



## The Directionality of Possessive ('s) and (of) Constructions in the English Language and its Cognitive Effect on Students' Learning

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### Abstract

Students are often accused of their slow learning, but throughout all this time, we have overlooked an important point: the design of the curriculum materials, which may be the reason behind mental burden and learning problems. To study this phenomenon, we adopted one of the linguistic cases of possessive constructions: the Saxon genitive ('s) which curricula emphasize on and clarify it and the of-construction which neglecting. This omission, despite the form's real-world existence, causes significant confusion and confusion for learners meeting it. While often semantically they corresponding, these assemblies are differ in their linear directionality, which may impose varying levels of mental effort and need diverse conceptual scanning processes. The study focuses on a sample of 30 2nd intermediate female students. Using an adapted subjective rating scale based on Kirschner et al. (2012), The teacher measured time and effort through observation and calculated the time has been required to comprehend the two sentences in the form by using a wristwatch. students showed perceived mental effort and directional sense for target sentences that expose to it. Results showed a statistically significant difference in effort of comprehending the content of sentences, in one hand the s-genitive shows the vast majority of students (80%) found it required "very little effort" and take (3-5 seconds)," with only (20%) reporting "very much effort" and take (7-10 seconds) to comprehend the content of target sentence. on other hand the of-construction, the ratio was nearly inverted, with (63%) reporting "very much effort" and take (7-10 seconds) and only (37%) reporting "very little effort" with (3-5 seconds). Directionality judgments were inconsistent across both structures, students took varies time to identify their sense of directionality of sentences. The findings propose that linear directionality and constructional familiarity significantly affect cognitive burden during language comprehension. The study comes concludes with and recommendations for curriculum design informed by cognitive linguistics principles to optimize instructional efficiency.

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## المخلص

غالباً ما يُعزى بطء التعلّم إلى قدرات الطلاب الذاتية، في حين يُغفل جانب جوهرى يتمثل في "تصميم المناهج الدراسية" وما قد تسببه من عبء ذهني ومعوقات إدراكية. تسعى هذه الدراسة إلى تقصي هذه الظاهرة من خلال تسليط الضوء على إحدى القضايا اللغوية في التراكيب الإضافية (الملكية): "صيغة الملكية بالـ (S) اللاحقة- (Saxon genitive) "التي تركز المناهج على إبرازها وشرحها- مقابل "صيغة الإضافة باستخدام (of) التي يطالها التهميش المنهجي. إن هذا الإغفال، رغم الحضور الفعلي للصيغة الأخيرة في الواقع اللغوي، يؤد ارتباكاً ملحوظاً لدى المتعلمين عند مواجهتها.

وعلى الرغم من التطابق الدلالي بين الصيغتين في كثير من الأحيان، إلا أنهما تختلفان في "الاتجاهية الخطية (Linear Directionality)، مما قد يفرض مستويات متفاوتة من الجهد الذهني ويتطلب عمليات "مسح مفاهيمي" متباينة. أُجريت الدراسة على عينة من (30) طالبة في الصف الثاني المتوسط، وباستخدام مقياس تقدير ذاتي مُعدّل (Subjective Rating Scale) استناداً إلى كيرشنر وآخرون (2012). كما قامت الباحثة برصد الوقت والجهد المبذول عبر الملاحظة المباشرة وحساب زمن الاستيعاب الفعلي للجمل المستهدفة باستخدام ساعة يد.

كشفت النتائج عن وجود فروق ذات دلالة إحصائية في الجهد الذهني المطلوب لاستيعاب محتوى الجمل؛ حيث أظهرت النتائج أن الأغلبية الساحقة من الطالبات (80%) وجدن أن صيغة الملكية بالـ (S) تتطلب "جهداً يسيراً جداً" وزمن استجابة يتراوح بين (3-5 ثوانٍ)، بينما أفاد (20%) فقط بحاجتهن لـ "جهد كبير" وزمن استجابة (7-10 ثوانٍ). وفي المقابل، انقلبت النسب تقريباً عند التعامل مع صيغة (of)؛ إذ سجلت (63%) من الطالبات بذل "جهد كبير جداً" واستغرقن (7-10 ثوانٍ)، بينما لم تتجاوز نسبة من وجدنها يسيرة (37%). كما اتسمت أحكام "الاتجاهية" بعدم الاتساق في كلا التركيبين، وتفاوتت المدد الزمنية التي استغرقتها الطالبات لتحديد الاتجاهية المعنوية للجمل.

تخلصت الدراسة إلى أن "الاتجاهية الخطية" تؤثر بشكل جوهرى على العبء المعرفي أثناء الاستيعاب اللغوي. وتنتهي الدراسة بتقديم جملة من التوصيات لمصممي المناهج، تستند إلى مبادئ اللسانيات المعرفية، بهدف تحسين كفاءة العملية التعليمية

### Table of Contents

#### Table of Abbreviations

#### Section One: Introduction

- 1.1 Background and Problem Statement
- 1.2 Research Questions
- 1.3 Research Aims
- 1.4 Hypotheses
- 1.5 Scope and Limitations
- 1.6 Significance of the Study
- 1.7 Procedures Overview

