

Beyond the Postverbal Domain:
Heavy Noun Phrase Shift in Finnish and the Effect of Constituent
Surface Position

A thesis submitted

by

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Abstract

Heavy noun phrase shift has been well examined in both the linguistic and psycholinguistic literature, and it is known that the phenomenon exhibits itself differently in different languages. In English, speakers prefer to place shorter constituents before longer ones, while Japanese speakers have the opposite tendency and arrange longer constituents first. Several theories exist to explain this cross-linguistic alternation. However, these theories focus on canonical word orders without making use of scrambled structures. Furthermore, they seem to suggest that each language follows a single linearization principle and can therefore be characterized as “long-before-short,” like Japanese, or “short-before-long,” like English.

This thesis evaluates proposals which suggest that heavy NP shift is uniquely determined in a given language. To do this, heavy NP shift is explored in Finnish structures with two object arguments. Finnish is considered SVO, but allows SOV structures and preverbal object scrambling as well. Thus, it exhibits both SVO and head-final properties that resemble those in Japanese. A sentence rating task was used to determine the preferences of native Finnish speakers for differently constructed sentences with one heavy object and one light object. The data show that objects are ordered long-before-short when they are preverbal and short-before-long in the postverbal domain, demonstrating that Finnish does not have one single heavy NP shift trend. Rather, it patterns like Japanese in the preverbal domain and like English in the postverbal. These data lead to a proposal that the surface position of constituents with respect to the predicate determine the direction of heavy NP shift. Since some languages, like Finnish, allow both pre- and postverbal objects, they are predicted to have more than one linearization pattern.

Chapter 1: Introduction

Languages are characterized by different structures and surface syntax, but cross-linguistically, heavy noun phrases can disrupt canonical word orders. These alternations are easily examined when the VP contains two object arguments, as many languages allow fairly free ordering of the two objects. A myriad of different factors are thought to contribute to this ordering of VP constituents. However, when one object is very heavy, studies have shown that the order of objects tends to follow an organized pattern within a language, and that the length of the object is the main factor that determines this order. In English, lighter objects are placed before heavier objects, as seen in (1) (Yamashita & Chang 2001, ex (1)). (1a) and (1b) illustrate a preference for placing the direct object *a song* before the indirect object *with friends*. However, when extensive modifiers make the direct object heavy and long, it is much more acceptable for *with friends* to appear first ((1c)).

- (1) a. Bill sang a song with friends
b. #Bill sang with friends a song
c. Bill sang with friends a song that was written by a famous guitar player from Texas

Japanese, a verb-final language, exhibits the opposite trend. Heavier objects are placed before lighter objects, as seen in (2) (Yamashita & Chang 2001, Table 2).

- (2) Masako-wa sinbun-de syookai-sarete-ita otoko-ni okasi-o todoketa.
Masako-top newspaper-in introduced man-dat cake-acc delivered
“Masako delivered the cake to the man [who was] introduced in the newspaper”

Many different processing and syntactic accounts exist to explain this alternation and the phenomenon of heavy NP shift in general. However, these accounts are mostly based on examinations of English and other widely spoken languages, such as Japanese. This thesis, on the other hand, will explore heavy NP shift in Finnish. In addition, object argument ordering preferences will be examined in both pre- and postverbal positions, an approach which previous investigations have not used extensively, if at all. The unique characteristics of Finnish and the experimental design will allow me to evaluate several of the major theories and propose a more comprehensive and cross-linguistically accurate explanation of heavy NP shift.

This thesis will make use of sentence acceptability ratings from a large pool of native Finnish speakers. The need for more quantitative approaches to linguistic studies has been expressed in recent literature (Gibson et al. 2011), and this thesis will base its conclusions off of a large sample and statistical analysis.

Throughout this thesis, the terms “heavy” and “long” will be used synonymously to describe a heavy NP. Accordingly, both “light” and “short” will be used to refer to a light NP.

1.1 Structure of the Thesis

Chapter 2 will outline the major existing theories and explanations for heavy NP shift, including some shortcomings of each. Chapter 3 will illustrate the relevant basic facts about Finnish syntax and grammar and explore the reasons that Finnish is such an appropriate language in which to test theories about heavy NP shift.

In Chapter 4, I will detail the procedure and design of the experiment. The stimuli for the experiment were sentences with one heavy object and one light object, manipulated so that the object arguments appeared in different positions and orders. Native speakers of Finnish evaluated the acceptability of these sentences, and the results of their ratings are presented in Chapter 5. Chapter 6 will be a discussion of the conclusions that can be drawn from the data and the limitations of the study. I will propose an explanation based on the surface position of the objects in relation to the predicate. Finally, Chapter 7 will present some concluding remarks, including suggestions about areas for further research.

Chapter 2: Heavy NP Shift

The movement of heavy NPs has been explored in both the linguistic and psycholinguistic literature, and several different theories exist to explain the phenomenon. This chapter will outline the previous investigations into heavy NP shift, discussing both syntax- and processing-based hypotheses, and illuminate the motivations for this experiment and the gaps it seeks to fill. In this work, I will use the word “object” to refer to object arguments with no distinction between adjuncts and complements or dative and double object constructions

2.1 Factors Influencing Heavy NP Shift

Noun phrases move for a variety of reasons, of which weight is just one. Of main interest to this thesis is the movement and ordering of constituents when two object arguments are present. Bresnan and Ford’s (2010) corpus study of English found that postverbal constituent order depends on the pronominality/definiteness/animacy of the recipient, the pronominality/definiteness/plurality of the theme, and the presence or absence of previous dative constructions, in addition to the length of the theme and recipient. The complexity of the NPs in question plays a role as well, as more complex constituents tend to be shifted more frequently (Wasow & Arnold 2003). Arnold et al. (2000) also note that information structure and the givenness or newness of the objects affects shifting.

The length of the heavy NP relative to the other object is important as well (Hawkins 1994; Wasow & Arnold 2003; Stallings & MacDonald 2011), and Hawkins

(1994) showed that little shifting is seen until the heavy NP exceeds the length of the other object by more than four words. Finally, lexical properties of verbs (Wasow & Arnold 2003) and their “shifting dispositions” (Stallings et al. 1998) affect the frequency of shifted objects as well. While all of these factors can determine the ordering of verbal complements and adjuncts, when a heavy NP is present, predictable patterns of shifting occur. English speakers rearrange sentences to have a short-before-long structure, and these changes are attributed to the length of the NPs.

2.2 Syntactic Accounts of Heavy NP Shift

The syntactic processes and rules governing heavy NP shift have also been debated in the literature. Heavy NP shift does not change the grammatical acceptability of a sentence and thus is not considered to be a grammatical rule (Ross 1967; Hawkins 1994; Chang 2009, among others). Ross (1967) was one of the first to note the optionality of heavy NP shift and called the ordering of postverbal constituents “stylistic.” However, several competing accounts claim to outline the syntactic movement of heavy NP shift.

One central debate among syntacticians is the question of whether languages have symmetric or antisymmetric phrase structures. The symmetric approach proposes that both right- and left-adjunction can occur, and that hierarchical structure does not necessarily correlate with linear order. That is, an element A can be higher in the syntactic structure than an element B, but still appear to the right of B on the surface. Antisymmetric accounts argue that if A is higher than B in the syntactic structure, then A *must* precede B linearly as well. This debate is very relevant to heavy NP shift, as I will demonstrate.

2.2.1 Symmetric Accounts

Under the symmetric approach, rightward movement is allowed. This is the most straightforward and standard approach to heavy NP shift, as heavy NPs appear to the right of their lighter counterparts in English. Ross (1967) proposes a Right Roof Constraint in his dissertation, which states that a rightward moving element is upward bounded. Thus, heavy NPs move right but cannot move out of their clause. Several others have built off of this idea of rightward movement as well (Saito 1994; Ernst 1999).

Shifted phrases also seem to be unable to move to VP-external locations within their clause (Pesetsky 1995). Pesetsky argues that this observation implies that heavy NP shift is rightward adjunction to VP. His argument rests on an idea of semantic relatedness, where elements adjoined to V must be semantically related to V. Heavy NPs therefore cannot shift out of their clauses (or VPs, according to Pesetsky). Because all English heads precede non-specifier position arguments, adjunction into a semantically related position must be rightward.

2.2.1.1 Scrambling and Heavy NP Shift

Symmetric accounts inherently treat scrambling and heavy NP shift as very similar operations, distinguished by their directionality. It has been proposed that both operations are examples of adjunction (Saito 1985; Webelhuth 1989; Pesetsky 1995). Saito and Fukui (1998) later suggest that both scrambling and heavy NP shift are subcases of Merge. The difference in direction between Japanese scrambling and English heavy NP shift can be explained by which of the two merging elements projects. In head-initial languages, the left element projects, while in head-final languages, the right

element projects. Thus, scrambling is leftward, and heavy NP shift is rightward. They claim that because Merge is not subject to Last Resort, both operations are optional.

Wallenberg (2009) criticizes their approach by noting that scrambling and heavy NP shift are constrained by different rules. Scrambling is not clause-bounded as heavy NP shift is, and this difference cannot be explained if the two operations are structurally equivalent. He also points out several languages that allow both leftward scrambling and rightward heavy NP shift, which should not be allowed under Saito and Fukui's projection direction model. Finnish, as we will see, is one of these languages.

2.2.2 Antisymmetric Accounts

The prominent antisymmetric accounts essentially postulate that all movement is leftward, and that languages cannot allow both right- and left- adjunction. Larson (1998, 1990) argues that in heavy NP shift, the underlying movement is actually leftward movement of both the verb and the shorter object together while the heavy object remains in situ in specVP. He redubs the phenomenon "Light Predicate Raising." However, this model cannot account for several examples of heavy NP shift. For example, when both objects of a ditransitive verb appear shifted to the right of an adverb or other adjunct, the verb is separated from both its constituents (Rochemont & Culicover 1997). Kayne (1994) refines Larson's proposal by suggesting that leftward movement is the correct analysis, but that the shorter object is the only constituent that moves and that it targets a higher leftward specifier position.

Later, both den Dikken (1995) and Kayne (1998) enhance this idea and put forth varieties of a theory that involves leftward movement of both the heavy NP and the short

NP. This theory can be broadened to account for OV languages under the claim that OV structures are created through leftward movement of all constituents (Hinterhölzl 2006). Both of these accounts, however, are unable to explain the licensing of parasitic gaps (Wallenberg 2009).

Wallenberg (2009) proposes an explanation of heavy NP shift movement that is developed from Rizzi's (1997) split-C hypothesis. Wallenberg argues that the heavy NP shifts leftward to the specifier of a FocusP, and the remnant TP also moves leftward to the structurally higher specifier of a TopicP. However, evidence has also been presented that the heavy NP can target a *v*P-internal position as well, which presents some difficulties for this theory (Wallenberg 2009).

2.2.3 Mixed Approaches

Some linguists believe that languages may not be strictly symmetric or antisymmetric. Rochemont and Culicover (1997) conclude that there is no empirical support for rightward movement versus leftward movement, and that both frameworks can explain heavy NP shift. Abe (2001) later proposes a "hybrid position" where lexical categories follow an antisymmetrical framework while functional categories can participate in symmetric movement. Finally, Takano (2003) shows evidence that heavy NP shift must be antisymmetric, but that some cases of adjunction are indeed symmetric. Languages are thus "weakly antisymmetric."

