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**The Syntax-Semantics Interface in Possessive
Constructions: Online Processing and Developmental
Patterns in Italian**

PhD Candidate:

Veronica Repetti

Supervisor:

Prof. Filippo Domaneschi

Abstract (english version)

This dissertation investigates the cognitive and linguistic mechanisms underlying the comprehension of possessive structures, with a specific focus on how animacy of the possessor and alienability of the possessed interact with syntactic architecture in Italian. The work is motivated by two major gaps in the literature: a *Structural Gap*, due to the almost exclusive focus on attributive possession rather than on predicative have-sentences, and a *Methodological Gap*, as previous studies have rarely investigated online processing.. Against the background of a long-standing debate on what counts as the “prototype” of possession, the thesis proposes to redefine prototypicality in processing terms, asking which possessive relations are integrated most efficiently and how this changes over development. To address these questions, four experiments were conducted. Three studies with adults examined the roles of animacy, alienability and syntactic structure. Experiment 1 replicated Vaid and Chen’s (2019) plausibility-judgment task for Italian attributive possessives, establishing an offline baseline and confirming an Inalienability Hypothesis: inalienable combinations were judged faster than alienable ones. Experiments 2 and 3 added self-paced reading to attributive and predicative structures respectively, allowing a direct comparison between online reading times and offline reaction times. In both syntactic frames, reading times revealed a robust Interaction Hypothesis: sentences combining animate possessors with inalienable possessions were processed fastest, indicating that these cues collaborate during comprehension. However, reaction times showed structure-dependent patterns: in attributive possession, decisions were primarily driven by animacy, whereas in predicative possession animacy and alienability contributed as independent factors. Experiment 4 investigated preschool children (3–6 years) using a picture-selection task. Accuracy was high across conditions, suggesting that the basic competence to interpret both attributive and predicative possessives is in place by age three. Reaction times, however, diverged from the

adult pattern. In the predicative condition, children were faster with animate possessors and alienable possessed, consistent with an early “control-based” prototype aligned with the event structure of *avere* (‘to have’). In the attributive condition, no reliable effects of animacy or alienability emerged, suggesting that these phrases may be processed as cohesive chunks with limited inspection of internal semantic features. Taken together, the findings support a processing-based view of the possessive prototype. Animacy emerges as a stable ontological anchor across development, while the specification of the possessed shifts from a child prototype centered on controllable, alienable objects to an adult prototype centered on intrinsically connected, inalienable relations. Syntactic structure acts as a gatekeeper, modulating when and how conceptual cues are recruited: predicative frames with higher computational load promote active semantic scaffolding, whereas cohesive attributive frames tend to suppress it. By integrating theoretical, experimental and developmental perspectives, this dissertation positions possession as a key testing ground for the syntax–semantics interface and for the role of processing economy in language acquisition.

Abstract (versione italiana)

Questa tesi di dottorato indaga i meccanismi cognitivi e linguistici che sottendono la comprensione delle strutture possessive, con un'attenzione specifica a come l'animatezza del possessore e l'alienabilità del posseduto interagiscono con l'architettura sintattica in italiano. La ricerca si basa su due principali lacune nella letteratura: una strutturale, dovuta al focus quasi esclusivo sulla possessione attributiva piuttosto che sulle frasi predicative con *avere*, e una metodologica, in quanto gli studi precedenti hanno raramente indagato l'elaborazione online. Sullo sfondo di un dibattito di lunga data su che cosa debba intendersi come "prototipo" di possesso, la tesi propone di ridefinire la "prototipicità" in termini di elaborazione cognitiva, chiedendosi quali relazioni possessive vengano integrate in modo più efficiente e come ciò cambi lungo lo sviluppo. Per rispondere a queste domande sono stati condotti quattro esperimenti. Tre studi con adulti hanno esaminato il ruolo di animatezza, alienabilità e struttura sintattica. L'Esperimento 1 ha replicato, per l'italiano e per possessivi attributivi, il test di giudizio di plausibilità di Vaid e Chen (2019), stabilendo un punto di riferimento di misura offline e confermando l'*Inalienability Hypothesis*: le costruzioni inalienabili vengono giudicate più rapidamente di quelle alienabili. Gli Esperimenti 2 e 3 hanno aggiunto una misura di misurazione del tempo di lettura rispettivamente a strutture attributive e predicative, permettendo un confronto diretto tra tempi di lettura online e tempi di reazione offline. In entrambi i contesti sintattici, i tempi di lettura hanno messo in evidenza una robusta *Interaction Hypothesis*: le frasi che combinavano possessori animati con posseduti inalienabili risultavano le più veloci da elaborare, indicando che questi indizi collaborano durante la comprensione. I tempi di reazione, tuttavia, mostravano pattern dipendenti dalla struttura: nel possesso attributivo, le decisioni erano principalmente guidate dall'animatezza, mentre nel possesso predicativo

animatezza e alienabilità contribuivano come fattori indipendenti. L'Esperimento 4 si è concentrato su bambini in età prescolare (3–6 anni) tramite un compito di scelta d'immagine, rispetto a una frase udita. L'accuratezza è risultata elevata in tutte le condizioni, suggerendo che la competenza di base per interpretare sia i possessivi attributivi sia quelli predicativi è già disponibile intorno ai tre anni. I pattern dei tempi di reazione, tuttavia, divergevano dal pattern adulto. Nella condizione predicativa, i bambini erano più veloci con possessori animati e posseduti alienabili, in linea con un prototipo precoce “basato sul controllo”, allineato alla struttura evocata da *avere*. Nella condizione attributiva, invece, non emergevano effetti di animatezza o alienabilità, il che suggerisce che questi sintagmi possano essere elaborati come unità coese. Complessivamente, i risultati sostengono una visione del prototipo possessivo basata sulle modalità di elaborazione. L'animatezza emerge come un punto di riferimento stabile lungo tutto lo sviluppo, mentre la specificazione del posseduto si sposta da un prototipo infantile centrato su oggetti controllabili e alienabili a un prototipo adulto centrato su relazioni inalienabili, intrinsecamente connesse. La struttura sintattica agisce come un “filtro”, modulando il quando e il come gli indizi concettuali vengono implementati: i contesti predicativi, con un carico computazionale più elevato, favoriscono un attivo supporto semantico, mentre i frame attributivi, più coesi, tendono a sopprimerlo. Integrando prospettive teoriche e sperimentali, questa tesi propone le strutture possessive come banco di prova privilegiato per lo studio dell'interfaccia sintassi–semantica e del ruolo dell'economia di processamento nell'acquisizione del linguaggio.

CONTENTS

LIST OF ABBREVIATIONS	10
LIST OF LANGUAGES.....	13
INTRODUCTION.....	18
1 WHAT IS POSSESSION IN LANGUAGE?.....	25
1.1 A DIFFICULT DEFINITION	25
1.2 SEMANTIC DIMENSIONS: ALIENABILITY AND ANIMACY.....	33
1.3 CULTURAL PERSPECTIVES	41
1.4 TYPOLOGY AND MORPHOSYNTAX.....	50
1.5 WE HAVE OTHER WAYS TO EXPRESS “TO HAVE”	54
2 CHILDREN AND POSSESSIVE STRUCTURES.....	61
2.1 LONGITUDINAL DATA	68
2.1.1 <i>Morphosyntactic Economy and the Cost of Movement</i>	69
2.1.2 <i>Pragmatic Anchors and Item-Based Construction</i>	76
2.1.3 <i>Semantic Constraints and the Animacy Hierarchy</i>	80
2.2 EXPERIMENTAL DATA	84
2.2.1 <i>Syntax or the world knowledge?</i>	85
2.2.2 <i>The Acquisition of Pronominal Possession</i>	88
2.2.3 <i>Semantic Distinctions</i>	88
2.3 IDENTIFYING THE RESEARCH GAP	92
2.3.1 <i>The Structural Gap: Attributive vs. Predicative Asymmetry</i>	93
2.3.2 <i>The Methodological Gap: From Offline to Online Processing</i>	93
2.3.3 <i>The Present Study on Child Possession</i>	94
3 ADULTS AND POSSESSIVE STRUCTURES.....	95
3.1 CORPORA DATA	95

3.1.1 <i>Syntactic Architecture</i>	95
3.1.2 <i>Attributive Possession: Semantics vs. Pragmatics</i>	98
3.1.3 <i>The Semantics of Predicative Possession</i>	99
3.2 EXPERIMENTAL DATA	101
3.2.1 <i>The “Self” Advantage and Predictive Processing</i>	101
3.2.2 <i>The Semantics of the Possessed: Animacy and Alienability</i>	103
3.2.3 <i>Predicative Possession: The Role of Embodiment and Syntactic Strategy</i>	110
3.3 CONCLUSION AND FUTURE DIRECTIONS: IDENTIFYING THE RESEARCH GAP.....	114
3.3.1 <i>The Structural Gap: Attributive vs. Predicative Asymmetry</i>	115
3.3.2 <i>The Methodological Gap: From Offline to Online Processing</i>	116
3.3.3 <i>The Present Study on Adult Possession</i>	116
4 THE ROLE OF ALIENABILITY AND ANIMACY IN THE PROCESSING OF POSSESSIVE STRUCTURES IN ITALIAN	118
4.1 INTRODUCTION	119
4.2 PSYCHOLINGUISTIC PREVIOUS APPROACHES.....	121
4.3 RESEARCH QUESTIONS.....	125
4.4 CURRENT STUDY	129
4.4.1 <i>Experiment 1</i>	131
4.4.2 <i>Experiment 2</i>	140
4.4.3 <i>Experiment 3</i>	148
4.5 GENERAL DISCUSSION	153
4.6 CONCLUSION	158
5 CHILDREN’S COMPREHENSION OF POSSESSIVE STRUCTURES: THE ROLES OF ANIMACY, ALIENABILITY, AND SYNTACTIC STRUCTURE	160
5.1 INTRODUCTION	161
5.2 THE CURRENT STUDY	166
5.3 PARTICIPANTS.....	171

5.4 STIMULI	171
5.5 PROCEDURE	176
5.6 DATA ANALYSIS	178
5.7 RESULTS	178
5.7.1 <i>Predicative condition</i>	178
5.7.2 <i>Attributive condition</i>	182
5.7.3 <i>Complementary Analysis: Unified Model</i>	185
5.8 DISCUSSION	186
6 CONCLUDING DISCUSSION.....	191
6.1 OVERVIEW OF RESEARCH GOALS.....	191
6.2 SUMMARY OF KEY FINDINGS	195
6.2.1 <i>Evidence from Adult Processing</i>	195
6.2.2 <i>Evidence from Child Development</i>	196
6.3 REDEFINING THE POSSESSION “PROTOTYPE”	198
6.3.1 <i>The Anatomy of the Prototype</i>	198
6.3.2 <i>The Role of Syntax</i>	200
6.3.3 <i>The Developmental Shift</i>	202
6.4 LIMITATIONS.....	205
6.5 FUTURE DIRECTIONS	206
6.6 CONCLUSION	208
7 BIBLIOGRAPHY	210

List of Abbreviations

1 First person

2 Second person

3 Third person

ACC Accusative

ART Article

AUX Auxiliary

BNC British National Corpus

CL Clitic

COND Conditional

DAT Dative

DEF Definite

DEM Demonstrative

DET Determiner

DOM Differential Object Marking

F Feminine

FOC Focus

FUT Future

GEN Genitive

IMP Imperative

IND Indicative

INF Infinitive

L1 First Language

L2 Second Language

M Masculine

N Neuter

NEG Negation

NOM Nominative

OBJ Object

PL Plural

POSS Possessive

PRES Present

PRO Pronoun

PST Past

PTCP Participle

REL Relative

SBJ Subject

SG Singular

TOP Topic

UNPOSS Depossessed

VPE Verbal Phrase Ellipsis

List of Languages

Abun

Acholi

Afrikaans

Arabic

Arawak

Athabaskan

Avar

Bare

Cahuilla

Carib

Chamorro

Chukchi

Croatian

Daakaka

Daga

Dakota

Dhaasanac

Dutch

Dyirbal

Emirati Arabic

English

Estonian

Ewe

Fijian

Finnish

German

Greek

Hebrew

Hixkaryana

Hohôdene Baniwa

Hone

Indo-European

Irish

Jarawara

Kam

Kanuri

Kayardild

K'iche'

Koyukon

Kpelle

Lango

Lenakel

Likpe

Luganda

Luisefño

Macushi

Mande

Mandarin

Mandarin Chinese

Martuthunira

Modern Greek

Mongolian

Moskona

Mussau-Emira

Nanti

Nêlêmwa

North-east Ambae

Norwegian

Nyulnyul

Oromo

Paamese

Pareci

Paumari

Persian

Polish

Polynesian

Portuguese

Puluwat

Punjabi

Rotokas

Russian

Saker

Samoan

Sango

Siouan

Spanish

Tamambo

Tanacross

Tariana

Te Reo Māori

Tiwi

Tondano

Tongan

Tucano

Turkish

Tzeltal

Warekena

Warlpiri

Waurá

Welsh

West Greenlandic

Western Balochi

Yucatec Maya

Introduction

Possession is one of the most pervasive and yet conceptually elusive notions in human language. Every language offers its speakers multiple ways to express that something “belongs” to someone: we talk about Maria’s book, the child’s hand, my brother, the door of the house, the city has a cathedral. These expressions do not merely encode legal ownership; they also capture relations of part–whole, kinship, body parts, social roles and more abstract links such as responsibility, control and authorship. From a typological perspective, possessive constructions display remarkable diversity in their morphosyntactic encoding, ranging from adnominal genitives and possessive pronouns to existential verbs and specialized classifiers. At the same time, cross-linguistic work has argued that possession rests on a relatively constrained set of conceptual building blocks, such as control and spatial contiguity. In this sense, possession can be seen as a privileged window onto the interface between conceptual structure and grammatical form.

Within this broad domain, two semantic dimensions have attracted particular attention: alienability and animacy. The contrast between inalienable and alienable possession is commonly used to distinguish relations that are conceived as intrinsic, stable and often non-transferable (such as body parts and kinship) from relations that are more contingent, reversible and under the possessor’s control, such as the ownership of objects or property. Typological studies have shown that this distinction may be overtly grammaticalized, as in many Austronesian languages, or remain implicit but nonetheless influential in the distribution of possessive markers. Animacy, in turn, plays a crucial role in determining which entities are more likely to be construed as possessors or possessed, and it is tightly connected to cognitive and discourse prominence.

Research on possession has therefore contributed to several central questions in linguistics and cognitive science: how semantic distinctions are grammaticalized, how

children acquire complex mappings between conceptual relations and syntactic structures, and how adult speakers process these structures. Yet, despite a rich literature, current knowledge about the syntax–semantics interface in possessive constructions remains fragmented. Much of what we know comes either from typological descriptions and corpus data or from offline experimental tasks, such as grammaticality or plausibility judgments. These sources provide valuable information about the distribution of forms and speakers’ metalinguistic intuitions, but they offer only an indirect view of the of linguistic processing.

A further limitation concerns the structural domain that has received most empirical attention. Both in child and adult studies, possessive relations have been predominantly investigated in attributive constructions (e.g., *the girl’s dress*, *the nose of the witch*). By contrast, predicative possession, realized through existential or “have”-type verbs (e.g., *the girl has a dress*, *the witch has a nose*), has attracted considerably less attention, especially from a psycholinguistic perspective. Developmental work has focused largely on the acquisition of genitive and prepositional possessives in production and comprehension, while only a handful of studies explicitly compare attributive and predicative forms. Similarly, in adult research, the majority of experimental studies target nominal possessives, leaving open the question of whether the same semantic factors operate in comparable ways when possession is asserted in a full clause rather than presupposed within a noun phrase.

The picture is even more incomplete when we consider developmental data. Longitudinal and experimental studies on children provide rich descriptions of how possessive expressions emerge and stabilize, but they predominantly focus on early morphosyntax, on the contrast between pronominal and nominal possessors, or on the acquisition of specific markers (e.g., *’s* in English, *de* in Mandarin). Semantic dimensions such as animacy and alienability are often mentioned, but they are rarely tested systematically, and almost never in connection with online measures of comprehension.

Furthermore, the few experimental paradigms that do address children's understanding of possessive relations typically target attributive constructions and rely on accuracy in picture-selection tasks. This leaves open crucial questions about how children exploit semantic cues, how they interpret predicative possession, and how their processing strategies compare to those of adults.

Taken together, these observations point to a double gap in the literature. Structurally, we lack a unified account of how attributive and predicative possessive constructions relate to each other in processing and development. Methodologically, we lack fine-grained evidence on the online integration of semantic cues such as animacy and alienability, both in adults and in children. The present thesis is designed to address these gaps by focusing on a single language (Italian) and by combining typological, developmental and psycholinguistic perspectives within a coherent research programme.

The goal of this dissertation is to investigate how syntactic structure and semantic information interact in the processing and acquisition of possessive constructions in Italian. More specifically, the work concentrates on the interface between animacy of the possessor and alienability of the possessed noun, and on how these factors operate in two major syntactic configurations: attributive possession (e.g., *il cappello della strega*, 'the hat of the witch') and predicative possession (e.g., *la strega ha il cappello*, 'the witch has the hat'). By examining both adult speakers and preschool children, the thesis aims to uncover (i) whether animacy and inalienability confer a processing advantage in online comprehension; (ii) whether this advantage is stable across syntactic realizations; and (iii) how these semantic cues are exploited during development.

To achieve this goal, the dissertation adopts a multi-step empirical strategy. For adults, three experiments explore the role of animacy and alienability in Italian possessives, moving from offline judgments to online self-paced reading and from attributive to

predicative syntax. For children, a fourth experiment uses a picture-selection task with reaction times to probe the comprehension of the same semantic contrasts across both structures. Throughout, the thesis maintains tight control over lexical frequency and semantic plausibility, thereby disentangling conceptual factors from distributional biases. The central claim that will emerge from this work is that animacy and inalienability are not competing cues; rather, they collaborate in online processing, and their contribution is modulated (but not overridden) by syntactic encoding.

The remainder of the dissertation is organized as follows.

Chapter 1, “What is Possession in Language?”, lays the theoretical foundations by addressing the conceptual and typological landscape of possession. The chapter begins with the difficulty of defining possession in a way that encompasses both concrete ownership and more abstract relations, drawing on classic and recent work in linguistic typology and cognitive semantics. It then introduces the two key semantic dimensions that will be central to the empirical studies: alienability and animacy, discussing their cognitive underpinnings and their role in cross-linguistic systems of possessive marking. A section on cultural perspectives illustrates how different communities conceptualize and lexicalize possession, showing that notions such as control, kinship and embodied relationships can be dependent from the cultural perspective. Finally, the chapter surveys the major morphosyntactic strategies used to encode possession cross-linguistically, including adnominal genitives, possessive pronouns, relational nouns and predicative constructions, and briefly presents alternative strategies to express “having”, such as locative or existential patterns.

Chapter 2, “Children and Possessive Structures”, turns to the developmental literature. It reviews longitudinal studies of early possessive expressions, highlighting how children gradually expand their repertoire from item-based constructions and pragmatic

anchors to more abstract morphosyntactic patterns. Special attention is devoted to work on morphosyntactic economy and the cost of movement, which suggests that early grammars favour structurally simpler options within the determiner phrase. The chapter then examines experimental evidence on children's comprehension and production of possessive constructions, including research on pronominal possession, on the interpretation of complex genitives, and on early sensitivity to semantic distinctions such as animacy and alienability. By synthesizing these topics, Chapter 2 identifies a first research gap: the dominance of attributive possession in previous studies and the scarcity of developmental data on predicative forms, especially with online measures. The chapter concludes by formulating specific questions for the child study reported later in the thesis, concerning how syntactic structure and semantic cues jointly guide children's comprehension.

Chapter 3, "Adults and Possessive Structures", focuses on adult language. The first part presents corpus-based evidence from Italian, examining how possessive relations are distributed across syntactic patterns and exploring the interplay between semantics, information structure and choice of construction. The analyses consider the architecture of the possessive noun phrase, the contribution of pragmatic factors in attributive possession, and the semantic profile of predicative possession. The second part reviews psycholinguistic studies on adult processing of possessive constructions, with particular emphasis on the "self advantage", predictive processing, and the roles of animacy and alienability. This review reveals a second, methodological gap: most available data derive from offline judgment tasks or production preferences, and do not directly tap into online processing. The chapter closes by articulating the research questions that guide the adult experiments: whether the inalienability advantage observed in English extends to Italian; whether animacy and inalienability operate as independent or interacting cues; and whether syntactic realization (attributive vs. predicative) modulates these effects.

Chapter 4, “The Role of Alienability and Animacy in the Processing of Possessive Structures in Italian”, presents three experiments with adult native speakers. Experiment 1 replicates the plausibility judgment task of Vaid and Chen (2019) for Italian attributive possessives, establishing an offline baseline and validating a set of stimuli controlled for frequency and plausibility. Experiment 2 extends this design by adding self-paced reading to the plausibility judgement task, thereby contrasting online and offline measures within a single paradigm. Experiment 3 applies the same methodology to predicative possessive sentences in order to compare the two syntactic structures directly. The chapter details the methods, statistical analyses and results of each experiment, and concludes with a general discussion that introduces three working hypotheses: the Animacy Hypothesis, the Inalienability Hypothesis and the Interaction Hypothesis, regarding how animacy and alienability contribute to possessive processing.

Chapter 5, “Children’s Comprehension of Possessive Structures: The Roles of Animacy, Alienability, and Syntactic Structure”, reports a developmental experiment with Italian-speaking preschoolers aged 3 to 6. Using a picture-selection task, the study examines children’s comprehension of attributive and predicative possessives manipulated for possessor animacy and possessed alienability. Accuracy and reaction times are analysed to compare children’s performance with the adult patterns observed in Chapter 4. The results reveal how early semantic understanding of possession interacts with syntactic realization, and whether children already exploit animacy and alienability as informative cues during comprehension.

Finally, Chapter 6, “Concluding Discussion”, integrates the evidence from adults and children to offer a unified account of the syntax–semantics interface in Italian possessive constructions. The chapter summarizes the main findings, proposes a revised view of the “prototype” of possession that emerges from the processing data, and discusses the role of

syntax in modulating conceptual cues. It also considers the developmental trajectory from child to adult processing, reflecting on how structural and semantic factors converge over time. The thesis ends by acknowledging its limitations and outlining directions for future research, including more fine-grained online measures and broader cross-linguistic comparisons.

Through this trajectory, from typology to child development, from sentence structure to real-time processing, the dissertation aims to show that possessive constructions offer a fertile testing ground for understanding how grammar and meaning interact. By situating the Italian data within a wider theoretical and empirical landscape, the work aspires to contribute both to the study of possession and to the broader inquiry into how speakers build and interpret complex relations between entities in language.

1 What is Possession in Language?

1.1 A difficult definition

As with many linguistic terms, *possession* is an approximation (Aikhenvald, 2019). In all languages, the grammatical markers employed to express ownership are also used for a variety of other functions, although the exact range of these functions varies across languages. As Lyons (1977, p. 722) noted, “it is only a minority of what are traditionally called possessive constructions that have anything to do with property or possession.” According to Heine (1997, p. 1), possession has often been described as an inherently vague or fuzzy concept. Similarly, the English verb *have* has been characterized as “colorless” (Buck, 1949, p. 740), and Seiler (1983, p. 1) notes that possessive structures, though intuitively recognizable, remain among the least understood phenomena in linguistic research:

The linguistic phenomena labeled ‘possessive’ are there, ready for inspection and for classification – recognizable even for the layman. Nevertheless, possessivity is one of the phenomena least understood.

In everyday use, the term *possession* tends to be used in the narrow sense of “ownership”, but it can also refer to relationships between human and animal body parts, plant parts and inanimate entities, kinship ties, and broader associative relationships, as Lyons (1977, p. 722) points out. In fact, what appears to unify the phenomenon labeled possession is the presence of an asymmetrical relationship (Langacker, 2009; Seiler, 1983; Stassen, 2009) between two entities, termed the *possessor* and the *possessed*. However, this definition does not fully capture the semantic content of possession. The notion of an “asymmetrical relation” is insufficient (Mazzitelli, 2015), as many other relations also fit this description. It is therefore necessary to identify additional elements that can more effectively characterize

the elusive meaning of possession. Given these difficulties in defining possession purely in terms of asymmetry or ownership, some scholars have sought to explain it by appealing to more concrete conceptual domains. One influential line of thought is the localist approach, which interprets possessive relations as a subclass of locative expressions (Clark, 1978; Lyons, 1977).

Clark (1978) attempted to define possession with reference to the semantic theory of localism, according to which possessive relations are traced back to the class of locative expressions, building on earlier observations by linguists such as Lyons (1968, 1977) and Verhaar (1967). Lyons (1977, p. 474) stated: “It can be argued that so-called possessive expressions are to be regarded as a subclass of locatives (as they very obviously are, in terms of their grammatical structure, in certain languages)”. Clark (1978) conducted a typological survey across 30 languages to thoroughly demonstrate the robustness of these similarities, in particular between existential constructions (*There is a book on the table*), locative constructions (*The book is on the table*), and two types of possessive constructions (*The book is Tom’s* and *Tom has the book*). A central claim made by Clark (1978, p. 89) is that the possessor in the two possessive constructions is “simply an animate place,” in line with Lyons’ (1977, p. 722) reductionist claim that possession can be reduced to abstract (and animate) location. This analogy forms the basis for linking possessive structures to locative and existential ones. However, this account has been met with significant criticism, for example Payne (2009, p. 116) has pointed out important conceptual differences between possession and location:

I do not dismiss the clear linguistic evidence that human beings can and even often do see conceptual connections between predicating location of an object, possession of an object and existence of an object [...]. I do, however, believe it is too reductionist to say that they are simply the same.

This view is shared by Stassen (2009, p. 14), who argues that “location cannot be seen as a sufficient template for the cognitive/semantic notion of possession”. While acknowledging that “sameness of location is a necessary ingredient,” he maintains “that it is not the only one” and that “the notion of possession is defined by a second parameter which cannot be reduced to spatio-temporal notions”. Moreover, as Tham (2009, p. 12) points out, even in languages where possessive and locative constructions formally coincide, not all animate locations are interpreted as possessors by speakers:

Even in languages where PSRs [possessors] are encoded by a locative case and the PSR [possessor] interpretation is the only one possible for an animate-denoting nominal marked by this case, true animate locations are always available for expressing such spatial relations as BEHIND, BESIDE etc.

Empirical evidence supporting these criticisms is provided by languages such as Russian. As observed by Mazzitelli (2015), it is possible for a locative construction that has grammaticalized into a possessive one to retain its original spatial semantics. In such instances, the construction may predicate a location relative to a human referent without necessarily implying ownership. This distinction is clearly illustrated in Russian: the expression *u menja mašina* (literally ‘at me car’) functions as the standard predicative possessive *I have a car*. Conversely, a shift in word order to *mašina u menja* (literally ‘car at me’) triggers a strictly locative interpretation, meaning *the car is at my place* (e.g., in my garage). Thus, although the construction formed by the preposition *u* (‘at’) governing the genitive case has been grammaticalized to express possession, it remains available for spatial deixis. If the notion of human location were sufficient in itself to determine a possessive interpretation, these distinct communicative functions would collapse into ambiguity. These data highlight the conceptual limits of reducing possession to a form of abstract location, suggesting the need for alternative explanatory models.

While still drawing on typological data from a wide range of languages, Heine (1997) significantly broadens the theoretical perspective by focusing on the cognitive and diachronic processes that underlie possessive constructions. Heine (1997) argues that abstract grammatical domains such as possession are not directly encoded in language, but rather emerge from more concrete, experientially grounded schemas. This idea is rooted in the broader cognitive principle that speakers tend to conceptualize less accessible or more abstract experiences in terms of more immediate and concrete ones (Lakoff & Johnson, 1980; Stolz, 1991). In the case of possession, Heine identifies eight “event schemas” that serve as cognitive templates for the grammaticalization of possessive constructions across languages (Heine, 1997, pp. 32–44; Bybee et al., 1994).

Table 1. Event Schemas for Possession (based on Heine 1997, p. 47)

Formula	Label of event schema
X takes Y	Action
Y is located at X	Location
X is with Y	Companion
X's Y exists	Genitive
Y exists for/to X	Goal
Y exists from X	Source
As for X, Y exists	Topic
Y is X's (property)	Equation

Heine’s model is informed by grammaticalization theory (Hopper & Traugott, 1993; Traugott & Heine, 1991a, 1991b), which demonstrates that grammatical expressions typically do not emerge spontaneously, but are derived from more concrete lexical or syntactic sources. For example, possessive markers often originate from verbs of acquisition or spatial prepositions, reflecting the underlying event schemas from which they are derived (Bybee & Pagliuca, 1985). This process involves not only semantic extension but also

syntactic reanalysis, whereby constructions initially expressing concrete actions or spatial relations are gradually reinterpreted as markers of possession.

Importantly, Heine's schema-based approach accounts for both the diversity and the cross-linguistic similarities of possessive constructions. While Clark's (1978) typological survey suggests the robustness of locative-possessive parallels in a wide range of languages, Heine's work explains why certain schemas, like location or topic, are recurrent sources for possessive constructions: these schemas reflect fundamental, recurrent experiences in human cognition and interaction (cf. Matlin, 1989; Sanford, 1985; Shibatani, 1996). Moreover, the notion of *schema* itself, as used by Heine, builds on Bartlett's (1932) work in cognitive psychology and has been widely adopted in linguistics to refer to abstracted representations of stereotypical situations (Hengeveld, 1992; Langacker, 1978). In contrast to approaches that might seek a common structural core suggested by Clark's syncretism findings, Heine (1997, p. 239) explicitly concludes:

Finally, the observations made in this book explain why any attempt at [setting] up one single universal structure of predicative possession, to account for all the morphosyntactic variation to be found in the languages of the world, is doomed to failure.

A complementary cognitive perspective on possessive constructions is provided by Langacker (1991, 2009), who conceptualizes possession not through grammaticalization paths, but through the notion of reference-point relationships. Langacker defines possessive expressions as belonging to the class of reference-point relationships. These are relations where one of the two terms is chosen to be the reference point from whose perspective the situation is considered. The ability to establish reference points is a basic human cognitive capacity that Langacker (2009 p. 46) defines as follows:

[The] capacity for invoking one conceived entity as a reference point in order to establish mental contact with another, i.e. to mentally access one conceived entity through another. The entity accessed in this way is called the target in the reference point relationship. The set of entities accessible through a given reference point (the set of potential targets) are collectively referred to as its dominion.

As noted by Mazzitelli (2015, p. 21), the interest of Taylor's proposal does not lie only in the identification of a prototypical configuration, but also in the advantage of not treating the notion of possession in a nuclear definition for every existent possessive construction:

A prototype-based model accounts for the extreme variety of relations that cannot be reduced to a single, clear-cut notion, while at the same time preserving the common *quid* that unifies them under the heading of possessive relations.

With this same idea, several scholars have adopted a prototype-based approach to possession, arguing that this framework offers the most adequate description of the heterogeneity of possessive relations (*inter alia*, Heine, 1997a; Langacker, 2000; Stassen, 2009). However, they differ substantially in identifying which possessive relation should count as prototypical. In the most widespread interpretation, the prototype is identified with ownership, understood as the intuitive and cognitively most salient form of possession. This view is explicitly endorsed by Taylor (1996), Heine (1997), Baron and Herslund (2001), and Stassen (2009), all of whom treat ownership as the central conceptual configuration from which other possessive meanings radiate. For instance, Taylor approaches possession with the concept of 'experiential gestalt,' a "cluster of aspects, grounded in experience, which together define paradigmatic, or prototypical [possession]" (Taylor, 1996, p. 340). In Taylor's view, possession is not a notion definable in clear-cut terms; rather, it results from the co-occurrence of typical features, which, together, form the gestalt. According to Taylor (1996, p. 340), the possession gestalt is characterized by the following features:

The possessor is a human being; the possessed is an inanimate entity, usually a concrete physical object; the relation is exclusive (for any possessed entity there is usually only one possessor); but for any possessor, there is typically a large number of entities which may count as his possessions; the possessor has exclusive rights of access to the possessed (and other persons may have access to the possessed only with the permission of the possessor); the possessed is typically an object of value, whether commercial or sentimental; the possessor's rights of access to the possessed are invested in him through a special transaction, such as purchase, inheritance, or gift, and remain with him until the possessor effects their transfer to another person by means of a further transaction, such as sale or donation; typically, the possession relation is long term, measured in months and years, not in minutes or seconds; the possessor can have easy access to the possessed; the possessed is typically located in the proximity of the possessor.

So, a possessive relationship that fills all these properties is a prototypical instance of possession, whereas an expression where only some are present is non-prototypical. As Baron and Herslund (2001a, p. 11) note, many languages encode ownership through dedicated lexical items that cannot be used in non-ownership contexts, such as the English *possess*, *own*, or *belong*. Within this tradition, Mazzitelli (2015) also aligns with an ownership-based interpretation, arguing that this relation captures the instinctively “more possessive” character of canonical possessive expressions (Mazzitelli, 2015, p. 22).

However, not all scholars converge on ownership as the single prototype. Langacker (2000, 2002, 2009) rejects the idea of a unique core and instead proposes that the domain of possession is polycentric, revolving around several conceptual archetypes: ownership, kinship, and part–whole relations, especially those involving body parts. These configurations, he argues, are prototypical because they naturally lend themselves to reference-point construals (Langacker, 2000, p. 176; 2002, p. 338). Other scholars have

questioned the ownership prototype from a different perspective, suggesting that inalienable relations, notably kinship and body-part relations, form the semantic core of possession cross-linguistically. Evidence for this position comes from the fact that many languages encode such relations morphologically as inalienable (Aikhenvald, 2013; Chappell & McGregor, 1996), and even European languages display structural asymmetries distinguishing inalienable nouns from ordinary possessions (Stolz et al., 2008, pp. 480–481).

Taken together, these positions raise a broader methodological question: What exactly makes a possessive relation prototypical? The label “prototypical possession” is in itself indeterminate unless one specifies the criterion by which the prototype is selected. Different theoretical perspectives imply different answers. A prototype could be identified according to speaker intuition, measured through acceptability or plausibility judgments; it could be established through usage-based frequency, derived from corpus distributions; or it could be defined in terms of cognitive processing, focusing on which relations are accessed or integrated more easily during comprehension. Each criterion would lead to a different hierarchy of prototypicality, and none is theoretically obligatory.

This indeterminacy suggests that the notion of prototype is inherently linked to the dimensions along which possessive relations vary, and that different prototypical candidates foreground different semantic features. Two of the most widely discussed dimensions are alienability and animacy, which play a fundamental role both in linguistic encoding and in cognitive construals of possessive relations. The following section therefore turns to these notions.

1.2 Semantic Dimensions: Alienability and Animacy

Possession is a fundamental domain that reveals crucial aspects of how humans conceptualize their environment and interpersonal relationships. Through possessive structures, languages reflect social interactions and hierarchies, offering insight into cultural organization (Heine, 1997). Moreover, language contact often reshapes the meanings and forms of possessive constructions, underscoring their intercultural relevance (Aikhenvald, 2013). Among the authors who have attempted to define linguistic possession, Seiler (1983, p. 4) is notable for considering possession as a “bio-cultural” concept that cannot be explained without referring to extralinguistic knowledge:

Semantically, the domain of POSSESSION can be described as bio-cultural. It is the relationship between a human being, his kinsmen, his body parts, his material belongings, his cultural and intellectual products. In a more extended view, it is the relationship between parts and whole of an organism.

Capturing the semantic heterogeneity of the domain, McGregor (2009, p. 1) describes possession as a cover term for a manifold set of relations:

[It] potentially covers a wide range of conceptual relations between entities, including, for human beings, between persons and their body-parts and products, between persons and their kin, between persons and their representations (e.g. names, photographs), between persons and their material belongings (animate and inanimate items they own).

As noted previously, classifying these possible possessive relationships is linguistically challenging. A primary distinction can be made between alienable and inalienable possession. This possessive distinction dates back to the early twentieth century, when Lévy-Bruhl (1914, p. 96) observed that structures expressing adnominal possession such as *my*

head and *my garment* are coded differently in Oceanic languages. He explained this in terms of the conceptually different types of possession they involve: inalienable possession (*my head*) versus alienable possession (*my garment*). Formally, they indicate that entities like garments can easily shift possessors, while entities like heads cannot. Semantically, inalienable possession is assumed to involve “either inextricable, essential or unchangeable relations” between *possessor* and *possessed*¹ (Chappell & McGregor, 1996a, p. 4). Alienable possession, by contrast, involves associations between *possessor* and *possessed* that are of a less permanent and inherent type (Chappell & McGregor, 1989, p. 25).

A wealth of alternative terminologies and characterizations has been proposed in the literature: “inherent” versus “accidental” (Dixon, 1910), “separable” versus “inseparable” (e.g., Boas, 1911; Sapir, 1917), and “transferable” (Swanton, 1911) to refer to alienable possession. Nevertheless, we will use the traditional labels.

Chappell and McGregor (1996, pp. 3–4) propose four kinds of relationships that tend to be associated with inalienability: (a) a close biological or social bond between two people (e.g., kin); (b) an integral relationship (e.g., body parts and other parts of a whole); (c) an inherent relationship (e.g., spatial relations); and (d) items which are essential for one’s livelihood—again, closely connected to a person’s survival². For Heine (2006, p. 10), the distinction is straightforward: Items that cannot normally be separated from their owners are inalienable, while all others are alienable:

¹ Many scholars use the term “possessee” (Aikhenvald, 2013; Chappell & McGregor, 1989, 1996; Heine, 2006), but in this dissertation, I prefer to use *possessed* to avoid confusing the readers, as I find it more natural and immediate. Therefore, I replace the term to remain consistent: I keep the original terms of other authors only in punctual citations.

² Chappell and McGregor do not explicitly specify what they mean by “survival items.” However, elsewhere in the same volume, Walsh (1996, p. 356) offers a relevant clarification, noting that “the use of the body part ‘nose’ reflects that this level is crucial for survival (as the water rises!).” This suggests that the notion of survival may refer either to body parts whose loss would compromise an individual’s ability to survive, or more broadly to entities such as air or water that are indispensable for survival.

Thus, items belonging to any of the following conceptual domains are likely to be treated as inalienable: (a) Kinship roles. (b) Body-parts. (c) Relational spatial concepts, like *top*, *bottom*, *interior*, etc. (d) Parts of other items, like *branch*, *handle*, etc. (e) Physical and mental states, like *strength*, *fear*, etc. (cf. Lichtenberk, 1985, p. 105). (f) Nominalizations, where the *possessee* is a verbal noun, for example *his singing*, *the planting of bananas*. In addition, there are a number of individual concepts in a given language that may also be treated inalienably, such as *name*, *voice*, *smell*, *shadow*, *footprint*, *property*, *home*, etc.

This classical semantic distinction finds a reformulation in Kockelman (2009), who observes that the traditional terms *alienable* and *inalienable* broadly capture a contrast that is both linguistic and cognitive. In his view, inalienable possessions are marked entities: Speakers and addressees take their existence for granted (body parts, kinship relations, or other inherent properties are mutually known), but their condition is not equally accessible. One party may know whether *my arm* is injured or whether *her child* is sick, making these items simultaneously predictable in their existence yet informative in their state. For this reason, Kockelman (2009, p. 27) argues that inalienable nouns behave as both figure (focus-worthy, because their state can change) and ground (topic-like, because their existence is presupposed). Their status thus depends on cultural expectations about what counts as a constitutive part of a person and on general cognitive processes that structure inferential relations between wholes and parts.

Rather than fixing the notion of inalienability through a single criterion, Kockelman (2009) proposes treating it as a multidimensional category, identifiable along four partially overlapping dimensions:

1. A form class, tied to morphosyntactic marking.
2. A feature class, tied to semantic properties.
3. A function class, tied to pragmatic roles in discourse.