#### Section Two: Definitions and Overviews

- 2.1 Genitives ('s) and of-Construction
- 2.2 Genitives ('s) Versus of-Construction
- 2.3 Cognitive Directionality and Mental Scanning
  - 2.3.1 Mental Scanning Kinds
    - 2.3.1.1 Sequential Scanning (Process)
    - 2.3.1.2 Summary Scanning (or Holistic Scanning)
- 2.4 Cognitive Directionality and the Reference Point Relationship
- 2.5 The Cognitive Linguistics Perspective: Reference Points and Mental Scanning
- 2.6 A Cognitive Linguistic Analysis: Reference Points and Directionality
- 2.7 Cognitive Linguistics vs. Other Schools on Possession
- 2.8 Cognitive Load and Mental Effort in Learning

#### Section Three: Methodology

- 3.1 Research Design
- 3.2 Participants
- 3.3 Materials

3.4 Instrumentation and Data Collection  
3.5 Data Analysis

Abbreviation / Acronym	Full Form / Meaning	Context / Field of Study
CL	Cognitive Linguistics	Theoretical Linguistics Framework
CG	Cognitive Grammar	Sub-field of CL
GG	Generative Grammar	Theoretical Linguistics Framework
SFL	Systemic Functional Linguistics	Theoretical Linguistics Framework
EEG	Electroencephalogram / Electroencephalography	Measurement Tool / Neuroscience
NP	Noun Phrase	Syntax
R	Reference Point	Cognitive Grammar
T	Target	Cognitive Grammar
D	Dominion	Cognitive Grammar
T/L	Trajector/Landmark (Alignment)	Cognitive Grammar
H1, H2, H3	Hypothesis 1, Hypothesis 2, Hypothesis 3	Research Methodology
e.g.	<i>exempli gratia</i> (for example)	General Academic Writing
i.e.	<i>id est</i> (that is)	General Academic Writing
p.	page	Citation
pp.	pages	Citation

cf.	<i>confer</i> (compare)	General Academic Writing
vs.	versus	General Academic Writing
NP's N	Noun Phrase's Noun (structure of (s(-genitive)	Syntax
N of NP	Noun of Noun Phrase (structure of <i>of</i> -genitive)	Syntax

#### Section Four: Results and Discussion

##### 4.1 Presentation of Data

##### 4.2 Analysis of Mental Effort (Research Question 1)

##### 4.3 Analysis of Directionality (Research Question 2)

##### 4.4 Analysis of Time and Overall Discussion (Research Question 3)

##### 4.5 Limitations and Implications for Future Research

#### Section Five: Conclusions and Implications

##### 5.1 Conclusions and Educational Implications

##### 5.2 Final Reflections

#### References

##### Table of Abbreviations

#### Section One: Introduction

##### 1.1 Background and Problem Statement

The English language suggests multiple grammatical ways to form a single semantic notion, a feature that presents both a richness and a challenge for students. Among these are the two main possessive constructions units: the genitive ('s), as in "the surgeon's wife," and the periphrastic unit *of*-construction, as in "the wife of the surgeon." From a purely semantic view, these constructions are often switchable, signifying a relationship of possession between two linguistic entities (the possessor and the possessum). However, from a cognitive linguistic perspective, they represent distinct conceptualisations entities that may engage different mental processes and mechanism (Langacker, 2008).

A vital concept of cognitive linguistics is that syntactic assemblies are not arbitrary but are motivated by conceptual patterns and the embodied experience of humans (Langacker, 1987; Talmy, 2000; Langacker, 2008). A key code is that the linear order of elements in an utterance can be a reflection of a corresponding conceptual order, as prompted by how a scene is mentally scanned and structured. The s-genitive and the *of*-construction offer a perfect case of linear contradiction: the possessor precedes the possessum in the former, while this order is reversed in the latter. This vital alteration in "cognitive directionality" might have tangible effects on processing , possibly increasing mental effort and comprehension time for learners (Harrison et al., 2014).

This study tries to quantify the cognitive cost and mental directionality of word-order contradiction in semantically equivalent possessive constructions, to argue that some linguistic form can imposes a measurable processing load independent of meaning, impacting learning efficiency. To accomplish this, we adopted two structures in the English language: the Saxon genitive ('s) and the *of*-genitive entities. While they often show interchangeable nature at a semantic level (e.g., "the car's door" vs. "the door of the car"), but these constructions are echo different conceptual schemas and meaning , specifically involving a reversal in **directionality** and **reference point organization** in (Langacker, 1993). While the car in the first sentence is the focus of attention, in the second sentence it is the car's door. So, while there

is analogous of the meaning ,but they reflect different mental concepts. From an educational side, these structural changes present a potential learning variable. If distinct mental mechanism are need to process these forms, they may impose different levels of **cognitive burden** (Sweller, 1988), which could affect learning competence.

The problem this research addresses is the lack of empirical, classroom-based studies investigating the cognitive consequences of curriculum design, its content, and its mental load on student understanding and learning processing of this structural difference in school curricula. Preliminary reviews of the English for Iraq 2<sup>nd</sup> intermediate activity book indicate that while the 's-genitive is introduced by books and teachers , the possessive use of the of-construction still is not explicitly taught, potentially making it a novel and more challenging structure for students when they face it through their curriculum specially they serve the same semantic goal .

This research is important because understanding these concepts can help address learning challenges by applying cognitive science to educational frameworks. While theoretical linguistics has extensively described these constructions, and cognitive linguistics has proposed models like the reference-point relationship to explain them (Langacker, 1993), there is a gap in applying these theories to measure their direct impact on student learning. Understanding whether one construction is cognitively more demanding than the other can provide valuable insights for language pedagogy, curriculum design, and materials development.

