are *visible* to higher syntactic probes, rendering the DP *accessible* for further operations (and in need of syntactic Case).

(23) DP structure



Indeed, Preminger (2014) further illustrates how dative-marked PPs in French are unable to undergo A-movement: in (24), the dative PP *à Marie* cannot move to subject position.

(24) Dative movement to subject (McGinnis, 1998, via Preminger, 2014: 143)

*[À Marie]$_i$ semble ___ [Jean avoir du talent].
to Marie seem.3SG Jean have.INF DET talent.
'Jean seems to Marie to have talent.'

Preminger concludes that operations such as A-movement and phi-agreement are *case-discriminating*, in the sense that they cannot target nominals which have a PP layer. This explains

why nominals bearing dative (i.e., oblique) case – at the lower end of the morphological case hierarchy in (2) – are typically inaccessible.

As for the contrast between dependent-marked and unmarked nominals – recall from (2) that dependent nominals are less accessible than unmarked nominals – consider a proposal by Polinsky (2016). Polinsky argues specifically that ergative languages can be divided into two types: those in which the ergative nominal is a DP as in (23), and those in which the ergative is a PP, as in (22). In short, there is cross-linguistic variation in terms of whether an ergative argument comprises a structural PP layer (thus, rendering it inaccessible) or consists merely of a DP layer (rendering it accessible). If we generalise this proposal from ergative to *all* dependent-marked arguments (i.e., both ergative and accusative), then it follows that there is variation in terms of whether a dependent-marked argument contains a PP layer or not. In languages in which it contains a PP layer, it is inaccessible to higher syntactic probes: this would capture the lack of ergative agreement in Hindi-Urdu, for example. In languages in which the dependent-marked argument consists only of a DP layer, it is accessible: this would capture the state of affairs in Nepali, in which ergative-marked arguments are accessible for agreement (but dative-marked arguments are not). This contrast is illustrated in (25).

(25) **a. Only unmarked arguments accessible (e.g., Hindi-Urdu)**

unmarked case	> dependent case	> lexical/oblique case
DP	> **PP**	> **PP**

b. Unmarked/dependent-marked arguments accessible (e.g., Nepali)

unmarked case	> dependent case	> lexical/oblique case
DP	> DP	> **PP**

One could also envisage a language in which all core arguments – unmarked, dependent, and lexical, consist only of a DP layer, and thus all are accessible for operations such as agreement, as in (25c).

c. All core arguments accessible

unmarked case	> dependent case	> lexical/oblique case
DP	> DP	> DP

This is the state of affairs in Basque, for example: absolutive, ergative, and dative argument are all able to trigger agreement on the auxiliary, as illustrated by the ditransitive construction in (26).

(26) Basque agreement of absolutive, ergative, and dative arguments (Berro & Etxeparre, 2018: 788)

Ni-k zu-ri liburuak ekarri d-i-**zi-ki**-zu-**t**
I-ERG you-DAT book.DET.PL bring TNS-RT-**3.ABS.PL**-**2.DAT**-DF-**1.ERG**
'I brought you the books'

In sum, the lower on the accessibility hierarchy an argument is, the more likely it is to be comprise more complex phrasal structure, and subsequently, the less accessible it is.

There are two problems with this line of reasoning. The first is empirical: if arguments on the lower end of the hierarchy are inaccessible to higher syntactic probes by virtue of *having more complex internal structure*, then they should be inaccessible across-the-board. In other words, they are expected to be inaccessible to *all* syntactic probes, including, crucially, A-bar movement probes. Indeed, Polinsky's (2016) proposal – namely, that ergative arguments are in some languages DP and in other languages PPs – is intended to capture why some languages are morphologically ergative (i.e., DP-ergative languages) and others are syntactically ergative (i.e., PP-ergative languages). Thus, the scenario presented above predicts that syntactic ergativity and absolutive-only agreement should go hand-in-hand: either an argument is accessible to higher probes, or it is inaccessible. However, syntactic ergativity and absolutive-only agreement often do *not* go hand-in-hand: in Hindi-Urdu, for example, ergative arguments are freely able to undergo A-bar movement but are not accessible for agreement.

The second problem is a conceptual one: how does the scenario presented above fit with the notion of (un)markedness as a *distributional* property of a case? In other words, *why* should it be that a case which has a wider syntactic distribution has less internal syntactic structure than a marked case (which has a narrower syntactic distribution and more internal structure)? This brings us to the second perspective on the issue of why unmarked arguments are more accessible. Under this second approach, the correlation of accessibility with syntactic distribution is a frequency effect: that is to say, unmarked arguments are more accessible within the syntax of a language simply *because* they have a larger syntactic distribution - and thus, occur more frequently. Following this same line of reasoning, these more frequently occurring arguments are also more likely to be morphologically unmarked because this strategy reduces production effort. As such, accessibility of unmarked argument could be viewed as a syntactic manifestation of a more domain-general cognitive principle, namely the *Mere-Exposure* (a.k.a. the *Familiarity*) effect, first

developed by Zajonc (1968) within the field of social psychology. The Mere-Exposure effect is a principle by which increased exposure to something of a certain kind results in development of a more positive reaction to other things of that kind. For example, Zajonc (1968) observed that people tend to rate more frequently occurring words, and more frequently presented nonce words, more positively than less frequently occurring words, and less frequently presented nonce words. In addition, the Mere-Exposure effect has been shown to obtain for visual images (e.g., Craver-Lemley & Bornstein, 2006, a.o.) and sounds (e.g., Murphy, Monahan, & Zajonc, 1995, a.o.), among other phenomena; see Zajonc (2001) for a comprehensive overview. Notably, even when the relevant stimuli are presented subliminally, the Mere-Exposure effect still obtains (e.g., Bornstein, 1989, a.o.); thus, conscious awareness of the stimuli is not a prerequisite for the effect. This leads to the possibility of whether syntactic accessibility effects – wherein, for example, distributionally-unmarked arguments are typologically more targetable for phi-agreement than marked arguments – could be viewed as a further instantiation of Mere-Exposure, or of an analogous effect. Equating syntactic accessibility with Mere-Exposure is not at all straightforward, however: in social psychology, Mere-Exposure triggers a *positive* reaction to a frequently-presented stimulus. In syntax, however, an operation such as phi-agreement or A-movement cannot inherently be viewed as 'positive' (or indeed a 'negative') in the same way that reactions within social psychology can be labelled as 'positive'. Nonetheless, what the Mere-Exposure effect shows at the very least is that *exposure* to a certain kind of stimulus triggers a *response* towards that stimulus. If we take this broader version of the principle, we may be able to implement it in syntactic theory as a means of explaining why arguments whose case marking follows a wider distribution are more likely to affect a response – such as phi-agreement or A-movement – from the grammar. This principle is summarized in (27).

(27) Mere-Exposure in accessibility

The wider the syntactic distribution of a case, the more accessible arguments marked with that case are for syntactic operations.

Thus, we have two possible hypotheses for why distributionally-unmarked arguments are more accessible than distributionally-marked arguments. Under one hypothesis, accessibility follows from the greater phrasal structure of marked arguments compared with unmarked

arguments. Alternatively, accessibility is a result of a more general frequency exposure principle, which has been demonstrated to apply in non-linguistic domains.

Some support for the idea that accessibility of argument is conditioned by its case distribution comes from comparisons between Hindi-Urdu and Nepali. Recall from earlier discussion that in Hindi-Urdu, only absolutive DPs are accessible for phi-agreement (see again 25a) whereas in Nepali, both dependent (i.e., ergative) and absolutive DPs are accessible (see again 25b). If we follow the reasoning that accessibility is governed by structure, then ergative arguments would be analysed as PPs in Hindi-Urdu and DPs in Nepali[2]. In the absence of independent evident to support this, however, I consider a different approach: the ergative argument is accessible in Nepali because it has a sufficiently-wide syntactic distribution (at present, it is unclear as to how 'sufficiently' can be quantified, especially as this likely would vary across syntactic operations such as phi-agreement and movement). We find evidence that the distribution of the ergative in Nepali is, at the very least, *larger than the distribution of the ergative in Hindi-Urdu,* in which the ergative is inaccessible: the two languages in fact differ in terms of case marking in non-perfective aspects (e.g., habitual, imperfective). In Hindi-Urdu, ergative case is systematically absent: subjects of all verbs are marked as absolutive in the non-perfective, as in (28).

(28) ABS transitive subject in Hindi-Urdu non-perfective (Mahajan, 1990: 72)
Siitaa kelaa khaatii thii
Sita.**FEM.ABS** banana.MASC.ABS eat.IMP.**FEM.3SG** be.PST.**FEM.3SG**
'Sita (habitually) ate bananas.'

In Nepali, however, ergative case marking is partially retained in non-perfective aspects (Li, 2007): transitive subjects are obligatorily marked as ergative when they are inanimate (29a) and optionally when they are animate (29b). Thus, ergative case appears in more syntactic envrinoments in Nepali than in Hindi-Urdu.

(29) ERG transitive subject in Nepali non-perfective (Li, 2007: 1466-7)

a. Inanimate subject: obligatory ERG
dʱuŋgahɒru-**le** dzʰjal pʰuɽadɒitsʰɒ
stone.PL-**ERG** window.ABS break.IMP.PRES.3PL
'The stones are breaking the window'

[2] An alternative proposal might be that ergative case is assigned inherently (e.g., by Voice^0) in Hindi-Urdu but structurally (e.g., by T^0) in Nepali. This is unlikely to be so, however: see Butt and Poudel (2007) for evidence that ergative in Nepali is indeed inherent and not structural.

b. Animate subject: optional ERG[3]
Ram**(-le)** kitab lekʰdɒitʰijo
Ram-**ERG** book.ABS write.IMP.PRES.MASC3SG
'Ram was writing a book'

The contrast between Hindi-Urdu and Nepali provides some support for a view in which accessibility of a DP is correlated with its syntactic distribution, as per the Mere-Exposure hypothesis in (27).

6.4. Summary

This chapter has explored the interaction between subjecthood and unmarkedness and considered what it means for an argument to be 'unmarked'. I argued that subjecthood *cannot* be reduced to unmarkedness: both subjecthood and unmarkedness are independent factors, both of which influence accessibility of an argument. I further defined unmarkedness as a distributional property of a case, wherein the unmarked argument is the argument which appears in the largest number of syntactic environments. I then considered the roles of both unmarkedness and subjecthood in determining accessibility for syntactic operations, and in particular, explored why distributionally unmarked arguments are more accessible than marked arguments. The forthcoming chapter discusses how syntactic ergativity fits with the picture presented.

[3] Butt and Poudel (2007) argue that the putative optionality is in fact governed by the distinction between individual- and stage-level predication, with ergative marking indicating individual-level predication.

Chapter 7

Syntactic ergativity revisited

This chapter examines syntactic ergativity and addresses the question of what causes restrictions upon movement of ergative arguments in some languages, but not in others. I focus on primarily on two languages families: Tongic Polynesian and Mayan, within which some languages are syntactically ergative while other languages are not. Studying related languages in this way allows us to control as much as possible for extraneous cross-linguistic factors which may arise when comparing unrelated languages, and thus pinpoint the source of this particular syntactic variation. Following previous proposals, I argue that syntactic ergativity arises due to A-movement of the absolutive object to a position above the ergative subject, leaving the ergative subject trapped in its base position (Bittner & Hale, 1996; Aldridge, 2004; Coon et al., 2014, a.o.). I propose a novel account of how the ergative argument becomes trapped, appealing to the constraint on crossing dependencies (Kuno & Robinson, 1972).

7.1 Overview and preliminary questions

Recall that syntactic ergativity characterises the inability of an ergative argument to undergo A-bar movement. This is shown again below, for two syntactically ergative exemplar languages: Tongan (Tongic Polynesian; 1a) and Q'anjob'al (Mayan; 1b).

(1) Syntactic ergativity

a. Tongan ERG relative clause (Otsuka, 2000: 115, adapted)
*E siana$_i$ na'e [t$_i$_] langa 'a e fale
DET man PST build ABS DET house
'The man who built the house'

b. Q'anjob'al ERG *wh* question (Coon et al., 2014: 16)
*Maktxel$_i$ max-Ø y-il-a' [t$_i$_] [ix ix]?
who ASP-3ABS 3ERG-see-TV the woman
'Who saw the woman?' (Grammatical as: 'Who did the woman see?')

Tongan and Q'anjob'al utilise different syntactic strategies to convey the meanings intended in (1). In Tongan, a resumptive pronoun appears at the ergative gap site (2a). Q'anjob'al uses either

an antipassive or an Agent Focus construction (2b), in which ergative case marking is absent and the verb appears with an intransitive post-verbal status suffix, instead of a transitive one.

(2) Syntactic ergativity repairs

a. Tongan: ERG resumption (Otsuka, 2000: 115)
E siana$_i$ [na'e **ne$_i$** langa 'a e fale]
DET man PST **RP** build ABS DET house
'The man who built the house'

b. Q'anjob'al: Agent Focus (Coon et al., 2014: 43, adapted)
Maktxel$_i$ max-Ø il-**on**-i [t$_i$_] [ix ix]?
who ASP-3ABS see-**AF**-ITV the woman
'Who saw the woman?'

Not all ergative languages are syntactically ergative, however. In Niuean and Ch'ol (Mayan; related to Q'anjob'al), the ergative argument can be freely displaced, as in (3).

(3) No syntactic ergativity

a. Niuean (Longenbaugh & Polinsky 2016: 107)
E fifine$_i$ ne ofaofa t$_i$___ a Sione
ABS woman PST love ABS Sione
'The woman who loves Sione'

b. Ch'ol (Coon et al., 2014: 16)
Maxki$_i$ tyi y-il-ä-Ø jiñi wiñik [t$_i$ __]?
who ASP 3ERG-see-TV-3ABS DET man
'Who saw the man?'

In the study of *wh* questions in Niuean presented in Chapter 4, it was shown that absolutive dependency gaps are preferred over ergative dependency gaps during processing of *wh* questions even in a non-syntactically ergative language. Similarly, in Chapter 5, we saw that absolutive subjects are preferred compared with ergative subjects as referents in the resolution of ambiguous pronouns. To sum, absolutive arguments enjoy a privileged status in processing as compared with ergative arguments. If we consider the contrast between (2) and (3) in light of these results, this might lead to a view in which syntactic ergativity is a grammaticalization of a processing constraint wherein ergative dependencies are avoided because they incur processing difficulty. This would mean that the preference for absolutive gaps over ergative gaps is a soft, non-grammaticalized constraint in languages like Niuean and Ch'ol, and a hard, grammaticalized constraint in languages

like Tongan and Q'anjob'al (cf. Hawkins 2004; see Polinsky, 2016 for discussion and rebuttal of this view). Like Polinsky (2016), I argue against a soft vs. hard grammaticalization approach of this type. Evidence against such an approach comes from the fact that, within languages families such as Mayan and Tongic Polynesian, there is a degree of *systematicity* in terms of which languages are syntactically ergative and which are not. In other words, syntactic ergativity does *not* appear to be randomly distributed, as would be expected under the aforementioned grammaticalization account. I ultimately argue, however, that syntactic ergativity *is* nonetheless a result of grammaticalization of a processing constraint, namely, the *Constraint on Crossing Dependencies* (CCD; Kuno & Robinson, 1972; Steedman, 1984), wherein processing of crossing dependencies is more difficult than processing of nested dependencies. Languages within the Mayan and Tongic Polynesian families have grammaticalized the CCD, which means that crossing dependencies are *ungrammatical*. Within these families, in languages which have crossing dependencies, syntactic ergativity is the result. In languages which have only nested dependencies, no syntactic ergativity arises. The next section explores the systematic variation in these families in terms of the presence or absence of syntactic ergativity.

7.2 Systematic variation: Tongic Polynesian and Mayan

This section discusses previous literature which looks at variation in the presence versus absence of syntactic ergativity in Polynesian and Mayan languages. For both families, it has been proposed that syntactic ergativity arises from A-movement of the absolutive object past the ergative subject for case licensing purposes, trapping the ergative argument *in situ*.