4. A frequency class, tied to recurrent usage patterns.

Following Karvovskaya (2018), we can also distinguish inalienability in a cluster of usages, in which three more specific interpretations can be identified. A first use of the term concerns obligatorily possessed nouns: In certain languages, a sizable set of nouns cannot occur without a *possessor* and are judged ungrammatical when left uninflected for possession. Grammars of Athabaskan languages frequently describe such items (typically kinship terms, body part nouns, and some plant parts) as inalienable because they require possessive morphology whenever they appear (Hargus, 2007; Saxon & Wilhelm, 2016). A second use of inalienability as a noun-class label appeals to morphological splits in possessive coding. In languages with two distinct possessive strategies, a closed set of nouns selects a special possessive marker, while all remaining nouns take a more general one. In such cases, descriptive grammars often describe the closed set as “inalienable” and the rest as “alienable,” even when the semantic commonalities within each set are only partial (Gruber, 2013, p. 84). A third use is purely semantic: Authors sometimes speak of *semantically inalienable* nouns (typically kinship terms and body parts) purely on the basis of world knowledge about inherent relations, even when the language in question does not treat them as a homogeneous morphological class (Bower, 2012, p. 357).

As Karvovskaya (2018) points out, these three usages all assign the label *inalienable* to classes of nouns, but they do not actually describe the same phenomenon. The first concerns obligatory realization of a *possessor* argument, the second concerns differential possessive marking, and the third concerns the analyst’s categorization of meanings based on notions like “inherent” or “inborn” (Nichols, 1988, p. 573). It is therefore unsurprising that the resulting “inalienable” sets vary widely across descriptions, and that there is often no straightforward match between what is morphosyntactically marked as inalienable and what is intuitively perceived as inherently related.

A second major cluster of usages treats inalienability not as a property of the noun itself, but as a property of the relation between *possessor* and *possessed*. From this perspective, at least two main approaches can be distinguished (Karvovskaya, 2018, pp. 11–13). Some authors characterize inalienable relations in terms of temporal permanence: Chappell and McGregor (1996, p. 4) describe them as “permanent and inherent,” and von Prince (2012, p. 1) proposes that inalienability can be reduced to a notion of temporal stability, whereby inalienable relations are purely determined by context, while alienable relations are specified to be at least potentially temporary. They are defined as relations between two individuals and a period of time: A relation like *pig-bone* in Daakaka is inalienable because the bone is construed as an inherent property of the pig, whereas a relation like *Joebang-bone* is alienable because it describes a temporary relation between a person and an animal bone (von Prince, 2012, pp. 14–15).

Other authors instead characterize inalienable relations in terms of lack of control. In a later formulation, von Prince (2016) suggests that alienable possession corresponds to control relations, where the *possessor* can manipulate, abandon, or transfer the *possessed*, while inalienable possession groups together relations where such control is absent. However, under this view, contrasts between animate and inanimate *possessors* present challenges. For instance, Holton (2000) demonstrates that in Tanacross (Athabaskan), a noun like *water* can appear in two types of possessive constructions (e.g., *water* possessed by a person vs. *water* possessed by a lake). There is a possible ownership relation between *water* and an animate *possessor*, while there is a constitutional relation between *water* and an inanimate *possessor* (*lake*).

The role of control in possessive constructions has been formulated by Evans (1995, p. 146), who states that the meaning of the major possessive construction in the Australian language Kayardild can be explicated as follows: “X [the *possessor*] can expect Y [the

possessed] to be in the same place as X when X wants, and X can do with Y what X wants.” Thus, basically, the notion of ‘control’ can be described in terms of ‘power.’ Within an event, the participant that exercises control is typically construed as the initiator of actions and the one who ultimately benefits from them. Applied to possession, this means that the relation between the two participating entities is necessarily asymmetrical (Stassen, 2009, p. 14) because the *possessor* is conceptualized as the entity that directs and regulates the *possessed* item: It is the *possessor* who decides where the *possessed* object is located, what can be done with it, and whether the possessive relationship continues or is interrupted. Animacy is intimately linked with the notion of control (von Prince, 2016, p. 83), because control requires a high degree of agency, and agentivity in turn usually presupposes animacy. Stassen (2009, p. 15) points out that:

If we accept control as a parameter in the semantics of possession, we no longer have to view the human or humanized status of the possessor as a defining factor in the possessive relation. Instead, the [+Human] status of the possessor can now be seen as a consequence of the fact that, in possessive relations, one of the participants has control over the other, and that, in general, it is only humans that can execute control.

An intermediate position combining the temporal and the control perspectives is offered by Heine (1997, pp. 38–39), who characterizes the distinction “with reference to the extent of control the possessor has over the possessed on the one hand, and the length of time during which the possessed is located in proximity to the possessor on the other.”

However, there are difficulties regarding the use of the term *control* stemming from the fact that it has been associated with at least two different senses. *Control* is said to involve the ability of the *possessor* to manipulate the *possessed*; the question is whether manipulation includes the possibility of discontinuing ownership or not (Heine, 1997, p. 3). For example,

the phrase *my head* implies control in the former but not in the latter sense: I can manipulate my head in various ways but I cannot normally terminate ownership of it. Accordingly, while some authors argue that body part possession does not involve control (Chappell & McGregor, 1996), others say it does (cf. Brugman, 1988, p. 229; Lynch, 1973, p. 6).

Table 2. The five different uses of the term inalienability according to the table 1.2 in Karvovskaya (2018, p.13)

Inalienability as a characteristic of a noun class			Inalienability as a characteristic of a relation	
1	2	3	4	5
Inalienable nouns are obligatorily possessed	Inalienable nouns receive distinct possessive marking	Inalienable nouns are “semantically” inalienable (which is not always reflected in their formal marking)	Inalienable relations are permanent, alienable are relative to a certain point in time	Inalienable relations are not controlled by the possessors, alienable relations are controlled

Taken together, these usages (three noun-based and two relation-based) make it clear, following Karvovskaya (2018, p. 9), that the term *inalienability* operates as a blanket label for phenomena that share only superficial similarities (Karvovskaya, 2018; Nichols, 1988). Defining inalienability via obligatory possession points to argument-structure constraints; defining it via differential possessive morphology points to lexicalized splits in coding strategies; defining it via “semantically inalienable” nouns points to the analyst’s world knowledge; and defining it via permanence or control points to properties of the possessive relation rather than to the *possessed* lexical item.

What emerges is that semantic criteria alone cannot exhaustively capture how languages structure possessive relations. Even in domains that recur cross-linguistically (kinship, body parts, part-whole relations), languages diverge in where they draw the boundary between alienable and inalienable, and in how strictly this boundary applies

(Chappell & McGregor, 1989, 1996). As Aikhenvald (2013, p. 1) notes, linguistic categories often correlate with cultural values, social hierarchies, and patterns of perception, and possession is no exception. Thus, the classification of *possessor* and *possessed* cannot be reduced to semantic prototypes alone, but reflects culturally conditioned expectations about permanence, dependency, embodiment, and social relatedness. These considerations motivate a shift from purely semantic dimensions to a broader examination of the cultural factors that structure possessive systems, and how cross-linguistic variation in alienability and possessive marking patterns is shaped by culturally specific norms and conceptualizations.

Through the analysis of the notion of alienability, it seems clear that there is another important parameter in possessive relationships: animacy. In many works, the notion of animacy is presented as a binary factor, in terms of \pm animate specifications (Rosenbach, 2008, p. 153). Although, strictly speaking, animacy as a biological dimension is an inherent property of referents (either something is a living entity or it is not), animacy as a linguistic factor crucially depends on whether and to what extent speakers treat referents linguistically as if they were animate.

1.3 Cultural perspectives

Every language has a mechanism for expressing possession, both within a noun phrase and within a clause. A number of scholars have attempted to formulate hierarchies or implicational scales capable of predicting which semantic domains are most likely to be treated as inalienable or alienable within and across languages. Early proposals of this kind include Seiler (1983, p. 13) and Haiman (1985, p. 130), both of whom argue that possessive relations are not randomly distributed, but instead follow structured semantic patterns.

Within this tradition, Nichols (1992) proposes an influential implicational hierarchy for the semantic membership of inalienable classes. According to Nichols (1992, p. 572), the inalienable category tends to comprise the following domains, ordered by decreasing likelihood:

- kin terms and/or body parts
- part–whole and/or spatial relations
- culturally basic possessed items (e.g., arrows, domestic animals)

Nichols (1992) observes that if a language includes any items outside kin terms and body parts among its inalienables, it almost invariably includes both kin terms and body parts as well (p. 572). Crucially, however, she also emphasizes that inalienable possession is not primarily a semantic distinction but “the automatic consequence of the closer formal bonding that results in headmarked possession” (Nichols, 1992, pp. 121–122). In her view, the nouns most frequently occurring with *possessors* in discourse, (typically kin terms, body parts, and part–whole relations) become the core of the inalienable class precisely because their frequent association with a *possessor* becomes grammaticalized (Nichols, 1988, 1992).

Alongside these hierarchical accounts, other scholars have highlighted the difficulty of applying such scales in a uniform way across lexical classes. Tsunoda (1996), for example, discusses the ambiguous status of clothing items. Although traditionally classified as

alienable, clothing, when worn, becomes “physically (and probably psychologically as well) very close to the possessor, and [...] almost body parts” (Tsunoda, 1996, p. 578). When stored or not worn, however, the same items clearly belong to the alienable category. This kind of contextual shift challenges rigid hierarchical classifications and illustrates how the alienable–inalienable distinction may depend on discourse state and conceptual perspective. The lack of a single, reliable diagnostic is further underscored by the wide range of tests proposed to distinguish alienable and inalienable nouns, which frequently yield inconsistent classifications. As Heine (1997, p. 18) observes, tests such as *possessor* ascension, often exemplified for German³, identify body parts and a few related items as inalienable, but not necessarily kin terms. The outcome also depends on the verbs involved: If a verb like *zerreißen* ‘to tear’ is used, body parts tend to pattern as inalienable; if a verb like *wegnehmen* ‘to take away’ is used instead, kin terms emerge as inalienable whereas body parts do not.

The inconsistency of these diagnostics suggests that alienability is not a static lexical property, but rather a reflection of how a speaker perceives the automatic salience (Deane, 1992) and the relational tightness between entities (Jones, 2016). This conceptual flexibility is deeply intertwined with the hierarchy of animacy, which, as Rosenbach (2008) argues, is itself subject to cultural and contextual shifts. Such conceptualizations are often rooted in the “anthropocentric” character of language (Ortmann, 1998, p. 81). For instance, although animals are biologically as animated as humans, the fact that we perceive humans as being more animate accounts for the existence of graded animacy values and cultural differences in how these distinctions are made. In Chukchi, for example, proper names of reindeer

³ Possessor ascension refers to a set of constructions in which the possessor is encoded outside the noun phrase containing the possessum and is promoted to argument status at the clause level. In German, this phenomenon is classically illustrated by alternations involving body-part nouns, where the possessor may be expressed as a genitival modifier (e.g. Karl’s knee), as a dative argument, or as a core argument associated with a locative expression. In such cases, the possessor is said to be “raised” from a dependent position within the noun phrase to an argument position licensed by the verb (see, among others, Blake 1984; Chappell & McGregor 1996). Importantly, the availability and interpretation of possessor ascension depend not only on the semantic properties of the possessum (e.g. body parts), but also on verbal semantics, which partly explains why this diagnostic yields inconsistent results when applied to alienability distinctions.

behave linguistically like proper names of people (Comrie, 1989, p. 189), and Persian treats trees like animates (Wiese, 2003). Even within a single language, animacy assignments may vary. Siemund (2002) shows how Southwest English dialects may assign masculine gender (*he*) to inanimate referents like *hand* or *cask*, a choice that predicts a higher likelihood of using the *s*-genitive (Quirk et al., 1985). Furthermore, Nieuwland & Van Berkum (2006) showed that context can trigger temporary “conceptual shifts”: If a story attributes animate properties to a peanut, speakers are more likely to use the *s*-genitive (*the peanut’s girlfriend*), treating the entity as “closer” to the *possessor*. These animacy effects represent a case where language-internal variability mirrors cross-linguistic categoricity through what is known as a *possession split* or *animacy/referentiality split* (Koptjevskaja-Tamm, 2002), as follows:

- Animacy scale: human > animate > inanimate
- Referentiality/definiteness scale: pronoun > proper noun > definite > indefinite > non-specific

Languages differ in their “cut-off points” along these scales. This flexibility reinforces a “preference structure” for the genitive choice where animacy > topicality > possessive relation (Rosenbach, 2002, 2008). Within this system, relationships characterized by a small conceptual distance, such as body parts and kin, are systematically biased toward more “tightly bound” constructions like the *s*-genitive (Jones, 2016, p. 15).

Taken together, these contributions reveal both the insights and the limitations of attempts to establish universal hierarchies of alienability or animacy. While recurrent patterns can indeed be identified, especially in prototypical domains such as kinship, body parts, and part–whole relations, hierarchies often fail to account for culturally specific categories, context-dependent meanings, and cross-linguistic variation. Aikhenvald (2013, p. 1) evidences the correlation between culture and possession in linguistic variation:

Some linguistic categories show more obvious correlations with cultural values, social hierarchies, and their conceptualization than others. Genders, noun classes, and classifiers tend to mirror social and cultural stereotypes and patterns of human perception. Geographical features of a terrain, such as a hilly, or a riverine environment, are often reflected in demonstrative systems. Along similar lines, underlying social institutions, concepts, and attitudes may correlate with the expression of possession.

As a consequence, language and culture contact tends to affect the linguistic treatment of possessive relations, and the categorization of the *possessor* and the *possessed*.

There is a tendency for alienability splits to occur in languages with small speaker communities (Dixon, 2010a, p. 278), and these small languages differ considerably regarding where the boundary between alienable and inalienable items is located. For instance, in Mussau-Emira, inalienable nouns include not only kinship and body parts but also *name* and items intimately associated with the person, such as *knife*, *house*, and *canoe*. Conversely, items that seem anatomically inherent may be treated as alienable: In Nyulnyul and related Australian languages, hair and fingernails are alienable, indexing cultural conceptualizations of dependency rather than ontological structure (Chappell & McGregor, 1989, p. 27).

Contextual shifts further challenge rigid classifications. Tsunoda (1996, p. 578) notes that in some languages, clothing is treated as inalienable (almost as “body parts”) when worn, but patterns as alienable when stored. Similarly, in Paamese, a *sleeping place* (*vuli-n*) is marked as inalienable, reflecting its permanent association with the individual (Crowley, 1996). Even inanimate entities can adopt inalienable morphology for part–whole relations, as seen in Acholi (e.g., *handle of a scoop*), where the core notion is one of “inextricable linkage” (Chappell & McGregor, 1989, p. 33).

Kinship possession is particularly sensitive to cultural nuance and often splits across classes. In Lango, blood relations are inalienable while affinal relations (e.g., *wife*) are alienable (Noonan, 1992). This distinction is mirrored in Nanti, where consanguineal kin involves simple inalienable prefixes, while affinal kin requires more complex alienable morphology. Social structures often dictate these patterns: In Hone, consanguineal female kin are obligatorily marked with possessive suffixes, a potential vestige of a matrilineal system (Storch, 2013), whereas other relatives are not.

In some cases, these splits appear idiosyncratic. In Saker, while kinship is generally inalienable, the terms for *husband*, *wife*, and *child* remain alienable (Z'graggen, 1965, p. 124). Similarly, in Fijian, *wife* is inalienable, whereas in the related language Lenakel, it is alienable (Lynch, 1973, p. 15). Even within blood relations, “unexplainable” irregularities occur, such as in Paumari, where *brother* is the only blood relative term to be treated as alienable (Chapman & Derbyshire, 1991, pp. 256–257).

The alienable/inalienable distinction in some cases is a powerful tool for resolving polysemy. In Koyukon, the stem *tl'enh* means ‘bone’ when inalienable but ‘leg’ when alienable (Thompson, 1996, p. 661). In Puluwat, directly possessed *sasing-iy* (‘my photograph’) refers to a picture of the speaker, while the alienable construction refers to a camera or a photograph owned by the speaker (Elbert, 1974, pp. 61–62).

This distinction also manages the conceptual “separability” of items. In Koyukon, body products like *tears* or *milk* are alienable because they can be separated from the body. In Tariana, the bound form *-kale* means ‘breath/heart’ (inalienable), while the alienable *kale* means ‘wind.’ Perhaps most illustratively, in the Lolovoli dialect of North-east Ambae, a *leg* is inalienable when part of the speaker’s body (*karu-ku*), but alienable when it is a piece of food intended for consumption (*ga-ku karu-gi*) (Hyslop, 2001, pp. 183–184).

Beyond the alienability split, some languages utilize specific morphology to distinguish temporary from permanent ownership. In West Greenlandic, the suffix *-ut(i)* marks acquired or disposable possession; a hunter's own knife is *savia* (inalienable), but a borrowed or recently acquired knife is *saviutaa* (Fortescue, 1984, pp. 172–173). Similar analyses of temporary possession have been noted in Dyrbal (Dixon, 2010b, p. 275) and Martuthunira.

Finally, Polynesian languages like Tongan distinguish possession based on the *possessor's* level of control (Wilson, 1982). Churchward (1953) categorizes these as “subjective” and “objective” possessives. Subjective possession (*'eku*) is used for items under the *possessor's* active influence (tools, money, animals, food), while objective possession (*hoku*) is used for things the *possessor* depends on or is influenced by (persons or things that surround or support the individual).

In different languages of the world, certain nouns must occur as *possessed* in possessive constructions and cannot (normally) occur in an unpossessed, absolute way. For example, in Koyukon (an Athabaskan language of Alaska), the word for ‘my head’ is *setlee*, but one cannot simply say **tlee* for ‘head’ (Thompson, 1996). Such nouns are the opposite of the impossible and are called *possidend* nouns (Haspelmath, 2017, p. 214). The most extensive study of this phenomenon is by Nichols and Bickel (2005), who examine languages with “obligatory possessive inflection.” As the *possessor* typically occurs as a bound person index on the noun, the literature often treats obligatory inflection and obligatory free *possessors* as a single category.

Following Lehmann (1998, pp. 51–52), we can distinguish two subtypes of *possidend* nouns depending on how speakers treat the referent in an absolute sense. The first subtype is called *absoluble*, as these nouns can be “absolutized” (Haspelmath, 2017, p. 2015)

by an additional marker indicating the absence of a *possessor*. Following Stiebels (2006, p. 181), this is referred to as an *antipossessive marker* (aposs). An example is found in (1):

1) Cahuilla (Seiler, 1983, p. 25)

puč-	he-puš	puč-il
	3sg.poss-eye	eye-aposs
‘eye’	‘his eye’	‘eye’

This reflects a general tendency for inalienable nouns (kinship and body parts) to require special marking in non-possessed contexts, formulated by Haspelmath (2017, p. 2016) as Universal 4:

If a language treats alienable and inalienable nouns differently in nonpossessed contexts, and one of the constructions is overtly coded while the other one is zero-coded, it is always the alienable nouns that show zero-coding, while the inalienable nouns show overt coding (by an antipossessive marker).

Conversely, *inabsoluble* nouns (Lehmann, 1998, p. 52) cannot be used outside of a possessive construction at all, not even with an antipossessive marker. Yucatec Maya includes both types among its inalienables, with inabsoluble examples including:

- ich ‘face’
- moots ‘root’
- ti’a’l ‘property’

A number of languages have specialized ways of creating free nouns out of bound, obligatorily *possessed* forms. In Hixkaryana (Carib), the suffix *-nano* ‘depossession’ replaces possessive affixes (Derbyshire, 1985, p. 203): *r-aho-ni* (1sg-stool-poss) ‘my stool’, *aho-nano* (stool-unposs) ‘stool(s).’

In Koyukon, non-possessed forms of body parts take the prefix *k'e-*: as in (2a) the word *nelaane* ('flesh') requires a *possessor* if referring to the *possessor's* own body, but in (2b) its 'depossessed' form it refers to flesh no longer part of a living being:

2a) Thompson (1996, pp. 666–667)

benelaane

be- nelaane

3sg- meat/flesh

'his/her (own) flesh'

2b) Thompson (1996, pp. 666–667)

sek'enelaane

se- k'e- nelaane

1sg- unposs- meat/flesh

'my (animal's) meat (to be eaten)'

The majority of Arawak languages possess a 'non-possessed' suffix, *-tʃi* or *-hʋi* (Aikhenvald, 1999, p. 827). Examples include:

- Bare: nu-nene 'my tongue' vs. nene-hei 'tongue in general/someone's tongue'
- Pareci: no-tiho 'my face' vs. tiho-ti 'someone's face'
- Warekena: nu-deka 'my possession' vs. deka-ʃi 'possessions in general'

In Nanti, this suffix is restricted to a few body parts and personal inalienable items, while many North Arawak languages (like Tariana) show a tendency to lose this suffix (Aikhenvald, 2003, p. 129). Similarly, in Moskona, inalienably *possessed* nouns can occur without a *possessor* only if prefixed by the nominalizer *m-*.

Some languages have nouns that cannot occur as *possessed* nouns in a possessive construction, e.g., in Yucatec Maya (Lehmann, 1998, pp. 57–58), where the nouns listed below are among those that cannot occur with prefixed possessive person forms:

- maak 'person'
- xch'up 'woman'

- suhuy ‘virgin’
- iik ‘air, wind’
- ka’n ‘sky’
- yook’olkab ‘world’

At the other end of the spectrum, some nouns can never be owned. In Macushi (Abbott, 1991, p. 86), this includes plants (*pattia* ‘watermelon’), natural phenomena (*meren mere* ‘rainbow’), and certain animals (*waikin* ‘deer’). Hixkaryana similarly excludes *xerye* ‘manioc’, *tuna* ‘water’, and *koso* ‘deer’. In Moskona, nouns denoting natural phenomena or uncontrollable events like ‘disease’ cannot be possessed; they are conceptualized as entities affecting a person rather than being owned (non-volitional). The Nêlêmwa language excludes stars, deities, and general terms for humans. Waurá (Arawak) excludes *kamá* ‘sun’ and *kaa-lĩti* ‘star’, though some items like *e-pi* ‘axe’ can be possessed only by using a different suppletive stem: *ni-gãwa* ‘my axe’ (Aikhenvald, 2012; Richards, 1973). This “unpossessability” often reflects aboriginal concepts of property. In Dakota (Siouan), Boas and Deloria (1941, p. 128) note that natural objects like land and water could not be exclusive property. Consequently, reflexive verbal forms are used instead of possessive pronouns: Instead of *I slaughtered my buffalo*, a speaker says *I slaughtered buffalo for myself* (Mithun, 2001, pp. 307–308). Cultural taboos and social rules also play a role. In Hone, personal names cannot be possessed, and terms for male sexual organs are taboo and never occur with a possessive suffix. Aikhenvald (2013, p. 16) reported a personal conversation to strengthen the concept:

Unpossessability’ of items can be viewed as a matter of common sense within a particular culture [...] The late Marcília Fontes, my first teacher of Hohôdene Baniwa, said to me once, explaining that the term for cockroach cannot be possessed ‘Who would want to own a cockroach?’

1.4 Typology and Morphosyntax

Haspelmath (2017, p. 199) states that if a language has an adnominal alienability split, and one of the constructions is overtly coded while the other one is zero-coded, it is always the inalienable construction that is zero-coded, while the alienable construction is overtly coded. This generalization has been known for some time (Haiman, 1983; Heine, 1997; Nichols, 1992, p. 122; Svorou, 1993, p. 198ff; Ultan, 1978, p. 26; van Rijn, 2016a). In the Abun example below (3a; 3b), the alienability split shows coding asymmetry (i.e., an overt versus zero contrast), where an adpossession construction with an alienable noun (such as *garden*) requires a possessive (genitive) postposition, while a construction with an inalienable noun (a body part term) expresses possession by mere juxtaposition.

3a) Abun (Berry & Berry 1999:77-82)

Alienable possession

ji bi nggwe
I GEN garden
'my garden'

3b) Abun (Berry & Berry 1999:77-82)

Inalienable possession

ji syim
I arm
'my arm'

However, not all cases of alienability splits show a coding asymmetry, as can be seen in Example (4a) and (4b), where both possessive constructions use an overt marker: *a* for alienable and *o* for inalienable possession.

4a) Samoan (Oceanic) (Mosel & Hovdhaugen, 1992, pp. 282–290)

Alienable possession

le naifi a le fafine
the knife of the woman
'the woman's knife'

4b) Samoan (Oceanic) (Mosel & Hovdhaugen, 1992, pp. 282–290)

Inalienable possession

le uso o le fafine
the sister of the woman
'the woman's sister'

Another universal proposed by Haspelmath (2017, p. 207) states that if a language has an adnominal alienability split, and in one of the constructions the *possessor* is bound to the *possessed* noun while in the other it is free, it is always the inalienable construction that shows bound coding, while the alienable construction shows free coding, as can be seen in (5a) and (5b).

5a) Kpelle (Mande) (Welmers 1973:279)

Alienable possession

ŋa pɛrɛi
I house
'my house'

5b) Kpelle (Mande) (Welmers 1973:279)

Inalienable possession

m- polu
1sg- back
'my back'

The formal encoding of possession within the noun phrase involves a complex interplay between the locus of marking and the specific grammatical devices employed. Following the framework of Nichols (1986, 1992), we can categorize these strategies based on whether the relationship is signaled on the head (*possessed*), the dependent (*possessor*), on both, or on neither.

A primary strategy is head-marking, where the grammatical relationship is encoded on the *possessed*. In such systems, the head noun often takes what Dixon (2010b) terms a *pertensive* marker, the functional inverse of a genitive, or pronominal affixes that specify the

features of the *possessor*. For instance, in Rotokas, the suffix *-aro* attached to the head *aite* (‘father’) in the phrase *Siuparai aite-aro* signals the possessive bond. Similarly, the Lolovoli dialect of North-east Ambae employs the pertensive marker *-ni*, as seen in *gamali-ni Robert* (‘Robert’s club house’), where the marking resides strictly on the head. This strategy can also involve complex pronominal cross-referencing, as illustrated by Mussau-Emira, where the head noun *natu-na* (‘child-3sg.poss’) explicitly specifies the person and number of the *possessor Kealo*.

Conversely, dependent-marking involves placing the morphological burden on the *possessor*, typically through a genitive case. In Western Balochi, for example, the plural genitive suffix *-áni* is attached to the dependent *chokk* (‘children’), leaving the head *nám* (‘names’) unmarked. This is consistent with the “marking on possessor” strategy found in many Indo-European languages, such as German, where the genitive case in *das Buch meines Vaters* unequivocally identifies the dependent as the source of possession. When a language requires specifying the relationship on both constituents, double-marking occurs. A classic example is Turkish, where the possessive relationship is redundantly encoded by a genitive case on the *possessor* and a possessive suffix on the head, as in *Hasan-in kitab-ı* (‘Hasan’s book’) or *ev-in sahib-i* (‘the house’s owner’).

In languages where no overt morphological marker is present on either the head or the dependent, possession is expressed through zero-marking or simple juxtaposition. In such constructions, the possessive bond is inferred from the word order. In Abun, for example, the mere sequence of *Marta gum sye* (‘Marta’s surname’) is sufficient to encode the relationship. This reliance on constituent order is also evident in Tucano, which prefers a *possessor–possessed* sequence (*Y’i pa-ko*, ‘my mother’), and Kam, which utilizes a *possessed–possessor* order (*s@m jau*, ‘my room’). Crucially, the choice of zero-marking often adheres to the iconicity principle, which posits that a closer conceptual or social

relationship (such as kinship or body parts) requires less formal marking. This is strikingly evident in Ewe: While alienable possession requires an independent marker, inalienable relations like *evi-á-wó tO_gbé* (‘the grandfather of the children’) are marked by juxtaposition alone.

Finally, possession may be expressed through detached marking, where the marker is not consistently bound to a specific constituent but is instead sensitive to phrase boundaries. This is exemplified by the clitic *-n* in Chamorro, which attaches to the first word of the phrase regardless of whether that word is the head or an attribute. Similar independent strategies are found in Mandarin Chinese and Likpe, or in the use of the particle *fé* in Ewe. The latter is particularly instructive, as it shows how a language can switch strategies based on the nature of the *possessed*: Ewe uses the independent marker *fé* for garments and other alienable items, but employs juxtaposition for the “tighter” bonds of kinship. This highlights that the range of marking devices is not merely a syntactic choice, but a reflection of the underlying conceptual distance between the *possessor* and the *possessed*.

Table 3. Marking strategies across languages.

Strategy	Locus of Marking	Other Definitions	Examples
Head-Marking	Head (Possessee)	Pertensive / Pronominal Affix	Rotokas, Ambae, Mussau-Emira
Dependent-Marking	Dependent (Possessor)	Genitive Case	Western Balochi, German
Double-Marking	Both	Genitive + Pertensive	Turkish
Zero-Marking	Neither	Juxtaposition	Abun, Tucano, Ewe (Inalienable)
Detached Marking	Variable / Boundary	Linker / Independent Particle	Chamorro, Ewe (Alienable), Mandarin

1.5 We have other ways to express “To have”

Thus far, the discussion has primarily focused on the exploration of what are commonly termed nominal possessive structures (Aikhenvald, 2013; Nichols, 1988) or attributive possession (Heine, 1997; Stassen, 2009). As analyzed in the preceding sections, these constructions function within the boundaries of the noun phrase to establish a relationship of “belonging” between a *possessor* and a *possessed*. While attributive possession typically presupposes a possessive relationship as a given fact within a larger proposition (e.g., *My book is on the table*), predicative possession is characterized by the use of a complete clause to assert the existence of a possessive link (e.g., *I have a book*).

As noted by Stassen (2009) and Seiler (1977a), the semantics of these two domains do not overlap completely. While attributive possession covers a wide range of relations including whole–part and kinship, predicative possession often focuses more narrowly on ownership or temporary possession. Furthermore, the grammatical strategies used to encode these relationships vary significantly across the world’s languages. Less than half of the world’s languages employ a dedicated transitive verb like *have* to assert possession. The majority rely on alternative constructions involving copulas, existential verbs, or specific case markings. Following the typological framework established by the *World Atlas of Language Structures* (WALS) and authors such as Clark (1978), Heine (1997), and Stassen (2001, 2013), we can identify five primary strategies for encoding predicative possession: the *have*-construction, the Locative, the Genitive, the Topic, and the Conjunctive constructions.

The first major strategy is the *have*-construction, in which the possessive relationship is encoded via a transitive verb. In this construction, the *possessor* functions as the grammatical subject, while the *possessed* functions as the direct object.

It is widely observed that verbs employed in this strategy are often secondary acquisitions, stemming from transitive verbs with the general meaning of ‘to hold,’ ‘to grasp,’ or ‘to take’ (Isacenko, 1974, p. 42). Isacenko notes that this semantic shift from ‘take’ to ‘have’ occurred in historical times in Spanish, where the verb *tener* (originally ‘to hold’) replaced *haber* as the primary expression of possession. This is illustrated in Example 6, where *tener* asserts ownership:

6) Spanish (Isacenko, 1974, p. 42)

Tengo una cama
 Have.1SG ART bed
 ‘I have a bed.’

Similarly, in Oromo (Cushitic), the verb *k’ab* functions both as the possessive ‘have’ and as the referential verb ‘grasp’ or ‘hold.’ In Dakota (Siouan), the verb *yuha* (‘have’) also retains the meaning of ‘take along’ (Pustet, 2001, p. 62). Even in cases where the verb is fully grammaticalized, ‘have’ verbs often display morphological irregularities or syntactic deficiencies compared to standard transitive verbs. For instance, in Oromo, *k’ab* lacks a past tense form (Owens, 1985), and in Tamambo (Oceanic), *-noha* (‘have’) is the only transitive verb that cannot take tense or aspect marking (Jauncey, 1997). In Dhaasanac (Cushitic), the verb *aab* (‘have’) cannot be used in the negative; instead, the invariable form *man* (‘there is not’) is employed (Tosco, 2001).

In some languages, such as West Greenlandic, the transitive nature of the construction involves the morphological incorporation of the *possessed* into the verb itself. Here, in (7) the suffix *-qar-* (‘have’) combines with the noun *qimmi* (‘dog’) to form a complex predicate:

7) West Greenlandic (Fortescue, 1984, p. 171)

angut taanna qimmi-qar-puq
 man that dog-have-3SG.IND

‘That man has dogs.’

Even within languages that utilize a transitive strategy, the verb *have* is rarely the sole means of expressing ownership. English, for example, employs a lexical range that includes *possess*, *own*, and *lack* (‘not have’), as well as dynamic verbs such as *get*, *obtain*, and *come by*. Each of these items carries a distinct semantic character. As noted in the literature, *possess* often indicates a strong emotional or mental connection between the *possessor* (R) and the *possessed* (D), as in “She possesses a fine brain.” Furthermore, unlike *have*, the verb *own* can occur in passive constructions (e.g., “This car has only been owned by two old ladies”), highlighting a different syntactic flexibility.

A crucial typological distinction is found in the verb *belong to*, where the syntactic functions relating to possessor and possesses are effectively reversed, in contrast with the *have*-constructions.. Compare the following examples (8a) and (8b):

8a) The boss has a red car

8b) The red car belongs to the boss

In the first sentence, the statement is predicated about the boss (the *possessor*); in the second, the statement is predicated about the red car (the *possessed*). Heine (1997, pp. 29–33) notes that of the languages possessing a verb *have*, only a small minority also feature a distinct verb for *belong*. Rare exceptions exist: Colloquial Welsh, for instance, lacks a transitive *have* but does include a specific verb for *belong to* (Jones & Thomas, 1977, pp. 199–200).

In contrast to the *have* type, there are other four primary strategies that utilize a syntactically intransitive structure, often based on an existential or copula clause. In these systems, the distinction lies in how the *possessor* and *possessed* are mapped onto the grammatical roles of the clause.

In the Locative type (or Oblique type), the *possessed* functions as the grammatical subject of the existential predicate, while the *possessor* is marked by an oblique case,

typically locating the object at, to, or near the *possessor*. This reflects a conceptual metaphor where possession is viewed as spatial proximity. An example (9) is found in Mongolian:

9) Mongolian (Poppe, 1954, p. 147)

na-dur morin bui
1SG-at horse be.3SG.PRES
Lit. ‘At me is a horse.’
‘I have a horse.’

Similarly, in Lango (Nilotic), the *possessor* is marked by the preposition *bot* (‘to’) when functioning as the copula complement, as seen in (10).

10) Lango (Noonan, 1992, p. 148)

gwôk tíe bot okélo
dog 3SG.CS:be:present to Okelo
‘The dog is Okelo’s.’

The Genitive type is a subtype of the oblique strategy. Here, the *possessed* remains the grammatical subject of the existential clause, but the *possessor* is encoded as an adnominal modifier (a genitive) of that subject. The assertion is literally that “My X exists.” This is illustrated by Avar, in the example (11):

11) Avar (Kalinina, 1993, p. 97)

dir mašina b-ugo
1SG.GEN car be.3SG.PRES
Lit Of me is a car
‘I have a car.’

In the Topic type, the *possessed* functions as the grammatical subject, but the *possessor* is promoted to the role of the sentence Topic. Distinct from a grammatical subject, the topic sets the frame of reference for the assertion (“As for X, Y exists”). Tondano provides a clear example (12) where the *possessor* is the discursive frame for the existence of the *possessed*:

12) Tondano (Sneddon, 1975, p. 175)

si tuama si Wewean wale rua
ANIM.SG man TOP exist house two

Lit. 'As far as the man is concerned, there are two houses.'

'The man has two houses.'

Finally, the Conjunctional (or Comitative) type interprets the *possessor* as the grammatical subject. The *possessed* is then linked to the subject via a marker that indicates accompaniment ('with') or coordination ('and'). Unlike the *have* type, this is not a transitive structure; it asserts that the subject "is with" the object. Examples can be found in Daga (13a) and Sango (13b):

13a) Daga (Murane, 1974, p. 303)

orup da agoe Den
man one slave with

'A man had a slave.'

13b) Sango (Samarin, 1967, p. 95)

lo eke na Bongo
3SG be with garment

'She has a garment.'

The choice of construction is not always uniform within a single language; it may depend on the semantic class of the *possessed*. For instance, Punjabi employs different postpositions on the *possessor* depending on whether the possession is alienable or inalienable, permanent or temporary. In Jarawara, the verb *-kiha-* ('have') is restricted to ownership, while kinship terms and body parts require the existential verb *wata-* ('exist') or the copula *ama-* ('be'), as the example (14).

14) Jarawara (Dixon, 2004)

o-koto ama-ke

1SG-daughter be-DEC
'I have a daughter.'

Languages are not static, and possessive constructions often undergo diachronic change. Stassen (2013) identifies a phenomenon known as *have*-drift (or transitivity), where languages evolve from one of the intransitive types towards a transitive *have*-construction.

A common pathway for this drift originates from the Conjunctive type. Through grammaticalization, the comitative marker (e.g., 'with') may cliticize or incorporate into the copula ('be'), creating a new transitive verb meaning 'have'. In Luganda, for instance, the form *olina* is analyzed as a fusion of the verb 'be' (*li*) and the preposition 'with' (*na*), as can be seen in (15):

15) Luganda (Ashton et al., 1954, p. 234)

o-li-na ekitabo
2SG-be-with book
'You have a book.'

Similarly, *have*-drift can occur from the Topic type. This involves the reanalysis of the Topic constituent as a grammatical subject, and the existential verb as a transitive predicate. In Luiseño, this process appears to be currently in progress. The *possessor* can be marked either as a Topic (with enclitic *-p*), as in the example (16a), or as a Subject (with enclitic *-n*), as in the example (16b), suggesting a shift toward transitivity:

16a) Luiseño (Steele, 1977, pp. 114, 122)

Noo-p no-toonay Qala
1SG-TOP my-basket be.INAN.PRES
'I have a basket.'

16b) Luiseño (Steele, 1977, pp. 114, 122)

noo-n no-toonay qala
1SG-SUBJ my-basket be.INAN.PRES
'I have a basket.'

Another process, termed *Adjectivization* by Stassen (2013), occurs when the *possessed* is treated structurally as a predicate adjective. In these constructions, the noun denoting the *possessed* item functions as the complement of the copula, effectively describing a property of the *possessor*. This is observed in Tiwi (17a) and Kanuri (17b):

17a) Tiwi (Osborne, 1974, p. 60)

awa mantani teraka
our friend wallaby
'Our friend has a wallaby.'

17b) Kanuri (Cyffer, 1974, p. 122)

kam kura-te kugena-nze-wa (genyi)
man big-the money-his-with (NEG.COP)
'The big man has (no) money.'

2 Children and Possessive Structures

Every language provides mechanisms for encoding possessive relations, although the specific morphosyntactic strategies vary cross-linguistically (Marinis, 2002). The notions of possession and ownership are among the earliest conceptual domains to emerge in children's language development (Marinis, 2016). Previous research has shown that children begin to express and comprehend possessive relations at an early age (Kong et al., 1990; Li, 2004; Marinis, 2002; Parikka, 2001). Specifically, experimental studies indicate that infants as young as 12 months demonstrate comprehension of the possessive *my* (Saylor et al., 2011), while 20-month-olds are able to identify correct owner–object pairings based on verbal prompts alone (Golinkoff & Markessini, 1980). This early competence suggests that young children actively navigate the mapping relations between their conceptual knowledge of possession and the specific linguistic structures available in their input (Shi and Zhou, 2018).

It is, therefore, unsurprising that relationships between possessors and their belongings are among the first to be encoded once children begin to combine words (see, e.g., Brown, 1973). Even when a child points to an object and names its owner, such behavior reflects an initial understanding of the link between individuals and the objects associated with them (Chen and Zhang, 2023).

The development of possession and ownership in early childhood has long been recognized as a crucial domain in which cognitive, social, and linguistic abilities intersect. Children's early interactions with objects are not merely instrumental or motoric; rather, they rapidly become embedded in social exchanges, negotiations, and symbolic representations.

As several authors have argued, children's understanding of possession reflects a growing awareness of the relationships between people and objects (Furby, 1978), as well as emerging beliefs about entitlement, fairness, and social norms governing access to resources (Ross, 1996).