For this purpose, the research has designed a statistical form relying on the idea of mental effort by Kirschner et al. (2012), to test 30 second-intermediate class students at Zaha Hadid High School. The goal will be to examine their senses of effort and directionality with possessive constructions mentioned before, and then analyse the results to determine if there are difficulties, mental direction, and effort from these constructions and if affect learning time .The researcher used observation of the students and the time ( by watch )that require to distinguish meaning and directionality of linguistic unites and determine the time that is needed to cognize the meaning, due to a lack of specialized equipment (Electroencephalogram (EEG)

### 1.2 Research Questions

This study is guided by the following research questions:

1. Is there mental effort required to comprehend the s-genitive and of-construction among second -year middle school students, and if it is differ ?
2. Does students distinguish the sense of the directionality of the relationship between possessor and possessum in these two constructions?
3. What is the relationship between the type of possessive construction and the observed time that could be taken for comprehension the mentioned structure ?

### 1.3 Research Aims

This research aims to:

- 1.Count and compare mental effort that required to comprehend the s-genitive and of-construction among second -year middle school students on a learner. Based on the principles of Cognitive Grammar parameters of reference point relationships and mental scanning to analyze possessive constructions and the notion of cognitive burden (Sweller, 1988)using the notion mental effort by Kirschner et al. (2012)
2. Gather preliminary data on the perceived cognitive burden linked with s-genitive and the of-construction .
- 3.Explore the relationship between syntactic form and learning difficulty, independent of semantic content.

4. Discuss the implications of these outcomes for English language teaching and curriculum design.
5. Distinguish the sense of the directionality of the relationship between possessor and possessum in these two constructions.

#### 1.4 Hypotheses

We hypothesise that:

- **H1:** The *of*-construction will be allied with a considerably higher rating of mental effort compared to the *s*-genitive.
- **H2:** Students will show more understand and precise judgments of directionality for the *s*-genitive than for the *of*-construction.
- **H3:** The comprehension time for sentences using the *of*-construction will be longer than for those using with the *s*-genitive.

#### 1.5 Scope and Limitations

This is an exploratory, small-scale study. Its limitations are acknowledged:

1. **Sample:** The sample is small group of 30 female students from the second intermediate class , limiting generalizability.
2. **Prior Knowledge:** The study does not control for students' prior knowledge or familiarity with the *of*- genitive, which could confound results.
3. **Cognitive Measure:** Mental effort is measured subjectively via self-report through teachers' observation of students and time measure through (wristwatch), which, while validated in other contexts (Paas & Van Merriënboer, 1993), but in a same time can make lack of the objectivity of physiological measures like EEG or response time analysis.
4. **Lack of Control Group:** The design does not include a control group or a pre-test/post-test experimental intervention, preventing causal conclusions  
These limitations are not fatal but frame the findings as preliminary and highlight directions for future research.

#### 1.6 Significance of the Study

This research try to treat the gap between theoretical cognitive linguistics and applied educational practice in the field of educational curriculum. By giving empirical data on the cognitive reality of linguistic structures, it offers several contributions:

- **Theoretical Validation:** The study serves as a test for cognitive linguistics statements concerning conceptualisation and mental scanning, moving from theoretical hypothesis to classroom-based evidence.
- **Pedagogical Application:** Results can help teachers and curriculum designers about the possible cognitive difficulties of certain linguistic structures, allowing for more targeted and efficient instruction.
- **Methodological Contribution:** It proves we can use a simple, scalable tool for assessing subjective cognitive burden in a language learning context.

#### 1.7 Procedures Overview

To achieve its aims, this study will follow a mixed-methods approach:

1. Presenting a theoretical framework of possessive constructions and the Genitive ('s) and the *of*-construction from both traditional and cognitive linguistics perspectives .
2. Adopting Kirschner et al. (2012) of mental efforts modal.
3. Designing a statistical form as in figure (3.2) to measure students' effort and sense of direction of Genitives('s) and *Of*-constructions in the scope of Cognitive linguistics by expressions "very little effort" mean (easy) and " very much effort" mean(not easy) depend on

Kirschner, et. al's (2012) with direction arrow to depict the sense of directionality that students have

4 . Observe the time and the mental effort that are needed of 30 students from the second intermediate classes at Zaha Hadid School, while they try to comprehend the meaning and the directionality of the target sentences of ( Genitives('s) Of-construction).

5. Observing the required time needed by the student for comprehension of the meaning, when identifying who is the owner and who is owned, and the directional relationship that governs them, by the teacher's wristwatch.

6. Analysing the selected data in the light of the selected model.

7. Drawing conclusions and stating recommendations and suggestions for further studies.

### Section Two; Definitions and Overviews

#### 2. 1 Genitives ('s) and of-construction :

According to Vallejos (2016,p.2) possession is a ubiquitous phenomenon that can be manifested linguistically .Merriam-Webster Dictionary clarifies possession aspect as: "1) a: the act of having or taking into control; b: control or occupancy of property without regard to ownership c: ownership; 2) something owned, occupied, or controlled"(https://www.merriam-webster.com). Creissels (2006, p. 143) specifies possessive relations as the “inclusion of an entity (usually called the possessum) within the personal ambit of an individual (usually called the possessor).”

Lehmann's (2002,p.5) believes that possessive is built on the default assumption of control idea of the possessum by the possessor which raises the metaphorical interpretation of the possessive relation. Radden and Dirven (2007,p.343) argues that "The possession schema describes situation holding between a possessor and a thing possessed ". Possessive relation links a possessor to a thing possessed. In the English language, the possessor is represented as *a pronoun or genitive noun* preceding the noun conveying the possessed aspect, as in my mum's house. The possessor is the thematic role expressing the human being who owns and manages a thing (ibid.)