7.2.1 Tongic Polynesian

Consider firstly contrasts within the Tongic sub-branch of Polynesian. While Niuean shares many properties with its closest linguistic relatives, Tongan and Niuafo'ou, there are notable differences between the languages in terms of the syntactic behaviour of ergative and absolutive arguments. In Niuean, both ergative and absolutive arguments can be freely displaced (see Chapter 3). Both Tongan and Niuafo'ou, on the other hand, exhibit syntactic ergativity: while absolutive arguments undergo movement freely, movement of the ergative argument requires a resumptive pronoun, as in the Niuafo'ou *wh* questions in (4) and the Tongan relative clauses in (5).

(4) Syntactic ergativitiy in Niuafo'ou (Tsukamoto 1988:405-408, approx.)

a. ERG subject *wh* question
Ko ai$_i$ ne ***(ina$_i$)** taa'i 'ou?
PRED who PST **RP** hit 2SG
'Who hit you?'

b. ABS object *wh* question
Ko ai$_i$ ne tautea'i e te faiakó___$_i$?
PRED who PST punish ERG DET teacher
'Who did the teacher punish?'

c. ABS subject *wh* question
Ko te aa$_i$ ne hokó?
PRED DET what PST happen
'What happened?'

(5) Syntactic ergativity in Tongan (Otsuka 2000: 115-6)

a. ERG subject relative clause **[=(2a)]**
E siana$_i$ [na'e ***(ne$_i$)** langa 'a e fale]
DET man PST **RP** build ABS DET house
'The man who built the house'

b. ABS object relative clause
E fefine$_i$ ['oku 'afa'i 'e Sione ___$_i$]
DET woman PRES love ERG Sione
'The woman who Sione loves'

c. ABS subject relative clause
E fefine$_i$ [na'e 'alu ___$_i$ ki Tonga]
DEF woman PST go to Tonga
'the woman who went to Tonga'

Otuska (2000) shows that Tongan also exhibits syntactic ergativity in raising constructions (6): while absolutive arguments can raise from an embedded clause to a matrix clause, ergative arguments cannot (data from Niuafo'ou is unavailable). This contrasts with Niuean, in which *both* ergative and absolutive arguments can raise (see again Chapter 3).

(6) Raising in Tongan (Otsuka 2000: 183)

a. No raising (baseline)

‘Oku totonu [ke taa’i ‘e he faiako ‘a e tamaiki pau’u].
PRS advisable COMP hit ERG DET teacher ABS DET children naughty
‘It is advisable that the teacher hit the naughty children.’

b. Raising of ERG subject

*‘Oku totonu **’a e faiako**$_i$ [ke taa’i __$_i$ ‘a e tamaiki pau’u].
PRS advisable ABS DET teacher COMP hit ABS DET children naughty
‘It is advisable that the teacher hit the naughty children.’

c. Raising of ABS object

‘Oku totonu **‘a e tamaiki pau’u**$_i$ [ke taa’i ‘e he faiako __$_i$].
PRS advisable ABS DET children naughty COMP hit ERG DET teacher
‘It is advisable that the teacher hit the naughty children.’

Niuean and Tongan are both alike and yet different with respect to coordination (data from Niuafo’ou is unavailable). In terms of similarities, both languages have different connectives for coordinating phrases of different sizes: the connective *mo (e)* coordinates XPs as large as AspP[1] (7) while *ti* (Niuean) and *pea* (Tongan) coordinates larger XPs (e.g., TP, CP), as evidenced by the fact that a tense marker and/or complementizer may follow the connective (8, 9), which is ungrammatical when following *mo (e).*

(7) AspP coordination with *mo (e)*

a. Niuean *mo e*

Ne tutuli e Sione a Mele **mo e** kata a Carla.
PST chase ERG Sione ABS Mele **and** laugh ABS Carla
‘Sione chased Mary and Carla laughed.’

b. Tongan *mo* (Otsuka 2000: 121)

Na’e kai lahi ‘a Sione **mo** ne fiefia.
PST eat much ABS Sione **and** 3S. happy
‘Sione ate a lot and he was happy.’

[1] This type of coordination is treated as AspP coordination, instead of *v*P coordination, because the verbs in each conjunct appear to the left of its respective subject; therefore, the verb can be assumed to have raised to AspP. An example of *v*P coordination in Niuean is given below in (i); notice that the subject is shared between the conjuncts, indicating raising of a single (complex) *v*P.

(i) *v*P coordination in Niuean

Ne koli mo e tagi a Sione
PST dance and cry ABS Sione
‘Sione danced and cried’

(8) TP coordination with *ti/pea*

a. Niuean *ti* + tense marker
Ne kai e Mele e apala **ti/*mo e** kua kai e Sione e pea.
PST eat ERG Mele ABS apple **and** PERF eat ERG Sione ABS pear
'Mele ate an apple and Sione ate a pear.'

b. Tongan *pea* + tense marker (Otsuka 2000: 121)
Na'e kai lahi 'a Sione **pea/*mo** na'e inu lahi 'a Pita.
PST eat much ABS Sione **and** PST drink much ABS Pita
'Sione ate a lot and Pita drank a lot.'

(9) CP coordination with *ti/pea*

a. Niuean *ti* + complementizer
…**ti/*mo e** kaeke ke tutuli e Sione a Mele…
…**and** if TNS chase ERG Sione ABS Mele
'…and if Sione chases Mele…'

b. Tongan *pea* + complementizer (Churchward 1953, via Otsuka 2010: 323)
…**pea/*mo** kapau kuo 'osi 'a e ngaué…
… **and** if PERF finished ABS DEF work
'and if the work has been done….'

Niuean and Tongan differ, however, with respect to which DPs may be elided from the second conjunct under coreference with a DP in the first conjunct. In an accusative coordination pattern (Dixon 1994), the elided argument is always the subject (regardless of any differences in case). In an ergative coordination pattern, the elided argument must match in case with the argument in the first conjunct with which it co-refers. Niuean has a consistently accusative coordination pattern, with both *mo e* (10a, b) and *ti* (11a, b), while Tongan has an accusative pattern with *mo* (i.e., AspP) coordination only (10c, d). When *pea* is used to conjoin two XP (of TP or larger), an ergative pattern arises, whereby the elided DP in the second conjunct must match in case with the overt DP in the first (Dixon 1979; Otsuka 2000; 2010; Clemens & Tollan, 2019). In (11c, d), an absolutive argument in the first conjunct must co-refer with an elided absolutive argument in the second conjunct, regardless of subjecthood.

(10) Coordination with *mo (e)*

a. Niuean: accusative pattern (ERG subject + elided ABS subject)
Ne tutuli e Sione a Mele **mo e** kata.
PST chase ERG Sione ABS Mele **and** laugh
'Sione chased Mele and (Sione/*Mele) laughed.'

b. Niuean: accusative pattern (ABS subject + elided ERG subject)
Ne kata a Sione **mo e** tutuli *e/a Mele.
PST laugh ABS Sione **and** chase *ERG/ABS Mele
'Sione laughed and (he) chased Mele.'
(NOT: '…and Mele chased (him).')

c. Tongan: accusative pattern (ERG subject + elided ABS subject)
Na'e taa'i 'e Hina 'a Mele **mo** kata.
PST hit ERG Hina ABS Mele **and** laugh
'Hina hit Mele and (Hina/*Mele) laughed.' (Otsuka, 2000: 129)

d. Tongan: accusative pattern (ABS subject + elided ERG subject)
Na'e tangi 'a Hina **mo** taa'i *'e/'a Mele.
PST cry ABS Hina **and** hit * ERG /ABS Mele
'Hina cried and (she) hit Mele.'
(Not: '…Mele hit (her).') (Otsuka, 2000: 129)

(11) Coordination with *ti/pea*

a. Niuean: accusative pattern (ERG subject + elided ABS subject)
Ne tutuli e Sione a Mele **ti** kata.
PST chase ERG Sione ABS Mele **and** laugh
'Sione chased Mele and (Sione/*Mele) laughed.'

b. Niuean: accusative pattern (ABS subject + elided ERG subject)
Ne koli a Sione **ti** tutuli *e/a Mele.
PST dance ABS Sione **and** chase *ERG/ABS Mele
'Sione danced and (he) chased Mele.'
(NOT: '…and Mele chased (him).')

c. Tongan: ergative pattern (ABS object + elided ABS subject)
Na'e taa'i 'e Hina 'a Mele **pea** tangi.
PST hit ERG Hina ABS Mele **and** laugh
'Hina hit Mele and (Mele) cried.'
(Not: '…and (Hina) cried.') (Otsuka, 2000: 123)

d. Tongan: ergative pattern (ABS subject + elided ABS object)
Na'e tangi 'a Hina **pea** taa'i 'e/*'a Mele.
PST cry ABS Hina **and** hit ERG /*ABS Mele
'Hina cried and Mele hit (her).'
(Not: '…and (she) hit Mele…') (Otsuka, 2000: 123)

Thus, when two AspPs are coordinated, both languages exhibit an accusative pattern. A difference emerges when XPs of TP or larger are coordinated: while Niuean maintains an accusative pattern, Tongan exhibits an ergative pattern.

A final difference between Niuean and its linguistic neighbours concerns post-verbal word order. Niuean has strict VSO order with two full DP arguments (VOS occurs only when the object is pseudo-incorporated; see again Chapter 3): VOS is ungrammatical, as in (12). Tongan and Niuafo'ou, however, allow both VSO and VOS order (13, 14). For both languages, word order affects interpretation, such that the object is emphasized in VOS constructions (see Polinsky & Potsdam, 2018, for an information structure account of Tongan word order alternations).

(12) Niuean word order: strict VSO (Clemens 2014: 151; p.c.)

a. ✓VSO
Kua kai he tama e niu.
PFV eat ERG child ABS coconut
'The child ate the coconut.'

b. ✗VOS
*Kua kai e niu he tama.
PFV eat ABS coconut ERG child
'The child ate the coconut.'

(13) Tongan word order: VSO or VOS (Otsuka 2000: 282)

a. ✓VSO
Na'e 'ave 'e Sione 'a Mele.
PST take ERG Sione ABS Mele
'Sione took Mele.'

b. ✓VOS
Na'e 'ave 'a Mele 'e Sione.
PST take ABS Mele ERG Sione
'Sione took Mele.'

(14) Niuafo'ou word order: VSO or VOS (Tsukamoto 1988: 280)

a. ✓VSO
Ne taa'i 'e te tangatá 'ia te tamasi'î.
PST hit ERG DET man ABS DET boy
'The man hit the boy.'

b. ✓VOS
Ne taa'i 'ia te tamasi'î 'e te tangatá.
PST hit ABS DET boy ERG DET man
'The man hit the boy.'

Clemens and Tollan (2019) propose a unified account of variable word order and syntactic ergativity in Tongan and Niuafo'ou on the one hand, and of strict word order and lack of syntactic ergativity in Niuean on the other. Their account employs a 'high ABS' approach to syntactic ergativity (Campana, 1992; Bittner & Hale, 1996; Aldridge, 2004; Coon et al., 2014, a.o). Clemens and Tollan argue that the differences between Niuean, and Tongan and Niuafo'ou stem from the locus of absolutive case assignment (with ergative consistently assigned inherently by v^0). In Tongan and Niuafo'ou, absolutive case is assigned high, by T^0. Thus, in order to be case-licensed, the object must undergo A-movement into a *local* configuration with TP: the AspP phase edge (see Harwood 2013, for arguments that AspP constitutes the highest head of the inner phase), as in (15). This movement of the absolutive object past the ergative subject traps the ergative subject in situ, preventing it from undergoing A-bar movement (the reasons for why the ergative argument becomes trapped will be discussed later in this chapter). In Niuean, however, absolutive case is assigned low – by v^0 (see Massam 2006)[2]. As such, the absolutive object is not required to move

[2] Legate (2008) specifically proposes that Niuean is an ABS=DEF language: absolutive-marked subjects receive abstract nominative Case, absolutive-marked objects receive abstract accusative Case, and nominative and accusative have syncretic (default) spellout. This raises the question of whether Niuean is in fact a covert *tripartite* language, like Nez Perce, and if so, which abstract case (if any) is distributionally unmarked.The results of the *wh* question eye-tracking experiment presented in Chapter 4 do not, however, favour an approach in which Niuean absolutive is actually two distinct structural cases. On the contrary, there is no evidence to suggest that absolutive does not behave as a single, uniform case with respect to processing. Recall the three predicate types tested in the study: Transitive-ERG (a transitive ergative-absolutive cased predicate), Transitive-ABS (a transitive absolutive-oblique cased predicate), and Intransitive-ABS (an intransitive absolutive-oblique cased predicate, in which the object is non-obligatory). Of these three predicate types, comparing Transitive-ERG and Transitive-ABS isolates the effect of case (Intransitive-ABS cannot be minimally compared with Transitive-ERG because they two predicate types contrast in both case frame and verb transitivity). If we consider the looks during the ambiguous portion of the question (i.e., the verb plus adverb region), then we find that absolutive *objects* (in Transitive-ERG conditions) and absolutive *subjects* (in the Transitive-ABS conditions) behave as a uniform class in that they receive *similar degrees of attention during wh dependency planning*. Absolutive objects in the Transitive-ERG condition received a similar proportion of looks to absolutive subjects in the Transitive-ABS, in both the ambiguous region (.5 vs .47) and during the verb alone (.5 vs .44). If we conduct planned statistical comparisons of these proportions – using a linear mixed-effects regression model, with data logit-transformed and again taking Transitive-ABS as the reference level - we find that the difference between looks to absolutive objects and absolutive subjects is indeed *not* significant either during the whole ambiguous region (β = .3156, *SE* = .7123, *t* = .44, *p* = .66) or during the verb alone (β = .6464, *SE* = .9120, *t* = .71, *p* = .48). In other words, there is no evidence that absolutive subjects are processed differently from absolutive object, which would be expected they constituted two different structural cases.

Since there is no evidence in terms of processing that absolutive case in Niuean is actually two disparate structural cases, let us re-consider the data on which Legate (2008) bases her proposal for Niuean. Legate argues that absolutive case in Niuean constitutes the default 'Elsewhere' case because it appears in environments in which abstract Case is not assigned, such as in *ko* topicalization constructions (i).

(i) ***Ko* topicalization in Niuean (Seiter 1980, via Legate 2008: 61)**

Ko **e fifine** ia, to fakaatā mai e ia ke uta e au e motokā haana
PRED **ABS woman** that to let DIR ERG she SUBJ take ERG I ABS car her
'That woman, she'll let me take her car'

According to Legate, because the noun phrase *fifine* ('woman') appear with absolutive marking, then absolutive must be the morphological default in the languages. This is because *fifine* is not in a structural position in which it

for case licensing. The ergative argument, therefore, can freely undergo A-bar movement, as in (16).

(15) Tongan/Niuafo'ou: high ABS

(16) Niuean: low ABS

The 'high ABS' approach to syntactic ergativity is also intended to capture differences in post-verbal word order. Clemens and Tollan propose that VOS in Tongan and Niuafo'ou is a reflex of case assignment: as illustrated in (15), the *base* position of the Tongan absolutive object follows the subject, while the *case* position precedes it. As such, the object can be pronounced in either of its syntactic positions, with the choice governed by pragmatic factors (i.e., movement is covert in VSO). In Niuean, however, the object does not move from the lower position[3], and VSO is therefore the only option (see again 16). With respect to coordination, Clemens and Tollan suggest that argument co-reference in coordination (a condition for ellipsis of the argument in the second conjunct) must be between the structurally highest argument in each conjunct. Niuean exhibits a consistently accusative coordination pattern, because the structurally highest argument is, at all

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can be assigned an abstract Case. There is evidence, however, that the noun phrase which appears in a *ko* topicalization is indeed *not* assigned case. Recall from Chapter 3 that marking in Niuean for common nouns like *fifine* differs from marking used for proper nouns. Common nouns in ergative case are preceded by the marker *he*, which absolutive common nouns are preceded by *e*. In contrast, proper nouns with ergative case are preceded by *e*, while absolutive proper nouns are preceded by *a*. Thus, if the marker *e* in the *ko* topicalization in (i) is indeed an absolutive case marker, then we expect that a proper noun in the same position to be preceded by *a.* As evidenced by (ii), however, this is not so: the conjoined proper noun and pronoun *Sione mo au* ('Sione and I') appears with *no* case marker. Thus, absolutive cannot reliably be taken to be the morphological 'Elsewhere' case in Niuean.