2.2.4 Causation and Regulation

Although some issues are more severe than others, all of the syntactic accounts suffer from empirical and/or theoretical problems. In addition, no account is able to accurately describe a syntactic cause for heavy NP shift, so the questions of how and why phrase length affects movement and syntactic structure are left unclear. Syntax can explain the rules that regulate heavy NP shift, but not why heaviness causes the shift in the first place. The semantic factors discussed in 2.2 provide some insight into the motivations for heavy NP shift, but are generally disconnected from the syntax. And again, there is some curiosity about the issue of *why* factors such as givenness cause shifts, and how and if these semantic properties are correlated with weight.

2.3 Processing Accounts of Heavy NP Shift

Several hypotheses exist for the explanation of the difference in shifting patterns between English and Japanese that focus on processing and parsing. The lack of causation between weight and syntax suggests that other approaches are needed to fully explain heavy NP shift. Additionally, because heavy NP shift is not a required grammatical operation and merely gives rise to “more preferable” or “less preferable” structures, this focus on processing seems appropriate.

2.3.1 Language Features

Yamashita and Chang (2001) point out that while long phrases are more lexically and semantically rich, short phrases are more accessible. They propose that more accessible and more semantically salient phrases are preferentially placed earlier in

sentences. When the most accessible and the most lexically salient phrases are not the same, then a competition surfaces, as in the case of heavy and light NPs. In English, there is little case marking, a strict word order, and objects appear postverbally, meaning that the verb can have an effect on their order. Japanese, however, has a rich case marking system and free word order, and the lexical properties of the verb are less important in determining constituent order because the objects appear before the verb. Thus, lexical saliency has a larger effect on word order in Japanese, and lexically salient items are placed earlier in sentences. In English, the strict word order and influence of the verb do not allow conceptual factors to have such a large impact, and the direction of heavy NP shift is therefore determined by the accessibility of the NPs.

The structure of relative clauses is another language-specific characteristic that affects ordering of heavy NPs (Chang 2009). Relative clauses occur before the head noun phrase in Japanese, but after it in English. Finally, Chang further notes that Japanese allows argument omission and is articleless. Overall then, the individual language characteristics of headedness, case marking, word order flexibility, and presence of arguments and articles affect the shifting direction of heavy NPs.

In Hungarian, short-before-long constructions are preferred for postverbal objects, while preverbal objects are long-before-short (Hawkins 1994). Yamashita and Chang (2001) conform this data to their theory by arguing that variation *within* a language is also caused by many different competing factors. However, within a language, characteristics such as case, word order flexibility, and articles are constant. The only difference between Hungarian pre- and postverbal objects is the position of the objects relative to the verb. Thus, the Hungarian data diminishes the importance of language-

specific characteristics in causing heavy NP shift and instead suggests that constituent surface position is the most relevant factor.

2.3.2 Constituent Distance

Hawkins (1990, 1994) proposes a different explanation for heavy NP shift, and argues that cross-linguistically, parsers prefer to minimize the distance between the immediate constituents of a larger node. For this experiment, the node would be the VP, and the constituents would be the verb and the two object arguments, all of which are base-generated in the VP. When a constituent is encountered, its nature cannot be established until a “point of unique determination.” The point of unique determination is often the head or some other identifying element. In an NP, the head N or a determiner marks a constituent as an NP, and in English, this point of unique determination is usually clause initial. In Japanese, however, the point is clause-final. The constituent recognition domain (CRD) is the subset of words necessary to recognize all immediate constituents of a node, or the distance between points of unique determination. Parsers prefer to minimize the CRD. Consider (3) below (Hawkins 1994, ex (3.9)).

- (3) a. $[_{IP}[_{NP}\text{Mary-ga}][_VP[_{CP}[_{IP}\text{kinoo John-ga kekkonsi-ta}] \text{to}] \text{it-ta}]]^1$
 Mary yesterday John married that said
 “Mary said that John got married yesterday
- b. $[_{IP}[_{CP}[_{IP}\text{Kinoo John-ga kekkonsi-ta}] \text{to}] [_{NP}\text{Mary-ga}] [_{VP}\text{it-ta}]]$

¹ Node labels have been changed to IP and CP from Hawkins’ original labels of S and S’

The phrase *kinoo John-ga kekkonsi-ta to* is not identified until the parser reaches the clause-final complementizer *to*. In (3a), the CRD is much larger because the long CP intervenes between the short subject and the verb. In (3b), the short subject is next to the verb and the point of unique determination of the long phrase is as close as possible to the verb. Thus, (3b) has a smaller CRD and is preferred.

Hawkins' theory thus essentially posits that parsers prefer to have the shorter object closer to the verb. In addition, his theory also suggests that the location of the head N within the NP is important, and that differently constructed NPs might have different shifting patterns or different levels of acceptability within the same structure. This assumption, however, has not been explicitly proven in subsequent literature.

2.3.3 Memory Cost

Another distance-based explanation for heavy NP shift cites working memory and processing costs as the main factors influencing shifting. Gibson (1998) suggests that people make predictions about upcoming structures as they process sentences, and the longer these predictions are held in the working memory, the greater the memory cost and the less favorable the sentence structure. Thus, heavy English NPs are shifted because they would otherwise incur a high memory cost, as they must be retained until the final constituents of the sentence are encountered. Although Gibson does not directly discuss heavy NP shift in Japanese, he does argue that parsers of head-final languages like Japanese form predictions about predicates when they encounter noun phrases. Thus, one could extrapolate that long-before-short object orders are preferred because the prediction about the predicate needs to be retained over the second object, and a smaller

memory cost will be sustained if this second object is the smaller object. Gibson applies his theory to production as well, arguing that it is costly for speakers to keep a future constituent (the short object) in mind while producing another element (the long object). The longer this interfering object, the higher the memory costs.

One potential issue with Gibson's theory is the involvement of adjuncts. When encountering a transitive verb such as *meet*, only one object is expected. In the sentence *Mary met the man who collects rare coins and antique jewelry from Asian countries in the store*, there is no reason for the adjunct *in the store* to be expected, and thus no processing costs for keeping a prediction about it in memory. However, the backtracking and reanalysis required once the adjunct is encountered could pose a processing cost.

2.3.4 Head-Driven Parser Model

Alternatively, parsers may not make any decisions regarding sentence structure until they process the head of a node (Pritchett 1991, 1992). Once the head is processed, then a syntactic structure will be built and constituents will be attached in accordance with the projection principle. For verb final languages, all preverbal elements must be held in the working memory until the verb is reached, and as nodes are projected, the elements closest to the verb are attached first. Therefore, quicker attachments can be made when shorter objects are nearer to the verb than longer objects.

2.3.5 Production

Heavy NP shift is favorable in both production and comprehension, so successful theories should ideally be able to explain the motivation for shifting from both of these

perspectives. Distance-based accounts have been questioned with evidence showing that speakers do not plan out their utterances well enough in advance for these accounts to be valid, as studies have shown that language production is incremental (Ferreira 1996). In addition, Altmann and Kamide (1999) use experimental evidence to argue that speakers do make predictions about upcoming constituents based on the lexical information encoded in verbs, which creates problems for the head-driven parser model. Pre-head attachment can also occur (Kamide & Mitchell 1999). Finally, Chang (2009) argues that no study has conclusively shown that an extra processing load is incurred when producing sentences where the constituents are not optimally close to the verb, like Hawkins suggests. These points undermine the distance based and head-driven accounts, and illuminate the difficulty of producing a theory that accurately considers both comprehension and production motivations for heavy NP shift.

2.4 Heavy NP Shift in Finnish

Although specific characteristics of Finnish will be discussed at length in the next chapter, Finnish presents a unique opportunity to better understand heavy NP shift cross-linguistically. It allows for manipulation of both object distance and relative location to the verb, which will permit testing of the theories presented in this chapter.

Ordering preferences of long and short objects have not been extensively studied in Finnish. Sulkala and Karjalainen (1992) show that although objects generally precede adverbials in postverbal positions, when the object is long, it shifts to the end of the clause. They suggest that heavy elements are most commonly found in clause-final positions, but do not discuss preverbal versus postverbal domains. Finally, the authors

presume that double object constructions would follow a similar short-before-long pattern, but offer no definitive evidence.

Vilkuna (1991) performed a corpus study examining verbs followed by objects and adverbials of varying lengths. She found that short phrases tended to precede long ones postverbally, as in English. Again, though, she does not explore heaviness preferences in preverbal positions.

2.5 Focus of the Current Experiment

In this thesis, a more rigorous analysis of Finnish heavy NP shift will be performed, and both the preverbal and postverbal domains will be examined. Languages with multiple possible positions for objects have not been extensively studied, but analyzing both domains within a single language should allow for comment on proposals suggesting that a language's specific properties give it a single heavy NP shift linearization pattern. I am primarily referring to the theories of Yamashita and Chang (2001) and Chang (2009). In addition, I will explore the importance of the position of the head within the NP to test Hawkins' (1990, 1994) distance based theory.

This thesis also seeks to find an explanation for heavy NP shift that can accurately account for more cross-linguistic data (namely, data from Finnish) and that does not suffer from the shortcomings of the current theories. I also intend to offer an explanation for the cause of heavy NP shift, rather than just a description.

Because of the descriptive rather than explanative nature of the syntactic theories, this thesis will focus primarily on processing-based theories. Finally, despite the array of factors that influence constituent word order, length will be focused on exclusively.

Chapter 3: Finnish Grammar and Syntax

Finnish is a Finno-Ugric language and thus part of the Uralic language family (Karlsson 1983). There are an estimated 5 million native Finnish speakers in the world, most in Finland, where 93% of the population speaks Finnish natively. There are eight main dialects spoken, but standard written Finnish evolved primarily from the southwestern dialects. Written Finnish was developed relatively recently; the earliest texts date from the 16th century (Sulkala & Karjalainen 1992).

Finnish will be used as a testing ground for the theories about heavy objects presented in Chapter 2. This chapter will explain some basic facts about the Finnish language and highlight their relevance to the experiment.

3.1 SVO Classification

Finnish is considered an SVO language, but SOV structures occur naturally in some environments, as will be discussed. Several properties of Finnish establish this classification. Comrie (1989) discusses the parameters used to determine word and constituent order, which are (1) the relative order of an adjective and head noun within an NP, (2) the order of a relative clause and head noun, (3) the order of a genitive element and head noun, (4) the presence of prepositions and/or postpositions, (5) a preference for suffixing or prefixing, (6) the word order of embedded clauses, (7) the order of an auxiliary verb and its main verb, and (8) the syntax of comparative constructions. Parameter 8 will not be discussed here, because languages express comparisons in different ways and it is difficult to discern informative patterns from these differences.

Comrie also notes that while SOV word order tends to correlate with certain parameters, SVO languages do not exhibit strong patterns of association with particular parameter values.