Possession linguistically can be released as: possessive (s) which is also called possessive genitive or (Saxon genitive) is a construction in English that does not exist in some other languages, and also can be manifested as noun phrases, pronouns (mine, hers, yours, etc.), interrogative by( whose ?). Possessive phrases act just like one word as a noun or noun phrase ending in -'s or -s' (https://grammar.collinsdictionary.com). It can also occur as linguistic parameters' relations: phonetic, morphological, syntactic, lexical variety, and genitives (Jucker, 1993).On a semantic level, a possessive fabric in general, is entangled by three main parts: two main entities: the possessor and the possessum, and a relation between them. The possessive form is used when you want to show ownership by one noun (person, place, or thing) over another (https://www.strose.edu). Structuralist school and modern syntacticians do not contradict Langacker's opinions ,for instance, Chomsky (2002), believe that there is some conceptual meaning which is general enough to cover all the various usages of the genitive .As a result of these arguments, possessive expressions emerge from conceptual integration of the meaning structures of the two-component items, namely: possessor and possessum (Alaa,2019,p.115-116). Alaa arhues that possession concept is an essential part of human cognition (ibid).on the other hand, Purwanto, K. D. (2017,p.29-38) shows that there is a major role of mental activity that played on the process of language acquisition. The processes according to him include speaking or writing, and any mental activities will be reflected in the language we will perform.

In this study, we will deal with two main forms; the of-construction phrase and the genitive ('s),(s') An apostrophe form and the letter s add to the end of nouns, such as: "a mother's love". while the of-construction is made from a phrase followed by the preposition of and its complement: "The roof of the car." There is a clear interchangeability between the s-genitive and the of-genitive in areas of possession but with specific constraints .

## 2.2 Genitives ('s) Versus of-construction

Quirk et al. (1985,p.320) express two shapes of the inflected genitive form with singular and zero endings that occurs with a plural as in (2.1) or singular end with (s) as in (2.2), but it also can occur with an irregular plural such as (2.3).

(2.1) *The cats' food* (2.2) *for goodness' sake* (2.3) *The mice's misfortunes*

On another hand, Quirk think that the form of the of-construction is less complex since it always shows the same behavior, as shown in (2.4) and (2.5), nonetheless of the regularity or irregularity of the modifier. Altenberg (1982, p. 13) comments that the inflected genitive worked as a premodifier, while the of-construction worked as a post-modifier.

(2.4) *The food of the cats*

(2.5) *The misfortunes of mice*

In English, prepositions play a vital role in representative possession or relationship between objects or entities,"of," which means "belonging to," "owned by," and "possessed by."(wada, 2002,p.78)

According to A University Grammar of English (Vannestål, 2007) the s-construction basically tends to be used with humans, animals or geographical names. While on the other hand, the of-construction is used "when the 'possessor' is not a person, animal, collective noun or geographical name" more specific objects (Vannestål, 2007,p.119). Anderson (2013,p.2-3)Considers this phenomenon as one of the characteristics of the English language among other languages that it lacks, it can be used to indicate possession by a single word or phrase and he adds some instances to explain this case:

(2.6) *[Fred]'s opinion about the English genitive is different from mine.*

(2.7) *[the man on the Clapham omnibus]'s opinion about the English genitive is poorly thought out.*

Haiman's (1983,p. 781-819.) considers semantic scope plays a major role on genitive construction which builds on the convergence of the meanings. The greater the convergence in meaning between the possessor and the possessum, the higher the probability that the(s-genitive) construction will emerge. On other hand, if the possessor and the possessum do have not proximate content, then the (of-genitive) is the better choice (ibid).

## 2.3 Cognitive Directionality and Mental Scanning

Cognitive Directionality and Mental Scanning are vital in Cognitive Grammar scope , showing that the choice of expression imposes a specific internal construal on the conceived content (Langacker, 2008, p. 31, 82).

### 2.3.1 Mental Scanning Kinds

Mental Scanning is the essential cognitive processes when we mentally navigate a conceptual scene and emerges whenever the conceptualiser tries to form a full conception of the profiled relationship, or build a mental image of the text. It is tracing text's mental paths through every direction, which determines by the text's content. Mental scanning is not always followed linearly way, sometime the same spatial configuration has opposite contents that can only locate by the virtue of Mental scanning. (Langacker,2013,p.82).

For Langacker ,mental scanning is part of construal any domains such as visual, spatial or temporal, linguistic or non-linguistic, and so on. Mental scanning is essential to the nature of the senses in many expressions. It could be reflected in their form as in :

( 2.8 ) *I'll never get into a size 8, and a size 9 is probably still too small* (ibid.).

In the above example, the conceptualiser scans through a series of different sizes by using an expression of temporal that indicates stability in time to express spatial sense. This would arouse subjective construal. *Still* stimulates the conceptualiser to scan the sizes mentally as a spatial sense, but it basically designates persistence in time. Again this profiling of senses creates subjective construing of the expression since it indicates the insufficient *size* as persisting through *processing time* instead of through *conceived time(object)*(Langacker,2013,p.82\_83). . Different kinds of mental scanning are involved in the construal of any situation which includes: *summary scanning, sequential scanning, and a reference point relationship*

### 2.3.1.1 Sequential Scanning (Process)

*sequential scanning* is the processing that emerged whenever we track a change or event through time, and associated with processing time. In this mechanism, *the component entities* are mentally accessed **one by one** through processing time "in the order of their occurrence through conceived time"(Langacker 2008,p.111).In sequential scanning, just one component entity is highly activated between other entities at a given processing moment, and are successively accessed through processing time(ibid.).