From a social perspective, ownership is inherently relational. Objects are claimed, defended, and negotiated primarily in interaction with others, particularly siblings and peers. Levine (1983) demonstrated that children's self-knowledge is reflected in how they attend to their own possessions, to other individuals, and to others' possessions during peer interactions. In this view, possession functions as a means of delineating boundaries between self and other within the social world. In the absence of an interlocutor, the need to label an object as "mine" or "yours" largely disappears, highlighting the fundamentally social nature of ownership (Ross, 1996). In navigating this social landscape, children must rely on two primary forms of information: visual cues, such as observing physical custody of an object, and verbal statements, such as explicit claims of ownership (e.g., "That's Billy's ball") (Blake et al., 2012).

Experimental work complements these observational findings by linking ownership understanding to broader aspects of self-concept. Fasig (2000) investigated toddlers' understanding of ownership using an item identification task in which children were asked to indicate the owner of familiar objects. Children under 24 months performed at chance levels, whereas older toddlers reliably distinguished between their own possessions and those belonging to their mothers. Importantly, ownership understanding was related to other measures of self-knowledge, suggesting that recognizing ownership relations contributes to the development of an extended sense of self.

Fasig's findings align with theoretical accounts proposing that the extended self develops through social interaction and shared activities (Fivush, 1997; Neisser, 1988; Nelson, 1997). From early infancy, knowledge of the self is intertwined with knowledge of others (Meltzoff & Moore, 1995), and activities such as imitation serve as a bridge between self and other (Meltzoff, 1990; Meltzoff & Moore, 1989). Within this framework, possessions function as stable reference points that link the self across time and contexts.

Toys and cherished objects provide continuity between past, present, and future experiences, thereby supporting autobiographical memory and identity formation (Belk, 1991; Redfoot & Back, 1988).

Crucially, Fasig (2000) argues that ownership understanding captures a relational aspect of self-knowledge that is not fully addressed by classic measures such as mirror self-recognition (Lewis & Brooks-Gunn, 1979). While mirror recognition reflects physical self-awareness, ownership understanding reflects knowledge of self-continuity grounded in social relationships. Supporting this distinction, Levine (1983) found that mirror self-recognition was unrelated to other measures of self-knowledge, suggesting that different components of the self may develop on partially independent trajectories before becoming integrated later in development (see also Povinelli et al., 1996).

Observational studies provide early evidence that toddlers are sensitive to ownership principles well before they can articulate them fully in language. Bakeman and Brownlee (1982) demonstrated that toddlers are more likely to regain an object from peers if they had possessed it earlier, suggesting an implicit understanding that prior possession confers legitimacy. Yet, visual evidence is not the sole determinant (Blake et al., 2012); when children encounter a conflict between seeing a person holding a toy and hearing a verbal statement that the toy belongs to someone else, they must engage in “updating,” overriding the visual attribute of physical possession with the verbal information regarding ownership (Blake et al., 2012). Similarly, Eisenberg-Berg and colleagues showed that children are more likely to defend an object when they believe it is theirs to keep rather than temporarily available for shared play (Eisenberg-Berg et al., 1979; Eisenberg-Berg et al., 1981). By preschool age, children explicitly report that prior possession increases the likelihood of winning a dispute over an object (Hay et al., 1992), indicating that ownership has become an explicit principle guiding social reasoning.

Ross's (1996) detailed analyses of sibling disputes further illustrate this developmental trajectory. In families with a 2-year-old and a 4-year-old child, younger siblings frequently used ownership arguments when they were the legitimate owners of an object, rather than merely its temporary possessors. Crucially, the distribution of argument types showed that even 2-year-olds distinguished between owning an object and simply holding it. This ability to deploy ownership claims selectively suggests an early conceptual understanding of ownership that goes beyond immediate physical control.

Cross-linguistic studies covering languages such as English, German, Greek, and Hebrew suggest a consistent developmental pattern in this domain. Children typically progress from expressing the possessor in isolation to combining possessor and possessed (e.g., $X + Y$) (Chen & Zhang, 2023), subsequently acquiring grammatical markers like case inflection and prepositions, before finally mastering complete possessive syntactic constructions (Armon-Lotem & Crain, 1998; Eisenbeiss, 2014; Marinis, 2016). Evidence from languages with rich noun morphology further corroborates this trajectory. In Finnish and Estonian, for instance, children initially rely on suffixless nominative forms to express possession, only later acquiring the obligatory genitive suffixes (Argus, 2009; Laalo, 2009). Similarly, Croatian-speaking children have been observed using a "default" genitive marking that often deviates from adult norms, suggesting a struggle to manage the full constraints of a complex case system (Kovačević et al., 2009).

However, a distinction must be drawn between syntactic placement and morphological accuracy; while the word order of possessives is established relatively early, around 17 months in English and 2;6 in Greek (Marinis, 2003; Tomasello, 1998), morphological errors persist. Common deviations during this phase include the erroneous *s*-inflection of pronouns (e.g., *me's*) and the mixing of pronominal determiners with nominal pronouns (Bloom, 1970; Radford & Galasso, 1998). Early in language acquisition, children

use noun phrases to express possession (e.g., “mommy shoe”) before possessive pronouns form a distinct grammatical class (Dale, 1972). First-person possessive pronouns (*my, mine*) typically appear before second-person forms (*your, yours*; Imbens-Bailey & Pan, 1998), reflecting the primacy of self-reference in early language. This trajectory reflects a markedness hierarchy in which distinctions of gender, person, and number are acquired gradually. While *my, mine*, and *your* are typically produced appropriately by age 2;3, the third-person plural *their* is often delayed until 3;8 (Chiat, 1981; Rispoli, 1994).

However, the chronological relationship between nominal and pronominal marking remains a subject of debate. While Tomasello (1998) argues that the possessive marker *'s* typically emerges before the use of possessive pronouns, Radford & Galasso (1998) suggest there is no strict sequential order between the acquisition of the morphological marker and pronominal forms. During this period, possessive forms may be unstable, with occasional substitutions of *my* for nominative *I* reported in some contexts (Rispoli, 1998). Beyond case substitution, common syntactic errors include the omission of grammatical markers (such as *'s* or *of*) and the commingling of possessive and objective pronouns (Chen & Zhang, 2023). This phenomenon of simplification is also evident in Mandarin, where children frequently produce “headless” possessive forms (Possessor + Marker *DE*, omitting the possessed) as a transitional stage before fully mastering the “Possessor + *DE* + Possessed” construction (Liu, 2015; Packard, 1988).

This tendency toward morphological simplification extends to polysynthetic and agglutinating languages (Henke, 2020). Children acquiring Warlpiri, for example, frequently overgeneralize a single case marker for possession and may not master the full system until their fourth year (Bavin & Shopen, 1991). Likewise, in Mayan languages such as K'iche' and Tzeltal, toddlers produce possessor–possessed combinations that notably lack the obligatory person prefixes required by adult grammar (Brown, 1998; Pye, 1992).

Furthermore, errors may stem from a mismatch at the syntax–semantics interface. Research on Hebrew-speaking children indicates that they adhere to a more restrictive mapping than adults; for example, while adults use genitive constructions for both objects and substances, children tend to avoid genitives when describing mass entities, relying instead on bare nouns (Armon-Lotem & Crain, 1998).

Similarly, input ambiguity can trigger morphological overgeneralizations. Van Kampen (2023) reports that Dutch children frequently produce a non-standard possessive *-se* construction (e.g., *Laura-se*), effectively recreating the productive morphology of Afrikaans within a non-permissive grammar. This phenomenon arises because children re-analyze the phonologically reduced masculine pronoun *zijn* as an invariant marker, extending it to female and pronominal contexts until the acquisition of weak possessive pronouns eventually blocks this grammaticalization path. These error patterns are not random but appear influenced by variables such as the speaker’s gender, sociocultural context, and the animacy of the possessor or possessed (Wolford, 2006). The prevalence of these patterns supports the argument that input frequency predicts the order of acquisition; for instance, children between 2;0 and 3;0 hear and use *my* significantly more frequently than *his*, *her*, or the even rarer *their* (Ambridge et al., 2015; Rispoli, 1994). Importantly, this developmental sequence appears robust across learning contexts, with sequential bilingual children demonstrating a similar order of acquisition for grammatical markers, including the possessive *'s*, to that of monolinguals (Dulay & Burt, 1974).

Nevertheless, not all variation is explained by frequency alone (Babtsouli & Nicoladis, 2019), suggesting that grammatical complexity remains a distinct and contributing variable (Gathercole, 2016). However, the transparency of the morphological system can mitigate these difficulties (Henke, 2020). In Turkish, where morphology is highly regular and segmentable, children have been reported to acquire possessive suffixes on the

possessed as early as 1;06, with genitive case marking on the possessor following shortly thereafter (Ketrez & Aksu-Koç, 2009). This suggests that while rich morphology generally presents a learning challenge, high regularity and salience can facilitate earlier acquisition.

Hay's (2006) longitudinal study of toddlers interacting with familiar peers revealed that children did not simply acquire isolated possessive forms, but developed a broader repertoire of linguistic strategies for talking about possession. Possessive pronouns were systematically associated with the use of verbs such as *have* and *got* to indicate possession, as well as *want* and *need* to express motivational states related to desired objects. These associations suggest that toddlers are developing a general concept of possession rather than merely mastering a specific morphological marker.

A particularly important finding in Hay (2006) is that toddlers who used first-person possessive pronouns (*mine*) were also more likely to use second-person forms (*yours*), especially at earlier stages of development. At 18 months, the use of *mine* and *yours* was significantly correlated ($r = .42, p < .01$), indicating that children who asserted ownership of objects were also beginning to acknowledge that others could own objects as well. This pattern argues against the idea that early uses of *mine* are purely egocentric or imitative; instead, they reflect an emerging awareness that ownership is distributed across individuals. Beyond its role in self-concept, possession is central to the development of pragmatic competence in social interaction. Hay (2006) showed that early use of possessive pronouns was initially associated with physical aggression, such as grabbing objects from peers.

However, over time, these aggressive strategies were replaced by more socially acceptable forms of negotiation, including polite requests ("Can I have some of yours?") and justifications ("That's my favourite record"). Notably, early use of possessive pronouns predicted later sharing rather than aggression, particularly among girls, highlighting the role of socialization and experience in shaping the pragmatic use of possession language.

These findings suggest that learning to express possession is not merely a matter of vocabulary growth; rather, it represents an important step in learning how to pursue one's interests within socially sanctioned norms (Wenar, 1982). Interactions with parents, siblings, and peers provide repeated opportunities to practice and refine these strategies (Dunn, 1988; Ross, 1996; Ross et al., 1990), gradually transforming possession from a source of conflict into a domain of negotiation and cooperation.

2.1 Longitudinal Data

The acquisition of linguistic possession offers a unique window into the tension between formal grammatical maturation and communicative intent. This section synthesizes longitudinal evidence to map the developmental trajectory of possession, trying to detangle the influence of structural complexity from semantic conceptualization. The analysis begins by examining the morphosyntactic constraints governing early production, specifically testing the hypothesis that early omissions are driven by an economy of derivation, avoiding complex “Move” operations, rather than input frequency. Subsequently, the discussion turns to usage-based and semantic drivers, exploring how pragmatic needs and item-specific learning allow children to bypass structural deficits. By integrating longitudinal data from diverse typological backgrounds (including Germanic, Romance, Semitic, and Sinitic languages) it is shown how the child's grammar expands from rigid, concrete anchors to a fully abstract, adult-like possessive system.

2.1.1 Morphosyntactic Economy and the Cost of Movement

The acquisition of linguistic possession represents a multifaceted challenge for the developing child, requiring the integration of conceptual ownership with specific, often complex, grammatical markers. To understand the mechanisms underlying this development, existing research has traditionally bifurcated into two primary domains of inquiry: those focusing on the semantic and pragmatic drivers of possession (discussed in later sections) and those investigating the formal, morphosyntactic properties of the Determiner Phrase (DP). This section critically examines the latter perspective. A substantial body of longitudinal evidence suggests that the acquisition of possession is heavily constrained by the internal architecture of the DP. Specifically, the literature indicates that early child grammar is governed by principles of morphosyntactic economy, where the development from rudimentary lexical combinations to adult-like genitives is dictated by the gradual availability of functional categories and syntactic operations (such as “Move”) rather than purely by the statistical frequency of input.

Before examining specific case studies, the acquisition of possession must be contextualized within a cross-linguistic framework. Longitudinal data from typologically diverse languages illustrate a remarkably consistent, stepwise trajectory in how children build the DP structure. This progression typically moves from simple juxtaposition to complex case assignment. In Modern Greek, for instance, Marinis (2002) observed that children pass through three distinct developmental stages: initially using an isolating noun (the possessor) to express possession without syntactic integration; subsequently adopting a base order where the possessed precedes the possessor; and finally acquiring the complex word orders necessitated by correct case markings.

Similar patterns of incremental structural building appear in comparisons of English- and Finnish-speaking children. Despite the vast morphological differences between the

languages, Parikka (2001) noted that children in both linguistic environments master suffix-based genitive structures around the age of 2;2, crucially preceding the acquisition of possessive pronouns. Conversely, in languages with highly complex case systems like Polish, the trajectory may be non-linear. Dabrowska (2001) documented a U-shaped developmental curve for plural genitives, where children master singular forms separately due to the irregularity of plural morphological markings.

In the investigation of how the faculty of language develops from these rudimentary combinations to complex functional projections, the longitudinal case study presented by Galasso (2011) offers a compelling lens through which to examine the mechanics of this transition. Within the broader scope of research regarding the emergence of ownership marking, this study is particularly pertinent as it frames the acquisition of the English genitive, specifically the possessive 's and possessive pronouns, not merely as a morphological milestone but as a shift in processing models. Galasso posits that the child's grammar evolves from a "Merge-only" processing model, which handles simple adjacency, to a "Dual" model capable of incorporating "Move" operations required for abstract feature checking.

Galasso (2011) focuses on a single subject, Nicolas, an English-speaking child whose spontaneous speech was recorded weekly over a period of 15 months. The observation window ranged from age 2;3 to 3;6, a critical period for morphosyntactic explosion. This longitudinal methodology allowed for an analysis of the gradual emergence of functional morphology, contrasting the specific frequency and distribution of possessive markers in obligatory contexts with the parallel development of third-person singular subject-verb agreement. By isolating these variables, Galasso (2011) provides a timeline that effectively maps the child's transition from optional or non-existent marking to adult-like competence.

The developmental trajectory observed in Nicolas's speech is tripartite and reveals a clear struggle with functional categories:

- **Stage 1: The “Non-Access” Phase (2;3–3;1).** In the initial phase, the data reveal an absence of the possessive 's morpheme. During this period, the child operated under what Galasso terms a “non-access” stage to inflectional morphology, resulting in the production of structures such as *Daddy car* or *Mommy car* rather than the target genitive forms. Galasso analyzes this omission not as a phonological reduction but as a syntactic underspecification of the Inflectional Phrase (IP). Crucially, this stage is characterized by the prevalence of default objective case assignments in possessive slots. For instance, between ages 2;6 and 2;8, Nicolas produced objective first-person possessors (e.g., *me car*) in 96% of instances, while the correct genitive *my* appeared in only 4% of the data. Galasso argues that this reflects a grammar where the head of the IP is underspecified for agreement features [-Agr]. Without these active features, the grammar fails to trigger the necessary movement or feature checking that would result in genitive case assignment, leaving the child to rely on default objective forms.
- **Stage 2: The “Optional Inflection” Phase (approx. 3;2).** As the longitudinal window progressed, an “optional inflection” phase emerged around age 3;2. Here, the data show a fluctuation between the underspecified structures of the previous stage and the expected usage. Use of the possessive 's jumped from 0% to 23%, signaling the onset of functional category availability. Simultaneously, the correct genitive pronoun *my* began to oust the objective *me*, reaching 93% frequency by age 3;0. This shift was mirrored in the acquisition of second- and third-person possessives. For example, *you* functioning as a possessor (e.g., *you train*) was dominant at 3;2 (88%) but was rapidly replaced by the target form *your* (93%) by

age 3;6. Galasso interprets this optionality as the child's grammar beginning to license fully specified agreement heads [+Agr], thereby allowing for the "Move" operations that license genitive case.

- **Stage 3: Full Competence (3;6).** By the final stage of the study, Nicolas demonstrated near-adult competence. The rapid consolidation of genitive forms coincided with the stabilization of nominative subject case in clausal structures, suggesting a parallel processing maturation for both nominal and verbal domains.

Consequently, Galasso's findings support the hypothesis that early errors in possession are derived from an initial inability to do movement chains, forcing the child to rely on default, agreement-less structures until the functional architecture of the IP is fully established.

While Galasso's work highlights the processing difficulty of "Move" operations in English, a critical question remains: does input frequency mitigate this difficulty? The longitudinal study by Fábregas et al. (2019) addresses this by contrasting the acquisition paths of children learning Norwegian, where possessives are frequently postnominal, with those learning Spanish, where the prenominal position is standard. The study is particularly significant as it shows that children's early productions often defy the statistical patterns of their input, suggesting that internal grammatical economy drives early morphosyntactic development.

To map the developmental trajectory of possession, Fábregas et al. (2019) analyzed longitudinal data from the CHILDES database. The Spanish dataset consisted of six monolingual children (covering ages 0;11 to 4;8). This sample provided a substantial volume of general child speech (approximately 66,000 utterances), yielding 536 relevant possessive tokens. These data were compared against a previously analyzed longitudinal corpus of three Norwegian children aged 1;9 to 2;8, comprising 449 possessive structures. The use of longitudinal tracking allowed the authors to divide the children's output into developmental

stages, offering a precise timeline of when non-target-consistent forms emerge and eventually recede.

The longitudinal data reveal distinct acquisition patterns that appear to contradict a purely frequency-based account. In the Norwegian data, Anderssen and Westergaard (2010) observed that children initially produced very few possessives (Stage 1: 1;9–2;0), but crucially, 100% of these early productions were prenominal. This is striking given that the postnominal order (e.g., *boka mi*) constitutes roughly 75% of the adult input. If acquisition were driven solely by input statistics, one would expect the postnominal form to emerge first. Instead, it is only at Stage 2 (2;0–2;4) that postnominal forms appear, yet children continue to significantly overuse the prenominal form (47%) before converging on the adult distribution in Stage 3. This resistance to the frequent input suggests that the prenominal structure is syntactically “cheaper” or more basic in the child's developing grammar.

In contrast, the Spanish longitudinal data show that children produce prenominal possessives (e.g., *mi pelota*) from the very beginning. This aligns with the adult input, where the prenominal form represents 97% of usage. However, a closer longitudinal analysis reveals that the Spanish children exhibit a specific type of error that is absent in the adult language: the overuse of postnominal possessives. Although rare (representing about 1.87% of tokens), these errors were systematic. The children produced ungrammatical structures combining a definite article with a postnominal possessive, such as **la habitación mía* (‘the room of mine’) or **el bolso mío* (‘the bag of mine’), constructions that are restricted or ungrammatical in the adult variety being acquired. Furthermore, the longitudinal data from the child Magín (specifically between ages 2;4 and 2;10) documented instances of “possessive doubling,” where both the prenominal and postnominal forms were produced within the same determiner phrase (e.g., *mi patio mío*, ‘my yard mine’). This doubling phenomenon provides a unique window into the acquisition process, suggesting that at this

specific stage of development, the child has not yet parameterized the restriction against spelling out both positions simultaneously.

Fábregas et al. (2019) interpret these longitudinal findings as evidence of “economy of movement” in child grammar. They argue that the Norwegian children's preference for the prenominal form, despite its low frequency, stems from it being the base-generated position. In their theoretical framework, the frequent postnominal form requires syntactic movement of the noun (N-movement) across the possessive. Conversely, in Spanish, the postnominal form is analyzed as the base position. Therefore, when Spanish children produce errors like *la habitación mía* or *mío* in isolation, they are likely defaulting to a structure that avoids moving the possessive to the prenominal position. Thus, the longitudinal data from both languages converge on a single principle: children initially prefer structures that involve less syntactic computation, specifically avoiding movement operations until the target grammar is fully consolidated.

The bridge between morphosyntactic complexity and input frequency is further presented by Ntelitheos (2017) in an investigation of Emirati Arabic (EA). This study provides a compelling counter-narrative to purely frequency-based accounts of acquisition by utilizing longitudinal data to track two distinct possessive constructions: the Construct State (CS) and the Analytic Genitive (AG). The Construct State is morphosyntactically complex, involving movement operations to derive the correct word order and case marking. In contrast, the Analytic Genitive is derived via simple merge using the particle *ma:l*. The central aim of the study was to determine whether children prioritize the structure that is most frequent in their input (CS) or the structure that is syntactically less complex (AG). To disentangle these variables, the research utilized the EMALAC corpus, a longitudinal database comprising data from six Emirati children (three boys and three girls). The data collection was constituted by 41 half-hour recordings taken at roughly two-week intervals

over a period of two years. This design allowed for a view of syntactic development, covering an age range from approximately 1;11 to 5;0. The recorded material was transcribed in broad IPA and analyzed using CHAT formats, ensuring that the emergence of possessive forms could be tracked against the children's increasing linguistic maturity.

The findings presented by Ntelitheos (2017) reveal a striking dissociation between input frequency and early child production. In adult-to-adult speech, the complex CS structure is overwhelmingly dominant, accounting for over 95% of non-pronominal possessives. Even in Child-Directed Speech (CDS), adults continued to favor the CS (73%) over the AG (27%). A strictly frequency-based hypothesis would predict that children, mirroring this input, would acquire and produce the CS forms earlier and more frequently.

However, the longitudinal data contradicted this prediction. Ntelitheos observed that at the earliest stage of acquisition (Stage 1: 20–42 months), children produced the simpler AG structures 89.3% of the time, while the complex CS structures appeared in only 10.7% of instances. This preference for the less frequent but syntactically simpler form suggests that morphosyntactic economy serves as a primary constraint in early grammar, overriding the statistical weight of the ambient language.

The longitudinal nature of the study further suggests a clear maturational path. As the children progressed to Stage 2 (43–48 months) and Stage 3 (>48 months), the frequency of CS production increased significantly, eventually converging towards the levels found in the adult input. By Stage 3, the production of CS had risen to 46.5%, indicating that as the children's grammatical systems matured, they became capable of handling the movement operations required by the CS. A linear regression analysis confirmed a significant correlation between age and the production of CS structures, reinforcing the maturation hypothesis. Furthermore, the study highlighted a gradient in the acquisition of pronominal possession. While children produced pronominal suffixes early, often attached to the *ma:l*

particle, errors in definiteness marking—such as doubly marking a noun with both a definite article and a possessive suffix—suggested that these early forms might be unanalyzed chunks rather than the result of productive syntactic movement. This reinforces the argument that true syntactic competence regarding the complex internal structure of the noun phrase develops over time.

Collectively, the studies by Galasso (2011), Fábregas et al. (2019), and Ntelitheos (2017) provide data for structural and maturational accounts of syntax. Whether in English, Spanish, Norwegian, or Arabic, the data indicate that while input frequency plays a role, it is secondary to the constraints imposed by structural complexity (specifically *Move* operations) in the early stages of first language acquisition. However, focusing solely on syntactic operations offers an incomplete picture of possession. As the child's grammar matures, it does not function in whitout a context; it is deeply intertwined with semantic concepts and communicative intent. This necessitates a shift in focus from the form of the possessive to the meaning it encodes.

2.1.2 Pragmatic Anchors and Item-Based Construction

While the studies discussed in the previous section emphasize the role of syntactic constraints and structural economy in the acquisition of possession, a parallel and equally substantial strand of research suggests that this process cannot be fully explained by morphosyntactic operations alone. The acquisition of possession is not solely a formal computation of case and agreement; it is deeply rooted in the pragmatic communicative needs of the child. Grounded largely in usage-based and constructionist frameworks, this body of literature posits that children do not initially activate abstract syntactic rules, such as the functional projection of a genitive phrase, but instead build their grammar “bottom-up”. This construction process is driven by input frequency, specific lexical anchors, and the child's expanding cognitive ability to conceptualize relationships between objects and

people. Consequently, the trajectory of acquisition is often described not as a sudden parameter setting, but as a gradual semantic expansion from concrete, animate prototypes to abstract ownership.

To illustrate the intricate temporal dynamics of acquiring possession, it is essential to examine naturalistic data that capture the transition from pre-linguistic conceptualization to morphosyntactic competence. A seminal investigation by Tomasello (1998) provides a longitudinal framework for this purpose. Re-analyzing data originally reported in 1992, Tomasello investigated the ontogenetic emergence of “exchange-possession”, aiming to document the developmental relations among five distinct linguistic construals: performatives marking exchange, the morphological possessive *'s*, possessive pronouns, verbs of exchange (e.g., *give*, *have*), and complex utterances combining possessive noun phrases (NPs) with possessive verbs. The data for this analysis were derived from a comprehensive diary study of a single participant, T, an English-speaking female, during her second year of life (from 12 to 24 months). The methodology employed was strictly naturalistic and longitudinal; the researcher recorded virtually all of the child's predicative expressions and specific usage contexts on a daily basis. This high-density sampling allows for an analysis of the “verb island” hypothesis (Tomasello 1992, p. 23), where the acquisition of grammatical structures is initially tied to specific lexical items rather than abstract rules. By tracking the exact age of emergence for different possessive forms, the study constructs a timeline of how T moved from social-pragmatic interaction to grammatical assertion. The longitudinal data reveal that T's acquisition of possession followed a distinct three-stage trajectory:

- **The Performative Stage (12–17 months):** Initially, the child's expressions were performative rather than truly possessive. During this first stage, T engaged in object exchanges using social markers like “Thank you” or simple requestive verbs such as

get and *hold*. Crucially, these early utterances did not encode ownership but rather the physical manipulation of objects or social routines.

- **The Assertion of Ownership (approx. 17 months):** A second stage emerged around 17 months, characterized by the assertion of ownership. T began employing the morphological possessive *'s* (e.g., *Mommy's sock*) and possessive pronouns (e.g., *Mine*) to establish associations between objects and people, particularly in contexts where possession was threatened. Notably, the morphological *'s* emerged prior to possession verbs, likely because the child's parents frequently labeled objects in this manner (e.g., *That is Mommy's*).
- **Verbs of Exchange and Combinatory Capacity (19–20 months):** The third and most linguistically significant stage occurred between 19 and 20 months, marking a conceptual explosion in the domain of possession. T began to utilize specific verbs of exchange (e.g. *give, have, share, and keep*) to denote differences in possession versus temporary location. It was during this phase that the child demonstrated the syntactic capacity to combine possessive verbs with possessive NPs (e.g., *Have my box*). This combinatory capability suggests a sophisticated understanding that ownership is a stable state distinct from spatial collocation; the child could articulate that she held an object that belonged to someone else.

These findings highlight the lexically specific nature of early grammatical constructions. Tomasello (1998) observes that T's development did not rely on a sudden triggering of an innate "possession module", but was instead driven by input frequency and social interaction. Furthermore, T learned to talk about the activity of exchanging before she fully mastered the stative predication of *having*.

The balance between input frequency and the child's communicative intentions is further investigated by Leroy-Collombel and Morgenstern (2012) in their longitudinal study of French acquisition. Grounded in a usage-based theoretical framework, the authors examine the developmental trajectory of possession markers in French, specifically focusing on the interplay between standard input and the child's creative, often nonstandard, output. Their research aims to describe how a child constructs the category of possession, moving from global, pragmatic strategies to the capacity to use French possessive determiners and genitive constructions (e.g., *la voiture de maman*). The study relies on a dense longitudinal dataset drawn from the "Paris Corpus". The participant, a monolingual French-speaking female child named Anaé, was observed from the age of 1;06 to 4;00. To ensure a granular analysis of morphosyntactic development, the authors performed detailed coding on 11 one-hour video-recorded sessions spanning the critical period between 1;07 and 2;11. These data were triangulated with a maternal diary kept from birth to age 4;00, allowing the researchers to capture rare productions that might be absent in sampled recordings. The methodology effectively facilitates a micro analysis, tracking the exact moments when specific possessive constructions emerge.

From a developmental perspective, the findings reveal a non-linear trajectory characterized by the prominent use of "emergent categories" (Clark, 2001). In the initial phases of the study (1;07 to 2;00), Anaé did not merely replicate the adult model, which predominantly utilizes the structure [Possessive Determiner + Noun] (e.g., *sa chaussure*). Instead, she relied heavily on a nonstandard construction: [Noun + *à moi*] (e.g., *le chapeau à moi*, literally 'the hat to me'). Leroy-Collombel and Morgenstern (2012) argue that this reflects a functional generalization where the child co-opts a predicative marker (*à moi*, typically used for 'it is mine') to serve an attributive function. This phase coincided with a distinct spike in the child's general usage of the tonic pronoun *moi* around age 2;00,

suggesting that her morphosyntactic choices were heavily influenced by a pragmatic drive to assert agency and identity.

A significant shift in the longitudinal data occurs at 2;02. The authors observed a rapid decline in nonstandard forms and a simultaneous appearance of standard possessive determiners (*mon, ma, ton, son*). This transition marks the point where the child begins to parse the complex amalgam of gender, number, and person inherent in French possessive determiners. However, the path to full mastery remained dynamic; even after 2;02, Anaé produced creative redundancies such as *mon truc de moi* ('my thing of me'). The authors interpret these "errors" not as failures, but as evidence of the child acting as a "splitter", actively breaking down and recombining linguistic elements to maximize semantic clarity, even if it violates adult syntactic constraints. Furthermore, the comparison between the maternal input and the child's production underscores the active nature of acquisition. While the mother's input was dominated by second-person references (referring to the child's possessions), Anaé's early productions were overwhelmingly first-person oriented. This discrepancy challenges simple behaviorist imitation accounts; while the child eventually aligned with the statistical frequencies of the input regarding form, the function and person-reference were dictated by her own pragmatic perspective.

2.1.3 Semantic Constraints and the Animacy Hierarchy

Moving beyond pragmatics to semantic constraints, the work of Eisenbeiss, Matsuo, and Sonnenstuhl (2009) offers compelling evidence on how semantic features, specifically animacy, restrict the early application of possessive markers. Interestingly, distinct from purely usage-based accounts, this study interprets these semantic restrictions through a generative lens. Their study is particularly instrumental as it explicitly contrasts generative full-competence approaches with structure-building and usage-based models, utilizing data from German acquisition. To capture the developmental trajectory of possession, the authors

analyzed longitudinal corpora comprising 64 recordings from seven monolingual German children, aged between 1;11 and 3;6. The data were drawn from the Clahsen, LEXLERN, and Wagner corpora. A critical methodological innovation in this study was the rejection of chronological age or Mean Length of Utterance (MLU) as the primary independent variable. Instead, Eisenbeiß et al. (2009) adopted a four-stage model of noun phrase (NP) development, tracing the emergence of possession constructions against the backdrop of the child's growing syntactic capacity to manage the internal structure of the DP.

The longitudinal analysis revealed an incremental path in the acquisition of adnominal possession (e.g., *Susi's chicken*). In the earliest phases (Stages I and II), the children's production was heavily restricted. The authors observed that adnominal constructions initially relied almost exclusively on proper names and kinship terms, with a gradual shift toward pronominal possessors occurring only in Stages III and IV. This distribution supports the Lexical Learning Hypothesis (Eisenbeiss 2007, p. 4), which postulates that while Universal Grammar is available from the onset, syntactic development is driven by the incremental learning of grammatical features associated with specific lexical items. Under this view, early restrictions to specific lexemes reflect the gradual acquisition of the features required to project functional categories, rather than a lack of underlying abstract structure. This interpretation is corroborated by findings regarding the German possessive *-s* marker. Although adult German restricts the *-s* genitive to unmodified proper names, children were found to overgeneralize the marker to common nouns (e.g., *Affes Banane* for 'monkey's banana'). Crucially, however, they strictly respected the structural constraint prohibiting the combination of *-s* with determiners. This suggests that while the specific lexical features characterizing the class of nouns permitting *-s* were still being refined, the abstract syntactic constraints regarding the projection of the functional category were already operative suggesting that possessive markers are not immediately generalized

across the grammar but are learned item-by-item, anchored initially to animate possessors.

This implies an early sensitivity to syntactic constraints, even in the absence of full adult-like semantic categorization. Furthermore, the semantic scope of these constructions expanded longitudinally; children began by encoding prototypical ownership and kinship relations, only extending this to body parts and part-whole relationships in the later stages (III and IV).

The developmental narrative continues with predicative possession, where the authors observed a distinct chronological ordering: *Haben* ('have') constructions consistently emerged before *gehören* ('belong') constructions. This sequence aligns with typological hierarchies where *HAVE*-constructions are considered the unmarked option. Interestingly, when *gehören* did emerge in the longitudinal data, it was initially restricted to locative contexts (e.g., *Das gehört hier hin* / 'That belongs here') before acquiring its possessive function. This finding lends empirical weight to the grammaticalization path where possession is derived from locative schemas. Moreover, the children exhibited significant mapping errors with *gehören*, frequently overgeneralizing the argument structure of *haben* (nominative/accusative) to the dative-requiring *gehören*.

The hypothesis that possession expands radially from concrete to abstract domains is further supported by longitudinal data from non-Indo-European languages. While much of the existing literature focuses on Indo-European languages, Chen and Zhang (2023) provide a compelling longitudinal analysis of Mandarin Chinese, offering empirical data that supports the constructionist perspective. To capture the developmental patterns of these constructions, Chen and Zhang (2023) employed a longitudinal design involving six Chinese-speaking children aged between one and four years. Over a period of one year, the researchers collected naturalistic utterance data, recording each participant for approximately 30 minutes once or twice a month. This methodology resulted in a substantial

corpus of 71 observations. Syntactically, the study distinguishes between three primary types of possession: attributive, predicative, and external.

The longitudinal data reveal a distinct developmental hierarchy moving from simplicity to complexity. At the earliest stages (around 1 year and 10 months), children produced simple attributive variations, such as the juxtaposition of two nouns (N1 + N2) without the possessive marker *de*, and rudimentary predicative forms involving “have” (N1 + *have* + N2). It was not until the age of two that the functional marker *de* began to appear consistently. Most notably, complex structures such as external possession and the *be*-predicative variation appeared significantly later, largely restricted to the utterances of 3- and 4-year-olds.

Semantically, the data illustrate a parallel trajectory from concrete, egocentric concepts to abstract, sociocentric relationships. Chen and Zhang (2023) categorized the children’s utterances into four major semantic types: interpersonal, whole-part, ownership, and spatiotemporal relationships. The longitudinal analysis indicates that children initially acquire possession concepts related to their immediate, tangible reality. For instance, kinship terms (e.g., *mama*) and body-part relationships (e.g., *my eyes*) were among the first to emerge at 1;10 and 1;11, respectively. Conversely, abstract concepts such as social relationships (e.g., *classmates*) and temporal possession did not appear until much later, around age three and a half. Critically, the authors interpret these findings through the lens of usage-based theory, noting a robust correlation ($r = .977$) between the frequency of specific constructions in adult input and their emergence in child speech. Consequently, this study suggests that the “driving force” of syntactic development in Chinese possession constructions is inextricably linked to language use and ambient input frequency.

Recent data from Tang, Lau, and Leung (2023) further validate this trajectory using the newly established Corpus of Mandarin Child Language (CMCL). This research offers a

detailed look at the developmental timeline for semantic possession, grounded in a cross-sectional study of 82 native Mandarin-speaking children aged between 25 and 60 months.

The methodological approach of the CMCL is particularly relevant because the data were annotated on a semantic tier as well as a syntactic one. The study defined a category as “acquired” only when a rigorous 90% criterion was met (meaning that 90% of the children within a specific age group produced the semantic category at least once). The findings reveal that possession is a mid-stage developmental milestone. Among the 2-year-old participants (25–36 months), possession was not considered fully acquired according to the 90% threshold, despite these children demonstrating mastery over simpler sensorimotor concepts such as existence and action. It was only within the 3-year-old group (37–48 months) that possession was documented as a stable, acquired category. Tang and colleagues argue that this delay, relative to basic object labelling, is driven by the increased cognitive demand of processing the relationship between an owner and an entity. Furthermore, they suggest that syntactic complexity plays a significant role; while the concept exists early, the specific requirement of the Mandarin genitive marker *de* presents a grammatical challenge that may delay the productive mastery of the full possessive construction until approximately age three.

2.2 Experimental Data

While longitudinal corpora provide essential insights into the spontaneous production of possessive morphology, they cannot fully reveal the underlying interpretation strategies children employ before achieving productive competence. To delineate the acquisition process more precisely, this section turns to experimental methodologies that try to disentangle the interplay between conceptual ownership and syntactic realization. This analysis is structured into three developmental domains: first, the comparison between syntax and world knowledge, examining how children transition from semantic strategies

and visual heuristics to strict syntactic processing ; second, the acquisition of pronominal possession, specifically focusing on the dissociation between morphosyntactic forms and their pragmatic functions ; and finally, semantic features, investigating how characteristics such as alienability and animacy influence the elicitation competence.

2.2.1 Syntax or the world knowledge?

A central question in the literature concerns the timing of acquisition: Do children acquire the syntax of possession simultaneously with the semantic concept, or does the latter precede the former? Experimental evidence indicates a model of conceptual precedence, where children appear to rely on cognitive strategies and semantic probability before mastering the strict word-order rules of the target language. Research conducted by Golinkoff and Markessini (1980) provides a baseline for understanding the shift from semantic-based comprehension to rule-based processing. The study aimed to determine whether young children possess a differentiated concept of possession, distinguishing between alienable, intrinsic, and reciprocal relationships, and to isolate the developmental point where syntax (word order) overrides semantic probability (knowledge of the world).

To approximate a longitudinal perspective, the authors recruited 30 children ranging in age from 1;7 to 5;5. The study utilized Mean Length of Utterance (MLU) rather than chronological age to create five distinct developmental stages: Early Stage I (MLU 1.00–1.54), Late Stage I, Stage III, Stage IV, and Post-IV (MLU > 4.00). This stratification allowed the researchers to analyze the data through a developmental lens, treating each MLU group as a specific point in the trajectory of linguistic competence.

The study presented the “owner–owned” relationship using a picture-book comprehension task. The stimuli included acceptable possessive phrases (alienable, intrinsic, and reciprocal) alongside anomalous possessive constructions, including semantically incongruent phrases such as *flower’s boy* or *hair’s girl*. This design tested whether children

relied on cognitive strategies (choosing the most likely possessor based on real-world knowledge) or syntactic competence (following the *Noun1*-possessor, *Noun2*-possessed rule regardless of semantic plausibility).

The findings indicate a developmental progression. At the earliest developmental points, represented by the Early and Late Stage I groups, children demonstrated accuracy in understanding the basic concept of possession, generally performing above chance. However, their comprehension appeared to rely on semantic heuristics rather than syntax. For instance, these younger children found reciprocal possession (e.g., *baby's mommy*) more difficult than non-reciprocal types. This difficulty likely stems from the fact that reciprocal relationships involve two animate beings, both of whom are plausible possessors, thereby removing the “event probability” strategy available for inanimate objects. As the timeline progresses to Stages III and IV, a refinement in semantic categorization is observed, yet a reliance on world knowledge appears to persist over strict syntax. This is evident in the children’s responses to anomalous phrases. When presented with a phrase like *flower's boy*, the younger and middle-stage groups frequently ignored the syntactic word order. Instead of pointing to the boy belonging to the flower (the syntactic interpretation), they engaged in a “repair” strategy, selecting the flower belonging to the boy. This behavior suggests a hierarchy of “possessability” where animate beings are viewed as natural possessors, potentially overriding the syntactic signal.

The final group, Post-IV (mean age 5;5), marks a qualitative shift. At this stage, children began to utilize word order as a dominant strategy to comprehend possessive phrases, effectively overriding semantic anomalies. When hearing *flower's boy*, the Post-IV subjects were the only group to consistently provide syntactic responses rather than correcting the semantic anomaly. This suggests that the ability to process the possessive

construction as a purely syntactic rule, independent of “real world” plausibility, may be a late-emerging competence.