(ii) ***Ko* topicalization with proper noun/pronoun (Seiter 1980: 117)**
Ko **Sione mo au**, ne onoono fetū noa nī a maua he taha pō.
PRED **John with me** PST look stars just ABS we on INDEF night
'Sione and I were going out star-gazing one night'

Macdonald and Massam (2015) argue that the *e* which precedes nouns in absolutive position is in fact not a case marker, but rather, a determiner, which explains why it does not precede proper names. Thus, for common nouns, absolutive case in Niuean has null morphological exponence. Importantly for the purposes in hand, absolutive morphology does *not* appear with caseless nouns in *ko* constructions.

In the absence of compelling evidence that Niuean absolutive case morphology spells out two distinct structural cases, it should be assumed that all absolutive-cased nouns are assigned Case by a single source.

[3] This analysis assumes Clemens's (2014) approach to V-initial word order in Niuean. If we adopt Massam's VP-fronting account, the object raises out of VP, to the inner specifier of *v*P (i.e., below the subject). Nothing crucial hinges upon this.

points in the derivation shown in (16), necessarily the subject (whether transitive ergative or intransitive absolutive). Tongan, however, has an accusative pattern only with *v*P coordination (at which point in the derivation, the subject is the structurally highest argument). At the point of the derivation at which XPs of TP or larger are coordinated, absolutive movement has taken place, giving rise to a syntactically ergative coordination pattern.

7.2.2. Mayan

One issue with this Clemens and Tollan's (2019) account is that the small number of languages in the Tongic family means that the proposed correlation lacks strong empirical support. However, if we turn to another substantially larger language family, namely Mayan, we find a more convincing connection between syntactic ergativity and linear order. The Mayan language family consists of approximately 30 different languages, spoken in Central America by around six million people (Clemens, to appear). Mayan languages exhibit a head-marking ergative-absolutive case alignment (see Chapters 1 and 2 for further discussion), as exemplified by the Ch'ol example in (17). The ergative marker in (17a) is attached to the verbal stem as a prefix, while the absolutive marker attaches postverbally. Note that Mayan languages consistently allow pro-drop.

(17) Ch'ol (Coon et al., 2014: 13)

a. Transitive
Tyi **y**-il-ä-**yety.**
ASP **3ERG**-see-TV-**2ABS**
'She saw you.'

b. Intransitive
Tyi uk'-i-**yety.**
ASP see-ITV-**2ABS**
'You cried.'

Throughout the Mayan language family, ergative marking is consistently expressed via a verbal prefixal - argued by Coon (2017) to spell-out inherent *agreement* between v^0 and the external argument. There is variation, however, as to the position of the absolutive marker (argued to be a doubled clitic as opposed to agreement, as discussed below). In some languages - Ch'ol included – it attaches postverbally. In other languages, however, it *precedes* the verbal stem, as exemplified by Q'anjob'al in (18).

(18) Q'anjob'al (Coon et al., 2014: 13)

a. Transitive
Max-**ach** **y**-il-a'.
ASP-**2ABS** **3ERG**-see-TV
'She saw you.'

b. Intransitive
Max-**ach** oq'-i.
ASP-**2ABS** cry-ITV
'You cried.'

Tada (1993) influentially noted that languages such as Ch'ol, in which the absolutive marker follows the verbal stem, are mostly not syntactically ergative, and languages such as Q'anjob'al, in which the absolutive marker precedes the verbal stem, consistently are. The languages surveyed by Tada (1993), along with further additions by Coon et al. (2014), are given in Table 1.

	Syntactic ergativity (n = 17)	**No syntactic ergativity (n = 7)**
ABS marker precedes verbal stem (n = 15)	Akatek, Awaktek, Chuj, Kaqchikel, K'ichee', Q'anjob'al, Q'eqchi, Mam, Poqomam, Poqomchi', Popti', Sapapultek, Sipakapense, Tz'utujil, Uspantek.	
ABS marker follows verbal stem (n = 9)	Ixil, Yucatec	Ch'ol, Chontal, Itzaj, Lakatun, Mopan, Tojol'-ab'al, Tseltal

Table 1: Distribution of syntactic ergativity in Mayan according to placement of the ABS clitic

According to a Fischer's Exact Test, the correlation between the presence vs. absence of syntactic ergativity and the position of the ABS marker is indeed highly significant ($p_{\text{two-tailed}} < .001$): languages with syntactic ergativity have a preverbal ABS, while languages without syntactic ergativity have a postverbal ABS. A systematic correlation of this type is not predicted under a soft vs. hard grammaticalization proposal (à la Hawkins, 2004; see Polinsky, 2016 for discussion), suggesting instead that syntactic ergativity is connected with the position of the ABS clitic.

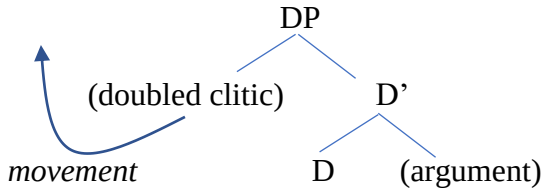
Aissen (2017), however, presents a challenge to the association between syntactic ergativity and the location of the ABS marker, noting that the preverbal vs. postverbal placement

of also ABS varies according to language sub-family groupings. Notably, all of the languages in the top left cell of the Table 1 belong to the Greater Q'anjobalan or K'ichean-Mamean subfamilies, and six out of seven of the languages in the lower right cell belong to the Greater Lower Mayan subfamily (i.e., Yucatecan and Greater Yucatecan). Thus, she suggests that both the placement of the ABS marker and the presence or absence of syntactic ergativity vary as a result of areal diffusion and are not causally correlated. There are two objections to ruling out a causal correlation, however. Firstly, it is entirely possible that both syntactic ergativity and preverbal ABS placement result indeed from the same underlying phenomenon, which itself varies according to subfamily. Secondly, it is noteworthy that the presence vs. absence in each language of Agent Focus marking – a well-known repair strategy for syntactic ergativity (see again 2b) – correlates perfectly with the presence or absence of syntactic ergativity: all syntactically ergative languages have Agent Focus marking, and all of the non-syntactically ergative languages lack it. In particular, the two languages in the bottom left cell - Ixil and Yucatec - which both exceptionally have syntactic ergativity and *post*verbal ABS placement, both also have Agent Focus marking. Notably, these two languages are from different subfamilies: Ixil belongs to the same subfamily grouping as the syntactically ergative languages in the upper left cell, and Yucatec belongs to the same subfamily grouping as the (majority of) on-syntactically ergative languages in the lower right cell. What is important here is that Agent Focus marking is not *only* used as a repair strategy for syntactic ergativity (see Coon et al., 2014; discussed below), but also in non-finite subordinate clauses. Thus, if it can be argued – as in Coon et al. (2014) - that preverbal ABS placement, syntactic ergativity, and the presence of Agent Focus marking all arise from the same underlying phenomenon, then this would substantially weaken the areal diffusion account.

7.2.2.1. High vs. low ABS in Mayan (Coon et al., 2014)

Let us first return briefly to the question of the status of the ABS marker in Mayan languages. Coon (2013, 2017) argues that Mayan absolutive morphemes are *doubled pronominal clitics* (as opposed to agreement markers). According to a movement account of clitic doubling, clitics are D^0 elements that A-move from within a larger DP – which also contains the argument to which the clitic doubles (see 19) - to attach to a higher structural head (e.g., Uriagereka 1995; Anagnostopoulou, 2003; Nevins, 2011), see Coon (2017) for more detailed discussion.

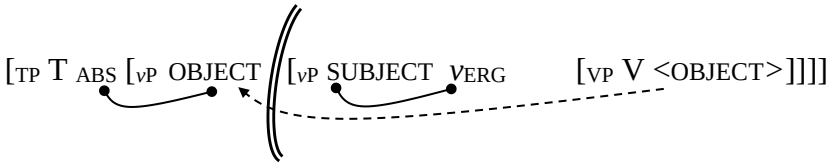
(19) Pronominal clitic doubling



Coon et al. propose that Mayan languages vary according to where the ABS clitic moves to. In languages in which ABS appears *preverbally* (e.g., Q'anjob'al), it moves to the *v*P phase edge, past the position of the ergative subject, and attaches to the higher aspectual marker in T^0. In languages in which it appears *postverbally* (e.g., Ch'ol), it attaches low (e.g., to v^0 itself; see Coon, 2017). The proposal reason for this variation is the locus of absolutive case assignment: absolutive can be assigned either high, by T^0, or low, by v^0. If it is assigned by T^0, the object must undergo movement past the ergative subject; if it is assigned by v^0, the object remains *in situ* (see also Campana, 1992; Bittner & Hale, 1996; Aldridge, 2004, for related proposals of syntactic ergativity).

In *preverbal* ABS languages, ABS case is assigned high, by T^0, such that the ABS argument must move into a local configuration with T^0 – namely, the *v*P phase edge – in order to have case checked[4]. In transitive sentences, this movement of the absolutive object traps the ergative argument in situ – by occupying the only *v*P phasal escape hatch - and prevents it from undergoing A-bar movement, as in (20) (cf. also the aforementioned account for Tongic languages proposed by Clemens and Tollan, 2019, which is based upon Coon et al.'s proposal for Mayan).

(20) Preverbal ABS = high ABS

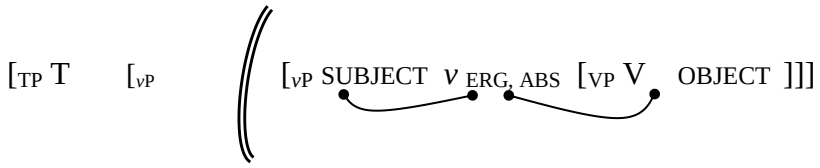


[4] While the ABS clitic is preverbal, full third person DPs are postverbal. Coon et al. (2014) suggest that either (i) the full DP forms a chain headed in the *v*P phase edge, of which only the lower copy is pronounced, or (ii) the full DPs are adjoined in a higher right-edge adjunct position, as per Jelinek (1984).

Note that this account also explains why intransitive ergative subjects can consistently undergo A-bar movement, as discussed in Chapter 2: because absolutive case is not assigned, then there is no absolutive argument occupying the *v*P phase edge, such that the ergative argument is not trapped.

In *postverbal* ABS languages, absolutive case is assigned low, by v^0, such that the ABS argument does not need to occupy the phase edge and remains in situ - as in (21) - allowing the ABS clitic to attach directly to v^0 and be spelled out post verbally[5]. Thus, in a transitive sentence, the ergative argument is *not* trapped and can freely undergo A-bar movement.

(21) Postverbal ABS = low ABS



In sum, Postverbal ABS languages are akin to Niuean: absolutive case is assigned low, the absolutive argument does not move for case, and no syntactic ergativity arises. Preverbal ABS languages, on the other hand, are like Tongan and Niuafo'ou: absolutive case is assigned high, requiring A-movement of the absolutive argument, which gives rise to syntactic ergativity.

Further evidence that syntactic ergativity in Mayan is a result of high absolutive case assignment comes from a type of repair strategy involving Agent Focus marking. Recall from earlier discussion that syntactically ergative Mayan languages utilise Agent Focus (among other strategies) to circumvent the restriction on A-bar movement of a transitive ergative subject. An example of Agent Focus in a Q'anjob'al *wh* question is given in (22b), alongside the parallel attempted ungrammatical transitive subject question in (22a) for comparison.

[5] Coon et al. in fact propose that postverbal ABS languages fall into Legate's (2008) classification of "ABS = default" languages, in which ABS case on intransitive subjects is structural nominative Case, assigned by T^0, and ABS case on transitive objects is structural accusative Case, assigned by v^0. Conversely, Coon (2010, 2013), Coon and Preminger (2011), and Coon & Mateo-Pedro (2011) propose that ABS in languages like Ch'ol is consistently assigned by v^0. In view of an objection by Aissen (2017) to the "ABS = default" approach (namely, that it predicts that ABS markers should attach preverbally in intransitive sentences like in 41b), I assume the latter approach.

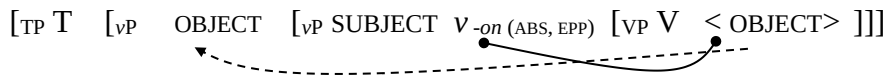
(22) Q'anjob'al transitive subject *wh* questions

a. ERG *wh* question (Coon et al., 2014: 15, adapted)
*Maktxel$_i$ max-**ach** **y**-il-a'?
who ASP-**2ABS** **3ERG**-see-TV
Attempted: 'Who saw you?'

b. Agent Focus *wh* question (Coon et al., 2014: 43)[6]
Maktxel$_i$ max-**ach** il-**on**-i?
who ASP-**2ABS** see-**AF**-ITV
'Who saw you?'

Notice that in an Agent Focus construction, the ergative agreement prefix is absent. The verb is suffixed by the Agent Focus marker *-on* and an intransitive status suffix. Coon et al. propose that the Agent Focus marker functions as a low (i.e., *v*P) case licenser. The reason the transitive subject can undergo movement in (22b) is, according to Coon et al., that the transitive object was exceptionally case-licensed low, by v^0, as opposed to by T^0. Coon et al. analyse the Agent Focus marker as a special type of v^0 which requires an intransitive status suffix and does not assign ergative case[7] to the subject, but rather, assigns low structural case to the *object*. They posit that intransitive (as well as transitive) v^0 bears an EPP feature, which forces the object to move to the *v*P phase edge, explaining why the preverbal position of the absolutive clitic in Agent Focus constructions (equally, movement could also be triggered by the EPP on T^0, as proposed by Polinsky, 2016). However, they also propose that intransitive *v*P is not phasal; therefore, the subject is not trapped, and can freely undergo movement. This is schematized in (23); notice the absence of the phase boundary, which allows for the subject to be displaced.

(23) Case licensing in Agent Focus constructions



Evidence that the Agent Focus marker indeed functions as a low case licenser comes from the fact that it also surfaces in environments which do not involve movement, but rather, comprise a non-

[6] Coon et al. further note that Agent Focus in Q'anjob'al is restricted to clauses involving third person agents; in other words, ergative displacement is unproblematic in constructions (e.g., involving focus fronting) in which the subject is first or second person. They suggest that the 1st and 2nd person arguments are potentially merged above the A-landing site of the absolutive object, such that they are not trapped by object A-movement. Alternatively, it could be that such constructions in fact do not involve movement at all, but rather, a biclausal cleft construction (see e.g., Henderson and Coon, 2017).

[7] Specifically, Coon et al. label the status suffix marker as v^0 and the AF marker as a lower Voice^0. Nothing crucial hinges upon the choice of terminology here; I label AF as v^0 for consistency with earlier discussion of Polynesian.

finite clause. In the Q'anjob'al example in (24), notice that the non-finite clausal complement of *uj* ('be able to') lacks an aspect marker. This can be taken as indication that T^0 is absent. In order to ensure that the object *Malin* ('Maria') is case licensed, the Agent Focus form of v^0 appears, which assigned low absolutive case to the object.

(24) Q'anjob'al AF in non-finite clauses (Coon et al., 2014: 51, approx.)

Chi uj [hin y-il-**on**[-i] ix Malin]
ASP be.able.to 1ABS 3GEN[8]-see-**AF**-ITV CLF Maria
"Maria can see me."

Coon et al. take this as evidence that the function of the Agent Focus marker in syntactically ergative Mayan languages like Q'anjob'al is as a *low* case licenser. This explains why only syntactically ergative languages have an Agent Focus strategy, while non-syntactically ergative languages like Ch'ol, do not: syntactic ergativity arises from the high (i.e., from T^0) locus of absolutive case, and languages in which absolutive is licensed high necessarily exhibit (i) preverbal, as opposed to postverbal, absolutive clitics, and (ii) an Agent Focus strategy to compensate for the otherwise lack of a low case licenser.