Langacker claims that,sequential scanning can apply to any type of text whether it is *observed, remembered, or imagined, (verbal or non-verbal)*, and it is part of any viewing arrangement relationships (2008,p.111). This mental process is an essential part of any observable event or image as shown in Figure (2.1) . For instance, in *a golf ball is rolling on greenfield*, in the reality scene, the ball is viewed only in one position at each moment of time, while this scene consists of solo sequential mental images called component states which are put together in the precise sequence of their temporal manifestation to form the final scene (ibid.). This kind of scanning takes place every time we profile a process, for instance, that coded by verbs of motions as 'moved'( Harrison, et al.,2014,p.9).

### 2.3.1.2 Summary Scanning (or Holistic Scanning)

Langacker (2008,p.107-111) statements that *summary scanning* surveys numerous entities in a cumulative way to collect them in one frame . They form in a group but as a single gestalt comparable to one interconnected *Jigsaw puzzle image* in one frame. Through this device, it can profile 'things' in the processing of nominals, for instance, *a cloud*, or static relationships as *the cloud above the city* ( Harrison, et al.,2014,p.9). Summary scanning is not restricted to verbal texts,we use summary scanning to depict any concept or series pieces of action mentally to shape them as solo image such as *a golf ball rolling on greenfield*. Visually, summary scanning helps us to trace goofball's motion mentally and represent its trajectory as a line of sequent images to get the final form as shown in Figure (2.1)which shows the final image that shows the ball in all positions simultaneously ( Langacker ,2008,p.112).

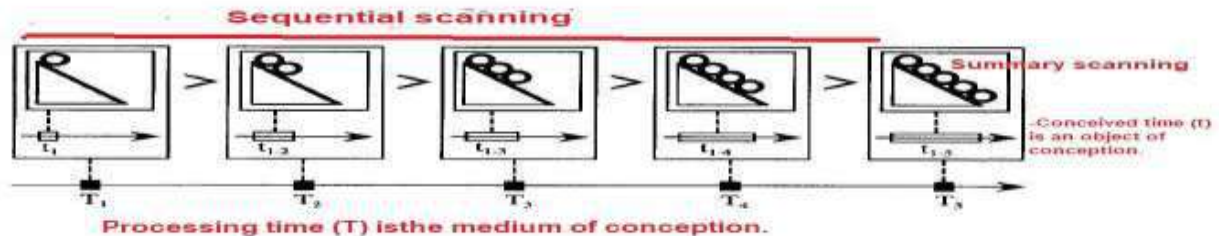
*Sequential and summary scanning* are two facets of the normal conceived of events. Sequential scanning deals with the real-time conceiving experience, and the successive entities are retained in short-term memory on the other hand,*summary scanning* is the end photo (ibid.,p.111-112) .In many cases, the same profiled content can be construed in either manner (dynamically or holistically) reliant on the kind of scanning adopted in its mental access ( ibid.). Compare the alternative construals based on( Harrison, et al. ,2014,p.9).

(2.9) (a) *The rain fell heavily.* (b)*There was a lot of rain.*

While the rain in (a) is depicted dynamically, in (b) the various positions add into a single gestalt within this trajectory which can be conceived in a holistic manner, as a multiple-

exposure photograph. In its simplest terms, the dynamicity of a construal is a matter of prominence ( Harrison, et al.,ibid.).

**Figure (2.1 )** shows The Temporal Dimension and the process of forming mental image of the ball with all its locations ( Langacker,2008,p.112)



#### 2.4 Cognitive Directionality and the Reference Point Relationship

This scanning operation is basically related to *Cognitive Directionality*, which is realized by the *Reference Point Relationship* (or Trajector/Landmark—T/L Alignment). The T/L alignment orders the asymmetrical path of conceptual access: the Trajector (T) is the figure of conceptual focus, while the Landmark (L) acts as the steady reference point for locating T. This affords the inherent directionality to all relational concepts (Langacker, 2008, p. 86).

**Example:** The semantic difference of *before* and *after* hinges totally on this directionality and the sequence of scanning:

(2.10) *Monday before Tuesday:* Here, Tuesday acts as the Landmark (L), and we sequentially scan backward from it to locate Monday (T).

(2.11) *Tuesday after Monday:* Here, Monday is the Landmark (L), and we sequentially scan forward from it to locate Tuesday (T).

The conceptual content remains constant, but the grammatical choice dictates the necessary path and direction of mental scanning (Langacker, 2008, p. 82, 111). These phenomena approve that grammar is a deeply meaningful reflection of our fundamental sensorimotor experience.

#### 2.5 The Cognitive Linguistics Perspective: Reference Points and Mental Scanning

Langacker (1993, 2008) suggests that possessive constructions are essentially instance of a **reference point relationship**. In this model, the conceptualizer first guides their attention to a *salient entity*, the **reference point** (R), because it is easily accessible and nearby. This reference point then offers mental access to a **target** (T), which is the actual target entity being referred to, within a certain conceptual region, which is called the **dominion** (D).