The reliance on non-linguistic cues in early stages is further investigated by Blake et al. (2012), who examined the intersection of social cognition and the comprehension of possessive morphology. Their study specifically explores the “possession heuristic” (the tendency to equate holding an object with owning it) and how this visual cue is eventually overridden by verbal testimony. The study included 391 children ranging from 2.5 to 6 years of age, stratified into four distinct age groups: 2-year-olds (mean age approx. 2;9), 3-year-olds (mean age approx. 3;5), 4-year-olds (mean age approx. 4;5), and 5-year-olds (mean age approx. 5;5). The core methodological paradigm involved presenting children with vignettes where a conflict was introduced between a visual cue (one doll physically possessing the toy) and a verbal cue (a statement identifying the other doll as the owner). This design simulates a longitudinal lens, highlighting specific developmental intervals where linguistic input begins to supersede visual heuristics.

The results outline a developmental trajectory regarding the weighting of linguistic input. At the earliest stage (the 2- and 3-year-old groups), the data indicated a significant reliance on visual cues or a “mixed” performance. While these younger children could understand possessive phrases in isolation, the presence of a conflicting visual cue appeared to disrupt their ability to assign ownership based on verbal testimony alone. Notably, 2- and 3-year-olds performed at chance levels in inconsistent conditions, suggesting that the linguistic concept of “ownership” as an abstract right separate from physical control may not yet be robustly entrenched. Conversely, a shift was observed around the age of 4. The data revealed that by this age, children begin to prioritize verbal statements as the reliable cue, effectively inhibiting the “possession is owner” bias. By age 5, this competence appeared fully consolidated. Blake et al. (2012) propose that this trajectory reflects social experience

outside the home; as children enter preschool environments, they encounter ownership norms that are defined by verbal labels (e.g., *Billy's locker*) rather than physical possession.

2.2.2 The Acquisition of Pronominal Possession

The dissociation between form and function is also evident in how children refer to themselves as possessors. Oshima-Takane (1995) investigated this through a mixed-method design involving 65 children (mean age 20 months) with a longitudinal follow-up subset. Using MLU as the primary index, the cross-sectional data revealed that children with lower MLUs often used nominal forms (e.g., *Jacob's*) almost exclusively for the Indicative Function (labelling ownership as an attribute, e.g., answering *Whose is this?*), while reserving pronominal forms (e.g., *Mine*) for the Volitional Function (expressing a desire to claim or keep an object). This supports the hypothesis that children distinguish communicative functions before mastering the adult-like mapping of forms.

The longitudinal follow-up provided insights into how this system reorganizes. The study identified two distinct developmental routes. In the first route, children who initially utilized the “distinctive use” strategy (Nominals for Indication, Pronouns for Volition) gradually transitioned to using pronouns for both functions. In the second route, some children bypassed the nominal stage for self-reference entirely, using pronouns exclusively for volition before expanding their semantic scope. This indicates that the acquisition of pronominal possession is not a linear accumulation of vocabulary, but a dynamic process of mapping specific pragmatic functions onto morphosyntactic forms.

2.2.3 Semantic Distinctions

Beyond the broad conceptual distinction between ownership and other types of possession, experimental research has examined how children acquire these semantic features. Specifically, a growing body of evidence investigates the acquisition of the alienable vs.

inalienable distinction and the interface conditions that map these semantic features onto syntactic forms. The acquisition of inalienable possession offers a specific domain for observing how children navigate cross-linguistic variation. While Romance languages often permit the use of definite determiners for body parts (e.g., Portuguese: *João levanta a mão*, “John raises the hand”), English typically requires possessive pronouns (e.g., *John raises his hand*).

Mendes (2017) investigated whether this distinction is present from the onset or if English-speaking children pass through a stage resembling the Romance pattern. To address this, Mendes employed a cross-sectional design utilizing a Truth Value Judgment Task (TVJT). The study recruited 45 American English (AE) speaking children, divided into a younger group (mean age 4;07) and an older group (mean age 7;02), alongside a control group of 13 adults. These were compared against a sample of 79 Brazilian Portuguese (BP) speakers (younger mean age 4;11; older mean age 7;06). The experimental design manipulated the type of determiner (definite article vs. possessive pronoun) and the possessive interpretation (alienable vs. inalienable) using visual stimuli involving Mr. Potato Head, which allows for a clear distinction between intrinsic and detached body parts.

The data suggest a developmental shift in the American English group. While adult AE speakers consistently rejected the use of *the* with body parts (preferring the alienable reading), the younger AE children accepted the inalienable reading with the definite determiner at rates higher than adults. Specifically, in syntactic contexts involving the complement of a preposition, younger children rejected the non-target structure only 6.5% of the time, whereas older children showed a rejection rate of 30%, moving closer to the adult norm. This trajectory suggests that AE children may initially access a grammar that permits definite determiners to mark inalienability, similar to the BP pattern, and subsequently restrict this usage based on input evidence. Furthermore, regarding possessive

pronouns, younger AE children accepted alienable readings (e.g., *cleaning his eyes* for detached eyes) more frequently (20–37% rejection rate) than adults (79–100% rejection rate). This indicates that the convergence on the adult grammar involves not only restricting the definite article but also narrowing the semantic scope of the possessive pronoun to understand inalienability.

The role of semantic complexity in acquisition is further observed in non-Indo-European languages. Shi and Zhou (2018) examined the acquisition of the Mandarin Chinese possessive *de* construction, aiming to determine whether young children distinguish this functional marker from simpler noun–noun compounding strategies when expressing alienable possession. The study included 50 monolingual Mandarin-speaking children, divided into two groups: 30 three-year-olds (mean age 3;5) and 20 four-year-olds (mean age 4;6). Experiment 1 utilized a two-choice forced judgment task where children viewed visual stimuli of alienable possession (e.g., a pig owning a towel) and heard two descriptions: a possessive *de* construction (*Xiaozhu de maojin*) and a noun–noun compound (*Xiaozhu maojin*). In adult Mandarin, the *de* marker specifies the possessive relation, whereas the compound often denotes a type or inalienable characteristic.

The findings indicate a developmental discontinuity between the two age groups. The 4-year-olds demonstrated competence comparable to adults, selecting the possessive *de* construction 82% of the time. In contrast, the 3-year-olds as a group performed at chance (56%). A closer analysis of individual profiles revealed that a significant subgroup of the younger children consistently preferred the noun–noun compound. This pattern suggests a preliminary stage where children may utilize nominal compounding, a structure that is morphosyntactically simpler, to encode possession before fully grammaticalizing the relation via the *de* marker. By age 4, this mapping appears to stabilize, as confirmed by Experiment 2, where older children successfully produced *de* constructions with 78%

accuracy. These results align with the hypothesis that the child must parse the conceptual distinction between “type” (compound) and “instance/owner” (possessive) before the morphosyntactic mapping stabilizes.

Finally, the interaction between syntax and semantics was scrutinized by Armon-Lotem, Crain, and Varlokosta (2004) in a comparative study of English, Hebrew, and Greek. The authors investigated how children map semantic relations onto syntactic structures like genitives. The participant pool included 65 children (25 English, 25 Hebrew, 15 Greek) ranging from late age 2 to age 6. Using an Elicited Production Task, the researchers prompted children to describe possession scenarios varying along dimensions of [\pm human], [\pm animate], and [\pm count]. The results indicated a high degree of homogeneity across age groups regarding animacy; children as young as 3 consistently distinguished between animate and inanimate possessors. For instance, English-speaking children generalized the genitive *'s* to animate possessors but utilized relative clauses or prepositional phrases for inanimate ones (e.g., avoiding *the tractor's rock*).

However, the data also revealed instances where children appeared more restrictive than adults. Specifically, Hebrew- and Greek-speaking children tended to avoid using genitive constructions with mass nouns (substances), even though the adult grammars of these languages permit it. For example, while Hebrew adults might accept a genitive construction for *grains of rice*, children consistently preferred bare nouns, mirroring the distinction found in English. This adherence to a stricter mapping suggests that early grammar may be constrained by the Uniqueness Principle (Wexler 1979), leading learners to assume distinct forms for distinct semantic functions (e.g., count vs. mass) before evidence expands their grammar to include the language-specific idiosyncrasies of the adult system.

2.3 Identifying the Research Gap

The comprehensive review of the literature presented in this chapter delineates a developmental landscape of possession that is empirically rich yet methodologically asymmetrical. By synthesizing longitudinal evidence, usage-based accounts, and experimental findings, a clear picture emerges of the balance between formal grammatical maturation and communicative intent.

From a morphosyntactic perspective, longitudinal evidence has robustly mapped the acquisition of the determiner phrase (DP). Research by Galasso (2011), Fábregas et al. (2019), and Ntelitheos (2017) suggests that children struggle with the internal syntax of the possession, often prioritizing structural economy—such as “Merge-only” models—over complex movement operations. Whether in English, Spanish, Norwegian, or Arabic, the data indicate that early grammar is governed by a resistance to computational complexity, often overriding input frequency.

From a semantic and usage-based perspective, the trajectory is defined by a gradual expansion from concrete anchors to abstract rules. Studies by Tomasello (1998) and Leroy-Collombel and Morgenstern (2012) highlight that acquisition is driven by specific lexical items and pragmatic needs, such as the assertion of agency. Furthermore, Eisenbeiß et al. (2009) and Chen and Zhang (2023) established that semantic features like animacy and alienability are fundamental constraints on early competence, with children often adhering to stricter semantic mappings than adults.

Finally, experimental approaches have separate conceptual knowledge from syntactic realization. Work by Golinkoff and Markessini (1980) and Blake et al. (2012) reveals that children initially rely on cognitive heuristics and visual cues, only later transitioning to strict syntactic processing. Similarly, cross-linguistic investigations by Mendes (2017) and Shi and Zhou (2018) indicate an early sensitivity to semantic constraints.

While Mendes (2017) highlights restrictions on determiners in inalienable contexts, Shi and Zhou (2018) show that Mandarin-speaking children learn to distinguish alienable possession (requiring the marker *DE*) from noun-noun compounds at an early age.

2.3.1 The Structural Gap: Attributive vs. Predicative Asymmetry

Despite this extensive corpus of data, a critical structural imbalance remains. Most of the existing research has focused on attributive possession. In contrast, predicative possession has received significantly less attention as a syntactic structure in its own right. While usage-based studies have tracked the emergence of verbs like *have* and *got*, there is a scarcity of data comparing the processing mechanisms of attributive versus predicative structures within the same experimental design.

2.3.2 The Methodological Gap: From Offline to Online Processing

A second, equally critical limitation is the field's reliance on offline measures of competence. Longitudinal corpora (e.g., CHILDES, EMALAC, Paris Corpus) capture spontaneous production, offering high ecological validity but providing no control over the input or processing time. Experimental tasks (e.g., truth value judgment, picture selection) has measured the final outcome of comprehension (accuracy) or the form of production.

While these methods elucidate what the child knows or produces, they remain silent on how the child processes this information. For instance, while we know that children differentiate between animate and inanimate possessors in production, we do not know if a sentence with an animate possessor is processed faster than one with an inanimate possessor, or if the early emergence of utterances with inalienable possessed reflect the facilitation in processing inalienable structures.

2.3.3 The Present Study on Child Possession

One of the primary objectives of this thesis is to investigate how syntactic structure (attributive *of*-phrases vs. predicative *avere* 'have') interacts with semantic cues (animacy and alienability) to affect comprehension speed (RTs) in children. By employing a timed sentence–picture verification task, this study seeks to determine:

- Whether the semantic facilitation effects (e.g., the animacy advantage) observed in production corpora translate to faster processing times in comprehension.
- Whether predicative possession incurs a different cognitive load compared to attributive possession, and how this interacts with the semantic type of the possessor.

In doing so, this research moves beyond the question of *when* possession is acquired, addressing the more granular question of *how* syntactic and semantic information is integrated during the online processing of language.

3 Adults and Possessive Structures

While the acquisition patterns observed in children provide a window into the development of possessive concepts, an analysis of the adult system is necessary to establish the target state of competence. Research on adult possession has largely relied on corpus-based methodologies to map the distribution of syntactic forms and the semantic constraints that govern them. The following sections review these findings, examining syntactic architecture and distributional biases before turning to the semantic and pragmatic mechanisms underlying interpretation in both attributive and predicative contexts.

3.1 Corpora Data

3.1.1 Syntactic Architecture

A primary focus of corpus linguistics has been determining how syntactic options, such as prenominal versus postnominal placement, are selected by adult speakers based on information structure and morphosyntactic constraints. Fábregas et al. (2019) conducted a comprehensive investigation into the distribution of possessive constructions in adult Norwegian and Spanish, aiming to establish a baseline against which L1 acquisition patterns could be measured.

The methodological approach employed distinct datasets to ensure comparability. For Norwegian, the study drew upon the corpus of adult Norwegian investigated by Anderssen and Westergaard (2010) and the NoTa-corpus of spoken Oslo Norwegian. For Spanish, the researchers examined spoken texts within the CREA corpus (Corpus de Referencia del Español Actual), a repository containing approximately 350 million words. Due to the lack of grammatical tagging for this specific feature in CREA, the Spanish data

required manual classification to exclude possessives occurring in isolation, with the scope explicitly restricted to texts tagged as oral and European Spanish.

The results indicated a marked divergence in the distribution of word orders between the two languages. In Norwegian, the data suggest a preference for the postnominal position. Specifically, the corpus analyzed by Anderssen and Westergaard (2010) indicated a distribution of approximately 75% for the postnominal order, with the remaining 25% being prenominal. This tendency was supported by the NoTa-corpus, where 73% of the possessives were found to be postnominal. Conversely, the Spanish data showed a contrasting pattern. Upon filtering the 22,498 examples of short forms and 1,895 long forms found in the CREA searches, the authors found that postnominal possessives with overt nouns were rare. The analysis yielded a total of 719 postnominal instances compared to nearly 22,500 prenominal ones. Consequently, prenominal possessives in Spanish accounted for approximately 97% of the total, with postnominal forms constituting 3%.

The authors suggest that the distributional preference in Norwegian is likely related to information structure, where the postnominal possessive with an overt noun is considered the informationally neutral order, while the prenominal position is associated with focus. In contrast, the restrictions in Spanish appear to be more morphosyntactic in nature. Within definite DPs in Spanish, only third-person postnominal possessives are typically permitted, often carrying a contrastive reading, whereas Norwegian permits any person in the prenominal position. Furthermore, the authors describes the movement of the postnominal possessive to the determinant space in Spanish syntax (Brucart, 1994; Ihsane, 2003) as a movement dependent on feature checking in definite contexts. In Norwegian, however, movement seems triggered by a focus feature. This finding suggests that learners of these respective languages must navigate distinct input patterns: one driven by information structure (Norwegian) and one driven by definiteness and person reference (Spanish).

Similar distributional asymmetries have been observed also in non-European languages, where usage often diverges from prescriptive grammatical descriptions. In a study on Te Reo Māori, Trye et al. (2024) investigated the complexities of the *a* and *o* possessive system using a corpus-based approach derived from social media (Twitter/X). While traditional grammars classify these markers based on semantic hierarchies of dominance or subordination, Trye et al. identified a gap in empirical large-scale analyses. Utilizing the Reo Māori Twitter (RMT) Corpus (2007–2022), the authors compared a predicted variable, based on standard grammars, against actual usage.

The analysis revealed a significant divergence regarding the *a* category. In instances where grammars would predict an *a* marker⁴, speakers used the *o* marker approximately 59% of the time. This tendency was most pronounced in nominalizations of active verbs and creation relationships. The authors propose that this indicates a grammatical levelling in progress, where the distinction between the two categories is becoming blurred in favor of the dominant, unmarked *o* form. Furthermore, the semantic analysis confirmed that possession on social media is highly human-centric; yet, contrary to typological expectations, explicit kinship relationships were less frequent in the *a/o* construction than anticipated. These findings suggest that adult production is characterized by strong distributional biases where high-frequency forms tend to entrench themselves, potentially overriding prescriptive semantic distinctions.

⁴ A class is best viewed as a ‘special’ (marked) relationship between the two (Clark 1976, pp. 42–44), used in situations where the possessor is dominant (Bauer et al. 1997, p. 390) or the possessum comes under its protection or authority (Head 1989, p. 102). This latter framing places responsibility on the possessor to be a good kaitiaki ‘guardian’. The O class, on the other hand, is the ‘default’ (unmarked) category that applies in all other cases (Bauer et al. 1997, p. 391; Harlow 2007, p. 168).

3.1.2 Attributive Possession: Semantics vs. Pragmatics

Moving from morpho-syntactic distribution to interpretive mechanisms, significant research has focused on how adults resolve the interpret the semantics in attributive possession.

Lichtenberk et al. (2011) also corroborated these experimental findings with corpus analyses, which similarly revealed that relational possessives encode a smaller and more salient set of relations than their non-relational counterparts. These results suggest that even without morphological marking, the mental lexicon of English speakers is organized in a way that prioritizes the inherent semantic links of inalienable possession.

Kolkman and Falkum (2020) explored the extent to which referential interpretations of English prenominal possessives are supported by the surrounding linguistic co-text. Their research addressed the theoretical debate between *lexical* interpretations (derived from the head noun's semantics, such as kinship) and *pragmatic* interpretations (context-dependent)⁵, challenging the view that lexical meanings operate as defaults requiring no contextual support.

To investigate these claims, the authors conducted a large-scale corpus study using the British National Corpus (BNC), extracting a dataset of 2,889 interpretable possessive noun phrase tokens. Their methodology involved a dual coding system: tokens were classified by interpretation group (e.g., Inherent, Control, Agentive) and by the type of contextual pointer present in a window of 500 words preceding and 100 words following the target. The results indicated that the vast majority of possessive interpretations (92% of the total sample) occurred within high-information co-texts containing identifiable pointers. Crucially, the analysis revealed that even apparently context-independent categories frequently appeared in high-information contexts. For instance, Control interpretations

⁵ The baseline of the authors is that non-lexically derived or 'pragmatic' interpretations (e.g., 'the house Mary dreams of buying') require explicit contextual support, while this is not needed for 'lexical' interpretations (e.g., 'the house Mary owns'), which are considered default and available in the absence of contextual support.

(ownership) received indirect support via bridging or text reference in a majority of instances. The only category exhibiting distinct behavior was the Inherent group (e.g., kinship), which was significantly more likely to appear without co-textual support.

Kolkmann and Falkum (2020) argue that these findings undermine the empirical validity of taxonomies that strictly differentiate between lexical and pragmatic interpretations. Instead, they propose that pronominal possessives should be viewed as semantically incomplete expressions requiring *saturation* (Kolkmann and Falkum, 2020, p. 3) or *linguistically mandated completion* (e.g., Bach, 1994; Recanati, 2002, 2004; Carston, 2004). In this framework, no interpretation occurs in a pragmatic vacuum; rather, low-information contexts simply require the listener to draw more heavily on encyclopedic assumptions, while high-information contexts provide linguistic triggers that guide the inference.

3.1.3 The Semantics of Predicative Possession

While attributive possession integrates the relationship into a noun phrase, predicative possession utilizes verbs to assert the relationship explicitly. Research in this domain has investigated the lexical boundaries between verbs such as *own*, *possess*, and *have*. Nordlund (2009) conducted a corpus analysis of the BNC to delineate the semantic profiles of *own* and *possess* beyond dictionary definitions. Analyzing 1,089 instances of *own* and 462 instances of *possess*, the study focused on the nature of their arguments to determine how these verbs function in usage.

The analysis of *own* indicated that the verb functions as a prototype category for legal ownership. Approximately 97% of the analyzed instances aligned with this legal sense, with extensions into domains of control and responsibility. Regarding arguments, *own* exhibited a strong anthropocentric constraint: subjects were predominantly human or metonymic institutions, and objects were typically concrete assets of high value. In contrast, *possess*

displayed a significantly different profile. Nearly 65% of its usage related to having a quality, faculty, or attribute rather than material ownership. Nordlund observed that *possess* frequently accepts inanimate subjects (e.g., *tomatoes possess flavour*), reflecting its function of attribution. Furthermore, distinct from the legal implications of *own*, *possess* was often used to denote “mere possession” (physical control without legal title), particularly in contexts involving illicit items. This suggests that the choice between these verbs is not merely stylistic but is strongly influenced by the animacy of the possessor and the alienability of the possessed item.

The function of predicative possession in specialized registers was further explored by Khorina (2018), who examined possessive relational process clauses in scientific discourse. Using a Systemic Functional Linguistics (SFL) framework, the study analyzed engineering textbooks to determine how grammatical structures are used in technical descriptions. The findings indicated that verbs such as *include*, *consist of*, *have*, and *possess* operate within the “attributive⁶ relational process mode”. The study identified three distinct roles for these clauses: *Classification*, *Composition*, and *Properties*. The role of Classification, often realized by the verb *include*, describes vertical relationships in scientific taxonomy. The role of Composition explicates part-whole relationships (meronymy) and is realized by verbs like *consist of* or *comprise*. Finally, the role of Properties defines the material traits of an entity and is frequently realized by *have* and *possess*. For instance, a clause might state that a material “possesses” magnetic properties. Khorina (2018) suggests that familiarity with these specific roles may aid learners in navigating scientific texts, as the predicative structure is used here not to assert ownership, but to ascribe stable, inalienable

⁶ It is important to clarify that the classification adopted by Khorina (2018) derives strictly from the Systemic Functional Linguistics (SFL) framework. In this specific theoretical context, the term *Attributive* designates a mode of the relational clause where a property is ascribed to an entity (the Carrier). This technical usage is distinct from the term *attributive possession* used elsewhere in this thesis, which refers to the syntactic modification within a noun phrase (e.g., the genitive construction).

characteristics to inanimate entities. Collectively, these corpus studies indicate that in the adult system, the realization of possession is tightly constrained by semantic factors such as animacy, legal definition, and register.

3.2 Experimental Data

While corpus studies provide valuable distributional data regarding adult competence, they cannot fully elucidate the real-time cognitive mechanisms underlying the comprehension of possessive structures. Consequently, experimental research has sought to isolate the specific morphosyntactic and semantic variables that modulate processing load. The following sections review this literature, moving from the general neurocognitive mechanisms of ownership and predictive processing to the specific semantic constraints of animacy and alienability, and finally to the limited data available on predicative realizations.

3.2.1 The “Self” Advantage and Predictive Processing

The concept of ownership appears to be deeply entrenched in self-referential processing networks. Shi et al. (2011) investigated the behavioral effects of the first-person possessive pronoun (*wo de*, ‘my’) versus the third-person (*ta de*, ‘his’) in Mandarin Chinese. Identifying limitations in prior studies where pronouns and nouns were presented simultaneously, the authors isolated the linguistic effect of ownership through sequential presentation. Their results indicated a “self-advantage”: nouns preceded by *wo de* (‘my’) elicited significantly faster response latencies and superior recall performance compared to those preceded by *ta de* (‘his’). Notably, this advantage persisted across both deep (contextual preference) and shallow (perceptual color judgment) encoding tasks. Shi et al. propose that the possessive pronoun serves a dual function: it not only establishes a sense of ownership but also categorizes subsequent content as self-related, thereby facilitating access to self-referential processing networks.

This distinction between self and other is further nuanced by the modality of input. Herbert et al. (2015) utilized event-related potentials (ERPs) to examine the auditory processing of German pronouns, distinguishing between the *I* (subject) and the *Me* (object/possessive). Their findings revealed a complex temporal architecture. While personal pronouns like *du* ('you', triggering the listener's *I*) elicited early sensory-driven responses (P1/N1 components), possessive pronouns such as *mein* ('my') engaged later processing stages associated with the cortical midline structures (CMS). Specifically, a late Processing Negativity (250–400 ms) differentiated possessive pronouns from third-person forms. This suggests that the processing of linguistic ownership (the *Me* mode) relies on reflective mechanisms distinct from pre-reflective subject processing, highlighting the cognitive cost associated with establishing ownership relations.

Beyond self-reference, possessive constructions impose significant demands on the parser's predictive capacities, particularly in languages with rich morphology like German. Stone et al. (2021) investigated whether the dual agreement dependencies of German possessives, where the stem marks the possessor (retrospective) and the suffix marks the possessed (prospective), interact during online processing. Using a visual world eye-tracking paradigm, they found that when the gender of the possessor and the possessed mismatched, the onset of prediction for the upcoming noun was significantly delayed (by approximately 307 ms in Experiment 2). This implies that the parser is not fully encapsulated; rather, the retrospective retrieval of the possessor interferes with the prospective prediction of the possessed, suggesting that possessive processing requires the simultaneous management of competing featural cues.

Building on this, Oltrogge et al. (2025) explored the interface between memory retrieval and prediction by comparing German possessive pronouns (which require antecedent retrieval) with indefinite determiners (which do not). Contrary to computational

models predicting that the simpler indefinite determiners would be processed faster, their eye-tracking data revealed a “staircase pattern”: matched possessives elicited the fastest predictions, followed by indefinites, and finally mismatched possessives. Oltrogge et al. attribute this to the “match effect” (Stone, et al. 2021), where the feature overlap between antecedent and target facilitates processing via similarity-based interference.

A similar interactivity is observed in structural priming. Schimke and Pappert (2024) examined the alternation between the genitive and the *von*-phrase in German to test error-based learning models. Contrary to the “inverse preference effect”, which predicts stronger priming for less frequent structures, they observed cumulative priming for the already dominant genitive structure. This suggests that for possessive constructions, activation-based mechanisms may outweigh error-based learning, reinforcing preferred structures over time.

3.2.2 The Semantics of the Possessed: Animacy and Alienability

The processing of nominal possessive constructions presents a unique challenge for theories of discourse representation. Unlike simple nominal phrases, which generally refer to a single entity, possessive constructions (e.g., *Sam’s car, her father*) explicitly reference two distinct entities: a possessor and a possessed. This dual-reference structure raises significant psycholinguistic questions regarding how speakers establish the relative prominence of these entities and how semantic features influence their encoding in memory. While traditional discourse theories have established that grammatical role and animacy are dependable predictors of prominence, the specific behavior of possessives has historically received limited attention.

Two studies by Storbeck and Kaiser (2018, 2021) investigate the mechanisms underlying these constructions. By examining both the passive resolution of ambiguity in distinct syntactic environments and the active production of discourse continuations, these

investigations indicate that the animacy of the possessed entity is not merely a semantic feature but a determining factor in establishing independent discourse status.

3.2.2.1 Animacy as a Driver of Discourse Independence

Storbeck and Kaiser (2018) explored the interpretive mechanisms governing verbal phrase ellipsis (VPE), a syntactic environment that has long served as a testing ground for theories of reference. The study focused on the ambiguity inherent in sentences such as *Bill washed his car, and John did, too*, where the elided pronoun can be interpreted via variable binding (the “sloppy” reading, where John washed his own car) or coreference (the “strict” reading, where John washed Bill’s car).

Previous research has consistently identified a baseline preference for bound variable interpretations in adult processing, a phenomenon often attributed to processing economy.

For instance, Reuland (2001) argued within the Primitives of Binding framework that variable binding operates at the semantic level and is therefore less costly than coreference, which requires accessing discourse memory. However, Storbeck and Kaiser (2018) posited that this baseline preference is modulated by the semantic nature of the possession relation. They contrasted two theoretical possibilities about the possessed part:

- **The alienability hypothesis:** Grounded in cross-linguistic morphosyntactic distinctions (Haspelmath, 2017), this hypothesis suggests that inalienable possessions (e.g., body parts, kinship terms) reflect a stable, dependent relationship that should favor bound variable interpretations due to the tight conceptual link.
- **The animacy hypothesis:** Drawing on observations by Dahl and Fraurud (1996), this hypothesis suggests that the crucial distinction lies in whether the possessed entity is animate or inanimate.

To test these competing hypotheses, the authors utilized a two-alternative forced-choice task involving four possession types: *inalienable* (e.g., *nose*), *ownership* (e.g., *bicycle*), *animate relational* (e.g., *opponent*), and *kinship* (e.g., *father*). The results provided decisive support for the animacy hypothesis, effectively overriding predictions based on alienability. Inanimate nouns, regardless of whether they were inalienable body parts or alienable property, elicited high rates of bound variable interpretations. In contrast, animate nouns, including both kinship terms and relational roles, elicited significantly higher rates of coreference.

These findings led Storbeck and Kaiser to propose a model based on discourse independence. They argued that possessed nouns vary in the extent to which they are processed as independent discourse referents versus entities dependent on their possessors. Animate possessions, by virtue of their inherent agency and complexity, are more likely to be constructed as independent nodes in the discourse model. In the context of VPE, this independence makes the referent available for coreference (the strict reading). Conversely, inanimate possessions are more likely to be conceptualized as dependent on the possessor, thereby favoring the semantic operation of variable binding. Notably, the authors ruled out real-world plausibility (e.g., the likelihood of the subject owning the object) as an alternative explanation in a follow-up experiment, reinforcing the conclusion that possession type and animacy fundamentally alter the structural representation of the referent.

3.2.2.2 The “Interaction Hypothesis”

While the 2018 study established that animate possessions behave as independent entities during interpretive tasks, Storbeck and Kaiser’s (2021) study investigated whether this “special status” extends to active discourse production and prominence. This later work addressed a discrepancy in the literature regarding Centering Theory. Previous accounts had offered conflicting hierarchies: Chae (2003) argued that possessors are invariably more prominent than possessions due to left-to-right processing, whereas Di Eugenio (1998) proposed that animate possessions could outrank their possessors.

To resolve these inconsistencies, Storbeck and Kaiser (2021) employed a sentence continuation experiment. Participants were presented with prompts such as *Jessica liked her electrician* (possessed animate) versus *Jessica liked her chandelier* (possessed inanimate) and asked to write a natural continuation. This design allowed the researchers to measure prominence by analyzing which entity participants chose to mention subsequently, particularly in the subject position of the following sentence. The study tested three hypotheses:

1. **The animacy hypothesis:** Predicting a simple main effect where animates are more prominent than inanimates.
2. **The possessive hypothesis:** Predicting that possessed entities would be more prominent than simple indefinites due to representational complexity.
3. **The interaction hypothesis:** Positing that animate possessions would exhibit a “superadditive” effect, meaning they would be exceptionally prominent, beyond the additive contributions of simple animacy and possession status.

The results of the sentence continuation task provided support for the interaction hypothesis. Statistical analysis revealed a significant interaction between animacy and possession: while

animacy generally increased the likelihood of mention, possessed animates (e.g., *her butler*) received a distinct boost in prominence compared to their unpossessed counterparts (e.g., *a butler*) and possessed inanimates.

Storbeck and Kaiser (2021) interpreted these findings through the lens of social cognition. They suggested that when both the possessor and the possession are human, the construction explicitly denotes an interpersonal relationship. Drawing on non-linguistic research indicating that social connectedness is critical for human well-being and memory, they argued that the human mind is “especially attuned to interpersonal relationships.” Consequently, the linguistic realization of these relationships enjoys a privileged status in discourse representation, granting possessed animates a level of salience that exceeds strict structural or semantic predictions.

Synthesizing these two studies reveals a cohesive narrative regarding the “independence” of animate possessions. The 2018 study demonstrated that animate possessions resist bound variable interpretations because they are processed as independent discourse referents. The 2021 study confirmed this by showing that these entities are not only available for coreference but are actively prioritized in production. However, it is notable that while Storbeck and Kaiser account for animacy, they explicitly note that their design did not fully explore the alienability distinction (e.g., kinship vs. social relations) as an independent variable, creating a gap regarding how semantic closeness interacts with these prominence effects.

3.2.2.3 Alienable and Inalienable Possession: Interpretation and Processing

Parallel to the investigation of animacy, a distinct line of research has focused on the role of alienability. The interpretation of possessive constructions constitutes a complex domain within psycholinguistics, primarily due to the semantic underspecification inherent in the syntactic form. As posited by Kay and Zimmer (1976), the genitive construction, particularly

the English *s*-genitive, encodes a relationship between a possessor and a possessed that is often indeterminate and must be pragmatically evoked by the interpreter.

Within this theoretical view, the distinction between inalienable possession and alienable possession is crucial. Barker (1995) refines this distinction by characterizing inalienable possession as “lexical possession,” suggesting that the relationship is directly recoverable from the lexical semantics of the relational noun itself. In contrast, alienable possession often relies on pragmatic factors and context to establish a plausible relationship, reflecting also the corpora findings of Kolkman and Falkum (2020). While this distinction is overtly grammaticalized in many languages (e.g., Samoan, Abun), English lacks such morphological markers. This raises the fundamental question of whether the distinction is merely a grammatical artifact of specific languages or a universal cognitive category present in the mental lexicon of English speakers. To investigate the psychological reality of this distinction, there are two connected studies: first examining offline interpretations (Lichtenberk et al. 2011) and subsequently analyzing online processing costs (Vaid & Chen 2019).

3.2.2.4 Investigating Interpretational Variability

Lichtenberk et al. (2011) sought to determine whether English speakers are sensitive to the distinction between inalienable and alienable nouns in the absence of explicit grammatical cues. The researchers hypothesized that if the distinction is cognitively motivated, possessive phrases containing inalienable nouns should elicit a narrower, more consistent range of interpretations compared to those containing alienable nouns, which would likely display greater variability. To test this, they conducted an offline interpretation task in which participants were presented with prenominal possessive phrases (e.g., *the poet's name* vs. *the student's books*) and asked to write down the first meaning that came to mind.

The findings of this investigation appeared to support the hypothesis that inalienable nouns enjoy a “privileged” interpretational status. The data indicated that phrases with inalienable possessed (such as body parts or kinship terms) overwhelmingly elicited intrinsic interpretations, demonstrating high consistency across different possessors. For instance, phrases containing inalienable possessed encoded a smaller and more salient set of relations. In contrast, phrases containing alienable possessed elicited a significantly broader range of extrinsic interpretations that were highly sensitive to the semantics of the possessor.

3.2.2.5 From Interpretation to Processing

While the 2011 study provided data for a conceptual distinction in *what* is understood, it did not address the cost of *that* understanding. The establishment of a “default” interpretation for relational nouns implies a difference in computational effort. If, as Barker (1995) suggests, the meaning of inalienable possession is lexically stored, whereas alienable possession requires pragmatic construction, one might expect this difference to manifest in real-time processing speeds.

Vaid and Chen (2019) tried to bridge this gap between offline interpretational preferences and the dynamics of comprehension. They employed a plausibility judgment task, arguing that this method offers a clearer measure of comprehension time for this specific linguistic context. The study presented participants with 120 *s*-genitive phrases, manipulating the possessed type (inalienable vs. alienable) and the possessor animacy (animate vs. inanimate) in a 2×2 factorial design.

The results of this study indicated a significant *possessum effect*: participants judged plausible phrases containing inalienable possessed (e.g., *the woman’s fragrance*) significantly faster than phrases containing alienable possessed (e.g., *the woman’s vase*). This processing advantage appears to support the notion that the relationship in inalienable

possession is directly retrieved from the lexicon, whereas alienable possession may require additional computational resources to establish a pragmatic relationship between the entities.

Furthermore, the study revealed a significant *possessor effect*, where phrases with animate possessors were processed faster than those with inanimate possessors. This finding is consistent with the “animacy hierarchy” and accessibility principles proposed by Ariel (2004) and Rosenbach (2008), which suggest that animate entities are more prominent and thus more easily processed in the prenominal position.

Notably, however, Vaid and Chen (2019) found no significant interaction between possessed type and possessor type. The statistical analysis showed that while both variables exerted main effects, they operated independently. This independence suggests that, in English attributive structures, the processing advantage for inalienable possession is robust and distinct from the general preference for animate possessors. This finding stands in partial contrast to the interaction effects observed by Storbeck and Kaiser (2021) in discourse production, raising the question of whether the interaction of these variables is task-dependent (production vs. judgment) or structure-dependent.

Moreover, a significant methodological limitation of Vaid and Chen (2019) must be noted: they recorded only the time of the judgment task (pressing a button to decide plausibility) and it remains unclear whether the facilitation of inalienable possession occurs during the incremental integration of the sentence (online processing) or whether it is an artifact of the decision-making phase (offline judgment).

3.2.3 Predicative Possession: The Role of Embodiment and Syntactic Strategy

While the majority of the experimental literature reviewed thus far has focused on the interpretive dynamics of attributive possession (e.g., the genitive case), a comprehensive understanding of the possessive system requires an investigation into its *predicative*

realization. Predicative possession differs from attributive structures in that it asserts the relationship explicitly rather than presupposing it. However, psycholinguistic data regarding the processing costs of this assertion remain limited. A recent contribution to this domain is the work of O’Sullivan (2024), who investigates whether distinct morphosyntactic strategies for encoding predicative possession correlate with observable differences in processing speed, interpreted through the theoretical lens of embodied cognition.

O’Sullivan’s (2024) investigation is grounded in the typological distinction between “*have*-languages” and “*be*-languages”. As noted by typologists such as Heine (1997) and Stassen (2009), languages employ diverse strategies to predicate ownership. English typifies the “*have*-strategy,” employing a transitive construction where the possessor functions as the grammatical subject and the possessed entity as the direct object (e.g., *John has a coat*). This structure encodes possession as a transitive event, potentially assigning a degree of agentivity to the possessor.

In contrast, the Irish language employs a “locational strategy”: the Irish equivalent, *Tá an cóta ag Seán*, translates literally as “The coat is at John”. In this framework, the possessed noun functions as the grammatical subject of an existential predicate, while the possessor is demoted to an oblique form introduced by the preposition *ag* (“at”).

O’Sullivan proposes that this distinction is likely cognitive as well as formal. Drawing upon the framework of embodied cognition, associated with scholars such as Lakoff and Johnson (1980) and Varela et al. (1991), the study posits that language processing involves a degree of neural simulation or re-enactment of the described event. From this perspective, the English *to have* construction is characterized as an “active” form of possession. To comprehend the sentence *John has a coat*, the parser may need to mentally simulate the agentive act of holding, controlling, or maintaining ownership. This simulation implies a higher degree of embodiment intensity because it invokes a transitive relationship

where the subject exerts a form of abstract force or control over the object. Conversely, the Irish locational strategy is characterized as “passive”. The structure *The coat is at John* describes a state of affairs rather than an act of ownership. It locates the object in the sphere of the possessor without ascribing agentivity to the human referent. O’Sullivan hypothesizes that this passive construction requires a less intense form of embodied simulation. Since the relationship is spatial and existential rather than transitive and agentive, the cognitive cost of simulating the event should theoretically be lower. Consequently, the central hypothesis of the study is that, all other variables being equal, the passive Irish construction should be processed more rapidly than the active English equivalent, as the latter incurs a potential penalty due to the cognitive load of simulating agency.

To test this hypothesis, O’Sullivan (2024) employed a Picture-Sentence Matching Task (PSMT), an established paradigm for measuring reaction times (RT) as a proxy for the cognitive effort required to integrate linguistic input with visual representations. The study recruited 64 participants, all of whom were bilingual in English and Irish. The sociolinguistic profile of the participants was a significant variable; while they were native or highly competent speakers of Irish, the dominant societal language remained English. This bilingual context necessitated careful statistical control for language dominance effects, as processing in a minority language typically incurs a latency cost.

The experimental materials consisted of 180 stimuli, balanced evenly between English and Irish. The items were categorized into “Variables of Interest” (VOI): sentences explicitly depicting possession and control sentences involving non-possessive descriptions, as well as distractor items to ensure task compliance. To ensure that visual complexity did not confound the results, O’Sullivan utilized artificial intelligence to generate the visual stimuli, maintaining a consistent stylistic standard across all conditions. The comparison involved measuring the reaction times for matching a picture (e.g., a man holding a coat)

with either the English transitive sentence (*The man has the coat*) or the Irish locational sentence (*Tá an cóta ag an bhfear*). Data analysis was conducted using a generalized linear mixed model, allowing the researcher to isolate the specific processing cost of the syntactic strategy from the general cognitive costs associated with bilingual processing and individual variability.