7.2.2.2. Further issues

Coon et al.'s account is highly advantageous in that it explains the correlation between (i) preverbal absolutive clitic positioning, (ii) syntactic ergativity, and (iii) the presence of Agent Focus marking. It is, however, faced with some empirical problems. In particular, a phase-based explanation of how the ergative argument becomes trapped in this type of scenario makes incorrect predictions both for A-bar movement in Mayan and for the broader typology of movement asymmetries. Consider firstly movement within Mayan. As pointed out by Assmann et al. (2015), a phase-based account predicts that, in languages like Q'anjob'al, *no arguments* besides the absolutive should be able to undergo movement. In other words, it is not only the ergative argument that is trapped, but every element below the *v*P phase edge. However, this is not the case with ditransitive goal arguments. As illustrated in (25), ditransitive goals *can* undergo displacement in Q'anjob'al. Thus, the restriction on movement of ergative arguments does not hold of all

[8] Coon et all. gloss this marker as ERG, but argue that it is in fact a genitive agreement marker (ergative and genitive are syncretic throughout the Mayan family), and the complement to *uj* is a nominalized clause.

arguments below the phase-boundary, suggesting, by corollary, that a phase boundary is not the true culprit.

(25) Ditransitive goal movement in Q'anjob'al (Pedro Mateo-Pedro, p.c.)

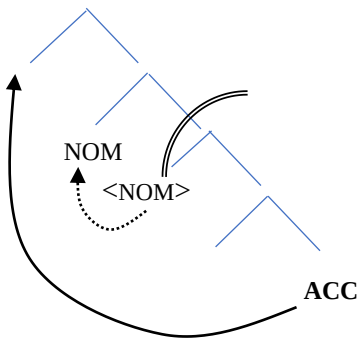
a. Declarative (baseline)
Max-Ø y-aq' naq Xhunik ixim nal b'ay ix Carla.
ASP-3ABS 3ERG-give CLF John CLF corn PREP CLF Carla
'John gave the corn to Carla.'

b. Ditransitive goal wh question: no Agent Focus required
Maktxel b'ay max-Ø y-aq' naq Xhunik ixim nal?
who PREP ASP-3ABS 3ERG-give CLF John CLF corn
'To whom did John give the corn?'

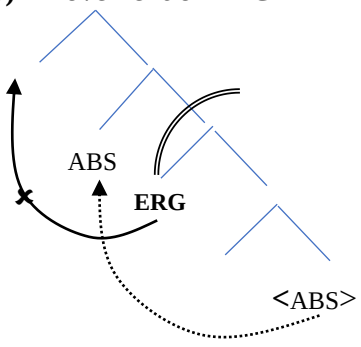
Secondly, consider the typology of movement asymmetries discussed in Chapter 2: specifically, it was observed that syntactic ergativity is far more common than syntactic accusativity. In other words, restrictions on the movement of an accusative object in a nominative-accusative language are far rarer than restrictions on movement of an ergative subject in an ergative-absolutive language. Taken at face-value, a phase-based account of syntactic ergativity predicts that syntactic accusativity should in fact obtain in *all* nominative-accusative languages: if A-movement of the absolutive argument to the *v*P phase edge in high absolutive languages like Q'anjob'al indeed traps the ergative subject in situ, then A-movement of the nominative argument to the *v*P phase edge should consistently trap the accusative argument in situ, giving rise to widespread syntactic accusativity, as schematized in (26).

(26) Syntactic accusativity and syntactic ergativity (A-movement is indicated with a dashed line, A-bar movement with a solid line, putative phase boundaries with a double line)

(a) Movement of ACC



(b) *Movement of ERG



To explain the asymmetry, Coon et al. propose that Mayan languages differ from nominative-accusative languages in terms of where the external argument is merged relative to the *v*P phase boundary. Following Chomsky (2000, 2001), Legate (2003), and Deal (2009), among others, they argue that, in nominative languages, the merge position of a transitive subject is, in fact, above the *v*P phase boundary. In Mayan, on the other hand, the merge position is suggested to be below the phase boundary. However, this latter point is, as noted by the authors, stipulative.

Given the lack of restrictions on both dative goal movement in Mayan and accusative object movement in nominative languages, a phase-based explanation of how the ergative argument becomes trapped by A-movement of the absolutive faces problems. In light of these issues, Assmann et al. (2015) propose an alternative account of Mayan syntactic ergativity, arguing that apparent restrictions on movement of the ergative argument arise because movement of the ergative proceeds *before* absolutive case is assigned to the object. This then bleeds absolutive case assignment to the object, leaving it caseless and causing the derivation to crash. While their proposal account for (i) why dative goal movement is permitted (dative movement, unlike ergative movement, does not bleed absolutive case) and (ii) why syntactic accusativity is much more rare than syntactic ergativity (a nominative subject is case licensed prior to movement of an accusative object), it does not account for Tada's Generalization for the Mayan language family as given in Table 1, nor for how Agent Focus in Mayan can circumvent the movement restriction on ergative subjects.

In sum, the proposals of both Coon et al. (2014) and Assmann et al. (2015) each account for different aspects of the observations regarding Mayan and the movement typology as a whole, but nether account for all of them. Before proposing a modified version of Coon et al.'s account, I close this section with a list of the desiderata of such an account.

(27) Desiderata of a modified account of syntactic ergativity in Mayan

- **a.** Accounts for Tada's Generalization (and in parallel, for the differences in word order between Niuean and Tongan).
- **b.** Explains how Agent Focus marking circumvents the ergative movement restriction.
- **c.** Accounts for how the ergative argument becomes trapped, while also explaining why ditransitive goal arguments can be displaced.

d. Accounts for the relative typological rarity of syntactic accusativity.

Because Coon et al.'s (2014) proposal - in contrast to that of Assmann et al. (2015) - successfully accounts for the first two desiderata, I adopt their proposal in the following discussion. However, I propose a crucial modification to their account of how the ergative argument becomes trapped, in order to fully account for the final two desiderata. The account also naturally captures the aforementioned variation in post-verbal word order and syntactic ergativity in Tongic Polynesian noted by Clemens and Tollan (2019).

7.3 Crossing and nested dependencies

Consider once again the trees shown in (26). In terms of the phase boundary, the movement in nominative-accusative languages is the same as that of ergative-absolutive languages: the unmarked (nominative or absolutive) argument first A-moves to the edge of the phase boundary, after which A-bar movement of the marked (accusative or ergative) argument is attempted. There is, however, a very noticeable difference between the two types of movement: in nominative languages, the accusative argument A-bar moves *over* the prior movement path of the nominative argument, whereas in ergative languages, the ergative argument moves *across* the path prior movement path of the absolutive argument. Thus, the nominative A-dependency and the accusative A-bar dependency in (26a) are *nested*, whereas the absolutive A-dependency and the ergative A-bar dependency in (26b) are *crossed*. The distinction between nested and crossed dependencies is formalized in (28).

(28) Nested and crossed dependencies

A dependency X is nested within dependency Y if the lower tail of X c-commands the lower tail of Y and the upper tail of Y c-commands the upper tail of X; dependencies X and Y are crossed if the lower tail of X c-commands the lower tail of Y and the upper tail of X c-commands the upper tail of Y.

Crossed dependencies are recognised as being typologically rarer in language than nested dependencies (e.g., Kuno & Robinson, 1972; Steedman, 1984; Levy et al., 2012, Yadav & Husain, 2018); in English, for example, constructions such as in (29a) which involve crossed dependencies are typically judged as far more acceptable than constructions which involve nested dependencies, as in (29b).

(29) Nested dependencies (Steedman, 1984: 35)

a. Nested

Which violin$_j$ are these sonatas$_i$ easy to play ___$_i$ on ___$_j$?

b. Crossed

*Which sonatas$_i$ is this violin$_j$ easy to play ___$_i$ on ___$_j$?

Kuno and Robinson (1972: 474) propose the '*Wh* Crossing Constraint', also known as the *Constraint on Crossing Dependencies* (CCD; see Steedman, 1984). According to the CCD, dependencies can be nested as in (29a), but cannot cross, as in (29b). This has led to theories that dependency crossing is more difficult to process than dependency nesting (e.g., Fodor, 1978; Frazier & Fodor, 1978; Rochemont & Culicover, 1990; Pickering & Barry, 1991)[9]. In particular, Frazier and Fodor (1978) propose that the CCD is a result of the storage and processing mechanisms by which filler-gap dependencies are formed: fillers are stored in a "first-in-last-out" (i.e., nested) manner, as opposed to a "first-in-first-out" (i.e., crossed) manner. Alternatively, it may be that nested dependencies are easier to process because the dependency heads follow a different order to the tails[10] (i.e., NOM-ACC dependency nesting, as in 26a, results in a reverse ACC-NOM output order, while ERG-ABS dependency crossing, as in 26b, results in an identical ERG-ABS output order); this means that the surface order in a nested movement structure is markedly *different* from the order of a corresponding declarative structure – thereby aiding immediate recognition of the structure as one which involves movement - while the surface order in a crossed structure is the *same* as a corresponding declarative, which does not provide this same advantage.

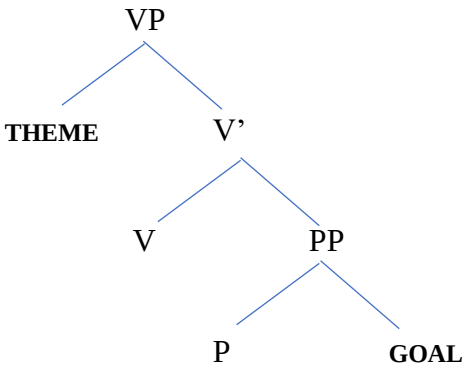
Applying this to syntactic ergativity, it can be noted that A-bar movement of an ergative argument in a 'High Absolutive' ergative language like Q'anjob'al (and Tongan) creates a crossed dependency, because the A-bar gap of the ergative argument is contained *within* the tails of the A-dependency of the absolutive argument (see again 26b). By contrast, A-bar movement of the accusative argument in a nominative-accusative language like English creates a nested dependency, because the A-bar gap of the accusative argument is contained *outside* the tails of the

[9] There is, however, evidence that double nesting incurs an additional cost; see de Vries et al. (2012).
[10] I thank Susana Béjar for this suggestion.

A-dependency of the nominative argument (see again 26a). In a non-syntactically ergative language like Ch'ol (and Niuean), the absolutive argument does not A-move past the ergative, such that there are no multiple movement dependencies created. I therefore propose that syntactic ergativity arises because (i) it creates a crossed dependency; in other words, it triggers dependency formation *within* an already formed A-dependency, and (ii) Mayan (as well as Tongic Polynesian) languages have *grammaticalized* the CCD.

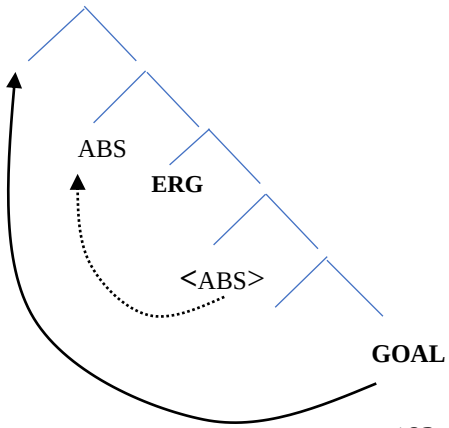
This account also explains why languages like Q'anjob'al permit movement of a prepositional ditransitive goal argument (see again 25). It is standardly assumed that prepositional ditransitive goals are structurally *lower* than direct objects (i.e., direct objects asymmetrically c-command ditransitive goals; e.g., Larson, 1988, a.o.), as shown in (30).

(30) Prepositional ditransitive construction: theme c-commands goal (Holmberg et al., 2018: 7)



This means that, when a ditransitive goal is A-bar moved, the gap of the goal argument is (unlike the gap of ergative arguments) situated *below* the tails of the absolutive A-dependency, as shown in (31). As such, the dependency is *nested* and is thus permitted.

(31) Ditransitive goal movement



Thus, in languages like Q'anjob'al, the ergative argument becomes trapped not because it is situated *below* a saturated phase boundary, but because it is situated *between* the tails of the absolutive A-dependency.

Crucially, this theory predicts that any other element also situated between the absolutive tails should equally be unable to undergo movement. One such example would be the dative goal of a double object construction; as noted by Coon et al., however, Q'anjob'al (along with other preverbal ABS languages) lacks a double object construction altogether. If we consider movement of adverbs, however, a contrast arises. Notably, manner adverbial interrogatives require Agent Focus marking (32a), whereas temporal adverbial interrogatives do not (32b).

(32) Movement of adverbs in Q'anjob'al (Coon et al., 2014: 65)

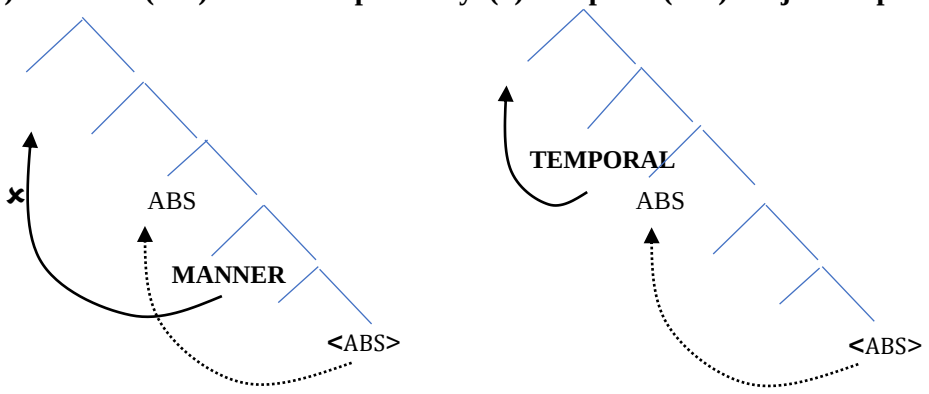
a. Manner adverb question: Agent Focus required
Tzet max-Ø y-un s-b'on-**on** naq te' na?
how ASP-3ABS 3ERG-do 3ERG-paint-**AF** PRON CLF house
'How did he paint the house?'

b. Temporal adverb question: No Agent Focus
B'aq'in max-Ø s-b'on naq te' na?
when ASP-3ABS 3ERG-paint PRON CLF house
'When did he paint the house?'

Crucially, it has independently been argued that manner and temporal adverbials differ in terms of their base positions in the structure. Alexiadou (1997; see also Cinque, 1999) proposes that manner adverbs are situated in Spec, VoiceP, while temporal adverbs are situated higher, in Spec, TP. Thus, the gap site of manner adverbs in sentences like (32a) is located *between* the A-movement dependency tails of the absolutive object, as shown below in (33a). This means that movement of a manner adverb results in a crossed dependency, thus requiring an Agent Focus repair strategy (the precise nature of the Agent Focus marker will be discussed shortly). The gap site for temporal adverbs (see 32b), however, is located *above* the A-movement tails of the absolutive object, such that movement of a temporal adverb results in a disjoint dependency, as in (33b); disjoint dependencies are argued to be easier to process even than nested dependencies (e.g. Bach, Brown, and Marslen-Wilson 1986, a.o.), such that no Agent Focus strategy is required.

(33) Movement of manner and temporal adverbs in Q'anjob'al

(a) Manner (32a): crossed dependency (b) Temporal (32b): disjoint dependency



In sum, syntactic ergativity in Mayan preverbal ABS languages such as Q'anjob'al arises because movement of the ergative argument, which - like manner adverbs unlike ditransitive goals - is situated between the A-movement tails of the absolutive argument, creates a *crossed* dependency. The processing error associated with a crossed dependency means that a repair strategy – such as Agent Focus – is required. The following subsection discusses how Agent Focus resolves this processing difficulty. In postverbal ABS languages like Ch'ol, the absolutive object does not A-move, such that no crossing (or indeed nested) dependency is created.

This same account can also explain how the ergative argument becomes trapped in syntactically ergative Tongic Polynesian languages like Tongan and Niuafo'ou: A-movement of the absolutive object past the ergative subject – which allows for VOS word order – means that movement of the ergative subject would create a crossed dependency, just as in Mayan preverbal ABS languages like Q'anjob'al. As such, ergative movement requires a resumptive pronoun at the gap site, by way of repair strategy. In Niuean, however, the absolutive object is licensed low – which means that VSO order is obligatory – and the ergative argument can be freely displaced, just as in Mayan postverbal ABS languages like Ch'ol.