Adjectives usually immediately precede head nouns in Finnish. Relative clauses most commonly follow the head noun, and genitive elements precede the head noun that they modify. Postpositions are seen much more commonly than prepositions, but both are present in the language, and Finnish is also strongly suffixing. Embedded clauses can be either head-final or head-initial (Sulkala & Karjalainen 1992). Auxiliaries can either follow or precede the verb, although if the verb has a complement, the auxiliary can only precede the verb if its verbal complement also precedes the verb (Holmberg 2000).

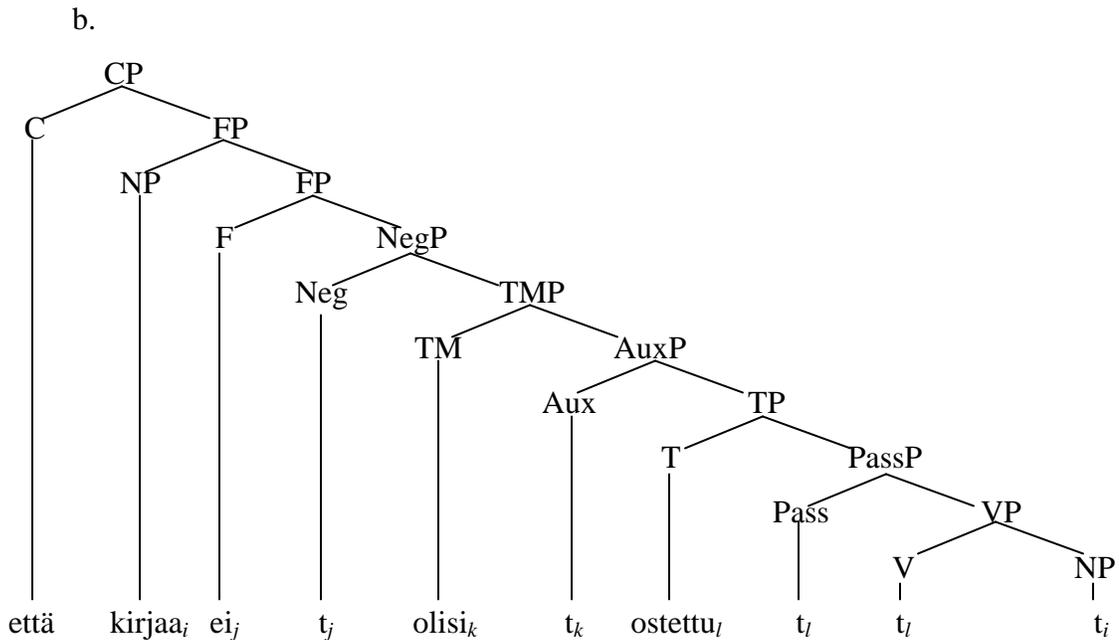
Because unmarked declarative finite sentences are SVO in Finnish, it is considered an SVO language (Holmberg 2000). However, the prevalence of adjectives preceding nouns, genitive elements preceding nouns, postpositions, and suffixing are characteristics that are well-correlated with SOV structures. In addition, Finnish's rich case-marking system is another feature often found in SOV languages (Comrie 1989).

Embedded clause structure gives insight into this discrepancy. SOV structures can only occur in embedded clauses, as will be discussed more in 3.4.1 (Vilkuna 1989). This fact, coupled with the other traditional SOV qualities that Finnish exhibits, suggests that Finnish was once an SOV language but has drifted to SVO, as per Vennemann's theory (1974).

3.2 IP Structure

Finnish has been analyzed as a language with a split IP structure, where the subject-verb agreement is a separate category from Tense and Mood. This can be overtly seen in negative finite sentences. The negation element is inflected for subject/verb agreement, but the verb takes the tense/mood inflection, showing a separation between these two nodes. Overall, it has been suggested that Finnish syntax can be explained with the structure in (4), shown with an example sentence (Holmberg et al. 1993, ex (4)):

- (4) a. että kirjaa ei olisi ostettu
 COMP book+PAR NEG+F be+COND buy+PASS+PST PTC
 “that the book would not have been bought”



The IP domain encompasses both FP and TMP. FP stands for “finite phrase” and is the location of subject-verb agreement, and thus corresponds to the AgrS of other representations. Finnish is distinctive from other languages with AgrS, however, because

all Finnish finite structures have an agreement-like suffix whether or not there is agreement. For example, sentences with passives, modals with quirky case, partitive subjects, and existential, presentative, and possessive constructions are all finite and have the Agr-like inflection, but do not have any agreement between the subject and the verb (Holmberg et al. 1993).

In the tense/mood node, the binary features of [+/-Mood] and [+/-Tense] create three morphological moods: indicative, conditional, and potential. The indicative can occur in either past or present tense, and the imperative can also technically be included as a fourth mood. As discussed, mood is separate from the subject/verb agreement in FP, and thus are in a separate TM node (Holmberg et al. 1993).

Verbs are generated in V. They move all the way up through T, TM or F, depending on the presence of a negative element or an auxiliary. When there is no negative element or auxiliary, the verb moves to F, taking tense and mood and agreement morphology. When a sentence has negation, the negative element is inflected for subject/verb agreement and moves to F, while the verb moves to TM and takes tense and mood inflection. In the presence of an auxiliary, the auxiliary (which is base generated higher than the verb) moves to F and takes tense and mood inflection and agreement morphology. V moves to T, where it receives tense without mood. In cases where there is a negative element and an auxiliary, the negative element resides in F, the auxiliary in TMP, and the verb in T (Holmberg et al. 1993).

3.3 Morphology

3.3.1 Case

Finnish's rich case-marking system is one feature that renders Finnish such an interesting language for the study of double objects. Its fifteen cases are the nominative, accusative, partitive, genitive, essive, translative, instructive, abessive, comitative, and six locative cases: inessive, elative, illative, adessive, ablative, allative. The cases are realized morphologically through the addition of suffixes, and this inflection often takes the place of prepositions. Nominative case is not overtly marked, and subjects usually take this case. Objects are most often in the partitive, genitive, or nominative cases, while adverbials take one of the six locative cases (Sekerina 2003). Partly as a result of the extensive case system, Finnish is articleless (Kaiser & Trueswell 2004) and scrambling and a relatively free word order are tolerated, allowing for manipulation of the location of objects. This will be important for testing movement tendencies of heavy objects. This thesis will not investigate the case system more deeply than what is noted here.

3.3.2 Focus

Another set of morphological units are focus markers, which add emphasis to words. The focus marker *-pa/-pä* is used in this experiment, and this marker is attached at the end of the word. The marker *-pas/-päs* is often used in spoken language, but for this experiment, *-pa/-pä* is used exclusively. Unlike some languages such as Hungarian, Finnish has no set focus position. Rather, focused elements can appear anywhere in the sentence and do not necessarily have to be marked overtly with a focus morpheme (Karlsson 1983). These markers, like other enclitics, are added after all other affixes.

Noun phrases are inflected first with derivational affixes, then subject-verb agreement morphology, then case endings, followed by any other affixes such as possessive suffixes, and finally, enclitics (Sulkala & Karjalainen 1992; Karlsson 1983).

3.4 Alternate Word Orders

Finnish is considered SVO, but various permutations of this standard word order are allowed and play a key role in this experiment.

3.4.1 SOV Constructions

There are certain circumstances where SOV can occur. Usually, the sentence needs to have sentence-initial focus in the C node to support the SOV structure, such as a wh-question or a sentence with a focused constituent (Holmberg 2000). The following examples illustrate possible SOV sentences. (5a) shows a focused subject in specCP with no overt marking, (5b) has a question marker on the initial constituent, (5c) shows wh-movement, and (5d) has a fronted auxiliary with a focus marker (Holmberg 2000, ex (4)).

(5) a. JUSSI romaanin kirjoitti

Jussi novel wrote

“It was Jussi who wrote a novel.”

b. Jussiko romaanin kirjoitti?

Jussi.Q novel wrote

“Was it Jussi who wrote a novel?”

c. Milloin Jussi romaanin kirjoitti?

When Jussi novel wrote

“When did Jussi write a novel?”

d. Onpas Jussi romaanin kirjoittanut

has.FOC Jussi novel written

“Jussi HAS written a novel.”

The structures of each example in (5) are shown below in corresponding order in (6) (Holmberg 2000, ex (4')).

- (6) a. [_{CP} JUSSI [_C C (FOC) [_{IP}t ...]]]
b. [_{CP} Jussi [_C [_C -ko (Q)] [_{IP} t...]]]
c. [_{CP} Milloin [_C C (Q) [_{IP}...t...]]]
d. [_{CP} [_C [_C on [_C -pas (FOC)] [_{IP}...t...]]]]

If the question feature Q is a focus feature, then each sentence has a focus feature in C, show in parentheses. Focusable elements are attracted to specCP or C depending on their nature. Elements in the specCP node are contrastive if they are referential, but non-referential elements such as wh-questions and some pronouns are not contrastive (Holmberg & Nikanne 2008).

Holmberg (2000) further stipulates that the information conveyed by the preverbal SOV complements (the objects, in this case) should not be discourse-new information.

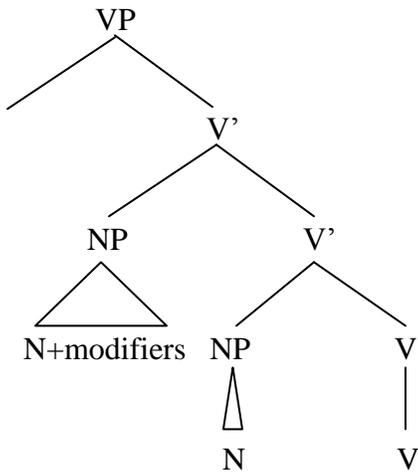
The main news of the sentence must therefore be expressed by the subject or by some other element.

3.4.1.1 Final Over Final Constraint

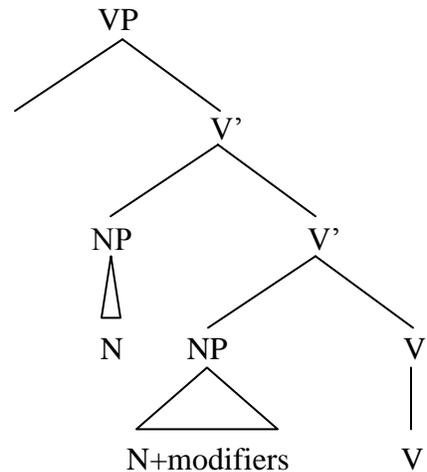
Additionally, the SOV sentences are limited by the Final Over Final Constraint (FOFC). The FOFC states that "a head-initial category cannot be the immediate structural complement of a head-final category within the same extended projection" (Biberauer et al. 2010, page 1).

This constraint poses a problem for Finnish SOOV constructions where the object closest to the verb has postnominal modifiers, as in (8). For the current study, this would be the “long” object.

(7) Aux-FOC S O_{long} O_{short} V



(8) Aux-FOC S O_{short} O_{long} V



(7) shows the long object first and the short object adjacent to the verb. Because the short object is only one word (the head), it cannot be defined as head-initial or head-

final, and thus does not violate the FOFC. In (8), however, the long object is sister to the verb, and it is clearly head-initial because of the postnominal modifiers. This violates FOFC. To circumvent this problem, prenominal modifiers can be used for the objects in sentences like (8). This way, both the NP and the VP will be head-final.