The results of the experiment provided support for the embodied cognition hypothesis. A preliminary descriptive analysis revealed a significant main effect of language: on average, participants responded approximately 171 ms slower to Irish sentences than to English sentences. O’Sullivan attributes this baseline delay to the “L2 effect” (Jiang, 2013), reflecting the reality that even for highly competent bilinguals, processing in the minority language is generally more cognitively demanding. However, the primary finding emerged from the interaction between language and condition. When the baseline L2 latency was accounted for in the GLME model, the analysis indicated that the reaction times for Irish possession sentences relative to their controls were significantly faster than the reaction times for English possession sentences relative to their controls. Specifically, the model estimated a relative processing advantage of approximately 51 ms favoring the Irish locational construction. This finding implies that while processing Irish is generally slower, the specific act of processing a predicative possession structure appears comparatively more efficient in Irish than in English. O’Sullivan interprets this “relative speed-up” as evidence that the “active” transitive strategy employed by English (*to have*) may incur a specific cognitive cost. The requirement to simulate the possessor–possessed relationship as a transitive event seems to tax cognitive resources more heavily than the spatial, existential strategy (*to be at*) used in Irish.

In the discussion, O’Sullivan (2024) evaluates alternative explanations, particularly those grounded in pure syntax. Standard psycholinguistic theories might predict that the

increased syntactic complexity of Irish (VSO word order, case mutations) should lead to slower processing times. However, the data do not align with this syntactic prediction: despite its formal complexity, the Irish structure exhibited a processing advantage. O’Sullivan argues that this supports the embodied cognition framework: the semantic simplicity of the passive state (*being at*) appears to override the syntactic complexity of the realization.

This study serves as reference point for the present research. While O’Sullivan focused on cross-linguistic differences, the question remains whether similar modulations occur *within* a language when the semantic parameters of the possessor (animacy) and the relationship (alienability) are manipulated in predicative contexts. If the “active” simulation of *having* is costly, does this cost increase when the possessor is inanimate (and thus incapable of agency) or when the possession is inalienable (and thus inherently “located” at the possessor)? O’Sullivan’s findings suggest that the semantic fit between the syntactic strategy and the conceptual relationship is an important factor in processing speed.

3.3 Conclusion and Future Directions: Identifying the Research Gap

The literature review conducted thus far outlines a complex landscape where semantic variables and morphosyntactic constraints interact to modulate the comprehension of possessive structures in adults. However, by integrating data from corpus studies with experimental evidence, two primary limitations in current understanding emerge: one structural and one methodological. The following sections detail these gaps, leading logically to the experimental design adopted in the present study.

3.3.1 The Structural Gap: Attributive vs. Predicative Asymmetry

The vast majority of psycholinguistic research on possession has focused on *attributive possession*. Studies such as those by Vaid and Chen (2019) indicate that inalienability appears to facilitate processing within the noun phrase (e.g., *the witch's hat*), while Storbeck and Kaiser (2018, 2021) observe that the animacy of the possessed entity seems to promote greater discourse prominence in coreference contexts.

In contrast, *predicative possession* (*X has Y*) remains a relatively unexplored territory from the perspective of real-time (online) processing. Although Nordlund (2009) provided a lexical description of the verbs *own* and *possess* based on corpora, his work does not offer data on the cognitive costs of these structures during incremental comprehension. Recent experimental evidence on predicative forms comes from O'Sullivan (2024), who observed that the transitive strategy (*to have*) entailed a higher processing cost compared to the locative strategy (*to be at*). However, O'Sullivan's study highlights a processing difference across two distinct languages (English vs. Irish) utilizing different predicative strategies. This leaves an important question unanswered regarding *intra-linguistic* variation. Current research does not determine whether a similar processing asymmetry exists within the same language when contrasting the two primary realizations of possession: attributive and predicative. It remains unclear whether the cognitive mechanism shifts when a speaker moves from the implicit, presupposed relationship of the attributive phrase to the explicitly asserted predicative sentence.

Notably, it is unclear whether this syntactic shift modulates the semantic effects of animacy and alienability. Does the explicit assertion of a relationship in the predicative form (e.g., *The boxer has a scar*) maintain the same interaction patterns observed in the attributive form (e.g., *The boxer's scar*), or does the syntactic prominence of the verb override these semantic cues? If, as suggested by theoretical literature, predicative possession fulfills a

different communicative function—assertion versus presupposition—it is plausible to hypothesize that the interaction between semantic variables may diverge from what has been observed in the noun phrase.

3.3.2 The Methodological Gap: From Offline to Online Processing

The second limitation concerns the validity of the measures employed in previous studies. The *inalienability hypothesis*, supported by the findings of Vaid and Chen (2019), relies on a plausibility judgment task. Although their data show faster reaction times for inalienable possessions, this measure reflects offline competence: it quantifies the time required to make a metalinguistic decision *after* reading the sentence, but it does not necessarily illuminate the cognitive processes occurring *during* reading.

Similarly, studies on interpretation rely on post-hoc preferences, while work on prominence utilizes production tasks, which measure memory salience but not the immediate cost of syntactic integration. Consequently, there is a lack of direct measurement of online processing, that can discriminate whether the observed inalienability advantage is a phenomenon of automatic facilitation during syntactic parsing or an artifact of the post-interpretive decision process. Furthermore, most previous studies have not strictly controlled for the lexical frequency of the terms used, leaving open the possibility that observed effects may be influenced by statistical co-occurrence rather than solely by a conceptual distinction.

3.3.3 The Present Study on Adult Possession

To address these gaps, the present study adopts a progressive experimental design structured across three experiments on adult native speakers:

1. **Replication and Baseline (Experiment 1):** The first step consists of replicating the design of Vaid and Chen (2019) using offline acceptability judgments. This step is methodologically necessary to establish whether the inalienability advantage is

observable in Italian and to validate the set of stimuli, which are controlled for frequency and semantic plausibility.

2. **Online Processing of Attributive Possession (Experiment 2):** The second experiment introduces the measurement of reading times (Self-Paced Reading) applied to the same attributive structures (*the N1 of the N2*). This aims to address the methodological gap, verifying whether semantic facilitation (animacy and alienability) emerges in online processing.
3. **Online Processing of Predicative Possession (Experiment 3):** Finally, the third experiment applies the same online reading paradigm to predicative structures (*the N1 has the N2*). By directly comparing these data with those of Experiment 2, the study addresses the structural gap, testing whether the explicit assertion of possession modulates the interaction between semantic variables or if, in accordance with the *semantic hypothesis*, processing patterns remain constant regardless of syntactic encoding.

4 The role of alienability and animacy in the processing of possessive structures in Italian

Abstract

Inalienable possessions (“The nose of the witch”) are inherently linked to the possessor, while alienable possessions (“The witch has the hat”) are more easily separable. Animacy also plays a role in possessive structures: possessors can be either animate (“The witch’s hat”) or inanimate (“The puppet’s hat”). However, the relationship between these two variables is still unclear. This study explores the link in possessive structures between animacy of the possessor and inalienability of the possessed during online processing in Italian. Additionally, it examines whether syntactic realization modulates this link. The study addresses three key questions: (1) Are inalienable possessions more prominent than alienable ones in online processing? (2) Is alienability or animacy more prominent than the other? (3) Do different syntactic realizations influence the processing of possessive sentences? In order to test them, three experiments were conducted: Experiment 1 replicated Vaid & Chen (2019), studying attributive possessive structures through acceptability judgments. Experiment 2 expanded the design by collecting reading times as well, to investigate online processing. Lastly, Experiment 3 investigated predicative possessive structures through the same design. Results confirmed that inalienable possessions require less cognitive effort to process, also in online processing. Neither animacy nor inalienability resulted to be inherently more prominent. Lastly, the interaction between animacy and inalienability is observed across syntactic structures. In conclusion, our results suggest that animacy and inalienability do not appear to be in competition; rather, they interact, jointly facilitating online processing, and they do so regardless of syntactic encoding.

4.1 Introduction

The term “possession” is often used in everyday language to mean “ownership”. However, it can also refer to relationships between body parts of humans and animals (e.g., *The mouth of the lion*), parts of plants and inanimate entities (e.g., *The thorn of the rose*), kinship relations (e.g., *Maria’s brother*), and other types of relationships. When the possessive relationship is characterized by a close connection between the possessor and the possessed – e.g. kinship or part-whole connections (Vaid & Chen, 2019) – it is defined inalienable possession.

This is described in the literature as an intrinsic, intimate, and obligatory relationship (Aikhenvald, 2013:4), generally perceived as involving stable relations over which possessors have little or no control (Chappell and McGregor 1996:4). In contrast, alienable possession is often described in the literature as encompassing a range of less permanent and more controlled relationships (Hollmann and Siewierska, 2007:410).

The same possessor can exhibit both inalienable (e.g., *the model’s arm*) and alienable (e.g., *the model’s skirt*) possession. This is not only true for animate possessors (e.g., *the model*), but also for inanimate possessors (e.g. *the cactus*). In fact, inanimate possessors can also have inalienable (e.g., *the cactus spines*) and alienable (e.g., *the cactus pot*) possession.

Importantly, this distinction is differently marked across languages. For example, while most languages do not overtly grammaticalize this split, many Austronesian languages lexicalize the distinction between alienable and inalienable possession in different ways (Lichtenberk 1985, 1995, 2009). For example (see es. 18a-18b), in Samoan (Oceanic) both possessive constructions use an overt marker: *a* for alienable and *o* for inalienable possession (Mosel and Hovdhaugen 1992: 282–290).

18a)

Samoa (Oceanic) (Mosel & Hovdhaugen, 1992, pp. 282–290)

Alienable possession

le naifi a le fafine
the knife of the woman
'the woman's knife'

18b)

Samoa (Oceanic) (Mosel & Hovdhaugen, 1992, pp. 282–290)

Inalienable possession

le uso o le fafine
the sister of the woman
'the woman's sister'

However, other languages may take a different approach to distinguish between alienable and inalienable constructions, with one structure overtly coded and the other zero-coded. This can be observed in West Papuan language Abun (Berry and Berry 1999: 77–82), in (19a) and (19b).

19a)

Abun (Berry & Berry 1999:77-82)

Alienable possession

ji bi nggwe
I GEN garden
'my garden'

19b)

Abun (Berry & Berry 1999:77-82)

Inalienable possession

ji syim
I arm
'my arm'

4.2 Psycholinguistic previous approaches

Although the distinction between alienable and inalienable possessive structures has been extensively investigated at both the syntactic (Tremblay, 1991; Chandra & Kumar, 2012; Dikken, 2015) and typological levels (Heine, 2006; Aikhenvald & Dixon, 2013; McGregor, 2010; Stassen, 2013), the psycholinguistic features of the processing of these possession structures remains less explored.

Storbeck examines possessive constructions, which inherently involve two referents within a single phrase— a possessor (e.g., *Sam*) and a possessed entity (e.g., *car*)—and explores how their prominence is managed in discourse (Storbeck & Kaiser, 2021; Storbeck, 2022). Storbeck himself presents prominence as a theoretically valuable yet elusive concept, arguably close to other theoretical concepts that are more commonly used in psycholinguistics research⁷.

Unlike simple noun phrases that refer to a single entity (e.g., *the attorney, Kate, she*), possessive constructions introduce a more complex referential structure, requiring a discourse-level analysis of prominence. Given that grammatical role and animacy are key factors influencing prominence— with subjects generally more prominent than objects (Chafe, 1976; Crawley et al., 1990) and animates more prominent than inanimates (Bock et al., 1992; Dahl & Fraurud, 1996).

Storbeck and Kaiser (2021) attempt to shed some light on how these factors operate within possessive constructions, bringing up two main questions: (1) How are the two entities represented in discourse? Do they behave like independent discourse referents, or

⁷ Storbeck (2022) observes that referents in a given discourse vary in prominence or, “alternatively,” in salience. Although these terms are sometimes used interchangeably, they have distinct meanings: prominence is a structural and functional property that determines an element’s ability to attract linguistic operations (von Heusinger & Schumacher, 2019), whereas salience is a broader concept that can also depend on perceptual, cognitive, and contextual factors. In other words, prominence is mainly about an element’s position in the sentence structure and the syntactic and referential operations it can undergo, while salience can also be influenced by extralinguistic aspects such as visual attention or the pragmatic relevance of an entity in context.

are their representations linked somehow? (2) If the two discourse referents are linked, does this link differ across different types of semantic possession relations?

To explore these questions, Storbeck and Kaiser (2021) propose three hypotheses:

- *Animacy Hypothesis*: animate possessions (e.g., “Sam’s doctor”) are more prominent in discourse than inanimate possessions (e.g., “Sam’s car”). They present this expectation as based on the well-established finding that animate referents are generally more prominent in discourse and memory because they tend to be mentioned earlier (Bock et al., 1992; Dahl, 2008), are more frequently pronominalized (Arnold & Griffin, 2007; Fukumura & van Gompel, 2011), and persist longer in memory compared to inanimate referents (Nairne et al., 2013; Bonin et al., 2014).
- *Possessive Hypothesis*: possessions within possessive constructions (e.g., “car” in “Sam’s car”) are expected to be more prominent than their counterparts in simpler nominal phrases (e.g., “car” in “the/a car”) in discourse (Storbeck & Kaiser 2021:264). This is due to the increased representational complexity of possessive constructions, which include an additional referent (the possessor) and the link between the possessor and the possession (ibidem). This complexity is thought to promote retrieval from memory, thus enhancing the prominence of the possessed item (e.g. Fisher & Craik, 1980; Hofmeister, 2011; Karimi & Ferreira, 2016; Troyer et al., 2016).
- *Interaction Hypothesis*: possessed animate referents (e.g., “doctor” in “Sam’s doctor”) are especially prominent in discourse, beyond the additive effects of animacy and possession. The idea is that interpersonal relationships give possessed animates a unique boost in prominence, as these relationships are central to both cognitive and social domains, making them more likely to be mentioned and

remembered in discourse (Storbeck & Kaiser 2021:264). The authors suggest that this special status of possessed animates in discourse may be related to the cognitive significance of interpersonal relationships, which enhances their prominence in ways that extend beyond the typical effects of animacy and possession.

To test these hypotheses, the authors conducted a sentence continuation task, where the prominence of referents was inferred based on their likelihood of being mentioned as subjects in subsequent discourse. In the task, participants were significantly more likely to mention possessed animates than would be expected based on the independent effects of animacy and possession. According to the authors, these results supported the Interaction Hypothesis.

While the study provides a clear answer to the first research question—demonstrating that the two entities in possessive constructions are linked in discourse—the second question (i.e., whether the two discourse referents are linked, and how this link might differ across semantic possession relations of different types) has not been fully explored. Storbeck & Kaiser (2021) does not account for the distinction between types of possessive relationships (alienable vs. inalienable), but only distinguish between animate or inanimate possessed. In adjunct, they don't consider the potential differences between animate and inanimate possessors, leaving some aspects of the research question unresolved. While interpersonal relationships represent a particularly strong type of possessive relation, the question remains as to how animacy and inalienability interact when interpersonal relationships are excluded from the picture. Specifically, if we assume that possessive constructions inherently establish a link between possessor and possessed, is it possible to define a hierarchy among different combinations of animacy and inalienability?

Previous theoretical research has already proposed hierarchies of inalienability based on the types of entities typically categorized as inalienably possessed. For instance, Nichols

(1988: 572) suggests an implicational hierarchy in which kin terms and body parts are the most prototypically inalienable, followed by part-whole and spatial relations, and finally culturally basic possessed items (e.g., arrows, domestic animals). However, other scholars (e.g., Chappell & McGregor, 1989, 1996a) argue that individual languages treat these domains so differently that a universally valid hierarchy is difficult to establish. Interestingly, Heine (1997: 10–16) expands this view by including physical and mental states (e.g., ‘strength’, ‘fear’) and deverbal nominalizations (e.g., ‘her sleeping’, ‘his catching of fish’) as additional domains of inalienability.

Considering these distinctions, it is worth considering how animacy of the possessor and inalienability of the possessed interact and how strong is this link across different combinations of animacy and inalienability.

In contrast, Vaid & Chen (2019), in a plausibility judgment task, effectively focus on the distinction between alienable and inalienable possession, rather than the animacy of the possessed item. In their plausibility judgment task, 68 English native speakers were asked to establish the plausibility of attributive possessive phrases (e.g., “the chef’s fame”, “the bistro’s recipes”). These phrases were designed to pair alienable and inalienable possessions with either animate or inanimate possessors.

Their results showed that inalienable possessions, such as body parts, elicited quicker plausibility judgments, while judgments in the alienable possessions condition took more time. The authors interpret this as evidence that inalienable possessions carry a more salient default meaning, which is therefore more accessible in online language processing (Vaid & Chen 2019:156). However, the experiment did not, in fact, test online processing of these constructions, as it only focused on reaction times throughout the plausibility judgments phase. Unlike Storbeck & Kaiser, who examined the animacy of the possessed entity, Vaid & Chen incorporated the animacy of the possessor as a variable in their analysis, a first step

in recognizing the complex role that both possession type and possessor animacy play in language processing. However, to the best of our knowledge, no study to date has tested all these variables simultaneously in actual processing. For this reason, the present project aims to provide a first exploration of their combined effects, offering insights into how possession type and possessor animacy interact in language comprehension.

4.3 Research Questions

This study explores how strong the link is in possessive structures between animacy of the possessor and inalienability of the possessed during online processing. Additionally, we examine whether syntactic form influences this link. After a replication of Vaid & Chen (2019) study, we investigate the following three research questions:

- 1) Are inalienable possessions more prominent than alienable also in online processing?

We currently have results only from offline processing, based on Vaid & Chen (2019). The question remains whether the facilitation of inalienable possession emerges during reading or only when participants are required to perform explicit operations on the possessive structure, such as judgments. While Vaid & Chen (2019) assessed response times in a plausibility judgment task, where participants quickly judged phrase acceptability by pressing a button, their study did not, in fact, test online processing of these constructions, as it only measured reaction times during the decision-making phase. The authors interpret their findings as evidence that inalienable possessions carry a more salient and therefore more accessible default meaning in online language processing (Vaid & Chen, 2019:156). However, whether this accessibility effect also influences real-time comprehension remains an open question. To address this gap, our study examines reading times to determine whether inalienability effects emerge during processing or if they appear only in explicit judgment tasks. If inalienability effects are also observed in reading times (Inalienability

Hypothesis), this would support Vaid & Chen's (2019) hypothesis that inalienable possessions are inherently more accessible and require less cognitive effort to process. However, if inalienability does not facilitate reading times, or even results in slower processing, this would suggest that the strong semantic association between possessor and inalienable possessed reduces the need for active integration during online processing. According to this explanation, the possessive link is so predictable that speakers do not need to allocate processing resources to establishing the relationship.

2) Is alienability or animacy more prominent than the other?

If we derive the Inalienability Hypothesis by Vaid & Chen's (2019) findings, we can extend the framework by incorporating the Animacy Hypothesis, adapting it from Storbeck & Kaiser (2021). While their study predicts that possessed animates are more prominent than possessed inanimates, our study modifies this prediction: we propose that animate possessors (rather than animate possessed entities) drive prominence. This adjustment reflects a key difference in our design—our possessed referents are always inanimate, whereas Storbeck & Kaiser (2021) only tested animate possessors, leaving open the question of whether possessor animacy alone influences prominence. This leads us to ask whether inalienability or possessor animacy plays a stronger role in shaping prominence in language comprehension. If one factor dominates, this would indicate a hierarchy of prominence, in which either the conceptual binding of inalienable possession or the cognitive accessibility of animate possessors takes precedence.

If neither factor clearly prevails, then the next question is whether inalienability and animacy interact or function independently. If they are independent, their effects should be additive, meaning each contributes separately to prominence without influencing the other. However, if they interact (Interaction Hypothesis), we expect inalienable possessions within

animate possession contexts to display enhanced prominence, beyond what would be predicted by their individual contributions.

- 3) Do different syntactic realization (attributive vs. predicative⁸) influence the processing of possessive sentences?

Stassen (2009:27) notes that predicative and attributive possession differ not just in structure but also in meaning. Attributive possession occurs within a noun phrase, such as “John’s car”, emphasizing the relationship between the possessor and possessed at the phrase level. Predicative possession, on the other hand, uses a verb to establish this relationship, as seen in “John has a car” (or “The car belongs to John”). For instance, the sentence “John’s car” can be interpreted in multiple ways depending on shared knowledge between the speaker and listener: it lacks a verb informing the unaware listener of the specific kind of relation between John and the car (whether John dreams of owning a car, talks about it often, or has built one). On the other hand, predicative possession, as in “John has a car”, has only one semantic interpretation, because the verb “have” informs better about which interpretation you have to consider (in this case, it focuses mainly on ownership, ruling out other secondary hypothesis, such as the possibility that John designed the car).

The attributive possession, therefore, presents typically presupposed rather than asserted information (Heine 1997:143) integrating the possessor and possessed into the background discourse (Perniss & Zeshan, 2008:5). This difference in possible interpretations between predicative and attributive possession may influence processing, though it remains an open question whether it leads to significant differences.

⁸ Predicative possession is typically expressed at the sentence or clause level, often involving verbs like have or belong, presenting the possessive relationship as an event or a state. In contrast, attributive possession is expressed at the noun phrase level, modifying a noun with another noun (the possessor). (Stassen 2009; Heine 2006)

Following Stassen, it could be argued that attributive syntactic structures might facilitate processing of possessives, given that attributive possession encodes the relationship more implicitly, requiring additional inferential steps. This could be framed as the Syntactic Hypothesis, as syntax would entail “differences in meaning and not just in structure”. Heine (2006), however, suggests that both forms of possession derive from universal event schemas, which serve as cognitive templates for understanding possessive relationships. A competing hypothesis would therefore suggest that there will be no significant difference in processing between the two structures, since both are cognitively equivalent and ultimately derived from the same event schemas (Heine, 2006); this could be framed as the Semantic Hypothesis.

The Syntactic Hypothesis predicts that attributive and predicative possession will be processed differently, as attributive possession is syntactically embedded and presupposes a possessive relationship, while predicative possession explicitly asserts possession, potentially leading to differences in cognitive load. In contrast, the Semantic Hypothesis proposes that attributive and predicative possession will exhibit similar processing patterns, as both forms are derived from the same underlying event schemas (Heine, 2006). If possession is conceptualized in a cognitively uniform way across structures, then processing effects should be driven exclusively by animacy and inalienability, rather than by syntactic structure.

By testing these hypotheses, we aim to investigate whether syntactic structure plays an active role in possessive processing or whether processing differences are driven exclusively by semantic properties such as animacy and inalienability.

4.4 Current study

In designing our research, we planned three distinct studies to investigate the processing differences in possessive phrase comprehension. All the experiments employed a plausibility judgment task, requiring participants to assess the sense-making of possessive phrases or sentences. Plausible constructions involved the strategic pairing of alienable and inalienable possessed with animate or inanimate possessors, fostering a diverse yet controlled set of linguistic stimuli. In contrast, implausible constructions, designed as control measures, were formed by associating alienable and inalienable possessed with inanimate possessors, challenging participants with semantically incongruent combinations.

The experimental progression was designed to move from offline baseline measures to online processing, and from attributive to predicative syntax:

- In the first experiment, we replicated the design of Vaid & Chen (2019) to examine whether inalienable possessive phrases are more quickly accessible than alienable ones and whether animate possessors facilitate processing in attributive structures (“the N1 of the N2”).
- In the second experiment, we employed the same attributive structures but refined our methodology by introducing a sequential approach to capture online processing. Participants first read the possessive sentences (Reading Times), and then performed the plausibility judgment task (Reaction Times).
- In the third experiment, we investigated predicative structures (“the N1 has the N2”) to examine whether syntactic realization influences processing. Specifically, we aimed to determine whether predicative possession, which explicitly asserts the relationship, differs in cognitive cost from attributive possession, which presupposes it.

To summarize how this design addresses the theoretical gaps and to detail the specific hypotheses tested in each study, Table 4 provides a synoptic overview of the research framework.

Table 4. Summary of the experimental design, research questions, and competing theoretical hypotheses tested across the three experiments.

Experiment	Structure & Task	Research Question	Competing Scenarios (Hypotheses)
Exp. 1	Attributive (Offline) <i>Replication of Vaid & Chen (2019)</i>	Does the “Inalienability Advantage” observed in English generalize to Italian?	Scenario A (Universal): Inalienable items are processed faster (replicating English). Scenario B (Language-Specific): No advantage in Italian due to morphosyntactic differences.
Exp. 2	Attributive (Online + Offline) <i>Self-Paced Reading</i>	Does the semantic advantage emerge during online parsing or only in offline judgments?	Online/Offline Dissociation: We test whether Reading Times (automatic integration) mirror Reaction Times (strategic decision) or if they tap into distinct cognitive stages.
Exp. 3	Predicative (Online + Offline) <i>Comparison with Exp. 2</i>	Does syntactic structure modulate semantic processing?	Semantic Hypothesis: No difference between structures (both derive from uniform event schemas). Syntactic Hypothesis: The explicit assertion in predicative structures will trigger different processing costs compared to attributive chunks.

The study was conducted in accordance with ethical guidelines and received approval from the Ethics Committee of the University of Genoa. Informed consent was obtained from all of the participants for each experiment.

4.4.1 Experiment 1

4.4.1.1 Participants

We recruited 65 monolingual Italian volunteers [mean age = 26.75 (SD 7.72); 30 with a High School Diploma, 34 with a University Degree, and 1 with a PhD; 23 M, 42 F]. Data were collected in a laboratory setting.

4.4.1.2 Norming Study

A norming study was conducted to select stimuli for the experiment, ensuring a clear distinction between plausible and implausible possessive phrases. The classification of items as inalienable or alienable is not always easy to establish, as the boundary between these categories can be fluid and context-dependent. For instance, in Vaid & Chen (2019), phrases such as *the graphic designer's lettering* were categorized as animate inalienable possession, yet their classification could be debated depending on the interpretation of *lettering* as a personal style (inalienable) or a reproduced design (alienable). Similarly, examples such as *the mailbox's lettering* were used to exemplify inanimate inalienable possession, but the fact that a mailbox label can be replaced raises questions about its true inalienability. The distinction between *the musician's performance* (inalienable) and *the musician's breakdown* (alienable) is equally debatable, as both can be deeply personal. Similar considerations apply to inanimate examples such as *the engine's performance* (inalienable) and *the engine's breakdown* (alienable). Given these ambiguities, a norming study was necessary to ensure a data-driven selection of stimuli.

In the initial phase, two questionnaires were prepared, each featuring possessive phrases with either animate or inanimate possessors. These questionnaires were distributed via social media, and participants were randomly assigned to one of the two groups. Each questionnaire contained 64 items, and participants rated the acceptability of each phrase on a Likert scale from 1 to 5. The group evaluating animate possessors consisted of 128 participants (37 males, 89 females, 1 non-binary), while the group assessing inanimate possessors included 173 participants (41 males, 125 females, 3 non-binary).

After the first round of ratings, phrases with a mean acceptability score of 4 or higher were selected as plausible. Participants were not explicitly informed about the concepts of alienable and inalienable possession; they simply rated each phrase based on plausibility. Since an insufficient number of phrases met the selection criteria in the first round, additional items were introduced to ensure a total of 64 valid phrases per possessor type.

A second norming round was conducted with new participants. In this phase, 45 participants (11 males, 34 females) evaluated the inanimate possessor questionnaire, and 83 participants (14 males, 66 females, 1 non-binary) assessed the animate possessor questionnaire. The final selection included 80 phrases: 64 plausible phrases (32 alienable, 32 inalienable) with a mean score of 4 or higher, and 16 implausible phrases, identified as those with a mean score below 2. The two-phase selection process, including random assignment of questionnaires and post-rating pairing of phrases, ensured a balanced and unbiased set of stimuli.

4.4.4.3 Stimuli

Based on the results of the norming study, 80 Italian possessive phrases using the *of*-genitive were selected. The final set included 64 plausible phrases, divided into four categories: alienable/animate, inalienable/animate, alienable/inanimate, and inalienable/inanimate. An

additional 16 implausible phrases were included as fillers/controllers.⁹ Each stimulus followed the structure *the N1 of the N2*. Each participant judged 32 phrases, randomly presented: 16 plausible phrases (4 per experimental condition) and 16 implausible phrases.

Inalienable possessed nouns included parts of a whole and natural bodily features. Plausible phrases were constructed by pairing an alienable and an inalienable possessed noun with a given animate and a given inanimate possessor. The animate possessor was always a human or an animal. For instance, an inalienable possessed noun, *la caviglia* (Engl. tr. *the ankle*), was paired with an animate possessor, *della ballerina* (Engl. tr. *of the dancer*), and an inanimate possessor, *della bambola* (Engl. tr. *of the doll*). Similarly, an alienable possessed noun, *il tutù* (Engl. tr. *the tutu*), was also paired with the same two possessors. This resulted in the following four phrases: *la caviglia della ballerina* (Engl. tr. *the ankle of the dancer*) and *la caviglia della bambola* (Engl. tr. *the ankle of the doll*) (inalienable possession), and *il tutù della ballerina* (Engl. tr. *the tutu of the dancer*) and *il tutù della bambola* (Engl. tr. *the tutu of the doll*) (alienable possession). Another example included *la memoria del professore* (Engl. tr. *the memory of the professor*) and *la memoria del computer* (Engl. tr. *the memory of the computer*) (inalienable possession), as well as *il caricatore del professore* (Engl. tr. *the charger of the professor*) and *il caricatore del computer* (Engl. tr. *the charger of the computer*) (alienable possession) – see Tab. 5.

Implausible phrases were created by randomly pairing a separate set of 16 phrases with inanimate nouns as possessors. For example, *il ginocchio dell'orologio* (Engl. tr. *the knee of the clock*) (inalienable) and *il caffè della cravatta* (Engl. tr. *the coffee of the necktie*) (alienable). All implausible phrases had inanimate possessors only, since the norming study

⁹ Materials are available on the Open Science Framework online data repository (https://osf.io/cuq7j/?view_only=e8280c5a6ba245278fa29d231d1a34af)

showed that the use of animate possessors made it difficult to classify a phrase as implausible.

Table 5. Examples of items expressing possessive relations in the four experimental condition, with English translations.

INALIENABILE	ALIENABILE	INALIENABILE	ALIENABILE
INANIMATE	INANIMATE	ANIMATE	ANIMATE
La faccia delle monete <i>The face of the coins</i>	Il salvadanaio delle monete <i>The coin piggy bank</i>	La faccia degli universitari <i>The face of the university students</i>	Il salvadanaio degli universitari <i>The piggy bank of the university students</i>
Il calcio delle ossa <i>The calcium of the bones</i>	La radiografia delle ossa <i>The X-ray of the bones</i>	Il calcio dei calciatori <i>The kick of the soccer players</i>	La radiografia dei calciatori <i>The X-ray of the soccer players</i>
La memoria del computer <i>The computer's memory</i>	Il caricatore del computer <i>The computer's charger</i>	La memoria del professore <i>The professor's memory</i>	Il caricatore del professore <i>The professor's charger</i>
Il braccio del robot <i>The robot's arm</i>	I ricambi del robot <i>The robot's spare parts</i>	Il braccio del meccanico <i>The mechanic's arm</i>	I ricambi del meccanico <i>The mechanic spare parts</i>
Il muso dell'automobile <i>The car's front</i>	Il tappetino dell'auto <i>The car's mat</i>	Il muso del cane <i>The dog's snout</i>	Il tappetino del cane <i>The dog's mat</i>
La testa dei fiammiferi <i>The match head</i>	La scatola dei fiammiferi <i>The matchbox</i>	La testa dei gatti <i>The cats' head</i>	La scatola dei gatti <i>The box of the cats</i>
Il cuore dei carciofi <i>The heart of the artichokes</i>	Il campo dei carciofi <i>The field of artichokes</i>	Il cuore dei cinghiali <i>The heart of the boar</i>	Il campo dei cinghiali <i>The boar field</i>
L'odore del cantiere <i>The construction site's smell</i>	La ruspa del cantiere <i>The bulldozer of the construction site</i>	L'odore dell'operaio <i>The worker's smell</i>	La ruspa dell'operaio <i>The worker's bulldozer</i>
Le braccia dello spaventapasseri	Il cappello dello spaventapasseri	Le braccia dell'agricoltore	Il cappello dell'agricoltore

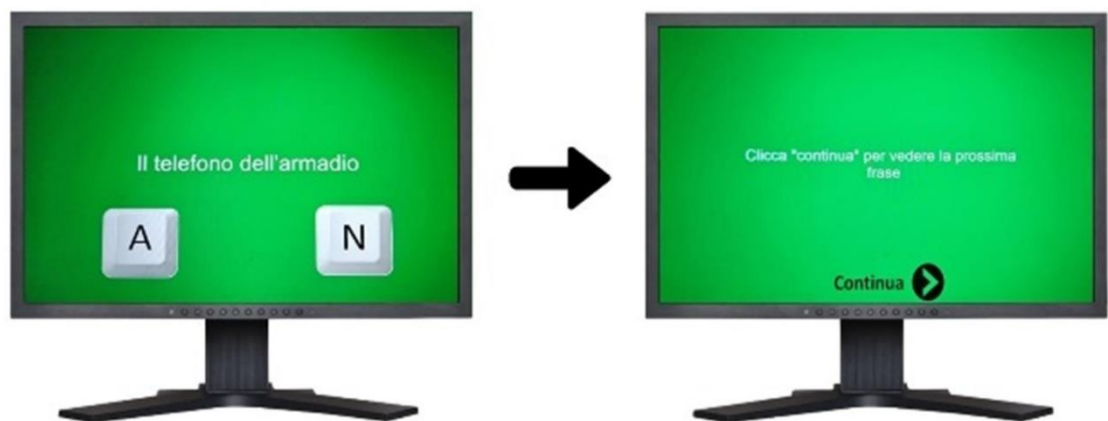
INALIENABLE	ALIENABLE	INALIENABLE	ALIENABLE
INANIMATE	INANIMATE	ANIMATE	ANIMATE
<i>The scarecrow's arms</i>	<i>The scarecrow's hat</i>	<i>The farmer's arms</i>	<i>The farmer's hat</i>
Le spine del cactus	I parassiti del cactus	Le spine del riccio	I parassiti del riccio
<i>The cactus spines</i>	<i>The cactus parasites</i>	<i>The hedgehog's spines</i>	<i>The hedgehog's parasites</i>
Il naso del pupazzo	Il mantello del pupazzo	Il naso della strega	Il mantello della strega
<i>The puppet's nose</i>	<i>The puppet's cloak</i>	<i>The witch's nose</i>	<i>The witch's cloak</i>
La storia del libro	Il segnalibro del libro	La storia dello scrittore	Il segnalibro dello scrittore
<i>The book's story</i>	<i>The bookmark of the book</i>	<i>The writer's story</i>	<i>The writer's bookmark</i>
Il polso della giacca	La spilla della giacca	Il polso del comandante	La spilla del comandante
<i>The jacket's cuff</i>	<i>The jacket pin</i>	<i>The commander's pulse</i>	<i>The commander's pin</i>
La caviglia della bambola	Il tutù della bambola	La caviglia della ballerina	Il tutù della ballerina
<i>The doll's ankle</i>	<i>The doll's tutu</i>	<i>The dancer's ankle</i>	<i>The dancer's tutu</i>
L'ala dell'aereo	Il cibo dell'aereo	L'ala del piccione	Il cibo del piccione
<i>The airplane's wing</i>	<i>The airplane's food</i>	<i>The pigeon's wing</i>	<i>The pigeon's food</i>
La smorfia del burattino	Il movimento del burattino	La smorfia dell'attore	Il movimento dell'attore
<i>The marionette's grimace</i>	<i>The marionette's movement</i>	<i>The actor's grimace</i>	<i>The actor's movement</i>

4.4.4.4 Procedure and Design

In Experiment 1, participants performed a self-paced plausibility judgment task using a computer keyboard in a laboratory setting. On each trial, a phrase was presented visually. Participants were instructed to judge whether the phrase was plausible or implausible as quickly and accurately as possible by pressing the designated key (A for acceptable and N for non-acceptable), as seen in Fig.1. Accidental key presses were not registered, and the program prevented participants from advancing to the next trial until a valid response was

provided. Inter-trial interval (ITI) was self-paced, initiated by the participant pressing a key. The phrase remained on screen until a response was made. A millisecond timer measured response latency, starting with stimulus presentation and stopping upon key press – see Fig. 1. The design was a 2(Possessed Type) x 2(Possessor Type) within-subjects.

Fig. 1 Example of the experimental interface used for the plausibility judgment task. Participants were presented with a sentence on the screen and had to respond by pressing the appropriate key.



4.4.4.5 Data analysis

A repeated measures analysis of variance was conducted by-participants and by-item responses on mean response latencies to correct responses¹⁰ for plausible stimuli. For the data analysis RStudio was used (version: 2023.06.0-Build 421, packages: languageR, pastecs, lme4, ggplot2, clinfun, car, tidyverse, readxl). The dependent variable was reaction time, the independent variables were the type of possession (alienable vs. inalienable) and the animacy of the possessor (animate vs. inanimate).

¹⁰ Since it has been shown that keeping outliers carries more biases than trimming the dataset (Berger & Kiefer, 2021), outliers were removed from both accuracy and reaction time data. Specifically, responses were considered outliers when made less than 300 ms after the presentation of the stimulus or longer than the mean plus 2 SD.

4.4.4.6 Results

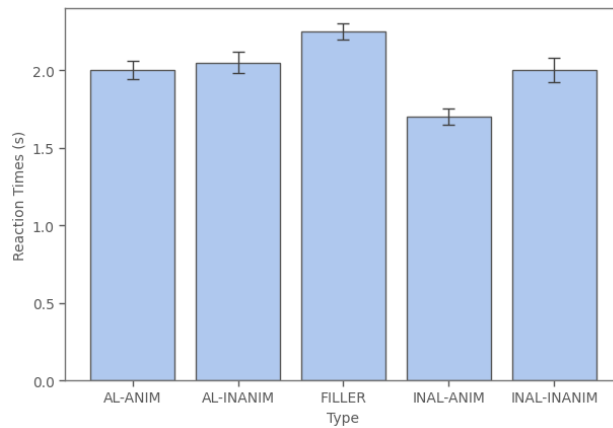
Accuracy: A generalized linear mixed model (GLMM) with a binomial distribution was conducted to test the effect of sentence type (filler vs. target) on accuracy. The effect was not statistically significant ($p = 0.36$), and the correlation between fixed effects was also nonsignificant ($p = 0.36$). These results suggest that accuracy was similar for both filler and target sentences.

Reaction times: A GLMM with an inverse Gaussian distribution was used to compare reaction times between target and filler sentences. Sentence type had a significant effect (deviance = 4271.2, df. resid = 2107, $p = 0.002$), with longer reaction times for filler sentences compared to non-filler sentences.

A second GLMM with maximum likelihood estimation and a random intercept for subjects was fitted to further examine reaction times. The model included 1012 observations from 65 participants, revealing a mean reaction time of 1.86 seconds, which was significantly influenced by alienability. Sentences with inalienable possessions were processed significantly faster than those with alienable possessions (Estimate = -0.19, SE = 0.058, $t = -3.26$, $p = 0.001$). No significant effect was found for animacy (Estimate = -0.04, SE = 0.062, $t = -0.61$, $p = 0.54$). The interaction between alienability and animacy approached significance (Estimate = 0.15, SE = 0.083, $t = 1.76$, $p = 0.078$), suggesting a potential interplay between these factors, although it did not reach conventional significance levels (see Fig. 2.).

Model fit statistics indicated a good fit, with an AIC of 2153.9, a BIC of 2183.4, and a log-likelihood of -1071.0. The random effect structure showed an intercept variance of 0.041, reflecting individual differences among participants. Residual variance was 0.064, indicating moderate variability in reaction times not explained by fixed effects.

Fig. 2. Reaction times across conditions. The bar plot illustrates the mean reaction times for different types of possessive phrases, showing that inalienable possessions were processed significantly faster than alienable possessions.