7.3.1 Resumption and Agent Focus repair

Recall that, in Tongic Polynesian languages, A-bar movement of the ergative subject requires a *resumptive pronoun* at the gap site as a repair strategy for an otherwise illicit crossed dependency. An example is shown in (34).

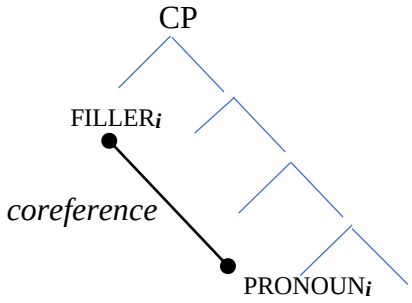
(34) Tongan: ERG resumption (Otsuka, 2000: 115) [=(2b)]

E siana$_i$ [na'e *(**ne$_i$**) langa 'a e fale]
DET man PST **RP** build ABS DET house
'The man who built the house'

This raises the question of precisely how a resumptive pronoun can repair such a structure. In consideration of this point, recall that, in filler-gap dependency constructions, gaps are typically *silent*: there is no overt cue in a linear surface string as to where a gap is located. Thus, the sentence processor must rely on other information – for example, knowledge of word order, structural relations, and verb argument frame - in order to successfully identify the gap site and form the relevant dependency. When this information not sufficient enable successful gap location and/or dependency formation, resumption can provide supplementary information to ease the process (see e.g., Givón, 1973; Keenan & Comrie, 1977; Alexopoulou & Keller, 2007; Heestand, Xiang, & Polinsky, 2011; McCloskey, 2006).Typically, resumptive pronouns are found at the would-be gap site of the dependency, thereby overtly signalling where the tail site of the dependency is located. In (34), however, the resumptive pronoun *ne* does not appear at the gap site (which is postverbal), is situated between the tense marker and the verb instead. Thus, it cannot be said to be directly signalling the dependency tail site. One can say, however, that it nonetheless provides *heuristic* information; namely, that the structure involves movement of the ergative subject.

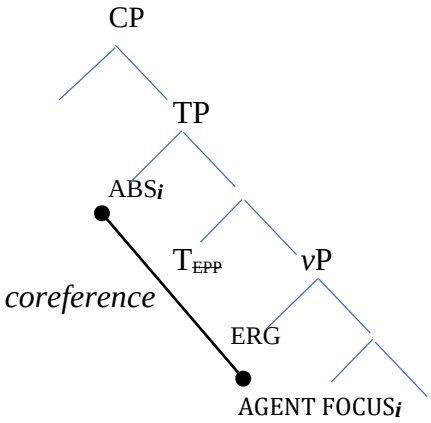
In generative syntax, one could categorise this scenario as, in fact, not involving movement at all: the 'displaced' filler has not been moved to the left periphery from lower in the structure, but rather, is merged in situ. The resumptive pronoun, which is co-indexed with the filler, is merged at the gap site, as shown in (35). In a structure like (34), the pronoun can be categorised as undergoing PF movement to a preverbal position (due, for example to constraints on prosodic well-formedness). Thus, the dependency is one of *co-referentiality between pronoun and antecedent*, rather than between filler and gap.

(35) Structure of resumption: no movement involved



Turning to Mayan, one could categorise the Agent Focus marker not only as a last-resort low case licenser (e.g., Coon et al., 2014), but also a resumptive pronoun which means that A-movement of the absolutive object clitic (for e.g., EPP checking purposes; Polinsky, 2016) does not take place. Rather, the clitic is merged *in situ* (i.e., in spec, TP), and co-indexed with the lower Agent Focus marker, as schematized in (36). The resulting lack of absolutive A-movement means that movement of the ergative argument does not create a crossed dependency (as there is no other movement dependency in the structure) and is, therefore, licit.

(36) Agent Focus as A-resumption in Mayan



7.3.2. Crossing and nested dependencies in double object passives

In this chapter, I have proposed that syntactic ergativity in Tongic and Mayan languages arises because A-bar movement of the ergative argument would create an illicit crossed dependency, given that it crosses over prior A-movement of the absolutive object (cf. Coon et al., 2014). In both Tongic and Mayan languages, syntactic ergativity can be circumvented by way of resumption: in Tongan, a resumptive pronoun is used in lieu of A-bar movement of the ergative argument, and in Mayan, a resumptive pronoun (a.k.a. Agent Focus marker) is used in lieu of A-movement of the absolutive object clitic.

Whether this analysis can be extended to languages outside of Polynesian and Mayan, however, remains an open topic. The 'high absolutive case' approach has been proposed to account for syntactic ergativity in other, unrelated languages, including West Circassian (Ershova, 2017), and Dyirbal (Bittner & Hale, 1996). In these languages, like in Tongan and Q'anjob'al, the absolutive object is argued to A-move past the ergative subjects for case licensing purposes; this

would leave the ergative subject unable to undergo movement without creating an illicit crossed dependency, as proposed above.

The distinction between crossing and nested dependencies can also be argued to play a role in *wh* dependency formation in other types of constructions. Notably, Holmberg, Sheehan, and van der Wal (2018), observe a distinction in a number of unrelated non-ergative languages with regards to passives of double object constructions. These languages include Norwegian (shown in 37), Swedish, Northwest British English, Zulu, Xhosa, and Lubukusu. Unlike many other languages, they allow passivization of both a goal argument (37a) and a theme argument (37b).

(37) Norwegian double object passives (Haddican & Holmberg, 2015, via Holmberg et al., 2018: 1)

a. Goal passive
Jon ble gitt boka.
Jon was given book.DET
'Jon was given the book'

b. Theme passive
Boka ble gitt Jon
book. DET was given Jon
'The book was given to Jon' (Lit. 'The book was given John')

These languages also allow *wh* dependencies of both goal arguments and theme arguments, as exemplified for Norwegian *wh* questions in (38).

(38) Norwegian *wh* questions (Holmberg et al., 2018: 2)

a. Goal *wh* question
Hvem ga du boka __?
who gave you book.DET
'To whom did you give the book?' (Lit. 'Who gave you the book')

b. Theme *wh* questions
Hvilken bok ga du __ Jon?
which book.DET gave you __ Jon
'Which book did you give Jon?'

With regards to *wh* dependencies inside double object passives, however, an asymmetry arises: a theme dependency can be formed inside a goal passive, but a goal dependency cannot be formed inside a theme passive. This is illustrated for Norwegian *wh* questions in (39) (note that the contrast

between D-linked and non-D-linked wh fillers is not the cause of the asymmetry, which holds regardless of D-linking asymmetries; see Holmberg et al., 2018).

(39) *wh* dependencies inside double object passives in Norwegian (Holmberg et al., 2018: 3, adapted)

a. Goal dependency inside goal passive
Hvem __ ble gitt boka?
who was given book.DET
'Who was the book given to?'

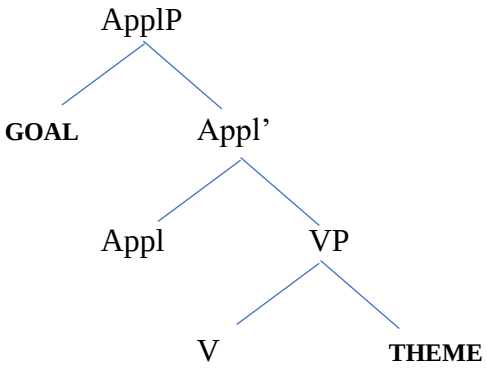
b. Theme dependency inside theme passive
Hvilken bok __ ble gitt Jon?
which book.DET was given Jon
'Which book was Jon given?'

c. Theme dependency inside goal passive
Hvilken bok ble Jon gitt __ ?
which book.DET was Jon given
'Which book was John given?'

d. Goal dependency inside theme passive
*Hvem __ ble boka gitt?
who was book.DET given
Attempted: 'Who was the book given to?'

This asymmetry can be explained under a theory based upon the distinction between crossing and nested dependencies, coupled with the assumption that passives involve *A-movement*. It is widely assumed that, in a double object construction, the goal argument is introduced by an Appl(icative) situated above VP, and thus c-commands the theme argument in VP (Harley, 1995; Anagnostopoulou, 2003; Pylkkänen, 2008, Holmberg et al., 2018; a.o.), as in (40). In other words, the goal is structurally higher than the theme (note that this structure differs from that of the prepositional ditransitive construction, in which the theme c-commands the goal).

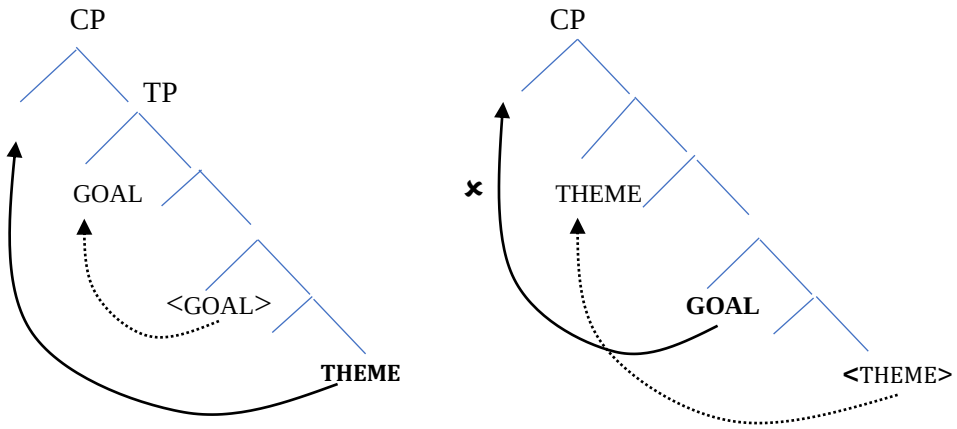
(40) Double object: goal c-commands theme (Holmberg et al, 2018: 7)



Now recall discussion of subjecthood and passive structures from Chapter 1: subjects undergo A-movement from their thematic *base* position to the specifier to TP. This means that, in a double object goal passive, the goal A-moves from Spec, ApplP to Spec, TP. In a double object theme passive, the theme A-moves from VP – *past the goal argument* – to Spec, TP. As a result, a theme *wh* dependency in a goal passive, as in (39c) is formed *outside* the tails of the A-movement of the goal argument; thus, the dependency is nested, and the structure is grammatical. Conversely, a goal *wh* dependency inside a theme passive, as in (39d), is formed *within* the tails of the A-movement of the theme argument; thus, the dependency is crossed, and the structure is ungrammatical. This contrast is shown in (41).

(41) *wh* dependencies inside theme and goal double object passives

a. Theme inside goal: nested (=39c) b. Goal inside theme: crossed (=39d)



In this way, constructions which involve a goal dependency within a theme passive, such as (62d), are analogous to attempted ergative *wh* dependency formation within A-movement of the absolutive argument.

7.4 Summary

This chapter has explored the cause of syntactic ergativity. I began by discussing previous work which has observed correlations between syntactic ergativity and linear word order – notably, in the Tongic Polynesian and Mayan language families – and extending the previous proposals to argue that syntactic ergativity results from a constraint on crossing dependencies. This arises in a subset of ergative languages in which absolutive case is assigned high – by T^0 – such that the object must A-move past the ergative subject for case licensing. This means any subsequent A-bar movement of the ergative argument results in an ill-formed crossed dependency.

Chapter 8

Concluding remarks

The starting point of the thesis was a typological overview of case alignment patterns, focusing on the difference between nominative-accusative and ergative-absolutive alignments. In nominative languages, subjects of both transitive and intransitive verbs receive the same case (i.e., nominative, or *unmarked* case) while the transitive object receives accusative (or *marked*) case. In ergative languages, objects of transitive verbs and subjects of intransitive verbs receive the same case (i.e., absolutive, or *unmarked* case), while the transitive subject receives ergative (or *marked*) case. Because of this variation, the definition of a grammatical 'subject', and the properties an argument must have to be formally characterized as a 'subject' is long-debated (see e.g., Comrie, 1975; Keenan, 1976). The thesis has explored this issue both from a generative syntactic perspective and from the perspective of sentence processing. I conclude with a few brief takeaway remarks concerning the key topics.

On subjecthood. The subject is the most agentive verbal argument of a clause. Subjects hold several core syntactic properties: they can bind the absolutive object, act as a null addressee in an imperative, and be controlled as the inferred actor ('PRO') in embedded infinitives (the properties which Manning (1996) characterizes as holding of 'thematic-subjects'). Subjects are more accessible than non-subjects (e.g., objects).

On accessibility. Accessibility refers to the ability of an argument to undergo syntactic operations. An argument is accessible for an operation X (e.g., verb agreement) if it can be targeted for operation X (i.e., if the verb can agree with it).

On unmarkedness. An unmarked argument of a language is the argument which has the widest syntactic distribution in that language. In nominative languages, the unmarked argument is the nominative-cased argument, because it occurs as the subject of both transitive and intransitive predicates (whether unergative or unaccusative). In ergative languages, the unmarked argument is (typically) the absolutive-cased argument, because it occurs as both the object of transitive predicates and the subject of intransitive predicates (see Chapter 6 for discussion of languages with more complex alignment patterns). Unmarked arguments are more accessible than marked

arguments with respect to syntactic phi-agreement and the processing of A-bar displacement (see below).

On unmarkedness and subjecthood. In nominative languages, unmarkedness and subjecthood align: unmarked arguments are usually subjects, and are accessible as both subjects and as unmarked arguments. In ergative languages, unmarkedness and subjecthood do not align: ergative arguments hold privileges attached to subjecthood, and absolutive arguments hold privileges attached to unmarkedness. In some ergative languages such as Nepali, however, the ergative argument has a wide enough syntactic distribution such that it can be considered as 'unmarked' for the purposes of verb agreement. In instances where more than one argument is unmarked, the argument most accessible is the subject. Results of a novel experimental study on pronoun resolution in the ergative Polynesian language Niuean demonstrated how both subjecthood and unmarkedness can be simultaneously relevant in determining accessibility.

On the subject advantage. The subject advantage reported in processing studies of nominative languages like English is better characterised as an advantage for the unmarked argument. Results of the study on the processing of *wh* questions in Niuean revealed that the argument privileged in processing is the unmarked argument, whether that argument is the grammatical object (as with an ergative-absolutive verb) or a subject (as with an intransitive absolutive-oblique verb).

On syntactic ergativity. I have argued that syntactic ergativity – in contrast to verb agreement – is not a direct result of case markedness, at least, not in Mayan and Tongic Polynesian languages. Firstly, syntactic ergativity is arguably cannot be shown to be governed by an abstract hierarchy of accessibility (see Chapter 2). Secondly, within these language families, we see a correlation between linear word order and the presence or absence of displacement restrictions on the ergative argument. I argue that syntactic ergativity arises in these languages because the site for ergative dependency formation is situated between the head and tail of an absolutive A-dependency, such that dependency formation would create an unparsable 'crossed' dependency. Whether this analysis can be shown to extend beyond the language families discussed remains an open question.

On the relationship between syntactic trees and sentence processing. The structures posited in generative syntax are not intended as a direct representation of how such structures are processed. Instead, generative grammar is a valuable framework within which structural relationships can be represented, and hypotheses with respect to both cross-linguistic and to processing mechanisms

can be formed. One such hypothesis is that elements, such as subjects, that are structurally *higher* in a tree (i.e., c-command other arguments such as objects) are easier to process, because they are less structurally embedded within other constituents. The study on the processing of *wh* questions in Niuean (see Chapter 4) provided evidence against this hypothesis, finding that absolutive objects are preferred over ergative subjects in the processing of *wh* dependencies, despite an absence of evidence that absolutive objects are structurally higher than ergative subjects, and despite the absence of morphological case cues. Therefore, other factors, such as distributional unmarkedness, can be demonstrated to also play a crucial role is processing. In turn, results of sentence processing studies can be vital for forming hypotheses which can further generative theory: if unmarkedness is to be defined as a distributional property of an argument, then this raises the question of why distributionally unmarked arguments should be most accessible for operations such as verb agreement, and how this should best be represented in a formal framework. To this end, the study of both formal syntax and sentence processing can together further our understanding of how language works.