3.4.2 Scrambling

Scrambling of an object involves the movement from the VP node (a verbal complement) to the specFP position. Objects can also be scrambled among post-subject positions, as scrambled objects may move to specTMP when specFP is filled with an expletive (Holmberg & Nikanne 2002). Scrambling is allowed in OV structures, so long as it complies with the FOFC and a head-initial category is not an immediate complement to a head-final one (Holmberg 2000). Semantic forces again play a role, as scrambled objects tend to be discourse-old. In (9), (b) and (c) are both acceptable answers, but in (c), the new information *Anna* is presented later and thus this structure would be preferred for this context (Vilkuna 1995, ex (5) and (6)).

- (9) a. Who lives here?
b. ANNA asuu täällä
Anna lives here
c. Täällä asuu ANNA

3.4.3 Topicalization

Like many languages, subjects are often the topic of the sentence. However, in Finnish, topics are not required for well-formed sentences and non-subject NPs can be topicalized to pre-subject positions. Topicalized NPs usually occupy specFP, but this node does not exclusively contain topics. If specFP is filled with a referential element, that element will be a topic; if the element is not referential, then it is not a topic (Holmberg & Nikanne 2002, 2008). When a non-subject occupies specFP, then the subject remains in-situ. Because Finnish has no morphological topic marker, it is not possible to discern scrambling from topicalization in Finnish based on morphology. Thus, the referential nature of the element can be used to determine topics.

According to Vilkuna (1995), Finnish sentences can have two pre-subject topics. In this case, the first topic is contrastive and the second refers to something previously mentioned in the discourse. Scrambling of two objects is allowed as well, and one will occupy specCP and the other, specFP. Additionally, Holmberg and Nikanne (2008) show that Finnish allows subject doubling and trebling. In subject doubling, a pronoun occupies specFP and the lexical subject remains in situ. In subject trebling, seen below in (10), the pronoun *se* appears twice in addition to the subject *Tarja* (Holmberg & Nikanne 2008, ex (31)). The first *se* fills specCP, the second *se* fills specFP, and the subject again remains in situ.

(10) **Se se** on Tarjakin lopettanut tupakoinnin.

SE SE has Tarja-too quit smoking

Overall then, Finnish allows the presence of two elements in presubject positions, and these elements will fill specFP and specCP. For simplicity's sake, we will refer to the movement of elements to presubject positions as scrambling rather than topicalization in this experiment.

3.5 Current Experiment

For this experiment, constructions with SOOV and scrambling of one and two objects are used. The four structures that comprise the experiment are SVOO, OSVO, OOSV, and SOOV. Only the SOOV construction in (5d) was used, where a focus marker is attached to an auxiliary. (5a)'s meaning would be difficult to convey in a written, non-verbal experiment, and (5c) and (5b) could have complicated the data by adding extra movement (wh-movement in (5c)) or by involving the modification of a relevant element of the SOV sentence (the subject in (5b)). (5d) involves the movement of an auxiliary, which does not affect the processing of the subject, object, or verb. These different structures allow for the manipulation of the distance and relative position of objects to the verb, which will be crucial for testing some of the theories presented in Chapter 2.

There are no tagged corpora of Finnish, so it is difficult to obtain a text count of the constructions used in this experiment. However, I will make use of the intuitions of linguists who studies the structure of Finnish and native speakers of the language. According to Professor Anders Holmberg, SVOO is the most common construction for double objects, and SOOV is reasonably common. OSVO is fairly uncommon, and he thought that OOSV was not allowed. The three Finnish speakers with whom I consulted, however, thought that the OOSV structure was uncommon but still grammatical.

Chapter 4: Method

The current study has three aims. First, it seeks to establish the natural placement of heavy constituents in Finnish SVOO constructions, the most commonly seen structure with two object arguments. Second, heavy NP shift will be explored in verb-final constructions. Finally, this experiment investigates whether heaviness affects the acceptability of sentences where one or both of the objects are scrambled to presubject positions. These conclusions will help to determine the effect of language-particular properties (including the position of the predicate) on the order of heavy and light constituents. In accordance with the terminology used by Yamashita and Chang (2001), “long” and “short” will be used to refer to heavy and light constituents.

Based on the cross-linguistic data from English, Japanese, and Hungarian discussed in Chapter 2, I predict that speakers will prefer long-before-short in sentences with two preverbal objects (OOSV and SOOV), and short-before-long in sentences with two postverbal objects (SVOO). Heavy NP shift in sentences with one scrambled object has been largely unexplored in the literature. However, based on the strength of the distance based arguments, I hypothesize that speakers will prefer to scramble the long object so that the shorter one can remain closer to the verb.

4.1 Participants

Data were used from forty subjects who spoke Finnish as their first language. One hundred ten subjects were gathered through Amazon Mechanical Turk, and 70 were excluded before analysis. Nine subjects were eliminated because responses were missing

for some items. Because the program required subjects to respond to a question before moving on to the next, these subjects represented system errors and were thus eliminated.

One subject was thrown out for rating every sentence as 7. The experiment was reposted multiple times on Mechanical Turk, and so there were some subjects who took the experiment twice. Nine subjects were duplicates, confirmed through the demographic information that they provided (email, name, age, and birthplace). The second and more recent response set was deleted for each duplicated subject. Finally, 51 subjects were eliminated for not responding “yes” to the question “Was Finnish your first language?” These 51 participants responded “no,” left the field blank, or entered random letters. The end product was a sample size of 40 subjects.

Participants were paid either \$2 or \$3 depending on which posting of the study they took. The use of Mechanical Turk to collect data is somewhat controversial among linguists, and we will engage in a discussion of the merits and shortcomings of the program in Chapter 6.

4.2 Stimuli

Each subject was presented with 120 sentences, 48 of which were experimental sentences, and 72 of which were filler sentences. The sentences were translated from English by native Finnish speakers, and were proofread by Professor Helena Halmari, a native speaker of Finnish and professor of linguistics. No context was given for any sentences. This ensured that object length was the only factor influencing subjects’ ratings of the sentences and standardized evaluation of the scrambled sentences.

The variables of sentence structure and ordering of objects were tested in the experimental sentences. There were four main conditions, corresponding to the sentence structures of SVOO, SOOV, OOSV, and OSVO. Each condition had subconditions of “long-before-short” (henceforth, LS) and “short-before-long” (SL), referring to which constituent preceded the other in the left to right linear order. In addition, half of each of the SVOO SL and SOOV SL subconditions used long objects with exclusively prenominally modified nouns, while the other half had nouns with postnominal modifiers. The sentence stimuli subconditions are shown in Table 1. “Nm” refers to postnominal modifiers, while “mN” means prenominal modifiers. All SL or LS subconditions contained six sentences each, except for the Nm and mN subconditions, which had three each.

Table 1: Sentence Stimuli

	Long-before-short (LS)	Short-before-long (SL)
SVOO	S V O _{long} O _{short} (6)	S V O _{short} O _{long} [Nm] (3) S V O _{short} O _{long} [mN] (3)
SOOV	S O _{long} O _{short} V (6)	S O _{short} O _{long} [Nm] V (3) S O _{short} O _{long} [mN] V (3)
OOSV	O _{long} O _{short} S V (6)	O _{short} O _{long} S V (6)
OSVO	O _{long} S V O _{short} (6)	O _{short} S V O _{long} (6)

The prenominal modifiers were a string of adjectives, while the postnominal modifiers were relative clauses. Where prenominal and postnominal were not specified, modifiers were either all postnominal or postnominal with one prenominal adjective.

As discussed in Chapter 3, the SOOV constructions were made by fronting an auxiliary with a focus marker. The auxiliary was the verb *olla*, which is the equivalent of the English verb *to have*, and the focus marker was *pa/pä*.

The division between Nm and mN in the SVOO and SOOV SL conditions was made to account for the FOFC discussed in Chapter 3. Because postnominally modified NPs are not head-final, they cannot be an immediate complement of a verb in a verb-final VP. Therefore, prenominally modified nouns were used as well. The FOFC is only relevant for the verb-final SOOV construction, but some mN sentences were used in the SVOO condition and some Nm in the SOOV condition as well so that subjects would not flag the SL SOOV mN construction as unusual.

Hawkins' statement that heavy NPs shift when they are four or more words longer than their shorter counterparts is not necessarily applicable in Finnish. Finnish is an articleless and agglutinating language, so an average Finnish word contains more lexical and syntactic information than an English word. Thus, the Finnish sentences tended to have fewer words than their English translations. In the English translations, the long objects had an average length of 13 words ($s=2.1$) and the short objects' mean length was 2.2 words ($s=0.6$). The long objects in the Finnish sentences were on average 8.2 words long ($s=1.7$), with a short object mean length of 1.2 words ($s=0.4$).

Twenty-four of the experimental sentences had a long direct object (DO), and the other twenty-four had a long indirect object (IO). Among conditions, all 6-item subconditions had 3 sentences with long IOs and 3 sentences with long DOs (except for the LS SVOO subcondition, which had 4 long DOs and 2 long IOs). The subconditions with 3 items had either two long IOs and one long DO, or vice-versa.

Overall, 19 ditransitive and 29 transitive verbs were used, so that both complements and adjuncts were encountered. The number of transitive and ditransitive verbs used in each subcondition is outlined in Table 2.

Table 2: Verb Types in Sentence Stimuli

	Transitive	Ditransitive
SOOV LS	3	3
SOOV SL Nm	1	2
SOOV SL mN	2	1
SVOO LS	3	3
SVOO SL Nm	2	1
SVOO SL mN	1	2
OOSV LS	5	1
OOSV SL	5	1
OSVO LS	4	2
OSVO SL	3	3

Of the filler sentences, 48 were completely grammatical. Fifteen were ungrammatical due to case or agreement problems, and the other 15 were ungrammatical due to incorrect word order. None had the long objects that were characteristic of the experimental sentences.

4.3 Procedure

The experiment was administered online through Amazon Mechanical Turk. Because of concerns about acquiring a large enough subject pool, each subject was presented with all 120 sentences. Thus, a Latin Square design was not used, so that all sentences were unique.

Subjects were instructed to rate the acceptability of the sentences based on their own intuitions and the naturalness of the sentences. The instructions were followed by a short demographic questionnaire and four practice sentences, given as examples of the types of sentences they would see. Then, one sentence was shown per page, and subjects rated the acceptability of the sentences on a scale of 1-7. Experiment instructions, demographic questions, and all sentence stimuli used can be found in Appendix A, Appendix B, and Appendix C, respectively.

Chapter 5: Results

Ratings were compared within conditions between the long-before-short and short-before-long subconditions and among conditions as well. This chapter will present the statistical analysis and results of the study participants' ratings.

5.1 Method of Analysis

For all conditions, t tests were used to determine whether there was a significant difference between the mean ratings for the long-before-short versus the short-before-long subconditions. The means of the subconditions were calculated from the combined ratings of all the sentences within the subcondition. Between subconditions that had the same number of ratings, a paired t test was used to account for the fact that all subjects rated one sentence in each subcondition. Between subconditions that had a different number of ratings, an unpaired t test had to be used due to the differences in sample size. All comparisons utilized a two-sided t test, as any two subconditions could have differed in either direction.