4.4.4.7 Rationale of the Experiment 2

Experiment 1, while relying on a norming study for sentence “naturalness”, neglected crucial factors for ensuring item comparability. Notably, both singular and plural possessors were used alongside possessed entities of varying inherent plurality. This inconsistency, combined with the lack of control over individual noun frequency, sentence legibility, and the natural co-occurrence of possessor-possessioned entity pairs, potentially introduced imbalance across the stimuli. The arbitrary pairing of entities further exacerbated these issues. To address these limitations, Experiment 2 incorporates several methodological refinements. Frequency control was implemented to ensure that individual nouns within sentences fell within similar frequency ranges. Sentence legibility was assessed using the GULPEASE index; while this step ensures that all stimuli are formally readable, we acknowledge that readability metrics alone do not guarantee cognitive equivalence. To further balance complexity, possessor number was strictly controlled by exclusively utilizing singular possessors, while possessed entities were restricted to those inherently plural (e.g., glasses). Finally, corpus-based co-occurrence analysis was employed to ensure that possessor-possessioned pairings reflected

naturally occurring linguistic patterns. By implementing these controls, Experiment 2 aims to create a more robust and balanced set of stimuli, minimizing potential confounding factors and improving the reliability of the findings.

4.4.2 Experiment 2

4.4.2.1 Participants

We recruited a sample of 706 volunteers [mean age = 36.00 (SD 11.44); 7 with a Secondary School qualification, 100 with a High School Diploma, 466 with a University Degree, and 133 who did not report their education level; 225 M, 445 F, 7 NB, 4 Other, and 25 who did not provide a response]. All participants were native Italian speakers. Data were collected online.

4.4.2.2 Stimuli

80 Italian possessive phrases using the *of-genitive* were constructed as stimuli. These comprised 64 semantically plausible phrases, divided equally into four categories (alienable animate, inalienable animate, alienable inanimate, inalienable inanimate) with 16 implausible sentences acting as fillers. To ensure accuracy and control for potential confounding variables, several measures were implemented.

First, vocabulary control was achieved by extracting all nouns from Tullio De Mauro's base vocabulary, comprising approximately 7,000 high-frequency and fundamental words. This minimized potential differences in readability across sentences, further confirmed through the GULPEASE algorithm with all sentences attaining the highest possible score of 100 (maximum facility).

Second, semantic control was ensured by selecting possessor-possessed entity pairs based on their semantic similarity. The Isafun word embedding system, which computes cosine similarity between input words and all word vectors in its database, was employed for this purpose. Specifically, words with a cosine similarity exceeding a predefined threshold of 0.1 were selectively chosen. This ensured that the pairs were semantically coherent and controlled.

Sentences were then builded using these selected pairs: plausible phrases were constructed by pairing an alienable and inalienable possessed with a given animate and a given inanimate possessor. The animate possessor was a human or an animal. Thus, for example, an inalienable possessed noun, *la caviglia* (Engl. tr. *the ankle*), was paired with an animate possessor, *della ballerina* (Engl. tr. *of the dancer*), and an inanimate possessor, *della bambola* (Engl. tr. *of the doll*). Similarly, an alienable possessed noun, *il tutù* (Engl. tr. *the tutu*), was also paired with the same two possessors. This resulted in the following four phrases: *la caviglia della ballerina* (Engl. tr. *the ankle of the dancer*) and *la caviglia della bambola* (Engl. tr. *the ankle of the doll*) (inalienable possession), and *il tutù della ballerina* (Engl. tr. *the tutu of the dancer*) and *il tutù della bambola* (Engl. tr. *the tutu of the doll*) (alienable possession). Another example included *la cicatrice del pugile* (Engl. tr. *the scar of the boxer*) and *la cicatrice della mano* (Engl. tr. *the scar of the hand*) (inalienable possession), as well as *il guanto del pugile* (Engl. tr. *the glove of the boxer*) and *il guanto della mano* (Engl. tr. *the glove of the hand*) (alienable possession) – see Tab. 6.

Implausible phrases were created by randomly pairing a separate set of 16 phrases with inanimate nouns as possessors. For example, *il piede del treno* (Engl. tr. *the foot of the train*) (inalienable) and *la sciarpa della benzina* (Engl. tr. *the scarf of the gasoline*) (alienable). All implausible phrases had inanimate possessors only, since the norming study showed that the use of animate possessors made it difficult to classify a phrase as implausible.

Table 6. Examples of items expressing possessive relations in the four experimental condition, with English translations.

INALIENABILE ANIMATE	ALIENABLE ANIMATE	INALIENABILE INANIMATE	ALIENABLE INANIMATE
La macchia del cavallo <i>The stain of the horse</i>	Il recinto del cavallo <i>The fence of the horse</i>	La macchia della casa <i>The stain of the house</i>	Il recinto della casa <i>The fence of the house</i>
Le ali dell'alieno <i>The wings of the alien</i>	Il razzo dell'alieno <i>The rocket of the alien</i>	Le ali della navicella <i>The wings of the spaceship</i>	Il razzo della navicella <i>The rocket of the spaceship</i>
Il naso della strega <i>The nose of the witch</i>	Il cappello della strega <i>The hat of the witch</i>	Il naso del pupazzo <i>The nose of the puppet</i>	Il cappello del pupazzo <i>The hat of the puppet</i>
La caviglia della ballerina <i>The ankle of the dancer</i>	La gonna della ballerina <i>The skirt of the dancer</i>	La caviglia della bambola <i>The ankle of the doll</i>	La gonna della bambola <i>The skirt of the doll</i>
I capelli della modella <i>The hair of the model</i>	Il berretto della modella <i>The cap of the model</i>	I capelli del fantoccio <i>The hair of the scarecrow</i>	Il berretto del fantoccio <i>The cap of the scarecrow</i>
I baffi del soldato <i>The moustache of the soldier</i>	La cintura del soldato <i>The belt of the soldier</i>	I baffi del peluche <i>The moustache of the stuffed animal</i>	La cintura del peluche <i>The belt of the stuffed animal</i>
Le zampe del gatto <i>The paws of the cat</i>	La scatola del gatto <i>The box of the cat</i>	Le zampe della statua <i>The paws of the statue</i>	La scatola della statua <i>The box of the statue</i>
Il sorriso dell'amica <i>The smile of the friend</i>	Gli occhiali dell'amica <i>The glasses of the friend</i>	Il sorriso della maschera <i>The smile of the mask</i>	Gli occhiali della maschera <i>The glasses of the mask</i>
Il muso del coniglio <i>The snout of the rabbit</i>	Il tappetino del coniglio <i>The mat of the rabbit</i>	Il muso dell'auto <i>The front of the car</i>	Il tappetino dell'auto <i>The mat of the car</i>
Le gambe della casalinga <i>The legs of the housewife</i>	La tovaglia della casalinga <i>The tablecloth of the housewife</i>	Le gambe del tavolo <i>The legs of the table</i>	La tovaglia del tavolo <i>The tablecloth of the table</i>

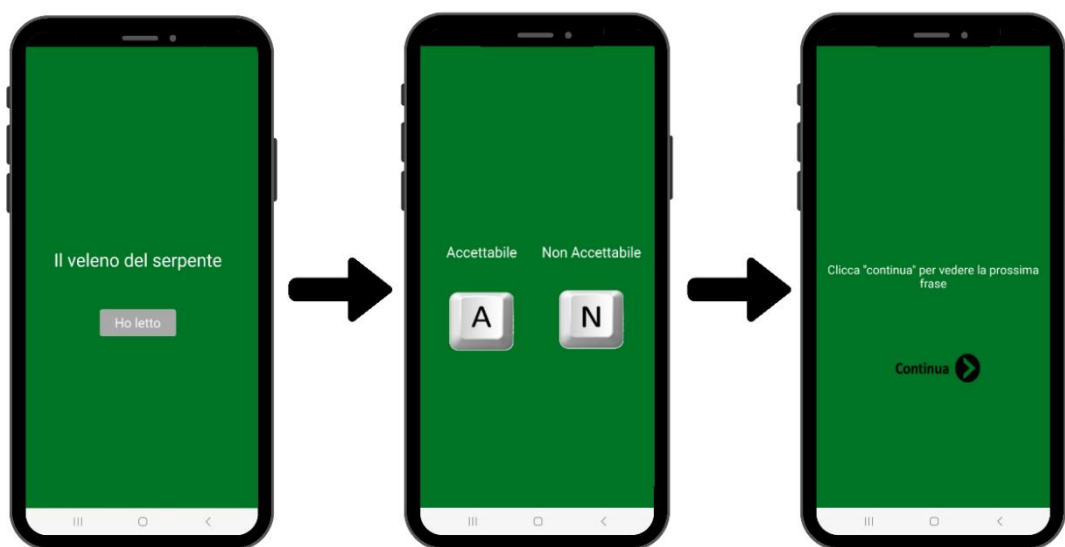
INALIENABILE ANIMATE	ALIENABLE ANIMATE	INALIENABILE INANIMATE	ALIENABLE INANIMATE
Le braccia dell'elettricista <i>The arms of the electrician</i>	Il ricambio dell'elettricista <i>The sparepart of the electrician</i>	Le braccia del robot <i>The arms of the robot</i>	Il ricambio del robot <i>The sparepart of the robot</i>
La memoria del musicista <i>The memory of the musician</i>	Il disco del musicista <i>The disk of the musician</i>	La memoria del computer <i>The memory of the computer</i>	Il disco del computer <i>The disk of the computer</i>
Il veleno del serpente <i>The venom of the snake</i>	Il nascondiglio del serpente <i>The hiding place of the snake</i>	Il veleno del fungo <i>The venom of the mushroom</i>	Il nascondiglio del fungo <i>The hiding place of the mushroom</i>
Il pulcino della gallina <i>The hatchling of the hen</i>	Il nido della gallina <i>The nest of the hen</i>	Il pulcino dell'uovo <i>The hatchling of the egg</i>	Il nido dell'uovo <i>The nest of the egg</i>
La cicatrice del pugile <i>The scar of the boxer</i>	Il guanto del pugile <i>The glove of the boxer</i>	La cicatrice della mano <i>The scar of the hand</i>	Il guanto della mano <i>The glove of the hand</i>
L'odore del cinghiale <i>The smell of the boar</i>	La terra del cinghiale <i>The soil of the boar</i>	L'odore della cipolla <i>The smell of the onion</i>	La terra della cipolla <i>The soil of the onion</i>

4.4.2.3 Procedure and Design

Building upon Experiment 1, the current experiment employed a modified self-paced plausibility judgment task for sentences. Unlike Experiment 1 where presentation and response were simultaneous, this iteration implemented a two-stage process. First, each sentence was individually presented without accompanying response options. Participants were instructed to read the sentence quickly and thoroughly and confirm comprehension by pressing a designated "Read" button. Upon confirmation, the sentence disappeared, followed by a one-second delay. Subsequently, two response options ("A" key for acceptable and "N" key for non acceptable) became available, corresponding to perceived plausibility. Participants were instructed to respond as quickly and accurately as possible using the designated keys. Response latency was recorded separately for both stages: reading time

(from sentence presentation to “Read” press) and judgment time (from response option presentation to key press). Notably, all participants completed the task on smartphones with touchscreens – see Fig. 3. The design was a 2(Possessed Type) x 2(Possessor Type) within-subjects factorial.

Fig. 3. Experimental procedure. Participants read a sentence, confirmed comprehension, and then judged plausibility by selecting “A” (Acceptable) or “N” (Non-Acceptable) on a touchscreen smartphone.



4.4.2.4 Data analysis

A repeated measures analysis of variance was conducted by-participants and by-item responses on mean response latencies to correct responses for plausible stimuli. For the data analysis RStudio was used). The independent variable was the type of possession (alienable vs. inalienable), and the dependent variables were reading times and reaction times. The dependent variable was reaction time, the independent variables were the type of possession (alienable vs. inalienable) and the animacy of the possessor (animate vs. inanimate).

4.4.2.5 Results

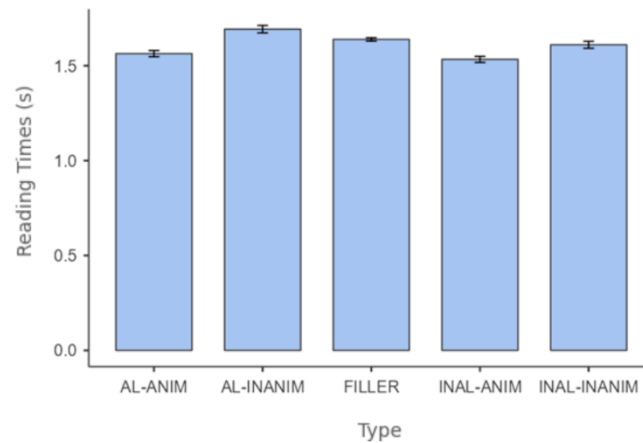
Accuracy

A Generalized Linear Mixed Model (GLMM) with a binomial distribution (logit link function) examined the effect of sentence type (target vs. filler) on the outcome variable in a dataset of 16,725 observations across 706 subjects and 80 items. The model included random intercepts for subjects and items. Sentence type did not have a statistically significant effect (Estimate = 0.237, SE = 0.432, $z = 0.55$, $p = 0.582$). Model fit statistics were AIC = 7686.9, BIC = 7717.8, and log-likelihood = -3839.4. Random effects variance components were 0.552 (SD = 0.743) for subjects and 2.296 (SD = 1.515) for items. The correlation between fixed effects was -0.879, indicating no substantial influence of sentence type on the outcome variable.

Reading Times

A GLMM with an inverse Gaussian distribution analyzed reading times in 8,363 observations across 706 subjects, with random intercepts for subjects. Animacy had a significant effect (Estimate = 0.077, SE = 0.013, $p < 0.001$), indicating longer reading times for animate referents. Alienability was not significant (Estimate = -0.002, SE = 0.011, $p = 0.826$). A significant interaction was observed between alienability and animacy (Estimate = -0.054, SE = 0.017, $p = 0.002$), indicating that inalienable possessions paired with inanimate referents were processed more quickly than other conditions – see Fig. 4.

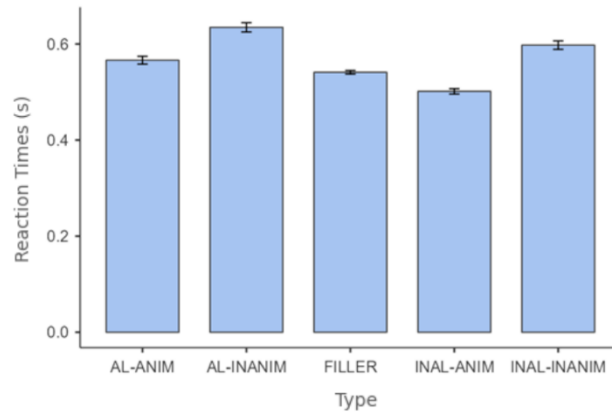
Fig. 4. Reading time results. The bar plot illustrates the effect of animacy and alienability on reading times, showing a significant interaction where inalienable possessions paired with inanimate referents were processed more quickly.



Reaction Times

A GLMM with an inverse Gaussian distribution analyzed reaction times in 8,363 observations across 706 subjects, with random intercepts for subjects. Alienability had a significant effect, with inalienable possessions processed faster than alienable ones (Estimate = -0.029, SE = 0.005, $p < 0.001$). Animacy also had a significant effect, with animate referents processed faster than inanimate ones (Estimate = 0.069, SE = 0.007, $p < 0.001$). The interaction between alienability and animacy was not significant (Estimate = -0.003, SE = 0.009, $p = 0.697$). Model fit statistics were AIC = -2968.4, BIC = -2926.2, and log-likelihood = 1490.2 – see Fig. 5.

Fig. 5. Reaction time results for alienability and animacy. The bar plot shows that inalienable possessions and animate referents were processed significantly faster.



4.4.2.6 Rationale of the Experiment 3

Experiment 3 was employed the same experimental measures and procedures as in Experiment 2. However, in Experiment 3, we changed the syntactic structure of the items to predicative possession. This allowed us to examine how differences in syntactic construction might influence the processing of possessive phrases. By comparing the results of Experiment 2 (attributive possession) with those of Experiment 3 (predicative possession), we aimed to gain insights into the role of syntax in possessive processing.

4.4.3 Experiment 3

4.4.3.1 Participants

We recruited a sample of 546 volunteers [mean age = 33.90 (SD 10.78); 1 with a Secondary School qualification, 155 with a High School Diploma, 357 with a University Degree, and 34 with a PhD; 207 M, 336 F, 3 NB]. All participants were native Italian speakers. Data were collected online.

4.4.3.2 Materials

80 Italian possessive phrases using the “have-form” served as stimuli. These comprised 64 semantically plausible phrases, divided equally into four categories (alienable animate, inalienable animate, alienable inanimate, inalienable inanimate) with 16 implausible sentences acting as fillers.

Sentences were then constructed using these selected pairs: plausible phrases were constructed by pairing an alienable and inalienable possessed with a given animate and a given inanimate possessor. The terms were joined by the verb *ha*, which is the present third singular person of *to have* in Italian. The animate possessor was a human or an animal. Thus, for example, an inalienable possessed noun, *la cicatrice* (Engl. tr. *the scar*), was paired with an animate possessor, *il pugile* (Engl. tr. *the boxer*), and an inanimate possessor, *la mano* (Engl. tr. *the hand*). Similarly, an alienable possessed noun, *il guanto* (Engl. tr. *the glove*), was also paired with the same two possessors. This resulted in the following four phrases: *il pugile ha la cicatrice* (Engl. tr. *the boxer has the scar*) and *la mano ha la cicatrice* (Engl. tr. *the hand has the scar*) (inalienable possession), and *il pugile ha il guanto* (Engl. tr. *the boxer has the glove*) and *la mano ha il guanto* (Engl. tr. *the hand has the glove*) (alienable possession).

Another example included *la strega ha il naso* (Engl. tr. *the witch has the nose*) and *il pupazzo ha il naso* (Engl. tr. *the puppet has the nose*) (inalienable possession), as well as

la strega ha il cappello (Engl. tr. *the witch has the hat*) and *il pupazzo ha il cappello* (Engl. tr. *the puppet has the hat*) (alienable possession) – see Tab. 7.

Implausible phrases were created by randomly pairing a separate set of 16 phrases with inanimate nouns as possessors. For example, *il fiume ha lo zaino* (Engl. tr. *the river has the backpack*) (alienable) and *il treno ha il piede* (Engl. tr. *the train has the foot*) (inalienable). All implausible phrases had inanimate possessors only, since the norming study showed that the use of animate possessors made it difficult to classify a phrase as implausible.

Table 7. Examples of items expressing possessive relations in the four experimental condition, with English translations.

INALIENABLE ANIMATED	ALIENABLE ANIMATED	INALIENABLE INANIMATED	ALIENABLE INANIMATED
Il cavallo ha la macchia <i>The horse has the stain</i>	Il cavallo ha il recinto <i>The horse has the fence</i>	La casa ha la macchia <i>The house has the stain</i>	La casa ha il recinto <i>The house has the fence</i>
L'alieno ha le ali <i>The alien has the wings</i>	L'alieno ha il razzo <i>The alien has the rocket</i>	La navicella ha le ali <i>The spaceship has the wings</i>	La navicella ha il razzo <i>The spaceship has the rocket</i>
La strega ha il naso <i>The witch has the nose</i>	La strega ha il cappello <i>The witch has the hat</i>	Il pupazzo ha il naso <i>The puppet has the nose</i>	Il pupazzo ha il cappello <i>The puppet has the hat</i>
La ballerina ha la caviglia <i>The dancer has the ankle</i>	La ballerina ha la gonna <i>The dancer has the skirt</i>	La bambola ha la caviglia <i>The doll has the ankle</i>	La bambola ha la gonna <i>The doll has the skirt</i>
La modella ha i capelli <i>The model has the hair</i>	La modella ha il berretto <i>The model has the cap</i>	Il fantoccio ha i capelli <i>The scarecrow has the hair</i>	Il fantoccio ha il berretto <i>The scarecrow has the cap</i>
Il soldato ha i baffi <i>The soldier has the moustache</i>	Il soldato ha la cintura <i>The soldier has the belt</i>	Il peluche ha i baffi <i>The stuffed animal has the moustache</i>	Il peluche ha la cintura <i>The stuffed animal has the belt</i>

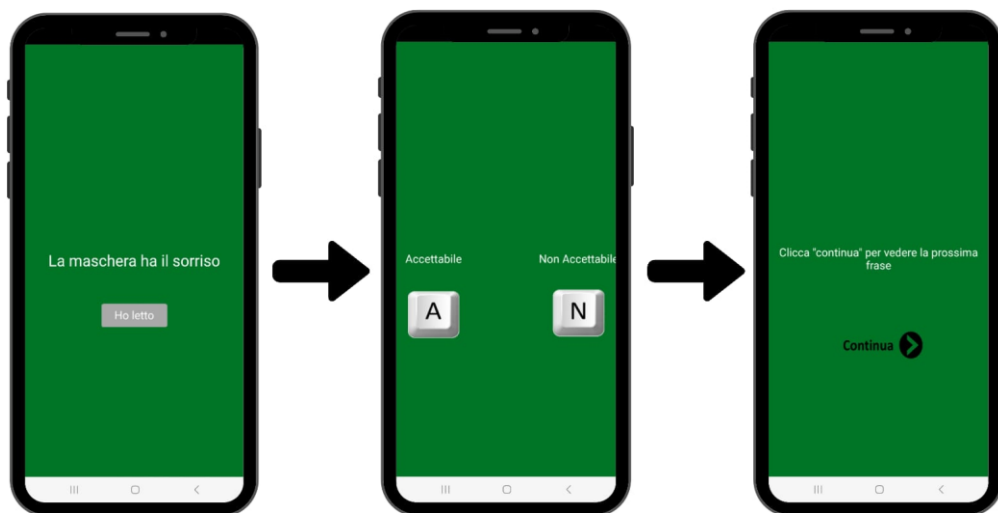
INALIENABLE ANIMATED	ALIENABLE ANIMATED	INALIENABLE INANIMATED	ALIENABLE INANIMATED
Il gatto ha le zampe <i>The cat has the paws</i>	Il gatto ha la scatola <i>The cat has the box</i>	La statua ha le zampe <i>The statue has the paws</i>	La statua ha la scatola <i>The statue has the box</i>
L'amica ha il sorriso <i>The friend has the smile</i>	L'amica ha gli occhiali <i>The friend has the glasses</i>	La maschera ha il sorriso <i>The mask has the smile</i>	La maschera ha gli occhiali <i>The mask has the glasses</i>
Il coniglio ha il muso <i>The rabbit has the snout</i>	Il coniglio ha il tappetino <i>The rabbit has the pad</i>	L'auto ha il muso <i>The car has the front</i>	L'auto ha il tappetino <i>The car has the pad</i>
La casalinga ha le gambe <i>The housewife has the legs</i>	La casalinga ha la tovaglia <i>The housewife has the tablecloth</i>	Il tavolo ha le gambe <i>The table has the legs</i>	Il tavolo ha la tovaglia <i>The table has the tablecloth</i>
L'elettricista ha le braccia <i>The electrician has the arms</i>	L'elettricista ha il ricambio <i>The electrician has the sparepart</i>	Il robot ha le braccia <i>The robot has the arms</i>	Il robot ha il ricambio <i>The robot has the sparepart</i>
Il musicista ha la memoria <i>The musician has the memory</i>	Il musicista ha il disco <i>The musician has the disk</i>	Il computer ha la memoria <i>The computer has the memory</i>	Il computer ha il disco <i>The computer has the disk</i>
Il serpente ha il veleno <i>The snake has the venom</i>	Il serpente ha il nascondiglio <i>The snake has the hiding place</i>	Il fungo ha il veleno <i>The mushroom has the venom</i>	Il fungo ha il nascondiglio <i>The mushroom has the hiding place</i>
La gallina ha il pulcino <i>The hen has the hatchling</i>	La gallina ha il nido <i>The hen has the nest</i>	L'uovo ha il pulcino <i>The egg has the hatchling</i>	L'uovo ha il nido <i>The egg has the nest</i>
Il pugile ha la cicatrice <i>The boxer has the scar</i>	Il pugile ha il guanto <i>The boxer has the glove</i>	La mano ha la cicatrice <i>The hand has the scar</i>	La mano ha il guanto <i>The hand has the glove</i>
Il cinghiale ha l'odore <i>The boar has the smell</i>	Il cinghiale ha la terra <i>The boar has the soil</i>	La cipolla ha l'odore <i>The onion has the smell</i>	La cipolla ha la terra <i>The onion has the soil</i>

4.4.3.3 Procedure and Design

In order to ensure maximal comparability, Experiment 3 followed the same procedure and design as Experiment 2. The only difference between the two experiments was the syntactic structure of the stimuli, which were presented in the exact same way, as pictured in Fig. 6.

Fig. 6. Experimental procedure. Participants read a sentence, confirmed comprehension, and then judged plausibility by selecting “A” (Acceptable) or “N” (Non-Acceptable) on a touchscreen

smartphone



4.4.3.4 Results

Accuracy

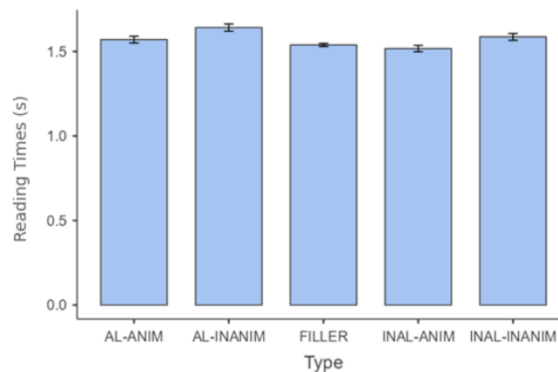
A Generalized Linear Mixed Model (GLMM) with a binomial distribution analyzed the effect of sentence type (target vs. filler) on accuracy in a dataset of 5,893 observations across 386 participants. The effect of sentence type was significant ($\chi^2 = 6.362$, $df = 1$, $p = 0.011$), with lower accuracy for target sentences (Estimate = -1.173, SE = 0.459, $z = -2.553$, $p = 0.010$). Random effects variance components were 1.002 (SD = 1.001) for subjects and 2.556 (SD = 1.599) for items. The correlation between intercepts for target and filler sentences was -0.878.

Reading Times

A GLMM with an inverse Gaussian distribution analyzed reading times in 5,893 observations across 386 participants, with random intercepts for subjects. Inalienable possessions were processed faster than alienable ones (Estimate = -0.026, SE = 0.0003, $t = -81.12$, $p < 0.001$), while inanimate referents resulted in longer reading times than animate ones (Estimate = 0.027, SE = 0.0003, $t = 84.18$, $p < 0.001$) – see Fig. 7.

Model fit statistics were AIC = 8446.5, BIC = 8486.6, and log-likelihood = -4217.2. Type III Wald chi-square tests confirmed significant effects of both alienability ($\chi^2 = 6581.3$, $p < 0.001$) and animacy ($\chi^2 = 7086.3$, $p < 0.001$). A significant interaction was found between alienability and animacy ($\chi^2 = 3244.0$, $p < 0.001$).

Fig. 7. Reading time results for alienability and animacy. The bar plot shows a significant interaction, indicating that inalienable possessions and animate referents were processed more quickly than alienable possessions and inanimate referents.

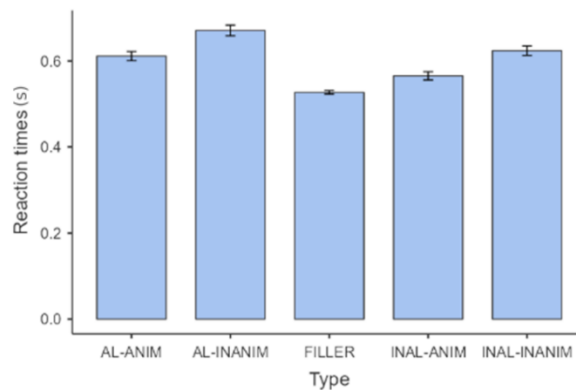


Reaction Times

A Generalized Linear Mixed Model (GLMM) with an inverse Gaussian distribution analyzed reaction times in 5,893 observations across 386 participants, with random intercepts for subjects. The analysis revealed significant main effects of alienability and animacy. Reaction

times were shorter for inalienable possessions than for alienable ones (Estimate = -0.041, SE = 0.008, $t = -4.751$, $p < 0.001$), and reaction times were longer for inanimate referents than for animate ones (Estimate = 0.040, SE = 0.010, $t = 4.032$, $p < 0.001$). Pairwise comparisons confirmed the significance of specific contrasts. Reaction times were shorter for inalienable animate phrases than for alienable inanimate ones (Estimate = -0.082, $p < 0.001$) and shorter for inalienable animate phrases than for inalienable inanimate ones (Estimate = -0.054, $p < 0.001$). Model fit statistics were AIC = -181.9, BIC = -141.8, and log-likelihood = 97.0 – see Fig. 8.

Fig. 8. Reaction time results for alienability and animacy. The bar plot shows that inalienable possessions were processed significantly faster than alienable ones, and animate referents resulted in faster reaction times compared to inanimate referents.



4.5 General discussion

This study explores how strong the link is in possessive structures between animacy of the possessor and inalienability of the possessed during online processing in Italian. Additionally, we examine whether syntactic form influences this link, addressing three key questions: 1) Are inalienable possessions more prominent than alienable also in online processing? 2) Is alienability or animacy more prominent than the other? 3) Do different syntactic realization influence the processing of possessive sentences?

As a first step, in Experiment 1 we replicated the plausibility judgment task from Vaid & Chen (2019) to assess whether the effects of inalienability observed in English extend to Italian. Our results confirm that inalienable possessions are processed faster than alienable ones, supporting the Inalienability Hypothesis, at least in offline processing. This experiment was the replication of Vaid & Chen's (2019) study, with the only novelty being the investigation of Italian. Vaid & Chen (2019) hypothesized that inalienable possessions are inherently more accessible and require less cognitive effort to process.

With regard to our first research question, Experiment 2 and 3 provide some relevant main results. In Experiment 2 we examined attributive possession (e.g. the hat of the witch), while in Experiment 3 we examined predicative possession (e.g., the witch has the hat); in both experiments, we collected both reaction times and, more importantly, reading times. Both experiments found faster reading times for inalienable possessed items, in line with the Inalienability Hypothesis for online processing as well.

Additionally, unlike previous research that did not control for lexical frequency (e.g., Vaid & Chen, 2019), our study carefully balanced word frequency, ensuring that processing differences cannot be attributed to differences in usage patterns (Nichols, 1988; Haspelmath, 2017). Haspelmath (2017) highlights that inalienable nouns, such as body parts and kinship terms, tend to occur far more frequently in possessive constructions than alienable nouns, which could offer an alternative, usage-based explanation for inalienability effects. However, the persistence of these effects under controlled frequency conditions strengthens the argument that inalienable possession is conceptually encoded rather than merely a consequence of usage frequency.

Regarding the second research question, again, Experiment 2 and 3 provide relevant and similar main results. Experiment 2 revealed a significant interaction between animacy and inalienability in attributive possession. Experiment 3 confirmed the same interaction in

predicative possession. In both experiments, sentences with animate possessors and inalienable possessions were processed more quickly, suggesting that these two features interact during online processing. This interaction supports the Interaction Hypothesis, rather than an Inalienability Hypothesis or Animacy Hypothesis, as no hierarchy of prominence emerged from our data. In fact, neither inalienable possession nor the cognitive accessibility of animate possessors seemed to be more prominent than the other. This seems to confirm that animacy and inalienability jointly facilitate processing when the possessive structure is actively integrated during comprehension.

Interestingly, however, Experiment 2 and 3 differed in terms of effects found in reaction times. In fact, in Experiment 2 (on attributive possession), while animacy and inalienability interacted, only animacy had a significant main effect. In Experiment 3 (on predicative possession), however, we found main effects for both animacy and inalienability, reflecting independent effects in reaction times as well.

This suggests that the possessor plays a more central role in attributive structures, likely due to the cohesive nature of attributive possession, where the possessor and possessed form a tightly integrated unit. This structural cohesion aligns with the notion that in attributive possession, the possessor is more foregrounded (Aikhenvald 2013:40), making animacy particularly prominent in processing. In contrast, in predicative possession, where possession is explicitly asserted rather than presupposed (Heine 1997:143), both animacy and inalienability had significant main effects, indicating a more balanced contribution of possessor and possessed.

Overall, the data indicate a divergence driven by the specific cognitive demands of each task. Reading times reflect the cognitive cost of active comprehension, capturing the global effort required to form a semantic representation of the sentence. In this phase, animacy and alienability interact to facilitate the formation of meaning, mirroring the high

interconnection of the possessive structure (as found by Storbeck & Kaiser, 2021). In contrast, Reaction Times reflect the cost of the meta-linguistic judgment, a distinct process where participants evaluate the representation against world knowledge. To perform this assessment, they must analytically separate the phrase or sentence between possessor and possessed to assess its acceptability.

Comparing findings from Experiment 2 and 3 also provide a preliminary answer to our third research question regarding syntactic realization. In reading times, animacy and inalienability interacted in both (attributive and predicative) possessive syntactic structures, confirming the role of both animacy and inalienability as central semantic properties in possessive comprehension. These findings also suggest both animacy and inalienability might be cognitively equivalent and ultimately derived from the same event schemas (Heine, 2006), in line with the Semantic Hypothesis.

However, the previously discussed findings on the differences in reaction times between Experiment 2 and 3 are relevant also with regard to questions on syntactic realizations. In fact, these differences suggest that while the effects of animacy and inalienability are primarily semantic, their relative prominence can be modulated by syntactic encoding. This effect is particularly evident in predicative possession, where possession is explicitly asserted rather than presupposed (Heine 1997:143). While reading times showed similar interactions between animacy and inalienability across both syntactic structures, reaction times revealed distinct patterns: in attributive possession (Experiment 2), only animacy had a significant main effect, whereas in predicative possession (Experiment 3), both animacy and inalienability had independent effects.

Although further research is needed to confirm this, one possible explanation is that attributive possession inherently integrates the possessor and possessed into a single cohesive unit, which facilitates processing by making the possessive relation implicit. This

cohesion aligns with the idea that the possessor is more foregrounded in attributive structures (Aikhenvald 2013:40), making animacy particularly prominent. In contrast, predicative possession disrupts this cohesion by requiring an explicit assertion of the relationship, which might lead to additional cognitive effort in evaluating the plausibility of the possessive link. For example, *"the ankle of the dancer"* is perceived as a natural and unmarked phrase because body parts are prototypically inalienable and their possession is typically presupposed. In contrast, *"the dancer has the ankle"* sounds less natural, despite being semantically valid, because the assertion of possession is unnecessary—it explicitly states a relationship that is already implicit in conceptual knowledge.

Going back to Storbeck and Kaiser's second open question about the link between the two discourse referents, and how this link could differ between different types of semantic possession relations, the results of these studies could provide some informative results.

Overall, these findings seem to speak in favor of a relevant interaction between animacy and inalienability in possessive structures of both attributive and predicative syntactic structure, at least with regard to online processing as reflected by reading times. This is in line with the Interaction Hypothesis and the Semantic Hypothesis. However, these findings also raise potential additional questions as to why the Interaction Hypothesis does not hold in offline processing.

Further investigation of both online and offline processing of different possessive structures would be needed in order to confirm our speculations and provide more precise data on the actual processing of these structures. In fact, the present work entails two main methodological limitations. First, the lack of discourse context means that our results reflect sentence-level processing rather than full discourse dynamics. In natural language,

possessive relations interact with information flow, and future research could explore how contextual salience modulates animacy and inalienability effects.

Second, while reading times on the whole sentence provide preliminary and relevant data in terms of processing as compared to previous research conducted with offline judgment tasks, future research should explore whether processing of these structures is incremental, through more fine-grained measures.

4.6 Conclusion

This study investigated how animacy and inalienability influence possessive processing in Italian through three experiments.

In Experiment 1 we replicated the plausibility judgment task from Vaid & Chen (2019) to assess whether the effects of inalienability observed in English extend to Italian. Our results confirm that inalienable possessions are processed faster than alienable ones, supporting the Inalienability Hypothesis, at least in offline-processing.

Experiment 2, which examined attributive possession but included reading times, revealed a significant interaction between animacy and inalienability. Sentences with animate possessors and inalienable possessions were processed more quickly, suggesting that these two features interact during online processing. This interaction supports the Interaction Hypothesis, indicating that inalienable possessions within animate possession contexts are processed more efficiently.

Experiment 3, which investigated predicative possession (e.g., *the boxer has a scar*), replicated this interaction in reading times, confirming that animacy and inalienability jointly facilitate processing when the possessive structure is actively integrated during comprehension.

Taken together, these findings suggest that animacy and inalienability interact in online possessive processing, regardless of syntactic structure, supporting both the

Interaction Hypothesis and the Semantic Hypothesis. However, the fact that this effect does not hold in offline tasks raises further questions about how syntactic realization modulates these semantic properties. Future research should explore these effects in discourse-level contexts and examine incremental processing through finer-grained measures to better capture the cognitive mechanisms underlying possessive comprehension.

5 Children's Comprehension of Possessive Structures: The Roles of Animacy, Alienability, and Syntactic Structure

Abstract

This study investigates how preschool children comprehend possessive constructions in Italian. We examined the effects of three key factors: syntactic structure (attributive vs. predicative), the animacy of the possessor, and the alienability of the possessed noun. Using a picture-selection task with 80 children aged 3 to 6, we measured both accuracy and reaction times. While accuracy was uniformly high, reaction times showed systematic differences. In predicative constructions, responses were faster with animate possessors and for alienable items. Conversely, reaction times in attributive constructions were not influenced by these factors. Our results suggest that, as early as age three, children's comprehension is modulated by the interaction between syntax and conceptual knowledge. Specifically, in predicative structures, syntax may cue children to rely on semantic cues like animacy and alienability, whereas this reliance is attenuated in attributive constructions.

5.1 Introduction

Every language provides mechanisms to encode possessive relations, although the specific morphosyntactic strategies vary cross-linguistically (Marinis, 2002). At the syntactic level, possessive relations can be expressed through attributive constructions, where the possessor directly modifies the possessed noun (e.g., *the witch's hat*), or through predicative constructions, in which the relationship is mediated by a verb, typically *have* (e.g., *the witch has the hat*) (Stassen, 2013; Heine, 2006).

From a semantic perspective, a key distinction is drawn between inalienable and alienable possession. Inalienable possession is characterized by a close connection between the possessor and the possessed, such as kinship or part-whole relations (Vaid & Chen, 2019), which the literature describes as an intrinsic, intimate, and obligatory relation (Aikhenvald, 2013:4), generally understood to involve stable relations over which possessors exercise little or no control (Chappell and McGregor 1996:4). In contrast, alienable possession is often described in the literature as encompassing a range of less permanent and more easily controlled relations (Hollmann and Siewierska, 2007:410). Animacy further modulates these relations, with possessors being either animate (e.g., *the witch's hat*) or inanimate (e.g., *the puppet's hat*).

Evolutionary accounts of cognition suggest that animate entities are prioritized by the human attentional system due to their importance for survival. It has been suggested that humans evolved hyperactive animacy-detection systems to maximize the chances of detecting potential predators (Barrett, 2005). This 'animacy advantage' has been well-documented in memory research: Nairne et al. (2013) suggested that words denoting animate referents are retained significantly better than inanimate ones. Similarly, in psycholinguistic processing, Bonin et al. (2014) found that animacy facilitates lexical access and naming speed. Consequently, in the context of possessive constructions, possessors that are animate

(e.g., the boy) should be conceptualized more rapidly and robustly than inanimate possessors (e.g., the table), potentially facilitating the processing of the entire possessive phrase.