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Appendix

A. NOM-ACC languages (Keenan & Comrie 1977: 76-94); Chapter 2.

Allow movement of both NOM subject and ACC object (no resumptive pronoun at ACC gap site) = no syntactic accusativity	Allow movement of NOM subject only = syntactic accusativity	Resumptive pronoun at ACC gap site = syntactic accusativity	Excluded from counts (not standardly considered as NOM-ACC languages)
Catalan Dutch English Finnish French North Frisian Fulani Greek Hausa Italian Japanese Korean Luganda Polish Romanian Roviana Russian Sinhala Shona Spanish Swedish Tamil Turkish Urhobo Welsh Yoruba Zurich German **TOTAL: 27**	German **TOTAL: 1**	Aoban Chinese Classical Arabic Czech Genoese Gilbertese Hebrew Kera Maori Persian Slovenian **TOTAL: 11**	Basque Hindi Iban Javanese Malagasy Malay Minang-Kabu Tagalog Toba Batak Tongan **TOTAL: 10**

Table 1: Names of nominative-accusative languages which are or are not syntactically accusative, according to Keenan and Comrie (1977: 76-94).

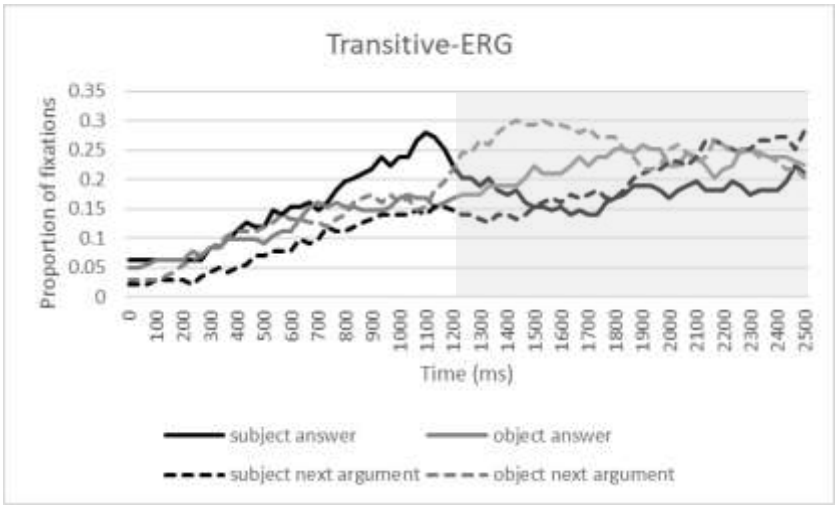
B. Graphs for fixations to four images; Chapter 4.

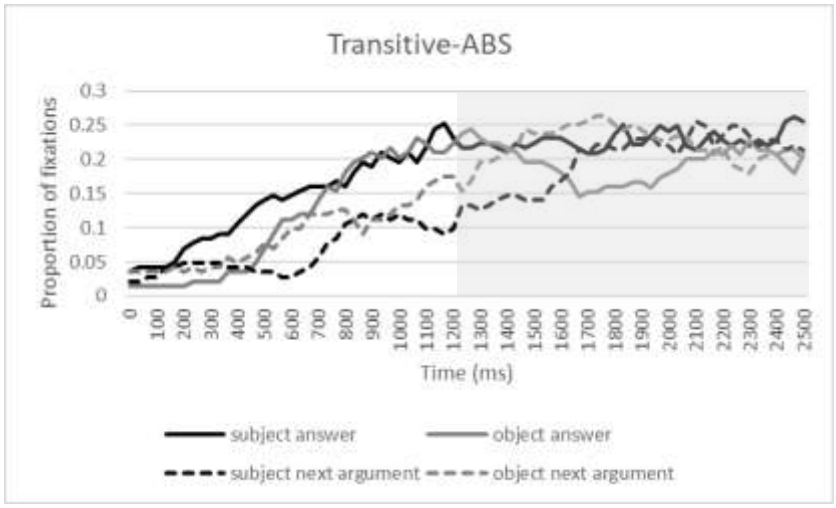
Figure 1 plots the proportion of fixations to each of the four images on the display board. Data are presented for each of the three verb types, collapsed across the question manipulation.

In the *Transitive-ERG* condition (top panel), looks to the subject answer rise momentarily above looks to the object asnwer just before the onset of the verb, before falling. During the processing of the verb and adverb, looks to the object answer rise above looks to the subject answer and remain there for the duration of the verb + adverb region. At the onset of the verb, looks to the object next argument rise above looks to the subject next argument, before falling at approximately 1800ms.

In the *Transitive-ABS* condition (middle panel), looks to the object answer begin to fall below looks to the subject answer shortly after the onset of the verb. They remain lower than looks to the subject answer until around 2000ms when they begin to rise, but are never higher than looks to the subject answer. Shortly before the onset of the verb, the looks to the object next argument begin to rise above the looks to the subject next argument; this continues until around 1900ms, after which looks to both arguments are approximately equal.

In the *Intransitive-ABS* conditon (lower panel), looks to the object answer fall below the looks to the subject answer shortly before the onset of the verb and remain below until around 2200ms, after which looks to both answers are approximately equal. Looks to the subject next argument rise steeply above looks to the object next argument shortly before the onset of the verb, before falling at around 1700ms. From 1800ms onwards, looks to both the subject next argument and object next argument are approximately equal.





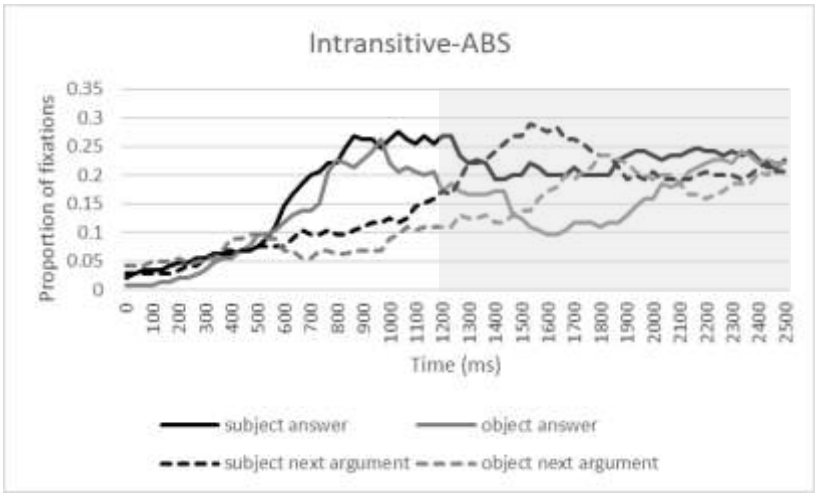


Figure 1. Looks to each of the four images in the display: the answer to a subject *wh* question ('subject answer'; solid black line), the answer to an object *wh* question ('object answer'; solid grey line), the anticipated object in a subject *wh* question (dashed black line) and the anticipated subject in an object *wh* question (dashed grey line). The verb + adverb region is shaded. 200ms is added to the question onset; this is the time it takes to program and launch a saccade.

C. Summary tables for mixed-effects models; Chapter 4.

	Estimate	SE	t	*p*
Fixed				
(intercept)	-1.713382	0.185045	-9.259	$< 2e^{-16}$
Tran-ERG vs. Tran-ABS & Intran-ABS	-0.025288	0.392572	-0.064	0.949
Tran-ABS vs. Intran-ABS	-0.007695	0.453229	-0.017	0.986
Question	**-2.670488**	**0.370090**	**-7.216**	**$2.47e^{-12}$**
Tran-ERG vs. Tran-ABS & Intran-ABS: Question	-1.150916	0.785144	-1.466	0.143
Tran-ERG vs. Tran-ABS & Intran-ABS: Question	-1.323604	0.906459	-1.460	0.145
Random	Variance	SD		
Subject (Intercept)	1.423^{e-15}	3.772^{e-08}		
Item (Intercept)	0.000^{e+00}	0.000^{e+00}		

Table 2A. Looks to subject-consistent images during the disambiguating region of the question. The dependent variable is quasi-logit transformed proportion, reflecting looking time over the length of the interval. The parsimonious mixed-effects model with Verb-type and Question as fixed effects (contrast coded) (all model comparison *p*s > .9995). The dependent variable is quasi-logit transformed proportion, reflecting looking time over the length of the interval. Significant effects are bolded.

	Estimate	SE	t	*p*
Fixed				
(intercept)	-1.7349	0.1935	-8.966	2.02^{e-06}
Tran-ERG vs. Tran-ABS & Intran-ABS	-0.4152	0.3936	-1.055	0.292
Tran-ABS vs. Intran-ABS	0.2107	0.4544	0.464	0.643
Question	**3.2051**	**0.3710**	**8.639**	**$< 2^{e-16}$**
Tran-ERG vs. Tran-ABS & Intran-ABS: Question	-0.8888	0.7873	-1.129	0.260
Tran-ERG vs. Tran-ABS & Intran-ABS: Question	0.6063	0.9090	0.667	0.505
Random	Variance	SD		
Subject (Intercept)	$4.862e^{-14}$	$2.205e^{-07}$		
Item (Intercept)	$3.629e^{-02}$	$1.905e^{-01}$		

Table 2B. Looks to object-consistent images during the disambiguating region of the question. The dependent variable is quasi-logit transformed proportion, reflecting looking time over the length of the interval. The parsimonious mixed-effects model with Verb-type and Question as fixed effects (contrast coded) (all model comparison *p*s > .9795). Significant effects are bolded.

	Estimate	SE	t	*p*
Fixed				
(intercept)	-0.5275	0.3521	-1.498	0.1625
Tran-ERG vs. Tran-ABS & Intran-ABS	**-1.0310**	**0.5236**	**-1.969**	**0.0497**
Tran-ABS vs. Intran-ABS	-0.1566	0.6129	-0.256	0.7985
Question	0.1569	0.4974	0.315	0.7526
Tran-ERG vs. Tran-ABS & Intran-ABS: Question	-0.9044	1.0498	-0.862	0.3895
Tran-ERG vs. Tran-ABS & Intran-ABS: Question	0.2815	1.2269	0.229	0.8187
Random	Variance	SD		
Subject (Intercept)	$2.332e^{-14}$	$1.527e^{-07}$		
Item (Intercept)	$7.468e^{-01}$	$8.642e^{-01}$		

Table 2C. Looks to subject-consistent images during the temporarily-ambiguous region of the question (i.e., verb and adverb). The dependent variable is quasi-logit transformed proportion, reflecting looking time over the length of the interval. The parsimonious mixed-effects model with Verb-type and Question as fixed effects (contrast coded) (models with random slopes did not converge). Significant effects are bolded.

	Estimate	SE	t	*p*
Fixed				
(intercept)	-0.7347	0.3310	-2.220	0.0494
Tran-ERG vs. Tran-ABS & Intran-ABS	**1.1846**	**0.5360**	**2.210**	**0.0277**
Tran-ABS vs. Intran-ABS	0.7048	0.6275	1.123	0.2621
Question	-0.5110	0.5093	-1.003	0.3163
Tran-ERG vs. Tran-ABS & Intran-ABS: Question	0.4000	1.0743	0.372	0.7099
Tran-ERG vs. Tran-ABS & Intran-ABS: Question	0.2415	1.2560	0.192	0.8476
Random	Variance	SD		
Subject (Intercept)	0.1496	0.3868		
Item (Intercept)	0.4923	0.7016		

Table 2D. Looks to object-consistent images during the temporarily-ambiguous region of the question (i.e., verb and adverb). The dependent variable is quasi-logit transformed proportion, reflecting looking time over the length of the interval. The parsimonious mixed-effects model with Verb-type and Question as fixed effects (contrast coded) (model comparison *ps* > .7855). Significant effects are bolded.

	Estimate	SE	t	*p*
Fixed				
(intercept)	-0.9793	0.4301	-2.277	0.0441
Tran-ERG vs. Tran-ABS	**-2.1738**	**0.8882**	**-2.447**	**0.0148**
Tran-ABS vs. Intran-ABS	1.6698	0.8984	1.859	0.0638
Random	Variance	SD		
Subject (Intercept)	0.000	0.000		
Item (Intercept)	1.019	1.010		

Table 2E. Planned comparison of looks to subject-consistent images during the processing of the verb. A parsimonious mixed-effects model with Verb-type as a fixed effect (model comparison *ps* > .5644). Significant effects are bolded.

	Estimate	SE	t	*p*
Fixed				
(intercept)	-1.1266	0.4566	-2.468	0.02897
Tran-ERG vs. Tran-ABS	**2.3458**	**0.8917**	**2.631**	**0.00889**
Tran-ABS vs. Intran-ABS	**-2.5361**	**0.9022**	**-2.811**	**0.00521**
Random	Variance	SD		
Subject (Intercept)	0.9786	0.9893		
Item (Intercept)	0.9945	0.9972		

Table 2F. Planned comparison of looks to object-consistent images during the processing of the verb. A parsimonious mixed-effects model with Verb-type as a fixed effect (model comparison *p* = .9927). Significant effects are bolded.

	Estimate	SE	t	*p*
Fixed				
(intercept)	0.1118	0.8358	0.134	0.89604
Tran-ERG vs. Tran-ABS	**-4.5054**	**1.6682**	**-2.701**	**0.00722**
Tran-ABS vs. Intran-ABS	**4.2143**	**1.6875**	**2.497**	**0.01293**
Random	Variance	SD		
Subject (Intercept)	$6.762e^{-13}$	$8.223e^{-07}$		
Item (Intercept)	$4.149e^{00}$	$2.037e^{00}$		

Table 2G. Planned comparison of looks to subject-consistent images minus looks to object-consistent images during the processing of the verb. A parsimonious mixed-effects model with Verb-type as a fixed effect (model comparison *p*s > .77). Significant effects are bolded.

D. Item sets for *wh* question study; Chapter 4.

1. **<u>The cats, the dog, and the rabbit.</u>**

TRANSITIVE-ERG:

Ne takafaga fakamafiti he pusi uli e lapiti, ti takafaga fakamafiti he kulī e pusi tea.

The black cat hunted the rabbit, and the dog hunted the white cat.

Ko e pusi fē ne **takafaga fakamafiti** {he kulī/e lapiti}?

=Which cat {did the dog hunted/hunted the rabbit} quickly?

TRANSITIVE-ABS:

Ne mamata fakamafiti e pusi uli ke he lapiti, ti mamata fakamafiti e kulī ke he pusi tea.

The black cat looked at the rabbit, and the dog looked at the white cat.

Ko e pusi fē ne **mamata fakamafiti** {e kulī ki ai/ke he lapiti}?

=Which cat {did the dog look at/looked at the rabbit} quickly?

INTRANSITIVE-ABS:

Ne poi fakamafiti e pusi uli ke he lapiti, ti poi fakamafiti e kulī ke he pusi tea.

The black cat ran to the rabbit, and the dog ran to the white cat.

Ko e pusi fē ne **poi fakamafiti** {e kulī ki ai/ke he lapiti}?

=Which cat {did the dog run to/ran to the rabbit} quickly?

2. **<u>The horses, the sheep, and the goat.</u>**

TRANSITIVE-ERG:

Ne gagau fakatekiteki he nua tea e mamoe, ati gagau fakatekiteki he koti e nua kakī.

The white horse bit the sheep, and then the goat bit the brown horse.

Ko e nua fē ne **gagau fakatekiteki** {he koti/e mamoe}?

=Which horse {did the goat bite/bit the sheep} quietly?

TRANSITIVE-ABS:

Ne fifitaki fakatekiteki e nua tea ke he mamoe, ati fifitaki fakatekiteki e koti ke he nua kakī.

The white horse copied the sheep, and then the goat copied the brown horse.

Ko e nua fē ne **fifitaki fakatekiteki** {e koti ki ai/ke he mamoe}?

=Which horse {did the goat copy/copied the sheep} quietly?

INTRANSITIVE-ABS:

Ne poi fakatekiteki e nua tea ke he mamoe, ati poi fakatekiteki e koti ke he nua kakī.