5.2 SVOO Condition

The subcondition of LS had 240 values (6 sentences rated by 40 subjects) and SL Nm and SL mN had 120 values each (3 sentences each, rated by 40 subjects). The total SL subcondition was the compilation of SL mN and SL Nm and thus had 240 values. The mean of LS was 5.033 ($s=1.69$), the mean of SL Nm was 5.217 ($s=1.42$), and the mean of SL mN was 5.317 ($s=1.60$). Total SL had a mean of 5.267 ($s=1.51$).

An unpaired, two-sided t test was used to compare the means of LS with SL Nm and SL mN. Observationally, the mean ratings for SL Nm and SL mN were both higher than the mean rating for LS, but not statistically significantly so ($p=0.306$ and $p=0.13$, respectively). A paired two-sided t test was run to compare the means of LS and total SL. The difference in means was found to be statistically significant at the 10% level with a p-value of 0.065. All data for the SVOO condition is shown in Table 3.

Table 3: SVOO Condition

	SL Nm (m=5.217, s=1.42)	SL mN (m=5.317, s=1.60)	Total SL (m=5.267, s=1.51)
LS (m=5.033, s=1.69)	Short-before-long	Short-before-long	Short-before-long*

* $p < 0.1$ ** $p < 0.05$

5.3 SOOV Condition

For SOOV, the LS subcondition had 234 values, SL Nm had 117, SL mN had 117, and total SL had 234. Due to an error in three of the SOOV sentences in the first posting of the experiment, one subject was excluded for the SOOV condition. All other conditions were unaffected, and thus this subject was not excluded for other conditions. The mean for LS was 4.825 ($s=1.75$), the mean for SL Nm was 4.641 ($s=1.78$), the mean for SL mN was 4.504 ($s=1.81$), and the mean for total SL was 4.573 ($s=1.79$).

As with the SVOO condition, an unpaired, two-sided t test was used to compare LS with SL Nm and SL mN. The LS mean was higher than both the SL Nm and mN means, but the difference was not significant ($p=0.357$ and $p=0.1109$, respectively). A paired two-sided t test was used to compare LS and total SL, and the resulting p-value (0.0581) was significant at the 10% level. These results are outlined in Table 4.

Table 4: SOOV Condition

	SL Nm (m=4.641, s=1.78)	SL mN (m=4.504, s=1.81)	Total SL (m=4.573, s=1.79)
LS (m=4.825, s=1.75)	Long-before-short	Long-before-short	Long-before-short*

*p<0.1 **p<0.05

5.4 OOSV Condition

There were 240 values for LS and SL each. The LS mean was 4.800 (s=1.59) and the SL mean was 4.617 (s=1.79), and a paired two-sided t test was again used to compare these means (Table 5). The long-before-short subcondition received higher ratings, but the p-value for the difference of means between the subconditions was 0.16, so the difference in means was not statistically significant.

Table 5: OOSV Condition

	SL (m=4.617, s=1.79)
LS (m=4.800, s=1.59)	Long-before-short

*p<0.1 **p<0.05

5.5 OSVO Condition

Both the LS and SL subconditions had 240 values for the OSVO condition. The LS mean was 5.104 (s=1.61) and the SL mean was 5.367 (s=1.48). A paired two-sided t test was used to analyze the difference in means, and the result was statistically significant at the 5% level with a p-value of 0.0443. Thus, subjects preferred when the short object appeared before the long one. Results are illustrated in Table 6.

Table 6: OSVO Condition

	SL (m=5.367, s=1.48)
LS (m=5.104, s=1.61)	Short-before-long

*p<0.1 **p<0.05

5.6 Head Noun Position within the NP

Comparisons can also be made between the ratings for the Nm and mN subconditions to determine the effect, if any, of the head noun's position. Within SVOO, the SL Nm mean was 5.217 (s=1.42) and the SL mN mean was slightly larger, at 5.317 (s=1.60). Using a paired two-sided t test, the difference in these means was found to be statistically insignificant, with a p-value of 0.5951 (Table 7).

Table 7: SVOO Head Noun Position

	SL mN (s=5.317, s=1.60)
SL Nm (m=5.217, s=1.42)	mN higher than Nm

*p<0.1 **p<0.05

For SOOV, the SL Nm mean rating was 4.641 (s=1.78) and the mN rating was 4.504 (s=1.81). The Nm rating was slightly higher than that of mN, but this difference was not significant (p=0.4766). A paired two-sided t test was again used to determine the significance. Table 8 shows these results.

Table 8: SOOV Head Noun Position

	SL mN (s=4.504, s=1.81)
SL Nm (m=4.641, s=1.78)	Nm higher than mN

*p<0.1 **p<0.05

5.7 Preferences among Conditions

Means were taken for all the ratings of each condition, using the combined ratings of both the LS and SL subcondition. SVOO, OOSV, and OSVO all had a total of 480 ratings, while SOOV had 468. SVOO had an overall mean rating of 5.150 ($s=1.60$), SOOV was rated 4.700 ($s=1.77$), OOSV was rated 4.708 ($s=1.70$), and OSVO received a mean rating of 5.235 ($s=1.55$). By visual inspection, OSVO had the highest rating, although its mean is not significantly different from the second highest rated structure, SVOO ($p=0.3521$). Its mean is, however, significantly different from OOSV ($p=0.0000$) and from SOOV ($p=0.0000$). A paired two-sided t test was used to determine these differences. These statistics are outlined in Table 9.

Table 9: Among Conditions

	SVOO ($m=5.150, s=1.60$)	OOSV ($m=4.708, s=1.70$)	SOOV ($m=4.700, s=1.77$)
OSVO ($m=5.235, s=1.55$)	OSVO higher	OSVO higher**	OSVO higher**

* $p<0.1$ ** $p<0.05$

5.8 Summary of Findings

Overall, subjects showed a preference for short-before-long in the SVOO and OSVO conditions and long-before-short in the SOOV and OOSV conditions, although the results for OOSV were not statistically significant. These results are summarized in Table 10 and Figure 1 below.

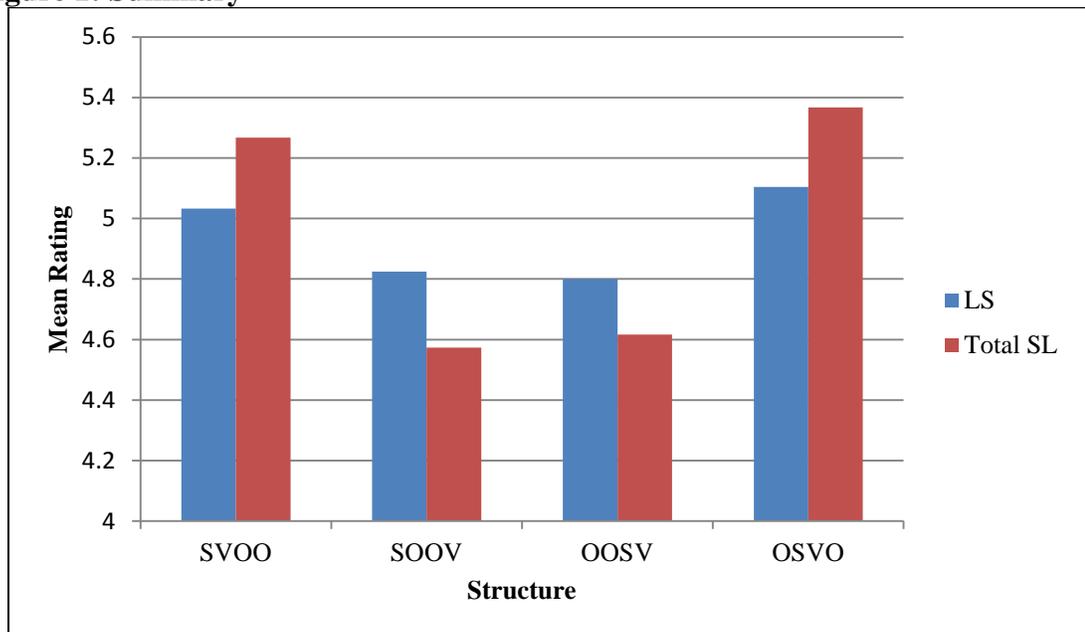
Finally, the position of the head noun within the object argument did not have a statistically significant effect on subjects' ratings.

Table 10: Summary

	Order Preference
SVOO	Short-before-long*
OSVO	Short-before-long**
SOOV	Long-before-short*
OOSV	Long-before-short

*p<0.1 **p<0.05

Figure 1: Summary



Chapter 6: Discussion

This chapter will present some conclusions that can be drawn from the results of the experiment. These conclusions will not take a stand on theories of underlying syntactic phenomena, such as whether movement is antisymmetric or how headedness is derived. I also will not make any claims about the motivations and reasons for placing objects in preverbal positions versus postverbal positions, as such a discussion is beyond the scope of this work. Instead, this chapter will focus on processing-based theories, and will explore how the results of this experiment affect current processing theories. A hypothesis will be made that the surface position of the objects with respect to the predicate exerts a strong influence on heavy NP shift tendencies. Finally, I will describe some limitations and strengths of the study.

6.1 Results and Original Hypotheses

The results from the SVOO condition supported the original hypothesis of a short-before-long preference. For SOOV, speakers preferred long-before-short structures, which confirmed my original hypotheses as well. There was not a statistically significant difference between the means of the ratings for short-before-long and long-before-short in OOSV, but long-before-short was rated slightly higher. While further studies will be needed to confirm this observed tendency, it does match my initial hypothesis about two preverbal objects.

The ratings for the OSVO condition demonstrated a short-before-long preference for this construction. I predicted that subjects would prefer a long-before-short order so

that the short object could remain closer to the verb, but my prediction was proven incorrect. It is interesting to note that this is the only instance in this experiment where a preferred structure does not have the short object directly adjacent to the verb. The OSVO condition was also the most highly rated structure overall when the ratings of all four structures were compared. Its mean rating was not, however, statistically significantly different from that of the SVOO condition, which had the second highest rating.

6.2 Constituent Surface Position

These conclusions from Finnish are very relevant to theories that heavy NP shift direction is uniquely determined by a series of language properties (Yamashita & Chang 2001; Chang 2009), as Finnish shares several crucial properties with Japanese. Both Finnish and Japanese have rich case-marking, flexible word order, and are articleless. The languages do differ in the rigidity of their headedness though: Finnish permits both verb-final and verb-initial structures, while Japanese is rigidly verb-final.

Despite the similarities between Finnish and Japanese, two Finnish structures (SVOO and OSVO) exhibit a short-before-long preference, which is different from the Japanese long-before-short tendency. If their shared properties of case and flexible word order were the cause for heavy NP shift direction, then we would have expected Finnish and Japanese to exhibit the same object ordering.

In addition, within Finnish, different structures showed different heavy NP shift tendencies. Subjects preferred a long-before-short order for SOOV and OOSV, and short-before-long for SVOO and OSVO. The main difference between SOOV/OOSV and

SVOO within the same language is the location of the objects with respect to the predicate. The other factors of case, flexible word order, and presence of articles are constant among these conditions, and so it is unlikely that they contribute to the variation in ordering preferences.