The notions of possession and ownership are among the earliest conceptual domains to emerge in children’s language development (Marinis, 2016). Previous research has shown that children begin to express and comprehend possessive relations at an early age (Kong et al., 1990; Li, 2004; Marinis, 2002; Parikka, 2001). It is therefore unsurprising that relationships between possessors and their belongings are among the first to be encoded once children begin to combine words (see, e.g., Brown, 1973). Even when a child points to an object and names its owner, such behaviour reflects an initial understanding of the link between individuals and the objects associated with them (Chen & Zhang, 2023).

Crucially, the distinction between attributive and predicative possession extends beyond syntax, reflecting fundamental differences in how the possessive relationship is conceptualized and communicated. From a typological and functional perspective, attributive constructions typically encode the possessor–possessed link as presupposed or backgrounded information (Heine, 1997; Perniss & Zeshan, 2008). In contrast, predicative constructions explicitly *assert* ownership, foregrounding the possessor (Aikhenvald, 2013) and activating notions of agency and control through the verb (e.g., *have*) (Stassen, 2009).

This functional difference is particularly relevant for language acquisition. Fasig (2000) documented that by 30 months of age, children already demonstrate a sensitivity to ownership as an active right of control. In naturalistic interactions, they were found to be more likely to assert possession of and defend objects typically considered alienable (e.g., toys, clothes) compared to inalienable features like body parts. As Fasig (2000:461–462) notes, alienable possession may be more accessible in early childhood because “possessiveness is most often observed in reference to objects that can be removed and controlled” and because “children are more likely to use explicit possessive language with

property-type objects.” Consequently, investigating how children process predicative possession is essential not merely to fill a gap in the literature, but to understand how the explicit assertion of ownership interacts with semantic factors like alienability and animacy during development.

Previous research on the acquisition of possessive constructions in children has predominantly focused on attributive possession, with relatively little attention given to predicative forms. This point is explicitly made by Marinis (2002), who limits their review to attributive possession across five languages (English, German, Greek, Hebrew, and Japanese), citing the methodological dominance of this syntactic structure in previous research.

The majority of empirical studies on children's possessive development have relied on elicited production tasks or spontaneous speech corpora, focusing almost exclusively on attributive structures. For instance, Parikka (2001) used a structured elicitation method with Finnish-speaking children (ages 2–6), eliciting genitive phrases with nominal possessors. Similarly, Kong et al. (1990) conducted a corpus-based analysis of early Cantonese, identified the use of possessive markers (e.g., *ge3^l*) in children's spontaneous utterances, with a developmental shift from pronominal to full nominal constructions.

Only a limited number of studies have examined predicative possession in children. To the best of our knowledge, only Eisenbeiß et al. (2009) examined both attributive and predicative possessive constructions in German-speaking children using structured production tasks. Their findings revealed that children show greater difficulty producing predicative possessives than attributive ones.

Another line of research has examined how children comprehend and produce recursive possessive constructions. Limbach and Adone (2010) investigated the comprehension of sixteen recursive possessive sentences in English-speaking children

through story-based tasks involving toys. Terunuma and Nakato (2018) also explored the production of both one-level and two-level possessive constructions in Japanese-speaking children.

In addition to syntactic structure, some studies have begun addressing semantic distinctions, such as the contrast between alienable and inalienable possession or the effect of animacy. Among these studies examining semantic distinctions in early possessive constructions, three works offer relevant insights, though they differ substantially in methodology and findings. Chen and Zhang (2023) conducted a corpus-based analysis of spontaneous utterances produced by six Mandarin-speaking children aged between 2 and 5 years. Drawing on transcripts from naturalistic interactions collected over time, they examined the syntactic and semantic development of possessive constructions. Their findings indicate that inalienable relations emerged earlier and occurred more frequently than alienable ones. This developmental pattern is interpreted as a reflection of young children's egocentric cognition and early social experience. Specifically, Chen & Zhang (2023:7) note that "body-part relationships are related to children's early self-centered psychology". As children gain broader exposure to the social world, they gradually begin to produce possession constructions involving alienable entities, and, subsequently, they also produced abstract possessive constructions such as *my secret* or *your help*.

Golinkoff & Markessini (1980) conducted an experimental study which which examined children's comprehension of English two-noun possessive phrases (e.g., *mommy's sock*). Thirty children aged between 1;7 and 5;5 were tested by their mothers using picture-selection tasks involving three types of possessive relations: alienable (e.g., *daddy's chair*), inalienable (e.g., *daddy's eye*), and reciprocal (e.g., *mommy's baby*). The results indicated that children could distinguish between these types, with reciprocal possessives being significantly more difficult than both inalienable and alienable ones, because "intrinsic and

alienable possessives were of equivalent difficulty” (Golinkoff and Markessini 1980, p. 127), with no statistical difference in comprehension accuracy. They argue that “Alienable and intrinsic relationships may have been easier to comprehend than reciprocal relationships for different reasons. Alienable relationships are cognitively determined if the child knows that an animate being is much more likely than an inanimate object to be a possessor. Intrinsic relationships are cognitively determined if the child knows the relation between the part and the whole” (Golinkoff and Markessini 1980, p. 128). Furthermore, they explicitly noted that any slight advantage for body parts might be due to social routines rather than cognitive bias, stating that “intrinsic or part/whole relationships may be a bit easier because parents commonly play an identify-the-body-part game with their young children” (Golinkoff and Markessini, 1980 p. 128). This contrasts with the egocentric view proposed by Chen and Zhang (2023).

Conversely, Shi and Zhou (2018) conducted a comprehension experiment with Mandarin-speaking preschoolers aged 3 and 4, investigating the mapping between linguistic markers (DE) and possessive relations. They found that while 4-year-olds performed accurately in distinguishing possessive constructions from noun-noun compounds for alienable possessions with animate possessors, 3-year-olds performed at chance level on alienable possessives, often confusing them with noun-noun compounds. Critically, unlike Chen and Zhang (2023), Shi and Zhou did not attribute this difficulty to an egocentric bias. Instead, they proposed a linguistic mapping account based on their analysis of error patterns, stating that “Mandarin-speaking children go through a developmental stage where they use noun-noun compounds to represent alienable possessive relations before they map possessive relations onto possessive constructions” (Shi & Zhou, 2018, p. 1335). Thus, the observed difficulty was linked to the acquisition of the specific grammatical mapping rather than a conceptual deficit in understanding alienable possession.

5.2 The current study

This study examines how preschool children comprehend possessive constructions in Italian, focusing on how syntactic structure (attributive vs. predicative), possessor animacy, and the alienability of the possessed noun affect children's performance. While most previous research (e.g., Marinis, 2002; Parikka, 2001) has concentrated on attributive constructions, predicative possession has been less examined in developmental contexts (Eisenbeiß et al., 2009). More importantly, comparing these two structures allows us to investigate how the syntactic explicitness of the possessive relation (asserted in predicative forms versus presupposed in attributive ones) interacts with semantic cues during processing. Moreover, the majority of studies have relied on production or corpus data, without incorporating online comprehension measures such as accuracy and reaction times. Previous findings on the role of alienability in possessive constructions present a fragmented picture, making it difficult to disentangle methodological factors from cross-linguistic variations. Golinkoff and Markessini (1980) found no significant accuracy differences between alienable and inalienable relations, although reciprocal structures appeared more difficult. In contrast, Chen and Zhang (2023) found that in Mandarin-speaking children, inalienable terms such as body parts and kinship nouns emerged earlier and more frequently in spontaneous speech.

However, comparing these studies directly is problematic due to the distinct typological properties of English and Mandarin. This highlights the need for data from additional languages to determine whether these patterns reflect language-specific constraints or broader conceptual biases. In this context, Italian offers a valuable testing ground. Unlike English, which relies heavily on the Saxon genitive ('s), Italian employs a prepositional strategy *di* (of) for attributive possession. Investigating a Romance language allows us to assess whether the lack of semantic effects found in earlier English studies extends to different syntactic systems or whether semantic factors like alienability are robust

across typologies. Overall, past studies do not provide a conclusive account of how alienability influences comprehension in children. There is therefore a need for experimental designs that systematically manipulate these conceptual dimensions under controlled conditions. In the present study, we address this gap by designing balanced materials that control for lexical frequency, visual complexity, and contextual plausibility. In addition to these controls, we considered whether factors such as sentence length (MLU) or noun length should be taken into account. Although sentence length was not directly balanced, all test sentences followed structurally uniform frames (either det N V det N [e.g., *la strega ha il naso*, “the witch has the nose”] for predicative possession or det N prep det N [e.g., *il naso della strega*, “the nose of the witch”] for attributive possession), which minimized variability in utterance length. As for noun length, lexical items were selected from the core vocabulary of preschool children on the basis of corpus frequency and familiarity norms. This ensured that even longer nouns did not impose additional processing demands compared to shorter ones, making explicit control for word length unnecessary.

The first research question asks whether preschool children comprehend alienable and inalienable possessions differently. Because our materials are carefully matched for lexical frequency, plausibility, and visual complexity, we do not expect systematic accuracy differences between the two types. Prior work on reaction times is scarce. While Vaid and Chen (2019) suggest in adults that inalienable relations may be faster to process in specific contexts, Golinkoff and Markessini (1980) report no latency difference in comprehension. In our view, latency differences are likely frame-dependent; accordingly, we defer specific RT predictions to RQ3.

The second research question concerns whether possessor animacy affects comprehension accuracy and reaction times. Shi and Zhou (2018) have included only animate possessors, which precludes assessing its independent contribution. To address this

gap, the present study includes both animate and inanimate possessors across both syntactic structures. As in the case of alienability, we do not expect systematic accuracy differences, since stimuli are carefully controlled for lexical frequency, plausibility, and visual complexity. However, consistent with the ‘animacy advantage’ framework discussed in the Introduction (Bonin et al., 2014; Nairne et al., 2013), we hypothesize that reaction times will reveal an effect: phrases with animate possessors should be processed more rapidly than those with inanimate possessors due to their higher conceptual salience.

The third research question addresses whether syntactic structure (attributive vs. predicative) modulates the effects of semantic factors (namely alienability and animacy) in children’s comprehension. We hypothesize frame-specific RT patterns. Since most previous studies have focused almost exclusively on attributive possession (e.g., Marinis, 2002; Parikka, 2001), we aim to include both structures in our investigation. We focus on reaction times: we hypothesize that alienable possessions are processed more rapidly in predicative sentences, whereas in attributive structures inalienable possessions yield shorter reaction times. In predicative constructions, the verb explicitly asserts ownership. Based on the developmental evidence discussed in the Introduction (Fasig, 2000), this structural assertion aligns with children’s early conceptualization of alienable objects as controllable entities. This congruence should facilitate processing speed for alienable items in predicative constructions. Conversely, the presuppositional nature of attributive possession (Heine, 1997:143; Perniss & Zeshan, 2008:5) may reduce the inferential demands needed to integrate possessor and possessed when the possessed item is inalienable (e.g., body parts, kinship terms). Consistent with this view, Vaid & Chen (2019:156) found that inalienable nouns were accessed more quickly than alienable ones in attributive possession, in a plausibility judgment task with response times. With respect to animacy, we expect animate possessors to be processed more rapidly than inanimate ones across both structures (cfr. RQ2), in line

with evidence that animacy enhances agentive interpretations during incremental parsing (Egurtzegi et al., 2025). At the same time, this effect may emerge more clearly in predicative structures, since predicative possession explicitly asserts ownership through the verb *have*, a context in which the agentive properties of animate possessors are especially relevant (Heine, 1997:143; Stassen, 2009:27).

Finally, the fourth question explores whether general grammatical competence, as measured by the Italian version of the Test for the Reception of Grammar – TROG-2 (Bishop, 2003; Suraniti et al., 2009), can predict individual variation in children’s comprehension of possessive constructions. The TROG-2 is a standardized multiple-choice picture-selection test assessing comprehension of a wide range of grammatical structures (e.g., relative clauses, passives, negation), but it does not directly target possessive syntax.

We hypothesize that children with higher TROG-2 scores show faster reaction times across possessive structures. In addition, we expect TROG-2 to account for participant-level differences in overall accuracy, capturing baseline performance rather than condition-specific contrasts. Since all TROG-2 items involve sentential structures with a verb, they are structurally closer to our predicative possessives than to attributive ones. We therefore expect TROG-2 scores to be more predictive of performance in predicative possession, whereas attributive possession may rely less directly on general grammatical competence as measured by TROG-2. To address this question, we include participants’ TROG-2 scores as an additional fixed effect in our mixed-effects models. This approach tests whether grammatical proficiency accounts for variance in performance beyond age and the experimental factors manipulated in the study. To provide a clear synthesis of the theoretical framework and expected outcomes, Table 8 summarizes the research questions along with the specific *a priori* predictions for accuracy and reaction times.

Table 8. Summary of Research Questions and A Priori Predictions

Research Question	Variable	Theoretical Basis	Hypothesis / Prediction
<p>RQ1 & RQ3</p> <p>Alienability by Structure</p>	<p>Alienability</p> <p>(Alienable vs. Inalienable)</p>	<p>Ownership vs. Connection:</p> <p><i>Predicative</i> evokes control/ownership (Fasig, 2000).</p> <p><i>Attributive</i> evokes intrinsic connection (Vaid & Chen, 2019).</p>	<p>Frame-Dependent Effect:</p> <ul style="list-style-type: none"> • Predicative: Faster processing for Alienable items (easier to "control"). • Attributive: Faster processing for Inalienable items (stronger integration).
<p>RQ2 & RQ3</p> <p>Animacy by Structure</p>	<p>Animacy</p> <p>(Animate vs. Inanimate)</p>	<p>Agentivity Bias:</p> <p>Animate entities are processed faster due to cognitive salience and agentive potential (Nairne et al., 2013).</p>	<p>Main Effect of Animacy:</p> <p>Animate possessors will be processed faster than inanimate ones across both structures, with potentially stronger effects in Predicative frames (due to the verb <i>have</i>).</p>
<p>RQ4</p> <p>Grammatical Competence</p>	<p>TROG-2 Score</p>	<p>Resource Availability:</p> <p>Higher grammatical competence frees up cognitive resources for processing.</p>	<p>General Speed:</p> <p>Higher TROG-2 scores will correlate with faster Reaction Times overall, but are not expected to interact with specific semantic conditions.</p>

5.3 Participants

A total of 81 children were initially recruited from three kindergartens in Northern Italy, one of which included three separate campuses. Data from 33 participants were excluded entirely from the study. Reasons for exclusion included fussiness, technical errors, failure to complete the task, or failure to meet the inclusion criterion for grammatical proficiency (i.e., TROG-2 scores significantly below age-appropriate norms). The final analysis included 48 unique participants contributing valid data to the experimental tasks. Specifically, the final sample consisted of 48 children for both the attributive and predicative possession conditions. Participants were native Italian speakers with typical language development [age range: 3–6 years; mean age = 61.21 months (\approx 5.1 years); SD = 7.83; gender: 25 F, 23 M]. Parental consent was obtained for all participants, and the study was conducted in accordance with ethical guidelines and received approval from the Ethics Committee of the University of Genoa.

5.4 Stimuli

Italian sentences were constructed as stimuli¹¹, each accompanied by a corresponding image pair. These included 48 attributive possessive constructions (e.g., *la bocca della ballerina*, “the ballerina’s mouth”) and 48 predicative possessive constructions (e.g., *la bambola ha la gonna*, “the doll has the skirt”), evenly distributed across the two syntactic conditions. Each sentence expressed a relation between a possessor and a possessed entity, following a 2×2 factorial design that crossed possessor animacy (animate vs. inanimate) and alienability of the possessed entity (alienable vs. inalienable), yielding four experimental conditions per syntactic structure and eight in total.

¹¹ Materials are available on the Open Science Framework online data repository https://osf.io/fwg6p/?view_only=72e8f43d822e406094dc53183bed1f43

To ensure developmental appropriateness and semantic coherence, several control procedures were implemented. Vocabulary control was achieved by selecting nouns from lexical resources tailored to early vocabulary acquisition in Italian, including Wordbank (based on MB-CDI inventories, with the Italian adaptation by Caselli & CLEX), the CHILDES Italian corpus, and the PVB Varless dataset. Since these corpora mostly reflect vocabulary up to 40 months of age and only partially represent the lexicon of preschoolers, additional lexical items were sourced from popular children’s media targeting the same age group.

Semantic control was ensured using the *lsafun* word embedding system, which computes cosine similarity between input words and reference vectors. Only noun pairs exceeding a cosine similarity threshold of 0.1 were retained. The word vectors used by *lsafun* were based on the *itWaC* corpus.

Sentences were then constructed by pairing each possessed noun (alienable or inalienable) with both an animate and an inanimate possessor. Animate possessors included both humans and animals. For instance, the inalienable noun *il naso* (“the nose”) was paired with *la strega* (“the witch”) and *il pupazzo* (“the puppet”), resulting in *la strega ha il naso* and *il pupazzo ha il naso*. Similarly, the alienable noun *il cappello* (“the hat”) was used to construct *il cappello della strega* and *il cappello del pupazzo*.

All sentences were recorded by four native speakers of Italian (two female and two male), with each speaker reading one-quarter of the total stimuli. No sentence was recorded by more than one speaker. Recordings were made using *Praat* and acoustically normalized to ensure consistent, unmarked declarative prosody.

The experiment followed a within-subjects design. Stimuli were organized into 12 sets, each comprising four sentences: one per experimental condition, crossing possessor animacy (animate vs. inanimate) and alienability of the possessed entity (alienable vs.

inalienable). Each participant was exposed to all four experimental conditions for both syntactic structures (attributive and predicative possession), and thus completed two separate experimental tasks. For each task, one sentence was randomly selected from each set, ensuring that all four conditions were represented while avoiding lexical repetition. The order of sets and the specific condition shown within each set were both randomized for each participant.

Each sentence was followed by two images: one representing the described possession relation (target), and one depicting the same character or figure without the possessed item (distractor). For instance, in response to *la strega ha il cappello* (“the witch has the hat”), the correct image displayed a witch wearing a hat, while the distractor showed the same witch without it.

Table 9. Examples of items expressing possessive attributive relations in the four experimental conditions, with English translations.

ANIMATE INALIENABLE	ANIMATE ALIENABLE	INANIMATE INALIENABLE	INANIMATE ALIENABLE
Il graffio del pirata <i>The scratch of the pirate</i>	La bandiera del pirata <i>The flag of the pirate</i>	Il graffio dell’auto <i>The scratch of the car</i>	La bandiera dell’auto <i>The flag of the car</i>
I baffi del la foca <i>The whiskers of the seal</i>	La maglietta della foca <i>The t-shirt of the seal</i>	I baffi del peluche <i>The whiskers of the stuffed animal</i>	La maglietta della il peluche <i>The t-shirt of the stuffed animal</i>
Il naso del la strega <i>The nose of the witch</i>	Il cappello del la strega <i>The hat of the witch</i>	Il naso del pupazzo <i>The nose of the puppet</i>	Il cappello del pupazzo <i>The hat of the puppet</i>
Le orecchie della il nonno <i>The ears of the grandfather</i>	Gli occhiali del nonno <i>The glasses of the grandfather</i>	Le orecchie della maschera <i>The ears of the mask</i>	Gli occhiali del la maschera <i>The glasses of the mask</i>
La bocca della ballerina	La gonna della ballerina	La bocca della bambola	La gonna della bambola

ANIMATE INALIENABLE	ANIMATE ALIENABLE	INANIMATE INALIENABLE	INANIMATE ALIENABLE
<i>The mouth of the ballerina</i>	<i>The skirt of the ballerina</i>	<i>The mouth of the doll</i>	<i>The skirt of the doll</i>
Le mani della il soldato <i>The hands of the soldier</i>	La pistola della il soldato <i>The gun of the soldier</i>	Le mani della il soldatino <i>The hands of the toy soldier</i>	La pistola della il soldatino <i>The gun of the toy soldier</i>
La barba della il poliziotto <i>The beard of the policeman</i>	La cintura della il poliziotto <i>The belt of the policeman</i>	La barba della il giocattolo <i>The beard of the toy</i>	La cintura della il giocattolo <i>The belt of the toy</i>
I capelli del maestro <i>The hair of the teacher</i>	Lo zaino dello il maestro <i>The backpack of the teacher</i>	I capelli del la barbie <i>The hair of the Barbie</i>	Lo zaino dello la barbie <i>The backpack of the Barbie</i>
I piedi del bambino <i>The feet of the child</i>	La coperta del bambino <i>The blanket of the child</i>	I piedi del burattino <i>The feet of the marionette</i>	La coperta del burattino <i>The blanket of the marionette</i>
Le braccia della il contadino <i>The arms of the farmer</i>	Il martello del contadino <i>The hammer of the farmer</i>	Le braccia della il robot <i>The arms of the robot</i>	Il martello del robot <i>The hammer of the robot</i>
Le strisce della il gatto <i>The stripes of the cat</i>	L'acqua del gatto <i>The water of the cat</i>	Le strisce della il bicchiere <i>The stripes of the glass</i>	L'acqua del bicchiere <i>The water of the glass</i>
Le ali della fata <i>The wings of the fairy</i>	La corona della fata <i>The crown of the fairy</i>	Le ali della statuetta <i>The wings of the figurine</i>	La corona della statuetta <i>The crown of the figurine</i>

Table 10. Examples of items expressing possessive predicative relations in the four experimental conditions, with English translations.

ANIMATE INALIENABLE	ANIMATE ALIENABLE	INANIMATE INALIENABLE	INANIMATE ALIENABLE
Il pirata ha il graffio <i>The pirate has the scratch</i>	Il pirata ha la bandiera <i>The pirate has the flag</i>	L'auto ha il graffio <i>The car has the scratch</i>	L'auto ha la bandiera <i>The car has the flag</i>
La foca ha i baffi <i>The seal has whiskers</i>	La foca ha la maglietta <i>The seal has the t-shirt</i>	Il peluche ha i baffi <i>The stuffed animal has whiskers</i>	Il peluche ha la maglietta <i>The stuffed animal has the t-shirt</i>
La strega ha il naso <i>The witch has the nose</i>	La strega ha il cappello <i>The witch has the hat</i>	Il pupazzo ha il naso <i>The puppet has the nose</i>	Il pupazzo ha il cappello <i>The puppet has the hat</i>
Il nonno ha le orecchie <i>The grandfather has ears</i>	Il nonno ha gli occhiali <i>The grandfather has glasses</i>	La maschera ha le orecchie <i>The mask has ears</i>	La maschera ha gli occhiali <i>The mask has glasses</i>
La ballerina ha la bocca <i>The ballerina has the mouth</i>	La ballerina ha la gonna <i>The ballerina has the skirt</i>	La bambola ha la bocca <i>The doll has the mouth</i>	La bambola ha la gonna <i>The doll has the skirt</i>
Il soldato ha le mani <i>The soldier has hands</i>	Il soldato ha la pistola <i>The soldier has the gun</i>	Il soldatino ha le mani <i>The toy soldier has hands</i>	Il soldatino ha la pistola <i>The toy soldier has the gun</i>
Il poliziotto ha la barba <i>The policeman has the beard</i>	Il poliziotto ha la cintura <i>The policeman has the belt</i>	Il giocattolo ha la barba <i>The toy has the beard</i>	Il giocattolo ha la cintura <i>The toy has the belt</i>
Il maestro ha i capelli <i>The teacher has hair</i>	Il maestro ha lo zaino <i>The teacher has the backpack</i>	La barbie ha i capelli <i>The Barbie has hair</i>	La barbie ha lo zaino <i>The Barbie has the backpack</i>
Il bambino ha i piedi <i>The child has feet</i>	Il bambino ha il cuscino/coperta <i>The child has the blanket</i>	Il burattino ha i piedi <i>The marionette has feet</i>	Il burattino ha il cuscino/coperta <i>The marionette has the blanket</i>
Il contadino ha le braccia	Il contadino ha il martello	Il robot ha le braccia	Il robot ha il martello

ANIMATE INALIENABLE	ANIMATE ALIENABLE	INANIMATE INALIENABLE	INANIMATE ALIENABLE
<i>The farmer has arms</i>	<i>The farmer has the hammer</i>	<i>The robot has arms</i>	<i>The robot has the hammer</i>
Il gatto ha le strisce <i>The cat has stripes</i>	Il gatto ha l'acqua <i>The cat has the water</i>	Il bicchiere ha le strisce <i>The glass has stripes</i>	Il bicchiere ha l'acqua <i>The glass has the water</i>
La fata ha le ali <i>The fairy has wings</i>	La fata ha la corona <i>The fairy has the crown</i>	La statuetta ha le ali <i>The figurine has wings</i>	La statuetta ha la corona <i>The figurine has the crown</i>

5.5 Procedure

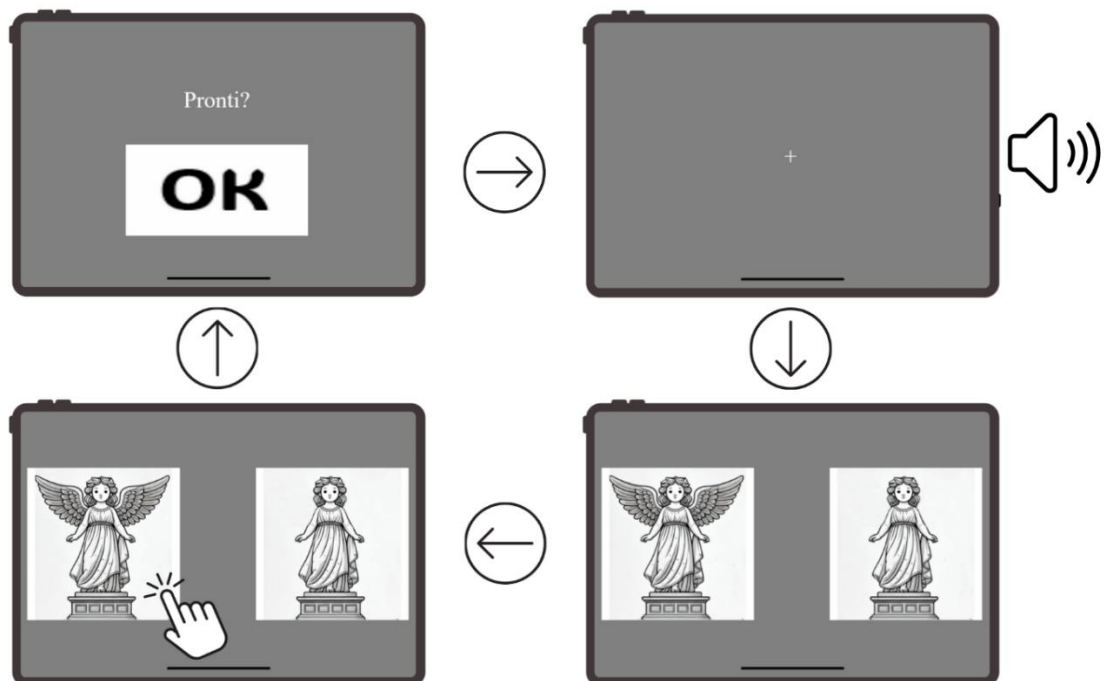
Before beginning the experimental tasks, children completed a brief elicitation task to assess their familiarity with the lexical items used in the main experiment. Using printed figurines representing all possible possessors and possessed entities (e.g., witch, puppet, nose, hat), the experimenter prompted the child to name or recognize each item.

Participants then completed two self-paced Picture Selection Tasks – i.e., one for attributive and one for predicative possession – using a touchscreen tablet. The order of the two tasks was counterbalanced across participants. The experiment was implemented in PsychoPy and administered via Pavlovía during individual in-person sessions at the child's school. Each trial was self-paced: children initiated the auditory presentation of the sentence by tapping the screen at the beginning of every trial, whenever they felt ready to proceed. After playback, the screen remained blank for 400 ms. After the blank screen, two pictures appeared simultaneously side-by-side (see Figure 9.) Children were instructed to select the picture that best matched the sentence they had just heard by tapping on it.

Each task consisted of 9 experimental trials, preceded by three familiarization trials to ensure comprehension. The familiarization trials matched the task type: attributive for the attributive condition and predicative for the predicative condition. The total duration for each task was approximately 10 minutes. Because the task was self-paced, children could decide

independently whether to pause briefly or continue to the next trial, as they triggered the onset of each sentence themselves. Before starting, they were explicitly told that they could take as much time as they wished between trials. All sessions were conducted in a quiet room within the child's school. The Italian version of the Test for the Reception of Grammar (TROG-2; Bishop, 2003; Italian adaptation by Suraniti et al.) was also administered in a separate session, either before or after the experimental tasks, counterbalanced across participants. Response latency was recorded only for the image selection. Specifically, reaction times were measured from the onset of the image display (i.e., when the two pictures appeared on the screen) until the child tapped on the chosen picture.

Figure 9. Trial sequence in the Picture Selection Task. After tapping "OK" to begin, a fixation cross appears and the sentence is played aloud. Then, two images are shown side by side, and the child selects the one that matches the sentence by tapping on the screen.



5.6 Data Analysis

A generalized linear mixed-effects analysis was conducted by participants and by items on reaction times to correct responses using RStudio (version: 2023.06.0+421; packages: *lme4*, *emmeans*, *ggplot2*, *tidyverse*). This statistical approach was chosen to appropriately model the positively skewed distribution of reaction time data without the need for normalizing transformations. To address potential variability associated with developing motor skills and attention in preschool children (Frank et al., 2016), strict outlier removal criteria were applied to the final sample of 48 participants. Specifically, incorrect trials were removed, and responses faster than 300 ms or exceeding the mean plus 2 SD within condition were discarded. This trimming procedure ensured that the analyzed data reflected genuine cognitive processing times rather than motor artifacts. The dependent variable was reaction time (s); the fixed factors were Alienability (alienable vs. inalienable), Animacy (animate vs. inanimate), and Age (centered, continuous). TROG score (centered) was included as a covariate. Random intercepts for Participant and Item were specified, and all two- and three-way interactions among the fixed factors were tested.

5.7 Results

5.7.1 Predicative condition

Accuracy

A Generalized Linear Mixed Model (GLMM) with a binomial (logit) link function was fitted to the accuracy data. The model included Alienability, Animacy, and Age as fixed effects, along with all their two-way and three-way interactions. To account for the hierarchical structure of the data, random intercepts for both Subject and Item were included. The model successfully converged using the bobyqa optimizer. Analysis of the random effects revealed substantial variability in baseline accuracy across subjects ($SD = 2.11$), indicating significant

individual differences. In contrast, the variability across items was considerably smaller ($SD = 0.54$), supporting the effectiveness of item balancing efforts. Regarding the fixed effects, the results indicated no statistically significant main effects for Alienability (Estimate = 0.19, $z = 0.06$, $p = 0.956$), Animacy (Estimate = -0.14, $z = -0.04$, $p = 0.967$), or Age (Estimate = 0.38, $z = 0.58$, $p = 0.562$). Furthermore, none of the interaction terms reached statistical significance (all $p > 0.20$), suggesting that the effect of Alienability and Animacy on accuracy did not significantly vary with each other or with Age.

Reaction times

Reaction times were analyzed using a generalized linear mixed model with inverse Gaussian distribution and identity link function, which was chosen because it appropriately models positively skewed RT data without the need for log-transformation. Prior to analysis, incorrect responses were excluded, and outliers were removed from both accuracy and reaction time data. Specifically, responses faster than 300 ms or exceeding the mean plus two standard deviations for each condition were discarded. The model included fixed effects of Alienability, Animacy, Age, TROG scores (as a covariate), and their interactions, with random intercepts for subjects and items (AIC = 2047.3, BIC = 2101.4, logLik = -1011.6).

A significant main effect of Alienability was observed ($\beta = 0.40$, $SE = 0.18$, $t = 2.23$, $p = .026$), indicating slower responses for inalienable items (see Figure 2). A main effect of Animacy also emerged ($\beta = 0.40$, $SE = 0.19$, $t = 2.17$, $p = .030$), with slower responses to inanimate compared to animate items (see Figure 10).

Age had a significant negative effect ($\beta = -0.32$, $SE = 0.16$, $t = -1.99$, $p = .046$), showing that older children responded faster (see Figure 11).

The interaction between Animacy and Age approached significance ($\beta = -0.34$, $SE = 0.17$, $t = -1.96$, $p = .050$), suggesting that the difference between animate and inanimate items tended to decrease with age (see Figure 12).

The TROG covariate had a negative, though non-significant, effect ($\beta = -0.04$, $SE = 0.03$, $t = -1.14$, $p = .256$), consistent with the idea that higher comprehension scores were associated with faster responses (see Figure 13). No other fixed effects or interactions reached significance (all $ps > .20$). As an exploratory check, we also fitted a Gamma model with log link, which showed a similar pattern of results but a poorer fit ($AIC = 2077.1$ vs. 2047.3).

Figure 10. Main effects of Alienability and Animacy on reaction times. Points are model-based marginal means from an inverse-Gaussian mixed-effects model (identity link; random intercepts for subject and item) with 95% CIs; point size $\propto n$. Predictions set TROG to its mean. RTs in seconds; incorrect responses and outliers ($RT < 300$ ms or $> \text{mean} + 2$ SD) removed.

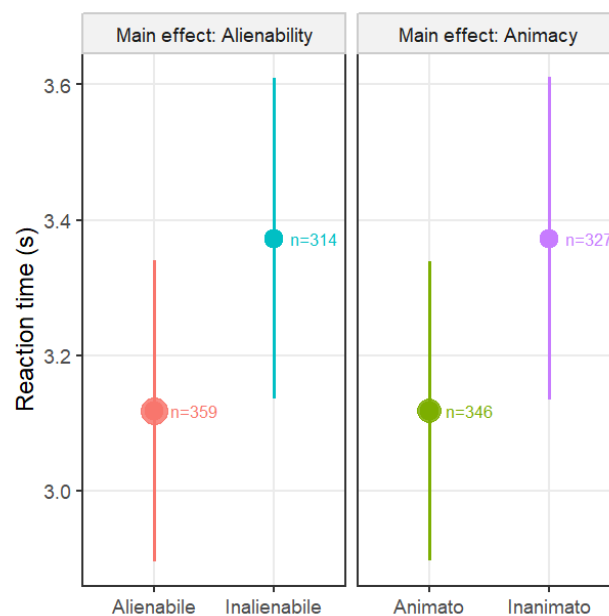


Figure 11. Effect of Age on reaction times. Solid line shows model predictions (same IG mixed model) with 95% CI; circles are empirical means by 0.5-year age bins with 95% CIs and n labels (only bins with $n \geq 30$); rug indicates the age distribution. Predictions average over Alienability/Animacy and set TROG to its mean; RTs in seconds.



Figure 12. Age \times Animacy interaction (trend). Lines show model predictions (inverse-Gaussian mixed-effects model, identity link) with 95% CIs; circles are empirical means by 0.5-year age bins (size $\propto n$; only bins with $n \geq 30$). The gap between animate and inanimate items narrows with age $\beta = -0.34$, $SE = 0.17$, $t = -1.96$, $p = .050$). Predictions average over Alienability and set TROG to its mean; RTs in seconds

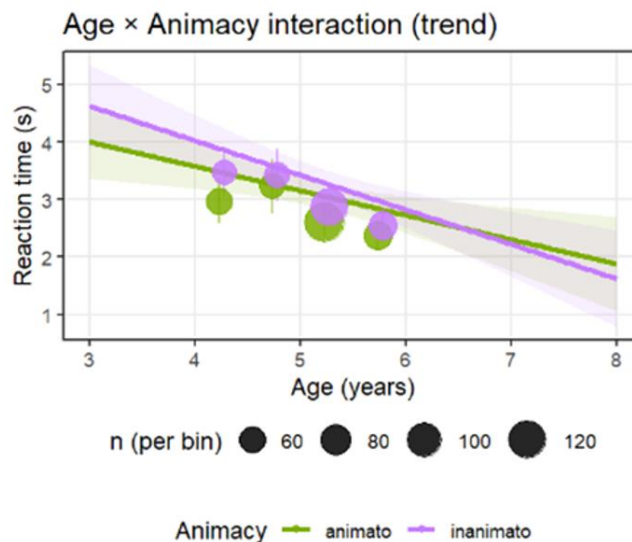
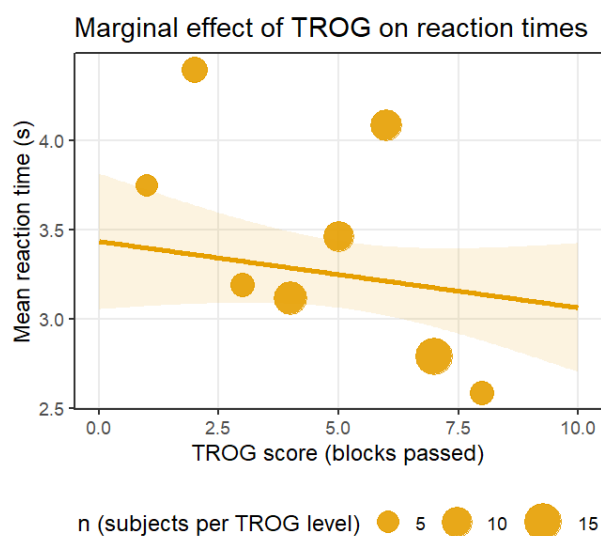


Figure 13. Marginal effect of TROG score on reaction times. Solid line shows model-based predictions from the inverse-Gaussian mixed-effects model (identity link) with 95% CI; circles are subject-level means grouped by TROG level (size $\propto n$) with 95% CIs (only levels with adequate n shown). TROG had a negative but non-significant effect ($\beta = -0.04$, $SE = 0.03$, $t = -1.14$, $p = .256$). A Gamma model with a log link showed a similar pattern but a poorer fit (AIC = 2077.1 vs. 2047.3).



5.7.2 Attributive condition

Accuracy

A Generalized Linear Mixed Model (GLMM) was fitted to the accuracy data using a binomial (logit) link function. The model included Alienability, Animacy, and Age as fixed effects, along with their two-way and three-way interactions. To account for the hierarchical data structure, random intercepts for both Subject and Item were included. The model successfully converged using the bobyqa optimizer.

Analysis of the random effects indicated substantial variability in baseline accuracy across subjects, with a standard deviation of 1.26. In contrast, variability across items was considerably smaller, with a standard deviation of 0.59. Regarding the fixed effects, the

intercept was highly significant ($z=5.62$, $p<0.001$), reflecting a high baseline accuracy at the mean age and reference levels of Alienability and Animacy. However, no statistically significant main effects were observed for Alienability ($z=-1.17$, $p=0.241$), Animacy ($z=-0.74$, $p=0.462$), or Age ($z=-0.64$, $p=0.522$). Furthermore, none of the interaction terms reached statistical significance (all $p>0.15$), indicating that the effects of Alienability and Animacy on accuracy did not significantly vary by Age, nor was there a significant three-way interaction. These findings suggest that, within the current dataset, the included Alienability, Animacy, and Age factors did not significantly predict variations in children's accuracy.

Reaction times

Reaction times were analyzed with a generalized linear mixed model with an inverse-Gaussian distribution and identity link, including fixed effects of Alienability, Animacy, and Age (centered) and all their interactions; TROG (centered) was entered as a covariate. Random intercepts for Participant and Item were specified ($N = 685$ trials; 80 children; 48 items; $AIC = 1950.5$, $BIC = 2004.8$, $\logLik = -963.2$).

No main effects of Alienability ($\beta = 0.228$, $SE = 0.203$, $t = 1.12$, $p = .261$) or Animacy ($\beta = -0.137$, $SE = 0.197$, $t = -0.70$, $p = .487$) were observed (see Figure 14). Age showed a negative trend ($\beta = -0.288$, $SE = 0.160$, $t = -1.80$, $p = .072$), and the TROG covariate was also negative but non-significant ($\beta = -0.047$, $SE = 0.029$, $t = -1.64$, $p = .102$) (see Figure 15). The Alienability \times Age interaction approached significance ($\beta = -0.374$, $SE = 0.215$, $t = -1.74$, $p = .081$), suggesting that the alienability contrast tended to diminish with age. No other interaction terms reached significance (Animacy \times Age: $p = .886$; Alienability \times Animacy: $p = .701$; three-way: $p = .519$). As an exploratory check, a Gamma model with a log link showed a similar pattern but a poorer fit ($AIC = 1982.1$ vs. 1950.5); in that model

the TROG covariate ($\beta = -0.023$, $SE = 0.011$, $t = -2.19$, $p = .029$) and the Alienability \times Age interaction ($\beta = -0.150$, $SE = 0.070$, $t = -2.15$, $p = .032$) reached significance.