Let's apply this model:

Depending on Langacker's work, linguistically, the reference point can appear in parallel with many linguistic units as possessive, as in the following instances(2.12);(2.13) . shows the difference in directionality between two sentences that present the same content but with different focal marks(Langacker,2008,p.83

(2.12) *The surgeon's wife just filed for divorce.* (2.13) *The wife of the surgeon just filed for divorce.*

- In the phrase "**the surgeon's wife**," *the surgeon* acts as the reference point (R). The conceptualizer uses this salient entity to establish mental contact with the target (T), *the wife*, within the dominion of things associated with the surgeon.
- In the phrase "**the wife of the surgeon**," the linear order is reversed. The initial focus now is on *the wife*, but the possessive scope still needs to the conceptualizer to access *the surgeon* as

the reference point to totally comprehend the connection. This needs a form of mental "zigzag" or retrograde mental scanning (foreword and backward) (Langacker, 2013, p. 82), where the initial focus must be mentally linked to a previously unmentioned entity.

This alteration in conceptual access is hypothesized to have cognitive consequences. While the ('s)-genitive's linear structure (R -> T) is argued to be more direct and aligned with a default scanning direction. In contrast, the *of*-construction's assembly (T -> R) involves an additional cognitive operation to resolve the directionality, potentially increasing cognitive load.

### 2.6 A Cognitive Linguistic Analysis: Reference Points and Directionality

Possession is a vital cognitive and linguistic area, classically including a relationship between a **Possessor** and a **Possessum** (Langacker, 1995). In English, this relationship is usually coded syntactically in two ways: the inflected Saxon genitive (NP's N) and the periphrastic *of*-genitive (N of NP). From a cognitive viewpoint, these two assemblies are not semantically equivalent; they signify different **construals** contents of the same possessive scene (Langacker, 2008).

- **The Saxon Genitive ('s):** In an expression like "the surgeon's wife," the conceptualizer first triggers the concept of the **surgeon**, which acts as a **reference point**. The mind after that scans from this reference point to locate the **target**, "the wife," within its conceptual dominion. This generates a mental path from (Possessor to→ Possessum).
- **The of-Genitive:** In the alternative construal, "the wife of the surgeon," the primary focus is on the **target**, "the wife." The conceptualizer must after that access the reference point scope, "the surgeon," via the preposition "of," which signals a reverse path. This establishes a mental path from (Possessum to→ Possessor).

This difference in **mental scanning** path is not easy. The 's-genitive is a recognisable comment structure in courses and is highly frequent, this making it easier to process. In contrast, the *of*-genitive, with its reversed directionality, may need extra cognitive operations to resolve the possessive relationship, thus increasing cognitive load (Sweller, 1988).

Cognitively, the *'s construction* (the surgeon's wife) stresses a closer, and shows more active relationship, often for **animate** possessors and highly topical items, making a quick mental link, but the *of construction* (the wife of the surgeon) makes a more distant, descriptive, or classificatory linking, common for **inanimate** items or abstract relations, which stress the possessed item (profile) over the possessor (reference point). *'s signals* displays a more direct conceptual binding sense, as possession or close connotation, while *of* establishes a looser relational frame, even if the meaning (possession) is similar

### 2.7 Cognitive Linguistics vs. Other Schools on Possession

The phenomenon of possession, embodied by the English Genitive ('s) (e.g., John's book) and the *of*-construction (e.g., the cover of the book), displays a vital difference between Cognitive Linguistics and other linguistic schools. From a Structuralist view, as in Saussurean doctrines, possession is essentially analysed as a syntagmatic relationship between two nominal elements, with the Genitive marker can be viewed as a formal, grammatical morpheme signaling this syntactic function (de Saussure, 1916/2011, p. 145).

Since the 1980s, the English possessive forms ('s and *of*) constructions) have been analysed through three distinct lenses: Cognitive, Generative, and Functional.

#### 1. Cognitive Linguistics

CL, particularly in the work of Langacker (2008) and Taylor (1996, p. 293), deals the select as conceptually motivated act. The ('s) assembly is analyzed via the Reference-Point Model, where the possessor is the mentally salient access-point used to identify the possessed item (e.g., the man's cat). The selecting is thus non-arbitrary, reflecting a continuum of

prototypicality (animate possessors prefer('s)) and conceptual prominence .The procedure of choosing between 's and of is thus not essentially syntactic, but driven by speaker-conceptualisation, impact by elements such as the prototypicality of the possessor (Genitive 's prefers animate, especially human, possessors) and the degree of conceptual nearness or control (Taylor, 2019, p. 98). While The of-construction, is often driven through another relation via the conceptual profile of a part-whole relation or an inherent assembly where the dependent element is less active or less animate (e.g., the leg of the desk), showing how diverse grammatical choices reflect diverse conceptual scenes (Lakoff, 1987, p. 75). CL commits to the notion that linguistic construction is formed by general human cognition (Lakoff, 1991). In Langacker's (CG) view, possession is a cognitive procedure placed on the conceptualisation of one entity (the Trajector) , which is mentally accessed through another entity (the Landmark) within a single Relational Profile ( 2008, p. 321).

### 2. Formal Schools (Generative Grammar)

GG, throughout the Minimalist Program (Chomsky), keeps the autonomy of syntax. Under this tent the ('s) and( of forms) are treated as the surface manifestations of underlying abstract and syntactic constructions which derived by purely computational processes . Main GG rely on heavily on the deep structure rules that made these surface forms, often dealing the('s and of)as results of a possessive transformation working on a simple underlying clause (Chomsky, 1965, p. 110).The forms are basically arbitrary invoke from the derivation of an abstract Possessor-Possessed relationship.

### 3. Functionalism

Functional methods, such as Halliday's SFL, analyse the forms by reference to the communicative functions they serve in context (Halliday, various). For SFL, the possessive is analyzed within the construing experience. The choice between ('s (prenominal) and of (post nominal) is often clarified by the way each structure packages and delivers information for textual flow and the identifiability of the possessor, aligning more closely with discourse organisation than with a rigid cognitive schema (Martin, 1992).