I therefore propose that the direction of heavy NP shift is cross-linguistically controlled by the surface position of objects relative to the predicate. Japanese, Finnish SOOV, and Finnish OOSV all show the long-before-short tendency, and all are characterized by a verb final structure and preverbal objects. On the other hand, short-before-long is preferred in English and Finnish SVOO, and these constructions have both objects following the verb. The implications of the OSVO results will be discussed in 6.2.2 below. Overall though, we would expect that a long-before-short ordering should be seen in preverbal positions and that short-before-long should be preferred in postverbal positions within and among languages.

6.2.1 Mechanism of Surface Position Effect

The exact reason for the importance of the constituent surface position requires further discussion. Yamashita and Chang's (2001) theory of competing factors of saliency and accessibility is compelling, but it is unclear what linguistic properties determine how salient or accessible an NP is and the effect of the NP's relative position to the verb has not been well described in relation to saliency.

I thus propose a modification to their theory. It seems that saliency and accessibility are important because of antilocality effects. Several studies have suggested that preverbal material increases memory load and thus hinders processing (Gibson 1998;

Pritchett 1991, 1992), but antilocality effects are seen when an increased amount of preverbal material facilitates processing (Levy & Keller 2012; Konieczny & Döring 2003). This effect is thought to arise because more preverbal material allows the parser to expect and predict the verb, contributing to processing ease.

Thus, preverbally, more salient phrases are placed first because they contribute more lexical information and consequently facilitate greater expectation and prediction of the upcoming verb. Postverbally, saliency is less important because the verb has already been processed and predictions about future constituents are not as necessary. More accessible phrases are therefore placed first, which contributes to a lower memory load and increased processing ease.

In this way, the relative surface position of the objects and the predicate controls the ordering of heavy and light objects by determining whether their saliency or accessibility will do more to ease processing costs. This is a modification of Yamashita and Chang's theory because it focuses only on constituent surface position and it explains why these positions are important for the saliency and accessibility of NPs. Other factors such as case and word order flexibility do not cause heavy NP shift ordering, but they can be peripherally associated with it. In languages with rich case marking, the case of an NP helps parsers quickly identify its role and aids in predicting the upcoming verb. However, the presence of case marking and word order flexibility themselves does not *cause* cross-linguistic variation in heavy NP shift, as evidenced by Finnish.

More broadly speaking, this theory also suggests that languages cannot be classified with one heavy NP shift direction parameter. Instead, languages can exhibit

both heavy NP shift trends if they allow both preverbal and postverbal object constructions.

6.2.2 Processing of Preverbal Material

The OSVO condition contained structures with one object preceding the verb and the other following it, so both preverbal saliency and postverbal accessibility could contribute to the constituent order. However, statistical analysis proved that subjects preferred structures with the short object before the verb and the long object after the verb ($O_{\text{short}} S V O_{\text{long}}$). This shows that in Finnish, speakers prefer to keep as much lexical information in the postverbal domain as possible.

Some literature has suggested that sentences with fewer preverbal arguments are easier to process (Ueno & Polinsky 2009), especially with the involvement of high memory load structures like relative clauses (Levy & Keller 2012). It appears that in Finnish, preverbal objects come with a processing cost, and this processing cost trumps the benefit of using salient phrases to predict the upcoming verb. When both objects are preverbal, speakers will use them to form expectations and facilitate the processing of the impending predicate. However, when speakers have the option of putting one or both objects in the postverbal domain, they prefer to put the longer object there, as the processing advantage gained by reducing the amount of preverbal material is greater than the advantage gained by making predictions. This is also evidenced by the high frequency of SVOO structures and the lower frequency of SOOV, OOSV, and OSVO structures in Finnish.

This result suggests that within languages, speakers have preferences about which domain they prefer to place objects in. However, if both objects are in one domain, then I predict that the objects will be ordered as either long-before-short (preverbal) or short-before-long (postverbal). Although I have briefly offered a suggestion for why Finnish speakers might prefer to place the longer object after the verb, it is beyond the scope of this thesis to discuss this issue further.

6.3 Alternate Theories

6.3.1 Constituent Distance

Hawkins' distance based account of heavy NP shift is plausible for some of this experiment's data, but is damaged by the comparison of NPs with prenominally modified head nouns and postnominally modified head nouns. These two types of NP constructions were examined in SVOO and SOOV sentences. Not only was the difference between the mean ratings of structures with prenominally and postnominally modified nouns not statistically significant, but in both conditions, constructions that placed the head further from the verb were rated slightly higher. That is, prenominally modified nouns were favored in SVOO (S V O_{short} O_{long(modifiers +N)}) and postnominally modified nouns were favored in SOOV (S O_{short} O_{long(N+modifiers)} V).

This result supports my theory about constituent surface position. When the long object is preverbal, parsers are most concerned with using the lexical information from the object to predict the upcoming verb. Thus, they prefer to encounter the head noun as early as possible, as the head identifies the NP and thus provides the most lexical and syntactic information about the NP. This allows for prediction of the upcoming verb.

When the object is postverbal, however, its accessibility is the more important factor. The prenominally modified NPs in this experiment involved a string of adjectives, while the postnominally modified NPs involved a postnominal relative clause. Relative clauses cause increased memory load (Levy & Keller 2012) and are less accessible. Therefore, parsers prefer objects without relative clauses to follow the verb (the prenominally modified NPs, in this experiment) to increase accessibility.

6.3.2 Headedness

Another possible explanation for this heavy NP shift data is based on headedness. SOOV structures (and Japanese) are head-final and exhibit long-before-short preferences, and SVOO (and English) are head-initial and exhibit short-before-long effects. OSVO is underlyingly head-initial and shows short-before-long as well. However, OOSV is underlyingly head-initial but does not pattern with the other head-initial constructions. Instead, it exhibits a long-before-short tendency like SOOV, and both of these structures have objects appearing preverbally. This implies that the surface position of the verb is more important than the headedness of the language.

In addition, headedness is an oft-discussed linguistic property but is not completely understood. Most languages are not purely head-final or head-initial, either. For example, English is traditionally considered head-initial, but some phrases are head-final, like NPs with nouns preceded by adjectives. It can be difficult to assign headedness to a language, and for languages that exhibit some mixed headedness, it can be difficult to determine which phrases' headedness might influence heavy NP shift. On the other

hand, predicate position is quite easily observed and understood among and within languages, which increases its appeal as an explanation for heavy NP shift.

It is important to note that this distinction between headedness and predicate position is only visible in mixed headed languages such as Finnish. In a language like Japanese, nearly all structures are head-final and verb-final on the surface as well. Thus, the study of Finnish has allowed us to tease apart the importance of headedness and predicate position in relation to heavy NP shift.

6.3.3 Strengths of the Constituent Surface Position Theory

My proposed theory explains the motivations for heavy NP shift rather than simply describing its distribution and regulation, and thus does not suffer from one of the main problems of the syntactic frameworks. Constituent surface position also accurately accounts for the data from Finnish, Hungarian, English, and Japanese. The distinction between adjuncts and complements is not important for this constituent surface position theory like it is for Gibson's (1998) proposal about memory load. Finally, this theory is not damaged by evidence that speakers make predictions about upcoming sentence material while processing (Altmann & Kamide 1999) as Pritchett's (1991, 1992) head-driven parser model is.

The motivation for heavy NP shift in production is a problem for many current theories and in some ways is not well understood. However, saliency and accessibility are just as relevant to production as they are to processing, as originally suggested by Yamashita and Chang (2001). Language production has been shown to be incremental (Ferreira 1996), suggesting that speakers do not have their entire sentence planned out

when they begin to speak. Thus, they need to make plans and prepare for the upcoming verb in the same way that parsers do. They produce the most lexically salient constituents first to help shape and facilitate the production of the rest of the sentence. Postverbally, saliency is less important because the sentence is nearly complete and there are fewer predictions and future plans to be made. Thus, the more accessible phrases that are more readily available are placed first to facilitate quicker production.

6.4 Strengths and Limitations of the Experiment

This study was designed carefully, but certain aspects of the experimental set up warrant further discussion.

6.4.1 Use of Amazon Mechanical Turk

The use of Mechanical Turk to gather subjects is potentially problematic. Subjects cannot be monitored, and thus could provide deceiving demographic information and/or could select answers without making an effort to read and understand the stimuli.

Running experiments in laboratories, on the other hand, allows experimenters to control for environmental distractions and ensure that subjects comprehend and complete the task appropriately.

However, there is an increasing number of studies that show the merits of using Mechanical Turk and dispel fears about control. Mechanical Turk has been shown to produce very reliable data. Sprouse (2011) demonstrated that data collected for an experiment through Mechanical Turk and the data collected for the same experiment in a lab were virtually indistinguishable except for the level of participant rejection rates.

Another study also showed that a variety of language processing tasks administered through Mechanical Turk had very similar results to the results produced by experts in the task's field (Snow et al. 2008). In addition, Mechanical Turk increases ease of experimental implementation because the subject pool is very large and speakers of many different languages can be reached. This study would not have been possible without Mechanical Turk, as it would have been difficult to find enough Finnish speakers with whom to conduct the study in person. I therefore conclude that Mechanical Turk was an appropriate method for eliciting sentence ratings.

6.4.2 Testing Hypotheses through a Rating Study

The utilization of more quantitative approaches is needed in linguistics, a field where data in published papers is often based on the intuitions of the author or of a small group (Gibson et al. 2011). Mechanical Turk is an easy way to amass data from a large group of native speakers to support linguistic theories. This study and its conclusions are therefore strengthened by the use of ratings from a large sample.

6.4.3 Limitations

Certain aspects of the experiment could have had unintentional effects on its results. First, a Latin Square design was not used, and thus sentences between subconditions contained different verbs, subjects, and objects. Repeating the study with a Latin Square design to control for lexical effects and ensure that differences in ratings were due solely to word order would strengthen the initial findings that this thesis has presented. Additionally, no context sentences were used in the study, and as seen in

Chapter 3, the acceptability of scrambled structures is linked to discourse effects. This could have affected participants' ratings and comprehension of the sentences, although should not have had an effect within conditions where sentence structure was constant.

In addition, two of the results of this study were only significant at the 10% level, and one was not statistically significant. This study was performed as an initial foray into heavy NP shift in the preverbal domain, and thus the results are mostly tendencies rather than statistically confirmed facts. This experiment has opened the way for more rigorous approaches to the preverbal heavy NP shift, however, which can be used to corroborate its findings.

Chapter 7: Conclusion

This thesis has examined heavy NP shift in Finnish constructions with two object arguments, and has produced a set of conclusions and explanations. First, we have seen that Finnish exhibits long-before-short tendencies in preverbal positions and short-before-long tendencies postverbally. Second, based on the Finnish data and known facts about heavy NP shift in other languages, I have proposed that the surface position of the objects relative to the predicate determines how objects are preferentially ordered. Finally, I have suggested that the arrangement of objects in the preverbal domain is based on saliency and the antilocality effect. Parsers put longer, more lexically salient phrases first to more easily predict the upcoming verb, thus easing processing costs. Postverbally, object order depends on accessibility and memory load. Longer, less accessible phrases are placed last to minimize the time that they must be held in the working memory.