Figure 14. Points show estimated mean differences with 95% confidence intervals. Left panel: inalienable vs alienable. Right panel: inanimate vs animate. The horizontal line at zero indicates no difference. Both contrasts are not significant ($p = .218$ and $p = .177$).

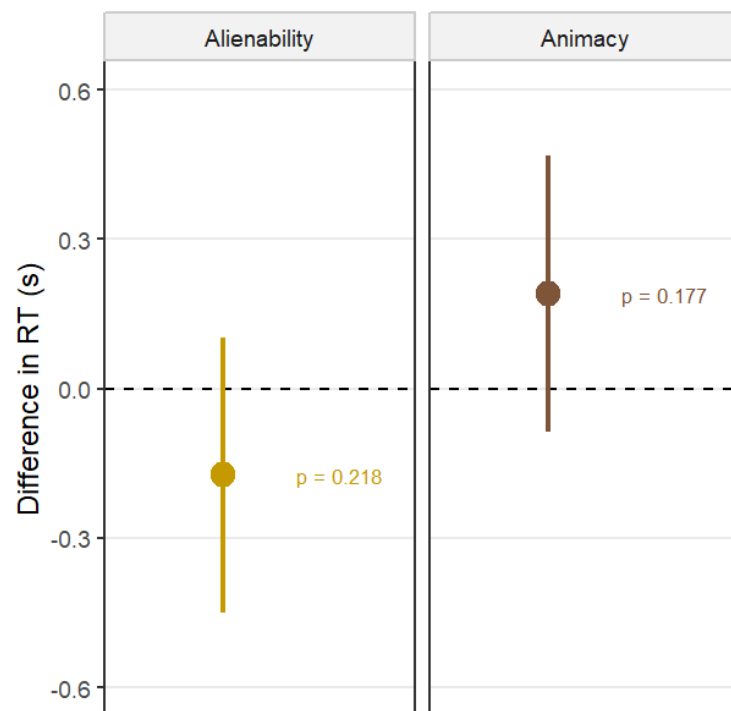
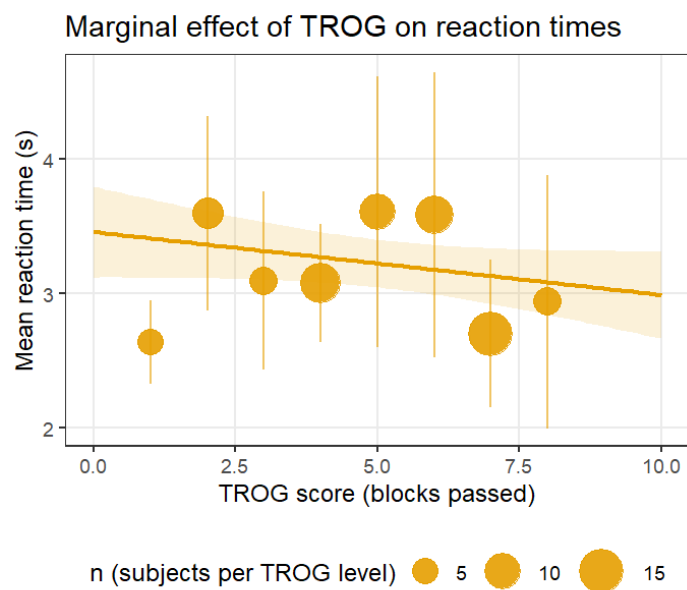


Figure 15. Marginal effect of TROG on reaction times (attributive). Solid line shows model-based predictions from the inverse-Gaussian mixed-effects model (identity link) with 95% CI; circles are subject-level means grouped by TROG level (size $\propto n$) with 95% CIs (only levels with adequate n shown). TROG had a negative but non-significant effect ($\beta = -0.047$, $SE = 0.029$, $t = -1.64$, $p = .102$). A Gamma model with a log link showed a similar pattern but a poorer fit (AIC = 1982.1 vs. 1950.5).



5.7.3 Complementary Analysis: Unified Model

In addition to the separate analyses presented above, a unified Generalized Linear Mixed Model (GLMM) was fitted to the entire dataset to explicitly test the interaction between syntactic structure and semantic cues. While the separate analyses focused on processing dynamics within each block, this unified approach allowed for a direct comparison.

Reaction times were analyzed using a Generalized Linear Mixed Model (GLMM) with an inverse Gaussian distribution and identity link function. This model was selected as it appropriately accounts for the positively skewed distribution of reaction time data. The model included fixed effects of Condition, Alienability, Animacy, Age (centered), and

TROG scores (centered), along with all two-way and three-way interactions involving the experimental factors. Random intercepts for Subject and Item were included to account for the hierarchical structure of the data (AIC = 4007.6).

A significant main effect of Age was observed ($\beta = -0.49$, SE = 0.14, $t = -3.43$, $p < .001$), indicating that older children responded significantly faster across all conditions. The TROG covariate did not reach statistical significance ($\beta = -0.03$, SE = 0.02, $t = -1.27$, $p = .204$). Regarding the experimental manipulations, the analysis revealed marginal main effects for both Alienability ($\beta = 0.32$, SE = 0.18, $t = 1.72$, $p = .085$) and Animacy ($\beta = 0.37$, SE = 0.19, $t = 1.95$, $p = .051$), suggesting a general trend where inalienable and inanimate items elicited slower responses. Furthermore, the interaction between Condition and Animacy approached significance ($\beta = -0.44$, SE = 0.26, $t = -1.65$, $p = .099$).

To explicitly test the hypothesis of a structure-dependent modulation of semantic cues, planned post-hoc comparisons were conducted. These comparisons revealed a double dissociation: the effect of Alienability was statistically significant specifically in the Attributive condition (Estimate = -0.27, SE = 0.13, $p = .045$), whereas the effect of Animacy approached significance specifically in the Predicative condition (Estimate = -0.25, SE = 0.14, $p = .068$). This pattern indicates that while age is the primary driver of processing speed, syntactic structure modulates the salience of specific semantic cues, with Alienability affecting processing in attributive frames and Animacy in predicative ones.

5.8 Discussion

The present study investigated how preschool children's comprehension of possessive constructions in Italian is modulated by alienability, animacy, syntactic structure (attributive vs. predicative), and general grammatical competence (TROG-2). Accuracy was uniformly high across all conditions, while this ceiling effect suggests that children from early age 3 can successfully interpret the basic possessive relation in both attributive and predicative

formats, accuracy data alone cannot reveal the underlying processing strategies. The analysis of Reaction Times (RTs), however, exposed systematic differences, shedding light on how conceptual and grammatical factors interact in comprehension.

The most striking finding is that semantic dimensions such as alienability and animacy did not exert uniform effects across syntactic frames. In predicative possession, where the sentence explicitly asserts a have-relation, both factors modulated RTs: alienable items elicited faster responses than inalienables, and animate possessors were processed more efficiently than inanimates. In attributive genitives, by contrast, RTs were largely insensitive to these dimensions.

This dissociation highlights the role of syntactic packaging in determining how far conceptual cues can influence comprehension. Predicatives, with their overt assertion of a relational structure (Heine, 1997), trigger a compositional process that invites the integration of semantic plausibility cues – e.g., ownership, control, transferability. Conversely, attributives encode the relationship as presupposed (Partee & Borschev, 2003). Crucially, this presupposition is realized cognitively as a cohesive unit (Aikhenvald, 2013), allowing the phrase to be processed as a single chunk. This structural cohesion effectively shields the processing mechanism from the internal semantic features, attenuating the relevance of conceptual heuristics.

This pattern is consistent with theoretical accounts that distinguish predicative have-sentences, which foreground possession as an eventive relation (Freeze 1992; Harley 1998), from nominal genitives, which background the relation within reference. The data thus suggest that children, from as early as three years of age, already appear to differentiate the interpretive weight that syntax assigns to semantic cues.

The effects of alienability and animacy themselves conform to well-established conceptual hierarchies. Alienable items are cognitively prototypical possessions, easily mapped

to ownership, whereas inalienables such as body parts or kinship terms require less canonical construals. Longer RTs for inalienables in predicatives indicate that additional inferential work is needed to reconcile the assertion of “having” with less transferable or controllable items (Seiler 1983; Nichols 1988). Similarly, animacy effects demonstrate that animate possessors facilitate the construction of a possession relation, reflecting the privileged role of animates as controllers or owners (Rakison & Poulin-Dubois 2001). The developmental trend is especially revealing: the animacy advantage diminished between ages 3 and 5, suggesting that younger preschoolers initially rely heavily on broad conceptual heuristics (e.g., “owners are animate”), but gradually down-weight such biases as grammatical knowledge and experience accumulate. This trajectory resonates with hybrid models of acquisition in which children’s early processing is scaffolded by conceptual salience, while linguistic maturation progressively strengthens syntax-driven interpretation (Tomasello 2003; Lidz & Gagliardi 2015).

The weak and non-robust associations with TROG-2 reinforce this interpretation. Although children with higher grammatical competence tended to respond numerically faster, the effect was small and not statistically reliable. This suggests that TROG-2 captures a baseline efficiency in morphosyntactic processing but does not directly account for the frame-contingent sensitivity to alienability and animacy observed here. The slight trend for predicatives is nonetheless theoretically coherent: since TROG-2 emphasizes verb-mediated structures, it overlaps more closely with have-predications, possibly supporting a modest processing advantage in this condition. Still, the general absence of robust correlations underscores that what drives the observed RT differences is not global morphosyntactic ability but the interaction of syntactic format with specific conceptual cues.

From a broader perspective, these results bear directly on debates about the syntax–semantics interface and the role of conceptual knowledge in acquisition. One generative

interpretation (Eisenbeiss 2009) is that children's grammars already encode structural distinctions: predicatives map onto eventive relational structures with thematic roles, while attributives serve as modifiers that background possession. Conceptual cues are not part of the grammar but influence processing when the structure requires thematic interpretation. A usage-based interpretation (Tomasello 2003), in turn, would emphasize how children learn mappings between forms and functions probabilistically, beginning with reliance on conceptual heuristics and gradually abstracting toward more structural generalizations. Our findings are compatible with both approaches, but the systematic dissociation between frames points to the presence of structured grammatical representations that constrain the relevance of conceptual information.

The developmental implications are equally significant. The data suggest that children as young as three use conceptual scaffolds like animacy and alienability to guide interpretation, but between three and five years they begin to reduce reliance on these cues, shifting toward more uniform, grammar-driven strategies. Possession thus emerges as an especially informative domain because it sits at the crossroads of conceptual cognition (ownership, part-whole, agency) and grammatical encoding (assertion vs. presupposition).

The decision to primarily analyze the two syntactic conditions separately was driven by the experimental design, as the tasks were administered in distinct, temporally separated blocks to prevent strategy carry-over effects. This allowed us to observe children's processing within each specific context without assuming immediate comparability between sessions. However, the results from the complementary unified model (reported in the Results section) offer a refined perspective that integrates with our main findings. The emergence of a double dissociation in the unified analysis, where Alienability guides processing significantly in attributive structures ($p = .045$) and Animacy in predicative ones ($p = .06$), suggests that syntactic structure plays an active role in modulating which semantic

cues are prioritized during interpretation. This reinforces the core finding that developmental processing is mediated by the syntax-semantics interface, but it adds a layer of complexity: different structures appear to highlight different conceptual aspects of the possessive relation. Specifically, the static, presuppositional nature of the attributive frame appears to increase sensitivity to the semantic distinction of Alienability, while the eventive, assertional nature of the predicative frame foregrounds the agentive properties of the possessor (Animacy). This frame-dependent modulation represents a novel insight that warrants specific investigation in future follow-up studies.

Naturally, the design has limitations. RTs measured at image selection combine linguistic processing with visual comparison, decision-making, and motor execution, potentially diluting associations with linguistic predictors. More fine-grained, time-locked methodologies such as eye-tracking, mouse-tracking, or EEG would provide a clearer picture of incremental comprehension. Furthermore, alienability was treated as a binary factor, but typological research shows it is better construed as a continuum: possessions vary in degrees of control, transferability, and intimacy. Future work could exploit graded manipulations to reveal subtler effects.

In conclusion, the present study shows that comprehension of possession in preschool children is not monolithic but structured by the interaction of syntax and conceptual knowledge. Predicative sentences invite reliance on alienability and animacy, while attributive genitives suppress their influence under controlled materials. Developmentally, children shift from concept-driven heuristics toward grammar-driven processing within a few years after age 3. Theoretically, these findings underscore that syntax determines when and how conceptual cues can shape comprehension, highlighting possession as a fruitful testing ground for understanding how conceptual and grammatical systems are integrated in early development.

6 Concluding Discussion

6.1 Overview of Research Goals

The primary objective of this doctoral dissertation was to investigate the cognitive and linguistic mechanisms underlying the comprehension of possessive structures. However, to fully appreciate the scope of this inquiry, it is necessary to situate it within a theoretical framework that is multifaceted. Possession is not merely a grammatical category; rather, it appears to be a fundamental domain that permeates human language, reflecting the complex ways in which speakers conceptualize the relationships between themselves, their kin, and the material world.

As extensively discussed in the introductory chapters, the classical and theoretical literature on possession is voluminous, highlighting the intrinsic difficulty in defining this concept with precision. A central theme in this theoretical debate concerns the elusive identification of a possessive prototype. Traditionally, scholars such as Taylor (1996) have viewed possession not as a clear-cut notion but as a *gestalt* formed by the co-occurrence of typical features. In Taylor's view, the *ownership gestalt* is characterized by a specific configuration: a human possessor, a concrete inanimate object, exclusive rights of access, and a transaction (such as purchase or inheritance) that legitimizes the bond. Consequently, a relation fulfilling all these properties (e.g., ownership) is considered a prototypical instance, while relations lacking some features are non-prototypical. This ownership-centric view is shared by scholars such as Baron and Herslund (2001) and Mazzitelli (2015), who argue that dedicated lexical items such as *own* or *belong* capture the canonical "possessive" character of the domain.

However, this "monolithic" interpretation is not universally accepted. Langacker (2000, 2009) explicitly rejects the idea of a single core, proposing instead that the domain of possession is polycentric. In his Cognitive Grammar framework, possession revolves around

several conceptual archetypes, including ownership, kinship, and part-whole relations, which are all considered prototypical because they naturally facilitate *reference-point construals*. Other scholars (e.g., Aikhenvald, 2013; Chappell & McGregor, 1996) have questioned the ownership prototype from a cross-linguistic perspective, suggesting that inalienable relations (kinship and body parts) form the true semantic core, as evidenced by the distinct morphological marking these relations receive in many of the world's languages.

Taken together, these diverging positions raise a broader methodological question: What exactly makes a possessive relation prototypical? The label "prototypical possession" appears to be indeterminate unless one specifies the criterion by which the prototype is selected. A prototype could be identified according to speaker intuition (what come in mind first if we say to define "possession"), established through usage frequency (corpus distributions), or, as proposed in this dissertation, defined in terms of cognitive processing, focusing on which relations are accessed or integrated most efficiently during online comprehension. This indeterminacy suggests that the notion of a prototype is inherently linked to the dimensions along which possessive relations vary, most notably alienability and animacy.

However, when shifting from the plane of theoretical and typological description to that of experimental verification of processing mechanisms, the landscape changes significantly. While the theoretical discussion is broad and classical, the experimental and psycholinguistic literature is, by contrast, surprisingly narrow. Despite extensive knowledge regarding how languages classify possession and which meanings it may convey, there is significantly less understanding of how the brain processes these distinctions. The existing research presents fundamental asymmetries, which this thesis has identified as structural and methodological gaps.

The first is a **Structural Gap: The Attributive vs. Predicative Asymmetry**. The vast majority of psycholinguistic studies have focused almost exclusively on attributive possession, i.e., the realization of possession within the noun phrase (e.g., *the witch's hat*). This bias is evident in the literature, where studies on the acquisition of the Saxon genitive or possessive pronouns abound. Conversely, predicative possession, the clausal realization of ownership via verbs such as *have* (e.g., *the witch has a hat*), has received significantly less attention as a standalone syntactic structure. As noted by Stassen (2009) and Heine (1997), the two structures are likely not equivalent: while attributive possession tends to “presuppose” or “background” the relationship as a given fact, predicative possession “asserts” it explicitly, bringing it to the foreground. Ignoring this distinction might mean overlooking a potential source of cognitive variation; it is plausible that the processing cost of an “asserted” relationship differs from that of a “presupposed” one, and that the interaction with semantic variables such as animacy may shift depending on the syntactic structure.

The second is a **Methodological Gap: From Offline Competence to Online Processing**. Parallel to the structural imbalance, there is a prevalent methodological limitation. Much of our current understanding of how adults and children manage the semantic dimensions of possession derives from “offline” measures. Studies based on corpora, acceptability judgment tasks, or elicitation measure the final product of comprehension or production. While we know, for instance through Vaid and Chen (2019), that speakers judge certain inalienable combinations as more plausible, this finding likely reflects a metalinguistic decision made post hoc. There is a lack of robust literature utilizing “online” measures (such reading times) to trace the moment-by-moment cognitive cost of integrating this information. From the perspective of previous researches remains unclear whether the advantage of inalienability or animacy emerges immediately during syntactic parsing or if it is a post-interpretive effect.

In light of these considerations, the objective of this thesis was not merely to add another descriptive element to the study of possession, but to systematically bridge these gaps. Through four progressive experiments, this work sought to shift the inquiry from the plane of competence and classification to that of processing. Specifically, the research was designed to address questions that theory alone cannot resolve:

- Does the cognitive “advantage” of inalienable relations and animate possessors, postulated by theory and observed in corpora, influence online processing?
- Is there an intrinsic difference in cognitive cost between processing an attributive possessive relation and one made predicative?
- Crucially, does syntax function as a modulator for semantics? That is, can the grammatical structure determine when and to what extent the cognitive system relies on conceptual cues like animacy?

To answer these questions, the experimental design was structured as follows:

- **Experiment 1 (Adults, Offline):** A replication of Vaid and Chen (2019) adapted for Italian, designed to establish a baseline of acceptability judgments for attributive structures.
- **Experiment 2 (Adults, Online Attributive):** An investigation into online processing of attributive structures, aiming to verify if semantic facilitation emerges incrementally.
- **Experiment 3 (Adults, Online Predicative):** A parallel investigation into the online processing of predicative structures (*have*-sentences), to determine if the explicit assertion of possession modulates the semantic effects observed in the attributive condition.

- **Experiment 4 (Children):** A developmental study using a picture-selection task to examine how preschool children comprehend both attributive and predicative structures, and to trace the developmental patterns of the interface between syntax and semantics.

6.2 Summary of Key Findings

The experimental research presented in this thesis, comprising three studies with adults and one with children, has yielded a complex but coherent set of findings that challenges a monolithic view of possession.

6.2.1 Evidence from Adult Processing

The investigation into the adult system was conducted through three experiments designed to disentangle the roles of animacy, alienability, and syntactic structure. Experiment 1 served as a baseline, replicating the offline plausibility judgment task by Vaid and Chen (2019) in Italian. Results confirmed that inalienable possessions are processed faster than alienable ones, supporting the Inalienability Hypothesis in offline processing.

However, the distinction between online and offline processing became evident in Experiments 2 and 3, which measured both reading times and reaction Times. Regarding Reading Times, results supported the Interaction Hypothesis across both syntactic structures. In both Attributive (Exp. 2) and Predicative (Exp. 3) possession, a significant interaction emerged between animacy and inalienability: sentences combining animate possessors with inalienable possessions were processed fastest. This indicates that during the active, online reading of the sentence, these semantic features collaborate. In contrast, Reaction Times revealed that syntactic realization modulates how these features are weighed during offline decision-making:

- In Attributive structures (Exp. 2): While an interaction was present, results were driven by a significant main effect of animacy only. This suggests that the cohesive nature of attributive possession (presupposed relation) foregrounds the possessor (Aikhenvald, 2013), making animacy the dominant cue.
- In Predicative structures (Exp. 3): The pattern shifted to independent Main Effects for both Animacy and Alienability. Because predication explicitly asserts a relationship (“has”) rather than presupposing it (Heine, 1997), it disrupts structural cohesion. This forces the processor to evaluate the possessor and the possessed as distinct entities, resulting in independent additive effects rather than integrated interaction.

Overall, the adult data suggest that while animacy and inalienability interact during the online construction of meaning (reading times), they function as distinct, syntax-dependent cues during offline plausibility assessment (reaction times).

6.2.2 Evidence from Child Development

The developmental data collected in the Exp. 4, from the study “Children’s Comprehension of Possessive Structures: The Roles of Animacy, Alienability, and Syntactic Structure” provided complementary evidence to the adult findings, highlighting a distinct pattern in how semantic information is processed during development. The study employed a picture-selection task with children aged 3 to 6, allowing for the assessment of accuracy and processing. Regarding accuracy, the results were similar across all conditions. There was a general high rate of correct responses that indicates that, by age 3, the grammatical competence necessary to interpret both attributive and predicative possessive structures appears to be largely established. However, the analysis of reaction times pointed to a divergence in processing strategies compared to the adult group.

A dissociation emerged depending on the syntactic realization of the possessive relation. In the predicative condition (*X ha Y*), reaction times were significantly modulated by both semantic properties of the sentence constituents. Specifically, children exhibited faster response times in trials involving animate possessors and, crucially, alienable objects. This suggests that while animacy acts as a facilitatory cue, the predicative structure specifically triggers a processing advantage for alienable items, possibly due to the semantic overlap with the concept of ownership. Conversely, in the attributive condition (*Il Y di X*), no significant main effects or interactions involving animacy or alienability were detected in the response latencies.

This pattern suggests that, for preschool children, the influence of semantic variables may be constrained by the syntactic architecture. While the predicative structure, which asserts a relationship between two entities, seems to benefit from the accessibility of semantic dimensions to ease processing load, the attributive structure does not elicit a comparable sensitivity to these cues. This might indicate that attributive possession is processed as a more cohesive or automated unit, wherein the contribution of individual semantic features is less prominent in determining processing speed. Unlike the adult participants, who integrated semantic information across both structures, the children in this study appeared to rely on semantic facilitation selectively, contingent upon the syntactic demands of the task.

By synthesizing the data from these studies, the following discussion will propose a re-definition of the possessive prototype: not as a static category defined by ownership, but as a dynamic configuration driven by the principles of processing economy.

Figure 11. Summary of Key Findings

				READING TIMES	REACTION TIMES
ADULTS	EXP 2	attributive	alienability	interaction but main effect animacy	additive effects
			animacy		
	EXP 3	predicative	alienability	additive effects	additive effects
			animacy		
CHILDREN	EXP 4	attributive	alienability	-	no effects
			animacy		
		predicative	alienability	-	additive effects
			animacy		

6.3 Redefining the Possession “Prototype”

The findings summarized above provide empirical grounds to revisit one of the central theoretical questions posed at the outset of this dissertation: What constitutes the “prototype” of possession? As discussed in Chapter 1, the definition of possession has long been elusive. The data collected in this doctoral work suggest that the prototype is not a monolithic construct stored statically in memory, but a dynamic configuration of features recruited to optimize processing. Specifically, comparing adult and child data reveals a picture of ontological continuity regarding the possessor (animacy) and conceptual divergence regarding the possessed object (alienability).

6.3.1 The Anatomy of the Prototype

Our analysis suggests that the “processing prototype”, should be defined not merely as a frequent category, but as an efficiency mechanism: it is the semantic configuration that minimizes cognitive load during online processing, is constituted by a stable ontological

anchor, represented by animacy, and a developmentally variable relational constraint, represented by alienability.

A notable convergence between the adult and child data is the facilitatory role of animacy, which appears to function as a universal conceptual primitive. As shown in the adult experiments, speakers consistently benefit from animate possessors, either through independent main effects in predicative structures or by interacting with inalienability in attributive ones. Similarly, children exhibited significantly faster reaction times with animate possessors in the predicative condition. This convergence supports the view, argued by Rosenbach (2008) and corroborated by neurophysiological evidence (Caramazza & Mahon, 2006), that animate entities function as distinct, primary ontological categories. Whether the system is developing or fully mature, the cognitive parser naturally prioritizes an animate possessor as the canonical “reference point” or logical subject for the relation. This “animacy advantage” thus appears to be the core, stable semantic feature of the prototype across development.

However, the two populations diverge significantly in the feature specification of the possessed object, suggesting a developmental shift in how the relationship itself is conceptualized to serve processing economy. In the predicative task, children were significantly faster with alienable objects, indicating that their early prototype is driven by the lexical semantics of the verb “to have” (*avere*). As noted by Eisenbeiß, Matsuo, and Sonnenstuhl (2009), this verb canonically encodes a relationship of control and availability. For a preschool child, the event structure of possession is inherently agentive, involving an animate agent manipulating an alienable patient. Consequently, inalienable items such as body parts, which lack the feature of transferability or manipulability, appear to be incongruent with the event structure of “having”. The longer reaction times observed for inalienable items in children’s predicative processing likely reflect the cost of coercing a

non-controllable object into a control-based verbal frame (Nichols, 1988; Seiler, 1983). In this sense, the child relies on the “Control Prototype” as a heuristic to bypass the high cost of the syntactic computation.

Conversely, adults show a consistent processing advantage for inalienable relations across experiments. This implies that the mature system has abstracted possession beyond the thematic role of a “controller”. Adults appear to prioritize relations characterized by intrinsic stability and self-reference, a preference that aligns with the “self-prioritization effect” described by Golubickis et al. (2019). Since inalienable possessions like body parts and kinship terms constitute the biological and psychological core of the self, they benefit from privileged access during processing. In this framework, body parts and kin act as “semantic molecules” (Goddard & Wierzbicka, 2016): universal building blocks of meaning that are processed with minimal cost because they are inherent to the conceptualization of the subject, marking a shift from a prototype based on external control to one based on internal connection.

6.3.2 The Role of Syntax

How do these conceptual prototypes interact with the grammatical structure? Our results suggest that syntax functions as a control mechanism for information access, effectively “gating” the influence of conceptual cues based on the computational demand of the structure.

The processing of attributive possession (*Il cappello della strega* / “The witch’s hat”) appears to rely heavily on a storage strategy. As noted by Aikhenvald (2013), this structure integrates the possessor and possessed into a “single cohesive unit”. Since the relation in this structure is presupposed and syntactically cohesive (Partee & Borschev, 2003), the processing system treats it as a holistic unit. In children, the absence of semantic effects suggests that the phrase is retrieved as a chunk (Gating Effect); the internal semantic

features, such as animacy, are not actively inspected because the unit is retrieved from associative memory as a block. Adults, similarly, show a pattern of high integration, confirming that for the expert system, this structure functions as a quasi-lexicalized unit wherein the semantic features of possessor and possessed merge rapidly to facilitate recognition without triggering distinct computational costs.

By comparison, the predicative structure (*La strega ha il cappello* / “The witch has a hat”) necessitates an active computation of the relation between two distinct arguments, requiring the assignment of thematic roles by the verb. To manage the high computational load of this compositional assembly, the cognitive system is forced to recruit semantic scaffolding. Children appear to verify the semantic features of the arguments against the selectional restrictions of the verb to facilitate the parse. The prototype [+animate agent] + [+alienable patient] satisfies the canonical requirements of *avere*, thus facilitating the computation, whereas deviations from this pattern increase the processing load. Adult speakers also show main effects of semantic variables, confirming that predicative syntax maintains the constituents as distinct entities requiring integration. However, their processing is not strictly bound by the “control” constraint; while they maintain the animacy advantage, their efficiency with inalienable items suggests a broader semantic flexibility that transcends the strict lexical requirements of the verb. Therefore, the results lend support to the Gating hypothesis: structures imposing a high computational load (predicative) trigger the active recruitment of semantic cues to aid processing, while highly cohesive phrasal structures (attributive) tend to inhibit their access.

6.3.3 The Developmental Shift

The trajectory from childhood to adulthood can thus be characterized as a transition from concept-driven heuristics to grammar-driven processing.

The children in our study exhibited a pattern of structural rigidity, wherein the recruitment of semantic information appeared to be effectively constrained by syntax. They relied on semantic features (animacy and alienability) only when the syntactic task involved the explicit event structure of a verb (predicative). In the attributive frame, where the relation is structural rather than lexical, these cues were effectively ignored. The adults, conversely, demonstrated a flexible system. They showed sensitivity to semantic variables across both structures, which implies that the mature system constantly monitors semantic plausibility to optimize comprehension regardless of the syntactic packaging.

This observed rigidity in children resonates with the Subset Principle proposed by Armon-Lotem, Crain, and Varlokosta (2006), which posits that children operate with a restricted grammar to avoid overgeneration. Our findings support the existence of such restrictions but invite a reinterpretation through the lens of processing economy. The child's reliance on the "control prototype" (animate + alienable) in predicative structures may not stem from a representational deficit, but from a strategy to minimize cognitive effort. Since the predicative computation is costly (requiring active thematic role assignment), the child adheres to the most canonical semantic path (agency and control) to facilitate the parse. The developmental shift, therefore, involves the gradual abstraction of the possessive concept from the strict lexical semantics of "control". As children mature, they move away from these concept-driven heuristics (Tomasello, 2003) toward a more generalized, grammar-driven representation. This maturation allows them to integrate inalienable relations, which are cognitively central to the self (Ferraro et al., 2011) but semantically peripheral to the verb "to have", as fluently as alienable ones, eventually privileging inalienability as the

cognitive anchor of the category. From a broader theoretical standpoint, the results discussed in this dissertation appear to have direct implications for the foundational debates concerning the syntax–semantics interface and the role of conceptual knowledge in language acquisition. The specific dissociation observed in the child data, wherein the recruitment of semantic cues seems strictly contingent upon the syntactic frame, offers a vantage point to evaluate and potentially reconcile two competing theoretical frameworks: the generative and the usage-based approaches.

A generative interpretation, such as the one proposed by Eisenbeiß (2009), would posit that children’s grammars likely encode abstract structural distinctions from the onset of combinatorial speech. Under this view, the distinct processing patterns observed in Experiment 4 might arise because the two syntactic frames map onto fundamentally different structural representations. Predicative possession (*X ha Y*) corresponds to eventive relational structures involving the assignment of thematic roles (e.g., agent/theme) by a verbal head. Consequently, conceptual cues like animacy and alienability would not be part of the grammar per se, but would influence processing precisely when the structure requires thematic interpretation and argument linking. In contrast, attributive constructions act as modifiers that background the possession relation within a DP structure, thereby structurally attenuating the relevance of these conceptual cues. The data align with this view insofar as they demonstrate a systematic structural constraint: the presence of structured grammatical representations appears to dictate when conceptual information becomes relevant for the parser.

Conversely, a usage-based interpretation (e.g., Tomasello, 2003) would emphasize that children learn mappings between forms and functions probabilistically. In this framework, acquisition begins with a reliance on conceptual heuristics derived from the statistical regularities of the input. Development is characterized by the gradual abstraction

from these item-based constructions toward more generalized schemas. The findings find support in this framework as well, particularly in the developmental trend observed: Younger preschoolers appear to rely on broad conceptual heuristics (e.g., the “control” bias in predicatives: owners are animate agents), but progressively attenuate their reliance on such biases as grammatical knowledge consolidates between ages 3 and 5.

While the results are compatible with elements of both approaches, neither framework alone seems to fully account for the dynamic interplay observed. The strict structural constraint (generative) does not easily explain the developmental attenuation of the semantic effect, while the probabilistic account (usage-based) does not fully explain the sharp dissociation between frames at such an early age. We therefore propose a “third way” rooted in a processing perspective. In this view, the child might be best understood neither as a mere executor of innate rules nor as a pure statistician, but as a cognitive economizer.

The data suggest that biological constraints, specifically the ontological salience of animacy, interact with environmental input to optimize processing resources. It is plausible to hypothesize that when the child encounters a structure imposing a high computational load, such as the predicative assertion (which requires active constituent integration and thematic role assignment), the system strategically recruits semantic scaffolds. The “rigidity” observed in the predicative condition would thus not reflect a representational deficit, but an efficiency strategy: The child likely uses the “semantic prototype” (animate agent + alienable object) to circumvent the heavy computational cost of semantic and syntactic variety. Conversely, in structures where the processing load is presumably lower (e.g., attributive chunks), this semantic recruitment appears to be suppressed. This perspective attempts to reconcile the two traditions: It accepts the generative premise that structure constrains interpretation, while acknowledging the usage-based insight that early processing is driven by heuristics. The original contribution of this work lies in identifying

processing economy as the potential mechanism governing the interaction between these two forces. Possession thus emerges as a critical testing ground for the interface between conceptual cognition and grammatical encoding, suggesting that the developing mind integrates biological biases with linguistic structure to achieve computational efficiency.

6.4 Limitations

While the experimental design employed in this doctoral work allowed for a controlled investigation of the interplay between syntax and semantics, certain methodological and theoretical limitations must be acknowledged to properly contextualize the findings. These constraints concern both the measures employed and the operationalization of the variables.

A primary methodological constraint pertains to the temporal resolution of the online metrics used across the studies. In Experiment 4, reaction times measured via a picture-selection task represent a composite metric. The recorded latency inevitably conflates purely linguistic processing with extraneous cognitive components, including visual search strategies, decision-making processes, and motor execution. This “compound” nature of the measure may introduce noise, potentially masking subtler morphosyntactic effects or diluting the strength of the associations with linguistic predictors. Similarly, regarding the adult studies (Experiments 2 and 3), while self-paced reading provides a window into real-time processing, it remains a relatively coarse-grained measure compared to continuous recording techniques. Relying on explicit motor responses, this method does not capture regressive eye movements or the reaction for every single word of the phrase. Consequently, while the data successfully identify that a processing cost exists at specific sentence regions, they offer limited insight into the precise millisecond-by-millisecond time course of syntactic-semantic integration, leaving open the question of whether the observed effects are truly incremental or reflect post-interpretative processes.

A second significant limitation, common to all experiments reported here, is the lack of discourse context. In natural communicative exchanges, possessive constructions rarely appear in isolation; they serve crucial pragmatic functions, such as reference tracking and establishing topic continuity. By presenting decontextualized sentences, the current design isolated the structural contribution of syntax but necessarily stripped away the pragmatic cues that often disambiguate possessive relations in natural speech. Consequently, the results reflect sentence-level processing mechanisms rather than full discourse dynamics. It remains to be determined whether contextual salience, for instance, a preceding context that highlights a specific possessor, might interact with or even override the sentence-internal semantic constraints of animacy and inalienability observed in this work.

Finally, a theoretical limitation concerns the operationalization of the variable *alienability*. For the purposes of experimental contrast, this variable was treated as a binary factor (inalienable vs. alienable). However, extensive typological and functionalist research suggests that possession is better construed as a continuum or a scalar hierarchy, wherein relations vary significantly in degrees of control, physical intimacy, and replaceability. By dichotomizing this variable, the study may have overlooked graded effects.

6.5 Future Directions

The limitations outlined above naturally inform future avenues of research, which should aim to verify the robustness of the “processing prototype” hypothesis through more granular methodologies and broader typological scopes.

To address the issue of measurement, future investigations would benefit from adopting different methodologies. For the child population, the visual world paradigm (eye-tracking) would be particularly informative. Unlike reaction times, which capture the endpoint of the decision process, measuring anticipatory eye movements upon hearing the possessor would provide a clearer picture of incremental comprehension, revealing whether semantic

facilitation effects occur immediately upon lexical access. For the adult population, electroencephalography (EEG) could elucidate the neural signatures of the observed effects. Investigating event-related potentials (ERPs), such as the N400 or P600, would help determine whether the cost of processing a “non-prototypical” possession, such as an inalienable object in a predicative structure, is treated by the brain primarily as a semantic anomaly or as a syntactic integration difficulty. Finally, to establish a directly comparable metric across age groups, future research should implement a word-by-word Self-Paced Listening task for both adults and children. By adopting a unified auditory methodology that measures incremental processing times segment by segment, it would be possible to directly align the adult and child data. This would eliminate the modality confound (reading vs. listening) and clarify whether the developmental differences observed are due to genuine processing strategies or simply artifacts of the task demands.

Moreover, the timeline of this cognitive maturation offers a compelling avenue for future investigation. Since the current study highlights a stark contrast between pre-schoolers and adults, pinning down exactly *when* this transition occurs represents a key objective for subsequent studies. Future research could therefore target intermediate age groups (such as late childhood (8–10 years) and early adolescence) to map the developmental shift. Investigating these transitional stages would clarify whether the acquisition of adult-like sensitivity to semantic cues is a gradual process driven by accumulated linguistic exposure, or a more abrupt reorganization of the processing system triggered by cognitive development.

Furthermore, future research should move beyond isolated sentences to explore discourse-level processing. Integrating these structures into naturalistic narrative contexts could reveal how information structure modulates the “processing prototype.” It is plausible that strong discourse salience could facilitate even non-prototypical relations, thereby testing

the plasticity of the constraints identified in this dissertation. Finally, to capture the scalar nature of possession, future work should exploit graded manipulations of alienability and expand the typological scope to include split-possessive languages, where the distinction between alienable and inalienable possession is morphologically encoded. Such cross-linguistic data would be pivotal to determining whether the processing constraints identified here represent universal cognitive biases or language-specific adaptations.

6.6 Conclusion

In conclusion, the present doctoral dissertation provides the first systematic evidence within the Italian context that the comprehension of possession is not a monolithic process but is structured by the dynamic interaction of syntactic architecture and conceptual knowledge. Rather than demonstrating a simple sensitivity to multiple factors, the results reveal a hierarchical organization: syntactic structure acts as a “gatekeeper”, determining when conceptual cues are recruited to support processing.

Crucially, the cross-sectional comparison provides empirical grounds to propose a refinement of the possessive prototype itself. The data suggest that the semantic core of the category undergoes a qualitative shift. The child’s prototype appears to be defined by *control*: It is anchored to the event structure of the verb *to have*, privileging relationships wherein an animate agent manipulates an alienable object. Conversely, the adult’s prototype appears to be reconfigured around *intrinsic connection*: the mature system privileges inalienable relations, likely reflecting a conceptual organization centered on the self rather than on physical control. While animacy remains a constant anchor across development, the feature specification of the object shifts from transferability (alienable) to inherent stability (inalienable).

Developmentally, this corresponds to a clear pattern. Preschool children utilize these conceptual cues to guide the interpretation of costly syntactic structures. However, within a few years, they begin to reduce reliance on these heuristics, shifting from concept-driven strategies toward more uniform, grammar-driven processing. This shift bridges the gap to the adult system, which integrates semantic information not to scaffold basic comprehension, but to optimize interpretation based on the mature prototype of inalienability. They question rigid modular accounts, which posit that semantic information cannot influence early syntactic parsing, by showing that high-cost structures (predicatives) trigger immediate semantic effects. Simultaneously, they refine purely usage-based or probabilistic accounts by demonstrating that this sensitivity is not ubiquitous, but strictly constrained by structural cohesion (as seen in the “gating” effect of attributives).

Crucially, a supplementary unified analysis in the children study (see p. 180) has further refined this picture. By comparing the two structures directly, it emerged that syntax does not simply block semantic access, but modulates it: the unified model suggests that while predicative structures prioritize Animacy, attributive structures show a specific sensitivity to Alienability. This indicates that the syntactic structure plays an active role in highlighting which aspect of the possessive relation (the agent or the intrinsic link) is prioritized during interpretation. This issue remains a fertile ground for further investigation.

These findings challenge existing models of the syntax-semantics interface. Ultimately, these findings highlight possession as a fruitful testing ground for understanding the architecture of the language faculty. They suggest that the “prototype” may not be a static lexical definition stored in the mental lexicon, but a dynamic processing variable: a configuration of conceptual cues that the mind recruits strategically: first to support the acquisition of syntax through the semantics of control, and later to represent the cognitive human reality.

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