In short, CL focuses on mind/cognition, GG on structure/computation, and Functionalism on use/communication.

### 2.8 Cognitive Load and Mental Effort in Learning

The concept of **cognitive load** denotes to the entire amount of mental activity that imposed on an individual's working memory at a given time (Sweller, 1988). Working memory of human has limited capacity, when it is loaded, learning and task performance becomes suffer. **Mental effort** ,on other hand, is the conscious cognitive capacity assigned to meet the demands of a mission and is considered a direct associate with cognitive load (Paas & Van Merriënboer, 1993).

Kirschner et al. (2012) define **mental effort** as "the aspect of cognitive load that refers to the cognitive capacity that is actually allocated to accommodate the demands imposed by the task" (p. 2). A common way for evaluating it subjectively is a self-report scale, such as the 9-point symmetrical type scale developing by Paas and Van Merriënboer (1993), where learners rate their effort from "very, very low mental effort" to "very, very high mental effort."

Research in many fields has shown that tasks needing increased addition of disparate elements, or those have unexpected patterns, lead to higher mental effort and longer processing times (Leminen et al., 2017; Scheiter et al., 2020). In language learning, unfamiliar syntactic constructions are a known source of unnecessary cognitive load, which does not contribute to learning process and can hinder it (Sweller, 1988). The (*of*-construction) which considers less

recurrent in early language input and involving a more complex linear construction for possession, is therefore expected to be a higher cognitive load item for beginner learners.

### Section three : Methodology

#### 3.1 Research Design

This study employed a quantitative method and all students were exposed to both target conditions ((‘s -genitive )and (*of*-construction)), and their answers for each were compared.

#### 3.2 Participants

The participant group consisted of 30 female students from the 2nd intermediate school level at Zaha Hadid Outstanding School. Furthermore, the study did not control for students' prior knowledge of possessive structures or their native language background. This is to understand the general impact of any new structures on mental effort and their effect on learning speed.

#### 3.3 Materials

The materials of research used are :

1. Student textbook and student activity book for the English language course(English for Iraq ), second intermediate grade, Unit 1, Lesson 1, page 4 (School Magazine), and page 5 in the student activity book, exercise 3, as shown in the following in images (3:1).

2. The statistical form as in figure (3.2) to measure students' effort and sense of direction of Genitives('s) and Of-constructions in the scope of Cognitive linguistics by expressions "very little effort" mean (easy) and " very much effort" mean(not easy) depend on Kirschner, et. al's (2012) with **direction arrow** to depict the sense of directionality that students have

3. Wristwatch to observe the time that need to answer the questions while they try to comprehend the meaning and decide the directionality of the target sentences of ( Genitives('s) Of-construction).

**Image** (3.1) shows the student books for the English language course(English for Iraq ), second intermediate class , Unit 1, Lesson 1, page 4 (School Magazine), and page 5 in the activity book, exercise 3.



Figure ( 3. 2) show a statistical form to measure students' effort and sense of direction of Genitives('s) and Of-constructions

Form to measure effort and directionality of ( Of-construction) and s-genitive

<i>The surgeon's wife</i> just filed for divorce.		<i>The wife of the surgeon</i> just filed for divorce.			
Directionality	efforts		Directionality	efforts	
	very much effort	very little effort		very much effort	very little effort
→			→		
			←		

### 3.4 Instrumentation and Data Collection

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The primary tool was a paper-based questionnaire featuring two target sentences offering the same *factual content* using different possessive structures:

1. A (s-genitive) sentence: "**The surgeon's wife just filed for divorce.**"
2. B (of-construction) sentence: "**The wife of the surgeon just filed for divorce.**"

For each sentence, participants provided two answers:

### 1. Perceived Mental Effort

They evaluate the effort that require to comprehend the sentence on a dual scale, selecting either "very little effort" (refers to easy comprehension) or "very much effort" (refer difficult comprehension). This basic scale was adapted from scales of Paas and Van Merriënboer (1993) and Kirschner et al. (2012) to be more accessible for the young and small participants group.

### 2. Perceived Directionality

They designated the directional relationship between the possessor and possessum by drawing an arrow between the two key nouns ("surgeon" and "wife"). The options were either left-to-right ( $\rightarrow$ ) or right-to-left ( $\leftarrow$ ).

Additionally, the researcher uses a wristwatch to measuring the required time that cognitive effort required to distinguish the possessive form, comprehend its meaning, and ascertain its directionality are measured using wristwatch. A longer response time correlates with an extended learning period, indicating a need for greater cognitive effort from the student.

## 3.5 Data Analysis

The data from the finished questionnaires were tabularized. Frequencies and percentages were calculated for the mental effort and directionality answers for each sentence, to determine if the distribution of "very much effort" responses was significantly different between the two structures. Time-on-task was recorded as a total value for the questionnaire.

## Section Four: Results and Discussion

### 4.1 Presentation of Data

The data collected from the 30 students are summarized in Table (4.1) below.