It thus appears that languages cannot necessarily be characterized as having a single pattern of heavy NP shift linearization. Rather, heavy NP shift preferences are determined by the relative surface position of the objects and the predicate, which can vary within a language. When objects are preverbal, long-before-short is seen; when they are postverbal, short-before-long is predominant. This focus on surface position is distinct from the derivation or deep structure of a phrase, which are factors that have been implicated in other heavy NP shift frameworks. Lastly, it is important to note that while languages cannot always be classified with a single linearization parameter, there still exists a systematic distribution of long-before-short and short-before-long orderings. This

distribution is based on the surface position of the objects and predicate, and so the linearization of heavy NP shift is still principled.

7.1 Further Research

As previously mentioned, these initial findings would benefit from a follow up study with more rigorous controls and statistical analyses. The study could be repeated with a larger sample size, and could perhaps use Yamashita and Chang's (2001) methodology so that Finnish and Japanese can be more directly and accurately compared.

In addition, the importance of case marking and word order flexibility could be evaluated by examining heavy NP shift in an SOV language that does not have a rich case marking system. If such a language exhibits the long-before-short preverbal preference, then this will be very strong evidence that case does not play a role in determining the order of heavy and light objects. If such a language does not exhibit the long-before-short preference, then case may play a larger role than I had imagined and the relative position of objects to the predicate may not be as important. Also, an experiment to further explore constituent surface position in relation to production costs would benefit my theory, as the current experiment did not explicitly test whether constituent surface position affects production.

Finally, heavy shifts could be explored in structures other than VPs with two object arguments, such as in NPs/DPs. When the head noun is modified by several separate modifiers of different lengths, how will these modifiers be preferentially arranged? This will allow for the expansion of the constituent surface position theory to

encompass a wider variety of structures and for a more accurate explanation of the behavior of heavy elements in a sentence.

Appendix A: Experiment Directions

Finnish, actual experiment

Tässä kyselyssä Teitä pyydetään arvioimaan lauseita asteikolla yhdestä (ei lainkaan hyväksyttävä) seitsemään (täysin hyväksyttävä). Teidän ei tarvitse kiinnittää huomiota kieliopillisiin sääntöihin tai kielen laatuun: haluaisimme vain kuulla mielipiteenne siitä, ovatko lauseet ymmärrettävää Suomea. Arvioinnin on tarkoitus olla siis puhtaasti tunteisiin perustuvaa. Lähtökohtana arvioille voitte pohtia onko tällaista lausetta edes mahdollista käyttää Suomen kielessä.

Huom. Kysely on tarkoitettu vain suomea äidinkielenään puhuville!

Kun kysely on ohi, näette varmistuksen, että vastauksenne on lähetetty eteenpäin. Jos näette painikkeen, jossa lukee “yritä uudelleen”, painakaa sitä.

Aloittaaksenne kyselyn, olkaa hyvät ja painakaa alla olevaa linkkiä.

English Translation

In this questionnaire you will be asked to judge sentences on a scale of 1 (unacceptable) to 7 (fully acceptable). In doing this, don't think about grammatical rules or the literary standard: we are most interested in your opinion about whether you can utter each example in Finnish. In assigning scores to sentences do not try to find objective criteria (there aren't any), but try instead to rely on your own sense of the language: is it possible to say this sentence, or hear something like this in Finnish?

Attention. The survey is only meant for native Finnish speakers!

When the experiment is over, you will see an announcement that your results have been sent to the main server. If you see a “Retry” button, please click there.

To start the experiment, please click the link below.

Appendix B: Demographic Questions

Finnish, actual experiment

Nimi:

Sähköpostiosoite:

Syntymäpaikka:

Puhutteko Suomea äidinkielenänne?

Suomessa asutut vuodet (esim. 1980 – nykyhetki):

Kaikki tiedot ovat luottamuksellisia ja kyselyitä käsitellään nimettöminä.
Sähköpostiosoitteenne on kuitenkin meille tärkeä, jotta voimme palata asiaan mikäli lisäkysymyksiä ilmaantuu.

Jatkaaksenne, painakaa tästä.

English Translation

Age:

Email:

Place of Birth:

Was Finnish your first language?

Years lived in Finland (for example, “1980-present”):

Please don't forget to indicate your email. This information will be kept private (the questionnaire is anonymous), but it is useful for us in case we need to get in touch with you with further questions.

To continue, click here.

Appendix C: Sentence Stimuli

Practice Sentences

Finnish, actual experiment	English Translation
Ensi keväänä olen opiskellut unkaria kaksi vuotta.	Next spring I will have been studying Hungarian for two years.
Ilkka juoksi kengän puhki.	Ilkka wore a hole in his shoe by running.
Taksi kuljetti minut viisi kilometriä Oulusta etelään.	The taxi took me five kilometers south of Oulu.
Hän tulee aamulla ja lähtee illalla.	He/she comes in the morning and leaves in the evening.

Experimental Sentences

Sentence Type	Finnish, actual experiment	English Translation
SVOO LS 1	Hän heitti pesäpallon, johon kuuluisa pesäpallopelaaja USA:sta oli kirjoittanut nimikirjoituksensa, Henrikille.	She threw a baseball that had been signed by a famous baseball player from the United States to Henrik.
SVOO LS 2	Sara antoi serkulleen, joka oli palvellut armeijassa viisi vuotta valmistuttuaan yliopistosta, suolasirottimen.	Sara passed to her cousin who served in the army for five years after graduating college the salt shaker.
SVOO LS 3	Hän näytti artikkelin, jonka oli kirjoittanut Osmon pitkä kaveri Ruotsista Seijalle	He showed the article that was written by Osmo's tall friend from Sweden to Seija
SVOO LS 4	Minä löysin maasta läheltä pientä leipomoa, joka myy herkullisia muffinsseja, kolikon.	I found on the ground near the small bakery that sells delicious muffins a coin.
SVOO LS 5	He näkivät kaulapannattoman koiran, joka oli melkein yhtä iso kuin lehmä Helsingissä.	They saw a dog without a collar that was almost as big as a cow in Helsinki.
SVOO LS 6	Hän antaa lahjan, joka oli kääritty kultapaperiin ja jossa oli suuri valkoinen rusetti vaimollensa.	He gives a gift that was wrapped in gold paper and a large white bow to his wife.
SVOO SL Nm 1	He toivat hänelle pussillisen omenoita, jotka he olivat poimineet edellisenä viikkona hedelmätarhasta takapihallaan.	They bring to him a bag of apples that they picked last week from the orchard in their backyard.

SVOO SL Nm 2	Hän opetti matematiikkaa yli 30-vuotiaille aikuisille, joilla ei ole varaa mennä yliopistoon.	She teaches math to adults over the age of 30 who cannot afford to attend college
SVOO SL Nm 3	Lintu rakensi pesänsä puuhun, joka kasvoi kentällä, joka oli ennen lentoasemaa.	The bird built the nest in the tree growing by the field that used to be an airport.
SVOO SL mN 1	Me leivoimme Eliakselle suklaakuorrutetun, nonparellipäällysteisen, kaksikerroksisen syntymäpäiväkakun.	We bake for Elias a chocolate-frosted, sprinkle-covered two layer birthday cake
SVOO SL mN 2	Minä lainasin kynän huonomuistiselle mutta valppaalle ja älykkäälle nuorelle vaaleahiuksiselle pojalle.	I lent a pen to the forgetful but observant and intelligent young blond boy.
SVOO SL mN 3	He tekivät Liisan kanssa suuren, paksun, monivärisen ja huolellisesti ommellun tilkkutäkin.	They make with Liisa a large, thick many-colored and carefully-sewn quilt.
SOOV LS 1	Ovatpa he tarkan diagrammin, joka esittää heidän psykologian tutkimuksensa tulokset, vihkoon piirtäneet.	They have drawn an accurate diagram that shows the results of their psychology experiment in a notebook.
SOOV LS 2	Onpa Henriikka nuorelle miehelle, jonka hän tapasi työskennellessään kirjastossa, hienon palkinnon antanut.	Henriikka has presented to the young man who she met while working at the public library a great prize.
SOOV LS 3	Ovatpa he sihteerille, joka osaa kirjoittaa nopeasti ja pitää hyviä muistiinpanoja lahjan antaneet.	They have given to the secretary who knows how to type quickly and take good notes a gift.
SOOV LS 4	Onpa mies taitavasti autotalliin, jota raekuuro pahoin vaurioitti, autonsa ajanut.	The man has skillfully driven into the garage that was damaged by the most severe hailstorms in history his car.
SOOV LS 5	Onpa hän sanomalehden kanssa otsikko noin kiistanalainen kansainvälisen kaupan uuden lain pöydälle laittanut	He has put a newspaper with a headline about a controversial new international trade law on the table.
SOOV LS 6	Onpa Kalle ison, virheän, epämukavan ja pahalta haisevan tuolin huoneeseen työntänyt.	Kalle has pushed a large green chair that is not comfortable and that smells funny into the room.
SOOV SL Nm 1	Onpa hän terävän kynän kiharapäiselle miehelle, joka varttui Norjassa, antanut.	She has handed a sharp pen to the man with the long curly hair who grew up in Norway.
SOOV SL Nm 2	Ovatpa he Tampereelle hienon tehtaan, joka toimii aurinko- ja tuulienergialla, rakentaneet.	They have constructed at Tampere a great factory to be exclusively powered by solar and wind power.
SOOV SL Nm 3	Olemme näyrän kirjeen miehelle, joka odotti tunteja päästäkseen puhumaan ala-asteen rehtorin kanssa,	We have sent a humble letter to the man who was waiting to speak with the elementary school principal.