The white horse ran to the sheep, and then the goat ran to the brown horse.

Ko e nua fē ne **poi fakatekiteki** {e koti ki ai/ke he mamoe}?

= Which horse {did the goat ran to/ran to the sheep} quietly?

3. **<u>The cows, the cat, and the duck.</u>**

TRANSITIVE-ERG:

Ne epo fakamafiti he povi kakī e pato, ti epo fakamafiti he pusi e povi tea.

The brown cow licked the duck, and then the cat licked the white cow.

Ko e povi fē ne **epo fakamafiti** {he pusi/e pato}?

= Which cow {did the cat lick/licked the duck} quickly?

TRANSITIVE-ABS:
Ne faliu fakamafiti e povi kakī ke he pato, ti faliu fakamafiti e pusi ke he povi tea.
The brown cow changed into a duck, and the cat changed into a white cow.
Ko e povi fē ne **faliu fakamafiti** {e pusi ki ai/ke he pato} ?
= Which cow {did the cat change into/changed into the duck} quickly?
INTRANSITIVE-ABS:
Ne gaki fakamafiti e povi kakī ke he pato, ti gaki fakamafiti e pusi ke he povi tea.
The brown cow nodded to the duck, and the cat nodded to the white cow.
Ko e povi fē ne gaki **fakamafiti** {e pusi ki ai/ke he pato}?
= Which cow {did the cat nod to/nodded to the duck} quickly?

4. <u>The fishes, the shark, and the octopus.</u>
TRANSITIVE-ERG:
Ne kitia tumau he ika lanu fuamoli e feke, ti kitia tumau he magō e ika lanu laukou.
The orange fish saw the octopus, and the shark saw the green fish.
Ko e ika fē ne **kitia tūmau** {he tafuā/e feke}?
= Which fish {did the shark see/saw the octopus} all the time?
TRANSITIVE-ABS:
Ne mamata tumau e ika lanu fuamoli ke he feke, ti mamata tumau e tafuā ke he ika lanu laukou.
The orange fish looked at the octopus, and the shark looked at the green fish.
Ko e ika fē ne **mamata tūmau** {e tafuā ki ai/ke he feke}?
= Which fish {did the shark look at/looked at the octopus} all the time?
INTRANSITIVE-ABS:
Ne kakau tumau e ika lanu fuamoli ke he feke, ti kakau tumau e tafuā ke he ika lanu laukou.
The orange fish swam to the octopus, and the whale swam to the green fish.
Ko e ika fē ne **kakau tūmau** {e tafuā ki ai/ke he feke}?
= Which fish {did the shark swim to/swam to the octopus} all the time?

5. <u>The girl, the boy, and the parents.</u>
TRANSITIVE-ERG:
Ne lagomatai fakalahi he tama fifine e matua fifine, ti lagomatai fakalahi he matua taane e tama taane.
The girl helped the mother, and the father helped the boy.
Ko e tama fē ne **lagomatai fakalahi** {he matua taane/e matua fifine}?
= Which child {did the father help/ helped the mother} a lot?
TRANSITIVE-ABS:
Ne fakatali fakalahi e tama fifine ke he matua fifine, ti fakatali fakalahi e matua taane ke he tama taane.
The girl waited for the mother, and the father waited for the boy.
Ko e tama fē ne **fakatali fakalahi** {e matua taane ki ai/ke he matua fifine}?
= Which child {did the father wait for/waited for the mother} a lot?

INTRANSITIVE-ABS:
Ne lologo fakalahi e tama fifine ke he matua fifine, ti lologo fakalahi e matua taane ke he tama taane.
The girl sang to the mother, and the father sang to the boy.
Ko e tama fē ne **lologo fakalahi** {e matua taane ki ai/ke he matua fifine}?
= Which child {did the father sing to/sang to the mother} a lot?

6. **<u>The dogs, the duck, and the cat.</u>**

TRANSITIVE-ERG:
Ne haku tumau he kulī kakī e pato, ti haku tumau he pusi e kulī uli.
The brown dog scratched the duck, and the cat scratched the black dog.
Ko e kulī fē ne **haku tūmau** {he pusi/e pato}?
=Which dog {did the cat scratch/scratched the duck} all the time?
TRANSITIVE-ABS:
Ne fakaaue tumau e kulī kakī ke he pato, ti fakaaue tumau e pusi ke he kulī uli.
The brown dog thanked the duck, and the cat thanked the black dog.
Ko e kulī fē ne **fakaaue tūmau** {e pusi ki ai/ke he pato}?
=Which dog {did the cat thank/thanked the duck} all the time?
INTRANSITIVE-ABS:
Ne fano hui tumau e kulī kakī ke he pato, ti fano hui tumau e pusi ke he kulī uli.
The brown dog walked to the duck, and the cat walked to the black dog.
The brown dog walked to the duck, and the cat walked to black dog.
Ko e kulī fē ne **fano hui tūmau** {e pusi ki ai/ke he pato}?
=Which dog {did the cat walk to/walked to the duck} all the time?

7. **<u>The pigeons, the owl, and the duck</u>**

TRANSITIVE-ERG:
Ne logona tumau he lupe kula e pato, ati logona tumau he lulu e lupe lanu efuefu.
The red pigeon heard the duck, and then the owl heard the grey pigeon.
Ko e lupe fē ne **logona tūmau** {he lulu /e pato}?
= Which pigeon {did the owl hear/heard the duck} all the time?
TRANSITIVE-ABS:
Ne manako tumau e lupe kula ke he pato, ti manako tumau e lulu ke he lupe lanu efuefu.
The red pigeon liked the duck, and the owl liked the grey pigeon.
Ko e lupe fē ne **manako tūmau** {e lulu ki ai/ke he pato}?
= Which pigeon {did the owl like/liked the duck} all the time?
INTRANSITIVE-ABS:
Ne lele tumau e lupe kula ke he pato, ti lele tumau e lulu ke he lupe lanu efuefu.
The red pigeon flew to the duck, and the owl flew to the grey pigeon.
Ko e lupe fē ne **lele tūmau** {e lulu ki ai/ke he pato}?
= Which pigeon {did the owl fly to/flew to the duck} all the time?

8. **<u>The fishes, the shark, and the whale.</u>**

TRANSITIVE-ERG:

Ne mui fakatekiteki he ika lanu moana e tafuā, ti mui fakatekiteki he magō e ika lanu ago.

The blue fish followed the whale, and the shark followed the yellow fish.

Ko e ika fē ne **mui fakatekiteki** {he magō/e tafuā}?

= Which fish {did the shark hunt/hunted the whale} quietly?

TRANSITIVE-ABS:

Ne faliu fakatekiteki e ika lanu moana ke he tafuā, ti faliu fakatekiteki e magō ke he ika lanu ago.

The blue fish turned into a whale, and the shark turned a into yellow fish.

Ko e ika fē ne **faliu fakatekiteki** {e magō ki ai/ke he tafuā }?

= Which fish {did the shark changed into/changed into the whale} quietly?

INTRANSITIVE-ABS:

Ne kakau fakatekiteki e ika lanu moana ke he tafuā, ti kakau fakatekiteki e magō ke he ika lanu ago.

The blue fish swam to the whale, and the shark swam to the yellow fish.

Ko e ika fē ne **kakau fakatekiteki** {e magō ki ai/ke he tafuā }?

= Which fish {did the shark swim to/swam to the whale} quietly?

9. **<u>The monkeys, the koala, and the gorilla</u>**

TRANSITIVE-ERG:

Ne poka fakalahi he magikī uli e koala, ti poka fakalahi he kolila e magikī kakī.

The black monkey pushed the koala, and the gorilla pushed the brown monkey.

Ko e magikī fē ne **poka fakalahi** {he kolila/e koala}?

= Which monkey {did the gorilla push/pushed the koala} slowly?

TRANSITIVE-ABS:

Ne fakaaue fakalahi e magikī uli ke he koala, ti fakaaue fakalahi e kolila ke he magikī kakī.

The black monkey thanked the koala, and the gorilla thanked the brown monkey.

Ko e magikī fē ne **fakaaue fakalahi** {e kolila ki ai/ke he koala}?

= Which monkey {did the gorilla thank/thanked the koala} slowly?

INTRANSITIVE-ABS:

Ne vagahau fakalahi e magikī uli ke he koala, ti vagahau fakalahi e kolila ke he magikī kakī.

The black monkey spoke to the koala, and the gorilla spoke to the brown monkey.

Ko e magikī fē ne **vagahau fakalahi** {e kolila ki ai/ke he koala}?

= Which monkey {did the gorilla speak to to/spoke to the koala} slowly?

10. <u>The guinea pigs, the gecko, and the rabbit.</u>

TRANSITIVE-ERG:

Ne tutuli fakavave he kinipiki kakī e moko taliga, ti tutuli fakavave he lapiti e kinipiki lanu efuefu.

The brown guinea pig chased the gecko, and the rabbit chased the grey guinea pig.

Ko e kinipiki fē ne **tutuli fakavave** {he lapiti/e moko taliga}?

= Which guinea pig {did the rabbit chase/chased the gecko} quickly?

TRANSITIVE-ABS:

Ne ono fakavave e kinipiki kakī ke he moko taliga, ti ono fakavave e lapiti ke he kinipiki lanu efuefu.

The brown guinea pig looked at the gecko, and the rabbit looked at the grey guinea pig.

Ko e kinipiki fē ne **ono fakavave** {e lapiti ki ai/ke he moko taliga }?

= Which guinea pig {did the rabbit look at/looked at the gecko} quickly?

INTRANSITIVE-ABS:

Ne fano hui fakavave e kinipiki kakī ke he moko taliga, ti fano hui fakavave e lapiti ke he kinipiki lanu efuefu.

The brown guinea pig went to the gecko, and the rabbit went to the grey guinea pig.

Ko e kinipiki fē ne **fano hui fakavave** {e lapiti ki ai/ke he moko taliga }?

= Which snake {did the tuaki go to/went to the gecko} quickly?

11. <u>The goats, the cow, and the horse.</u>

TRANSITIVE-ERG:

Ne tele fakamafiti he koti efuefu e povi, ati tele fakamafiti he nua e koti kakī.

The grey goat kicked the cow, and then the horse kicked the brown goat.

Ko e koti fē ne **tele fakamafiti** {he nua/e povi}?

=Which goat {did the horse kick/kicked the cow} quickly?

TRANSITIVE-ABS:

Ne fifitaki fakamafiti e koti lanu efuefu ke he povi, ati fifitaki fakamafiti e nua ke he koti kakī.

The grey goat copied the cow, and then the horse copied the brown goat.

Ko e koti fē ne **fifitaki fakamafiti** {e nua ki ai/ke he povi}?

=Which goat {did the horse copy/copied the cow} quickly?

INTRANSITIVE-ABS:

Ne poi fakamafiti e koti lanu efuefu ke he povi, ati poi fakamafiti e nua ke he koti kakī.

The grey goat ran to the cow, and then the horse ran to the brown goat.

Ko e koti fē ne **poi fakamafiti** {e nua ki ai/ke he povi}?

= Which goat {did the horse run to /ran to the cow} quickly?

12. <u>The mother, the father, and the children.</u>

TRANSITIVE-ERG:

Ne ketekulu tumau he matua fifine e tama fifine, ti ketekulu tumau he tama taane e matua taane.

The mother tickled the girl, and the boy tickled the father.

Ko e matua fē ne **ketekulu tūmau** {he tama taane/e tama fifine}?

= Which parent {did the father tickle/tickled the mother} all the time?

TRANSITIVE-ABS:

Ne fakatali tumau e matua fifine ke he tama fifine, ti fakatali tumau e tama taane ke he matua taane.

The mother waited for the girl, and the boy waited for the father.

Ko e matua fē ne **fakatali tūmau** {e tama taane ki ai/ke he tama fifine}?

= Which parent {did the boy wait for/waited for the girl} all the time?

INTRANSITIVE-ABS:

Ne vagahau tumau e matua fifine ke he tama fifine, ti vagahau tumau e tama taane ke he matua taane.

The mother spoke to the girl, and the boy spoke to the father.

Ko e matua fē ne **vagahau tūmau** {e tama taane ki ai/ke he tama fifine}?

= Which parent {did the boy speak to/spoke to the girl} all the time?

D. Summary tables for mixed-effects models; Chapter 5.

	Estimate	SE	z	*p*
Fixed				
(intercept)	2.4097	0.3597	6.698	$2.11e^{-11}$
Tran-ERG vs. Tran-ABS & Intran-ABS	-0.4155	0.2783	-1.493	0.1355
Tran-ABS vs. Intran-ABS	-0.1476	0.3726	-0.396	0.6920
Pronoun position	0.4676	0.2926	1.598	0.1100
Tran-ERG vs. Tran-ABS & Intran-ABS: Pronoun position	0.9204	0.5575	1.651	0.0988
Tran-ERG vs. Tran-ABS & Intran-ABS: Pronoun position	**-1.6916**	**0.7552**	**-2.240**	**0.0251**
Random	Variance	SD		
Subject (Intercept)	$3.046e^{00}$	1.745394		
Item (Intercept)	$2.037e^{-07}$	0.000451		

Table A. Looks to subject-consistent images during the disambiguating region of the question. The parsimonious mixed-effects logistic regression model with Antecedent Type and Pronoun position as fixed effects (contrast coded) (models with random slopes did not converge). The dependent variable is whether a subject referent was chosen or not. Significant effects are bolded.

	Estimate	SE	z	*p*
Fixed				
(intercept)	2.85949	0.52449	5.452	4.98e-08
Tran-ERG vs. Tran-ABS	0.05358	0.62140	0.086	0.931
Tran-ABS vs. Intran-ABS	-1.06637	0.60512	-1.762	0.078
Random	Variance	SD		
Subject (Intercept)	3.781	1.945		
Item (Intercept)	0.000	0.000		

Table B. Planned comparison of Intransitive 2nd conjunct. A parsimonious mixed-effects model logistic regression with Antecedent Type as a fixed effect (models with random slopes did not converge). Significant effects are bolded.

		Estimate	SE	z	*p*
Fixed					
(intercept)		2.4375	0.4859	5.017	$5.26e^{-07}$
Tran-ERG vs. Tran-ABS		**-1.3624**	**0.5642**	**-2.415**	**0.0157**
Tran-ABS vs. Intran-ABS		**1.6041**	**0.6532**	**2.456**	**0.0141**
Random		Variance	SD		
Subject	(Intercept)	$4.035e^{00}$	$2.009e^{00}$		
Item	(Intercept)	$4.598e^{-10}$	$2.144e^{-05}$		

Table C. Planned comparison of Transitive 2nd conjunct. A parsimonious mixed-effects model logistic regression with Antecedent Type as a fixed effect (model comparison $p = .8326$). Significant effects are bolded.

		Estimate	SE	z	*p*
Fixed					
(intercept)		7.2301	1.5689	4.608	$4.06e^{-06}$
Pronoun position		-0.4956	2.6320	-0.188	0.851
Random		Variance	SD		
Subject	(Intercept)	37.948	6.16		
	2nd-conjunct	141.653	11.90		
Item	(Intercept)	1.123	1.06		

Table D. Planned comparison of Transitive-ERG. A parsimonious mixed-effects model logistic regression with Pronoun position as a fixed effect (more complex models did not converge). Significant effects are bolded.

		Estimate	SE	z	*p*
Fixed					
(intercept)		2.8778	0.7245	3.972	$7.12e^{-05}$
Pronoun position		1.0311	0.5683	1.814	0.0696
Random		Variance	SD		
Subject	(Intercept)	3.5426	1.8822		
Item	(Intercept)	0.3486	0.5905		

Table E. Planned comparison of Transitive-ABS. A parsimonious mixed-effects model logistic regression with Pronoun position as a fixed effect (more complex models did not converge). Significant effects are bolded.

	Estimate	SE	z	*p*
Fixed				
(intercept)	1.7448	0.2180	8.003	1.22^{e-15}
Pronoun position	-0.5666	0.4361	-1.299	0.194
Random	Variance	SD		
Item (Intercept)	0	0		

Table F. Planned comparison of Intransitive-ABS. A parsimonious mixed-effects model logistic regression with Pronoun position as a fixed effect (more complex models did not converge). Significant effects are bolded.