**Table (4.1)** Measurement of Effort and Directionality for S-Genitive and Of-Construction

Sentence	Mental Effort: Very Little Effort	Mental Effort: Very Much Effort	Directionality: Left-to-Right ( $\rightarrow$ )	Directionality: Right-to-Left ( $\leftarrow$ )
<b>S-Genitive</b> ("The surgeon's wife...")	24 (80%)	6 (20%)	14 (47%)	16 (53%)
<b>Of-Construction</b> ("The wife of the surgeon...")	11 (37%)	19 (63%)	19 (63%)	11 (37%)

**Time** \ "very little effort" : It took approximately (3-5 seconds) of one student

\ "very much effort" : It took approximately (7-10 seconds) of one student

### 4.2 Analysis of Mental Effort aspect (Research Question 1)

The data expose a stark contrast in perceived mental effort between the two constructions. For the (s-genitive) sentence, the vast majority of students (80%) found it required "very little effort," with only 20% reporting "very much effort." Conversely, for the *of*-construction, this ratio was nearly inverted, with 63% reporting "very much effort" and only 37% reporting "very little effort."

This finding supports our first hypothesis (H1). The *of*-construction forces a higher subjective cognitive load on these learners and the researcher noted there are more visible hesitation and re-reading for the *of*-construction sentence.

This issue can be clarified by two interrelated reasons:

1. **Familiarity and frequency impact:** The (s-genitive), which is classically introduced early in English language school materials and is highly frequent in input. It is a familiar pattern for students, on the other hand ( *of*-construction ) is often met later in using as an expression of possession, and focuses more on its role as a preposition.
2. **Conceptual scanning demands impact:** In Langacker's (2008) reference point model, the (s-genitive) offers a more direct path from reference point (surgeon) to target (wife, while the( *of*-construction) , with its reversed linearity nature , needs an indirect or "zigzag" scanning manner (from *wife* back to *surgeon*), which is a less efficient and shows more effortful cognitive task.

#### 4.3 Analysis of Directionality aspect (Research Question 2)

The directionality data shows that the (s-genitive) answers are divided between left-to-right (47%) and right-to-left (53%). For the (*of*-construction), there is a clear liking for left-to-right (63%), but a considerable minority (37%) still chose the opposite direction. This does not fully support our second hypothesis (H2). Students are probable analyzing the sentences for general meaning rather than the possessive relationship.

#### 4.4 Analysis of Time aspect (Research Question 3)

The length of time that students need to figure out the meaning and construction is correlated with the higher effort for assessments of the (*of*-construction), which offers backup evidence for our third hypothesis (H3). Increased mental effort is often correlated with longer processing times, as the cognitive mechanism works harder to resolve the task (Scheiter et al., 2020).

The results designate that while students can extract the possessive meaning from both assemblies, the path to comprehension is more cognitively costly for the( *of*-construction). This has direct educational implications. It suggests that teaching or learning the ( *of*-construction) needs clear instructional support. Teachers should not suppose that because the words are simple, the structure is easy to process in mental level. Highlighting the reversed conceptual order—explaining that "the wife of the surgeon" means we are talking about a wife, and then specifying *which* wife by linking her to the surgeon—could scaffold the mental scanning process.

#### 4.5 Perceived Mental Effort

The data support the primary hypothesis. A large majority (80%) found the ('s-genitive) sentence need "very little effort," but a majority (63%) found the (*of*-construction) need "very much effort." This aligns with the theoretical claim that the reversed directionality and less familiar possessive structure of the (*of*-construction) enforces a higher cognitive load. This effect was possibly increased by the students' lack of formal instruction on the possessive (*of*-construction), causing them to process "of" in its more familiar prepositional sense.

## Section Five: Conclusions

### 5.1 Conclusions

1. The main goal of this study was to go beyond a purely descriptive aspect of English genitive acquisition and instead examine the underlying cognitive mechanism that is experienced by young learners. By analysing the interaction between syntactic form and perceived mental effort, several key insights arise that test how we approach possessive structures in the L2 classroom.

2. The findings show different cognitive load between the ('s-genitive) and the (of-construction). With 80% of participants classifying the (s-genitive) as "very little effort," it is clear that this construction has reached a level of becoming a "chunked" cognitive construction for the students. On the other hand, the (of-construction) does not show the same ease in processing. The 63% "very much effort" rating, associated with hesitations, suggests that learners are not just reading a sentence; they are dealing with a complex mental processing "re-aligning." This lends to the need for the application of Langacker's (2008) reference point model. It seems that when the linguistic input forces a "zigzag" scanning process (moving from target back to reference point), the cognitive cost increases for students who are not yet familiar with this specific conceptual schema.

3. The implications for English language teaching (ELT) are immediate. We can no longer deal with constructions as "of" and "wife" as simple vocabulary words. So as teachers, we should scaffold our teaching process (of-construction) or other complex constructions. Rather than just using a translation, teachers might use visual aids to show how we first establish the "target" and then "tether" it to a reference point. Addressing the "Of" Overload: Given that students often confuse the possessive "of" with its partitive or descriptive uses, explicit contrastive drills are necessary to help learners distinguish between these distinct conceptual domains.

4. While this study is constrained by its sample size and the subjective nature of the effort scale, the "signal" within the data is too strong to ignore. The correlation between the (of-construction) and increased mental effort is a clear call for more studies. As we move forward, the goal of linguistics should not only be to study the grammar of a language but to comprehend the "mental price" that a student pays to analyse and learn it. Only then can we design a curriculum that truly aligns with the architecture of the human mind.

This research goes beyond "possession structure" to examine the core of teaching design. Curriculum design is the primary catalyst for good learning; yet, complex linguistic density and poorly structured materials impose a cognitive load that stifles comprehension of students. Often, the curriculum itself is the true barrier. We are witnessing a massive drain on time and effort due to ineffective textbooks. We must redesign curricula to eliminate cognitive friction and ensure a seamless knowledge flow that accelerates student mastery.

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