	kirjoittaneet.	
SOOV SL mN 1	Onpa hän lattialle serkkunsa suuren, ruman, vanhan, likaisen, sinisen laukun asettanut.	Otto has placed on the floor his cousin's large, ugly, old, food-stained purse
SOOV SL mN 2	Ovatpa he pienen peilin suurimpaan, lämpimimpään ja erikoisimmin maalattuun makuuhuoneeseen siirtäneet.	They have moved the mirror into the biggest and most unusually painted bedroom.
SOOV SL mN 3	Onpa Jaana hirmuisen summan nopeasti puhuvalle, oudosti pukeutuvalla, vihaiselle kassaneidille maksanut.	Jaana has paid 5 euros to the fast-talking, strangely dressed, angry old cashier.
OOSV LS 1	Ison patsaan, jonka Kalle osti ollessaan lomalla Ruotsissa kaksi vuotta sitten, Seijalle hän antoi.	The large statue that Kalle bought while he was on vacation in Sweden two years ago to Seija they gave.
OOSV LS 2	Kirjan, joka kertoo kahdesta pienestä pojasta, jotka rakensivat linnan pahvilaatikoista ja teipistä, Miralle me luumme.	A book about two little boys who built a castle out of cardboard boxes and tape to Mira we read.
OOSV LS 3	Kummitusasulla, joka oli tehty vanhasta lakanasta, lapsi Paavon pelästytti.	With the ghost costume that he had made out of an old bed sheet the child Paavo frightened.
OOSV LS 4	Ravintolaan, jossa olimme tavanneet asiakkaan lounaalla puhuaksemme liikesopimuksesta, puhelimensa Kaarlo jätti.	In the restaurant where he had met a client for lunch to discuss a business deal his phone Kaarlo left.
OOSV LS 5	Liedellä, joka oli mennyt rikki ja joka oli korjattu kolmesti viime vuonna, vihanneksia hän keitti.	On the stove that had broken down and been repaired three times over the past year vegetables he boiled.
OOSV LS 6	Bakteerin, jonka epäiltiin aiheuttavan hengenvaarallinen tulehdus vastasyntyneissä, mikroskoopilla tiedemies tutki.	The bacteria that was thought to cause a fatal infection in newborn babies with a microscope the scientist examined.
OOSV SL 1	Hameen hänen ystävältään, joka kirjoittaa viikottaista kolumnia tunnettuun muotilehteen, Raakel lainasi.	A skirt from her friend who writes a weekly column for a famous fashion magazine Raakel borrowed.
OOSV SL 2	Voita paahtoleivälle, joka oli palanut hänen puhuessaan puhelimesta, Jussi levitti.	Butter over the toast that had gotten burned while he was talking on the phone Jussi spread.
OOSV SL 3	Valkaisuaineessa paitaa, jossa oli iso vihreä tahra hihansuussa, he liottivat.	In bleach the shirt that had a large green stain on the cuff of the left sleeve they soaked.
OOSV SL 4	CD-levyn elektroniikkakaupasta jonka omisti mies, joka oli ennen ollut poliisi,	A CD from the electronics store that was owned by a man who used to be a police

	poika varasti.	officer the boy stole.
OOSV SL 5	Omena kalkkunavoileivän, joka oli tehty vehnäleivästä ja ilman salaattia, Miska vaihtoi.	For an apple a turkey sandwich that had been made on wheat bread and without lettuce Miska traded.
OOSV SL 6	Pakettiautolla automme, jonka kolaroimme lunastuskuntoon viime viikolla kolarissa ison rekan kanssa, me korvasimme.	With a van our car that we totaled last week in a collision with a large truck we replaced.
OSVO LS 1	Koristeellisen maljakon, joka oli käsin tehty Kiinassa 1800-luvulla, hän osti kaupasta.	An ornate vase that was hand-made in China during the 18th century she bought in the store.
OSVO LS 2	Turistille, joka puhui oudolla aksentilla ja joka kantoi kameraa, Luukas myi postikortin.	To a tourist who spoke with a strange accent and carried a camera Luukas sold a postcard.
OSVO LS 3	Lautasellisen korvapuusteja, joita heidän äitinsä oli koko iltapäivän leiponut, he antoivat naapureilleen.	A plate of cinnamon rolls that their mother spent all afternoon making they gave to their neighbors.
OSVO LS 4	Pöydän alle, jolle oli katettu vihreät tarjoilualustat ja metalliset kynttilälajalat, he piilottivat television.	Under the table with the green placemats and the tall metal candlesticks they hid the TV.
OSVO LS 5	Tytölle, jolla oli tapana istua hänen edessään kansantaloustiedon tunnilla lukiossa, Fredrik suositteli vitsikirjaa.	To the girl who used to sit in front of him in his high school economics class Fredrik recommended a book.
OSVO LS 6	Pojan, joka oli asunut koko ikänsä maaseudulla ilman sähköä, saatoimme kaupungin läpi.	The boy who had grown up in the countryside on a farm without electricity we lead through the city.
OSVO SL 1	Koulussa hän tapasi tytön, joka kantoi pientä punaista muovinapein koristeltua selkäreppua.	At school, he met a girl who carried a small red backpack that was decorated with buttons.
OSVO SL 2	10,000 euroa he olivat velkaa pankille, joka oli hiljattain sekaantunut kansainväliseen rahanpesuskandaaliin.	10,000 euros they owed to the bank that was recently involved in an international fraud scandal.
OSVO SL 3	Aspiirinia lääkäri määräsi nuorelle tytölle, joka valitti toistuvista pää- ja selkäkivuista.	Aspirin the doctor prescribed to the young girl who complained of frequent headaches and back pains.
OSVO SL 4	Komeroon Annika ripusti punaisen mekon, jonka hän vahingossa repäisi tanssiensa häissä.	In the closet Annika hung the red dress that she had ripped while dancing at a wedding.
OSVO SL 5	Myyjältä Eveliina sai lentolehtisen, jossa mainostettiin uutta ja erittäin halpaa painonpudotustuotetta.	From a salesman Eveliina took a flier advertising a new and very cheap weight-loss product.

OSVO SL 6	Paperit me laitoimme työpöydälle, jonka isämme oli ostanut nettikaupasta poistohintaan.	The papers we placed on the desk that our father had bought on the internet for a low price.
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Fillers

Type	Finnish Sentence
Ungrammatical 1 (S-V agreement)	Pertti juoksivat viisi kilometriä.
Ungrammatical 2 (case)	Me söimme viidelle omenalle.
Ungrammatical 3 (case)	Hän antoi koiraksi luun.
Ungrammatical 4 (S-V agreement)	Laura ja Liisa luimme monta kirjaa.
Ungrammatical 5 (case)	Viime talvetä minä vierailin isoäitini luona.
Ungrammatical 6 (case and S-V agreement)	Kaksi lintua lensin ikkuna ohi.
Ungrammatical 7 (case)	Autoa takana on hirvi.
Ungrammatical 8 (case)	Antti ja Mikko menivät ostamaan maitoa kauppaan.
Ungrammatical 9 (case)	He matkustivat Ranskalle.
Ungrammatical 10 (S-V agreement)	Kauppiaat juoksit varkaan perään.
Ungrammatical 11 (case)	Lapsille leikkivät rannalla.
Ungrammatical 12 (case)	He kävelivät puistoitse.
Ungrammatical 13 (case)	Mäille päällä on kolme taloa.
Ungrammatical 14 (S-V agreement)	Te katsoimme televisiota.
Ungrammatical 15 (case)	Leijonille ja tiikereille ruokitaan hyvin eläintarhassa.
Incorrect Word Order 1	Siskoni tummaksi värjätyt hiukset hyvin ja ovat hoidetut.
Incorrect Word Order 2	Vesipullon oli etikettiin kirjoitettu veden ravintoarvot.
Incorrect Word Order 3	Marjatta viime yllättäen viikolla lainatessaan videoita videovuokraamosta törmäsi entiseen poikaystävänsä.
Incorrect Word Order 4	Kanasuikaleet maustetaan korianterilla paprikamausteella ennen uunin ja jo lämmittämistä.
Incorrect Word Order 5	Korvatulpat ovat tärkeitä kirjastossa erityisen.
Incorrect Word Order 6	Matkapuhelimen aikana käyttö on kielletty luennon.
Incorrect Word Order 7	Sukulaisilla on usein varsinkin paljon puhuttavaa syntymäpäiväjuhlilla.
Incorrect Word Order 8	Korvasienet ovat perinteinen yleensä herkku, joita saattaa kerätä alkusyksystä.
Incorrect Word Order 9	Koulukirjani ovat aina täynnä harmikseni turhia huolimattomuusvirheitä ja muita sotkuja.
Incorrect Word Order 10	On koulumatkoilla saattaa tehdä paljonkin läksyjä, jos tarpeeksi

	motivoitunut.
Incorrect Word Order 11	Kuulimme iskelmän matkatessamme kauniin halki Ruotsin viime vuonna linja-autossa.
Incorrect Word Order 12	Oven saranat parissa tulisi öljytä vähintään kerran vuodessa.
Incorrect Word Order 13	Yllättävä reppureissaajia löytyy usein aikamoinen määrä Thaimaan kauniilta rannoilta tammikuussa.
Incorrect Word Order 14	Lentotukikohdan öisin vierustalla asuvalla miehellä oli vaikeuksia nukkua.
Incorrect Word Order 15	Jos haistat syksyisin lehtien, muistuttaako se tuoksun sinua lapsuudestasi?
Grammatical 1	Urho Kekkonen oli Suomen presidentti.
Grammatical 2	Ministerit lähtivät lomalle.
Grammatical 3	Mikään ei ole mahdotonta.
Grammatical 4	Suomessa on vielä puhdasta ilmaa.
Grammatical 5	En ole nähnyt häntä kahta kertaa.
Grammatical 6	Hän luki lääkäriksi viidessä vuodessa.
Grammatical 7	Johtaja on palannut Brasiliasta.
Grammatical 8	Hän on ollut täällä viime vuodesta.
Grammatical 9	Emäntä panee ruuan pöytään.
Grammatical 10	Poliisi pysäytti auton kadunkulmaan.
Grammatical 11	Rauma on mukava kaupunki vanhoine taloineen ja kapeine katuineen.
Grammatical 12	Olisin sairastunut, ellei Martti olisi auttanut minua.
Grammatical 13	Ne tytöt, jotka ovat saaneet työnsä valmiiksi, voivat mennä.
Grammatical 14	Joulun jälkeen hän muutti lastensa kanssa isänsä luo.
Grammatical 15	Kaikki olivat tyytyväisiä tulokseen.
Grammatical 16	Hän kävi täällä ennen matkaa Lontooseen.
Grammatical 17	Eilen kaupungissa vierailivat monet turistiryhmät.
Grammatical 18	Pauli käski Marja-Liisan ostaa talon.
Grammatical 19	Harri halkaisi kiven vasaratta.
Grammatical 20	Ainon passinsaanti oli monimutkaista.
Grammatical 21	Kirje oli pudonnut postilaatikon ja kuusen välille.
Grammatical 22	Olin saavuttamassa Merjan, kun kaaduin.
Grammatical 23	Olisin tullut, jos olisin voinut.
Grammatical 24	Ystäväni kertoi Matin tavanneen Irmelin.
Grammatical 25	Hän kysyi Matti vai Maijako tulee.
Grammatical 26	Täällä oli ryhmä, joka katseli maalauksia.
Grammatical 27	Tuo talo, joka näkyy, on kylän vanhin.
Grammatical 28	Hän kiittää siitä, että oli oppinut koulussa täsmällisyyttä.
Grammatical 29	Hän tuli ilman, että oli valmistautunut esitykseen.
Grammatical 30	Työskenneltiin kovasti rahan hankkimiseksi.
Grammatical 31	Vesi oli liian lämmintä juotavaksi.
Grammatical 32	Ihailen kykyäsi oppia uusia asioita.

Grammatical 33	Kirsi meni ulos ja käveli siellä pitkään.
Grammatical 34	Miehet olivat kuuluisia mutta epäsuosittuja.
Grammatical 35	Tyttö ja hänen vieraansa istuvat penkillä.
Grammatical 36	He arvostelevat toinen toisensa harrastuksia.
Grammatical 37	Jukka lähtee Helsinkiin ja Ristokin menee sinne.
Grammatical 38	Ilma on niin lämmin, että varjossakin on liian kuuma.
Grammatical 39	Lihakeitto oli kalakeiton makuinen.
Grammatical 40	Vika huomattiin konetta korjattaessa.
Grammatical 41	Hotellia ei ole sataan kilometriin.
Grammatical 42	Nooran lisäksi tulivat Frans ja Nils.

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