E. Item sets for pronoun resolution study; Chapter 5.

(a = Transitive ERG-ABS; b = Transitive ABS-OBL; c = Intransitive ABS-OBL; *i* = object pronoun; *ii* = subject pronoun)

1. ai. Ne tutuli he kulī e lapiti, ti gagau he leona **a ia**.
*The dog chased the rabbit, and the lion bit **it**.*
Ko e manu fē ne tutuli e lapiti?
Which creature chased the rabbit?

   bi. Ne fakaalofa e kulī ke he lapiti, ti gagau he leona **a ia**.
*The dog pitied the rabbit, and the lion bit **it**.*
Ko e manu fē ne fakaalofa ke he lapiti?
Which creature pitied the rabbit?

   ci. Ne poi e kulī ke he lapiti, ti gagau he leona **a ia**
*The dog ran to the rabbit, and the lion bit **it**.*
Ko e manu fē ne poi ke he lapiti?
Which creature ran to the rabbit?

   aii. Ne tutuli he kulī e lapiti, ti tihe **a ia**.
The dog chased the rabbit, and it sneezed.
Ko e manu fē ne tutuli e lapiti?
Which creature chased the rabbit?

   bii. Ne fakaalofa e kulī ke he lapiti, ti tihe **a ia**.
The dog pitied the rabbit, and it sneezed.
Ko e manu fē ne fakaalofa ke he lapiti?
Which creature pitied the rabbit?

   cii. Ne poi e kulī ke he lapiti, ti tihe **a ia.**
The dog ran to the rabbit, and it sneezed.
Ko e manu fē ne poi ke he lapiti?
Which creature ran to the rabbit?

2. ai. Ne holoholo he matua fifine e tama fifine, ti haku he pusi **a ia**.
*The mother washed the girl, and the cat scratched **her**.*
Ko hai ne holoholo e tama fifine?
Who washed the girl?

   bi. Ne mamata e matua fifine ke he tama fifine, ti haku he pusi **a ia**.
*The mother looked at the girl, and the cat scratched **her**.*
Ko hai ne mamata ke her tama fifine?
Who looked at the girl?

ci. Ne lologo e matua fifine ke he tama fifine, ti haku he pusi **a ia**.
*The mother sang to the girl, and the cat scratched **her**.*
Ko hai ne lologo ke he tama fifine?
Who sang to the girl?

aii. Ne holoholo he matua fifine e tama fifine, ti kata **a ia**.
The mother washed the girl, and she laughed.
Ko hai ne holoholo e tama fifine?
Who washed the girl?

bii. Ne mamata e matua fifine ke ne tama fifine, ti kata **a ia**.
The mother looked at the girl, and she laughed.
Ko hai ne mamata ke he tama fifine?
Who looked at the girl?

cii Ne lologo e matua fifine ke he tama fifine, ti kata **a ia**.
The mother sang to the girl, and she laughed.
Ko hai ne lologo ke he tama fifine?
Who sang to the girl?

3. ai. Ne neke he kinipiki e kulī, ti epoepo he pusi **a ia**.
*The guinea pig nudged the dog, and the cat licked **it**.*
Ko e manu fē ne neke e kulī?
Which creature nudged the dog?

bi. Ne fakaaue e kinipiki ke he kulī, ti epoepo he pusi **a ia.**
*The guinea pig looked at the dog, and the cat licked **it**.*
Ko e manu fē ne mamata ke he kulī?
Which creature looked at the dog?

ci. Ne totolo e kinipiki ke he kulī, ti epoepo he pusi **a ia.**
*The guinea pig crawled to the dog, and the cat licked **it**.*
Ko e manu fē ne totolo ke he kulī?
Which creature crawled to the dog?

aii. Ne neke he kinipiki e kulī, ti mohe **a ia**.
*The guinea pig nudged the dog, and **it** slept.*
Ko e manu fē ne neke e kulī?
Which creature nudged the dog?

bii. Ne mamata e kinipiki ke he kulī, ti mohe **a ia.**
*The guinea pig looked at the dog, and **it** slept.*
Ko e manu fē ne mamata ke he kulī?
Which creature looked at the dog?

cii. Ne totolo e kinipiki ke he kulī, ti mohe **a ia.**
*The guinea pig crawled to the dog, and **it** slept.*
Ko e manu fē ne totolo ke he kulī?
Which creature crawled to the dog?

4. ai. Ne takafaga he lulu e lupe, ti tutuli he luko **a ia**.
*The owl hunted the pigeon, and the wolf chased **it**.*
Ko e manu fē ne takafaga he lulu?
Which creature did the owl hunt?

bi. Ne fakaalofa e lulu ke he lupe, ti tutuli he luko **a ia**.
*The owl pitied the pigeon, and the wolf chased **it**.*
Ko e manu fē ne fakaalofa e lulu ki ai?
Which creature did the owl pity?

ci. Ne lologo e lulu ke he lupe, ti tutuli he luko **a ia**.
*The owl sang to the pigeon, and the wolf chased **it**.*
Ko e manu fē ne lologo e lulu ki ai?
Which creature did the owl sing to?

aii. Ne takafaga he lulu e lupe, ti lele fakaeneene **a ia.**
*The owl hunted the pigeon, and **it** flew slowly.*
Ko e manu fē ne takafaga he lulu?
Which creature did the owl hunt?

bii. Ne fakaalofa e lulu ke he lupe, ti lele fakaeneene **a ia.**
*The owl pitied the pigeon, and **it** flew slowly.*
Ko e manu fē ne fakaalofa e lulu ki ai?
Which creature did the owl pity?

cii. Ne lologo e lulu ke he lupe, ti lele fakaeneene **a ia.**
*The owl sang to the pigeon, and **it** flew slowly.*
Ko e manu fē ne lologo e lulu ki ai?
Which creature did the owl sing to?

5. ai. Ne haku he pusi e kinipiki, ti fakamatakutaku he kulī **a ia**.
The cat scratched the guinea pig, and the dog frightened it.
Ko e manu fē ne haku he pusi?
Which creature did the cat scratch?

bi. Ne ono e pusi ke he kinipiki, ti fakamatakutaku he kulī **a ia.**
The cat looked at the guinea pig, and the dog frightened it.
Ko e manu fē ne ono e pusi ki ai?
Which creature did the cat look at?

ci. Ne fano hui e pusi ke he kinipiki, ti fakamatakutaku he kulī **a ia.**
The cat walked over to the guinea pig, and the dog frightened it.
Ko e manu fē ne fano hui e pusi ki ai?
Which creature did the cat walk over to?

aii. Ne haku he pusi e kinipiki, ti tihe **a ia**.
The cat scratched the guinea pig, and it sneezed.
Ko e manu fē ne haku he pusi?
Which creature did the cat scratch?

bii. Ne ono e pusi ke he kinipiki, ti tihe **a ia.**
The cat looked at the guinea pig, and it sneezed.
Ko e manu fē ne ono e pusi ki ai?
Which creature did the cat look at?

ci. Ne fano hui e pusi ke he kinipiki, ti tihe **a ia.**
The cat walked over to the guinea pig, and it sneezed.
Ko e manu fē ne fano hui e pusi ki ai?
Which creature did the cat walk over to?

6. ai. Ne tuo he moa fifine e lupe, ti fakamatakutaku he pusi **a ia**.
*The hen pecked the pigeon, and the cat frightened **it**.*
Ko e manu fē ne tuo he moa fifine?
Which creature did the hen peck?

bi. Ne fanogonogo e moa fifine ke he lupe, ti fakamatakutaku he pusi **a ia.**
*The hen listened to the pigeon, and the cat frightened **it**.*
Ko e manu fē ne fanogonogo e moa fifine ki ai?
Which creature did the hen listen to?

ci. Ne fano hui e moa fifine ke he lupe, ti fakamatakutaku he pusi **a ia.**
*The hen walked over to the pigeon, and the cat frightened **it**.*
Ko e manu fē ne fano hui e moa fifine ki ai?
Which creature did the hen walk over to?

aii. Ne tuo he moa fifine e lupe, ti koli **a ia**.
*The hen pecked the pigeon, and **it** danced.*
Ko e manu fē ne tele he moa fifine?
Which creature did the hen peck?

bii. Ne fanogonogo e moa fifine ke he lupe, ti koli **a ia.**
*The hen listened to the pigeon, and **it** danced.*
Ko e manu fē ne fanogonogo e moa fifine ki ai?
Which creature did the hen listen to?

cii. Ne fano hui e moa fifine ke he lupe, ti koli **a ia.**
*The hen walked over to the pigeon, and **it** danced.*
Ko e manu fē ne fano hui e moa fifine ki ai?
Which creature did the hen walk over to?

7. ai. Ne gagau he koti e mamoe, ti tele he povi **a ia**
*The goat bit the sheep, and the cow kicked **it**.*
Ko e manu fē ne tele he povi?
Which creature did the cow kick?

bi. Ne fakatali e koti ke he mamoe, ti tele he povi **a ia**.
*The goat waited for the sheep, and the cow kicked **it**.*
Ko e manu fē ne tele he povi?
Which creature did the cow kick?

ci. Ne gaki e koti ke he mamoe, ti tele he povi **a ia.**
*The goat nodded to the sheep, and the cow kicked **it**.*
Ko e manu fē ne tele he povi?
Which creature did the cow kick?

aii. Ne gagau he koti e mamoe, ti fano **a ia**.
The goat bit the sheep, and it went.
Ko e manu fē ne fano?
Which creature went?

bii. Ne fakatali e koti ke he mamoe, ti fano **a ia.**
The goat waited for the sheep, and it went.
Ko e manu fē ne fano?
Which creature went?

cii. Ne gaki e koti ke he mamoe, ti fano **a ia.**
The goat nodded to the sheep, and it went.
Ko e manu fē ne fano?
Which creature went?

8. ai. Ne tele he nua e povi, ti tuo he lupe **a ia.**
*The horse kicked the cow, and the pigeon pecked **it**.*
Ko e manu fē ne tuo he lupe?
Which creature did the pigeon peck?

bi. Ne fifitaki e nua ke he povi, ti tuo he lupe **a ia.**
*The horse copied the cow, and the pigeon pecked **it**.*
Ko e manu fē ne tuo he lupe?
Which creature did the pigeon peck?

ci. Ne gata e nua ke he povi, ti tuo he lupe **a ia.**
*The horse went over to the cow, and the pigeon pecked **it**.*
Ko e manu fē ne tuo he lupe?
Which creature did the pigeon peck?

aii. Ne tele he nua e povi, ti nofo hifo **a ia.**
*The horse kicked the cow, and **it** sat down.*
Ko e manu fē ne nofo hifo?
Which creature sat down?

bii. Ne fifitaki e nua ke he povi, ti nofo hifo **a ia.**
*The horse copied the cow, and **it** sat down.*
Ko e manu fē ne nofo hifo?
Which creature sat down?

cii. Ne gata e nua ke he povi, ti nofo hifo **a ia.**
*The horse went over to the cow, and **it** sat down.*
Ko e manu fē ne nofo hifo?
Which creature sat down?

9. ai. Ne epoepo he lapiti e kinipiki, ti gagau he kuli **a ia**.
*The rabbit licked the guinea pig, and the dog bit **it**.*
Ko e manu fē ne gagau he kuli?
Which creature did the dog bite?

bi. Ne ono e lapiti ke he kinipiki, ti gagau he kuli **a ia.**
*The rabbit looked at the guinea pig, and the dog bit **it**.*
Ko e manu fē ne gagau he kuli?
Which creature did the dog bite?

ci. Ne poi e lapiti ke he kinipiki, ti gagau he kuli **a ia.**
*The rabbit ran to the guinea pig, and the dog bit **it**.*
Ko e manu fē ne gagau he kuli?
Which creature did the dog bite?

aii. Ne epoepo he lapiti e kinipiki, ti fano **a ia**.
*The rabbit licked the guinea pig, and **it** left.*
Ko e manu fē ne fano?
Which creature left?

bii. Ne ono e lapiti ke he kinipiki, ti fano **a ia**.
*The rabbit looked at the guinea pig, and **it** left.*
Ko e manu fē ne fano?
Which creature left?

cii. Ne poi e lapiti ke he kinipiki, ti fano **a ia**.
*The rabbit ran to the guinea pig, and **it** left.*
Ko e manu fē ne fano?
Which creature left?

10. ai. Ne poka he mamoe e koti, ti neke he nua **a ia**.
*The sheep pushed the goat, and the horse nudged **it**.*
Ko e manu fē ne neke he nua?
Which creature did the horse nudge?

bi. Ne fakaaue e mamoe ke he koti, ti neke he nua **a ia**.
*The sheep thanked the goat, and the horse nudged **it**.*
Ko e manu fē ne neke he nua?
Which creature did the horse nudge?

ci. Ne poi e mamoe ke he koti, ti neke he nua **a ia**.
*The sheep ran to the goat, and the horse nudged **it**.*
Ko e manu fē ne neke he nua?
Which creature did the horse nudge?

aii. Ne poka he mamoe e koti, ti koho **a ia**.
*The sheep pushed the goat, and **it** coughed.*
Ko e manu fē ne koho?
Which creature coughed?

bii. Ne fakaaue e mamoe ke he koti, ti koho **a ia**.
*The sheep thanked the goat, and **it** coughed.*
Ko e manu fē ne koho?
Which creature coughed?

cii. Ne poi e mamoe ke he koti, ti koho **a ia**.
*The sheep ran to the goat, and **it** coughed.*
Ko e manu fē ne koho?
Which creature coughed?

11. ai. Ne kitia he pusi e kulī, ti tutuli he nua **a ia**.
*The cat saw the dog, and the horse chased **it**.*
Ko e manu fē ne tutuli he nua?
Which creature did the horse chase?

bi. Ne fanonogo e pusi ke he kulī, ti tutuli he nua **a ia**
*The cat listedned to the dog, and the horse chased **it**.*
Ko e manu fē ne tutuli he nua?
Which creature did the horse chase?

ci. Ne gata e pusi ke he kulī, ti tutuli he nua **a ia**
*The cat went over to the dog, and the horse chased **it**.*
Ko e manu fē ne tutuli he nua?
Which creature did the horse chase?

aii. Ne kitia he pusi e kulī, ti nofo hifo **a ia**.
The cat saw the dog, and it sat down.
Ko e manu fē ne nofo hifo?
Which creature sat down?

bii. Ne fanonogo e pusi ke he kulī, ti nofo hifo **a ia**
The cat listened to the dog, and it sat down.
Ko e manu fē ne nofo hifo?
Which creature sat down?

cii. Ne gata e pusi ke he kulī, ti nofo hifo **a ia**
The cat went over to the dog, and it sat down.
Ko e manu fē ne nofo hifo?
Which creature sat down?

12. ai. Ne takafaga he ika lanu moana e ika lanu lakou, ti kai he magō **a ia**.
*The blue fish hunted the green fish, and the shark ate **it**.*
Ko e ika fē ne kai he magō?
Which fish did the shark eat?

bi. Ne fifitaki e ika lanu moana ke he ika lanu laukou, ti kai he magō **a ia**
*The blue fish copied the green fish, and the shark ate **it**.*
Ko e ika fē ne kai he magō?
Which fish did the shark eat?

ci. Ne kakau e ika lanu moana ke he ika lanu lakou, ti kai he magō **a ia**
*The blue fish swam to the green fish, and the shark ate **it**.*
Ko e ika fē ne kai he magō?
Which fish did the shark eat?

aii. Ne takafaga he ika lanu moana e ika lanu lakou, ti koli **a ia**.
The blue fish hunted the green fish, and it danced.
Ko e ika fē ne koli?
Which fish danced?

bii. Ne fifitaki e ika lanu moana ke he ika lanu lakou, ti koli **a ia.**
The blue fish copied the green fish, and it danced.
Ko e ika fē ne koli?
Which fish danced?

cii. Ne kakau e ika lanu moana ke he ika lanu lakou, ti koli **a ia.**
The blue fish swam to the green fish, and it danced.
Ko e ika fē ne koli?
Which fish danced?