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| RESEARCH ARTICLE

The Role of Complement/Adjunct Identification in the L2 Acquisition

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| ABSTRACT
This study investigates how a learner's first-language interacts with their developmental sequences. It focuses on morphology and syntax acquisition in learning English as a foreign language (EFL). The current article mainly describes how a learner identifies the head of an English expression and explores the application of Cognitive Grammar. Distinguishing the "head" (the constituent that determines the syntactic category of a word or phrase) from "non-heads" (complements or adjuncts) plays a crucial role in comprehending (and producing) multimorphemic words such as *books*. To address this issue, we employ Dowty's (2000) dual-analysis perspective regarding issues of complement and adjunct identification, which allows for a better account of a systematic semantic and syntactic distinction process in learning a foreign language, which initially appears to be at odds with the traditionally assumed unambiguous function of lexical elements.

| KEYWORDS
Complements, Adjuncts, Cognitive Grammar, EFL [English as a Foreign Language] Learners.

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1. Introduction

When interpreting the complexities and regularities of a non-native language, learners use the patterns of the languages they know. First-language patterns are firmly established, and as learners gain experience with a new language, they witness an interplay between the new and old patterns (Lightbown & Spada, 2013, pp. 57–8). Even when learning something new, we improve on what we already know. Current views on second-language development highlight the interaction between the first (or other previously learned) language or languages and cognitive processes as learners engage in the input (Tyler, 2012; Hilpert, 2019). For instance, when learners reach some level in language learning and perceive similarities between their first and second languages, they may spend more time at that level or add a substage to the sequence that is generally similar for all learners regardless of their first language. To address this issue more closely, this study applies Dowty's (2000) dual-analysis perspective to issues of complement and adjunct identification in non-native language learning by Japanese EFL learners.

One grammatical domain in which typological differences between L1 and L2 affect second language acquisition is the domain of argument structure (Hilpert, 2019, p.244). Extending this claim, we consider ways in which one's first-language interacts with their developmental sequences. Admittedly, for second-language learners, one factor that makes new vocabulary more easily learnable is the frequency with which they see, hear, and understand words (Nation, 2001). However, the present study aims to empirically and theoretically support the claim that the distinction between adjuncts and complements is also critical in language learning, particularly for beginners. It also proposes a novel perspective that can serve as a useful framework for clarifying the non-native language learning process. Specifically, building on Dowty's (2000) dual analysis, we demonstrate that learners do not always determine the role of complement/adjunct identification in advance, but rather, they proceed by increments and may reinterpret the functions of lexical items as they go along.

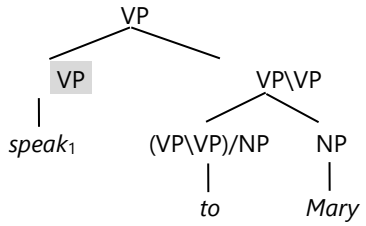
2. Dowty's (2000) Dual Analysis of Complements/Adjuncts

This section presents an overview of the study's central concept. Following Dowty (2000), we begin our discussion with "the distinction between complements and adjuncts, [which] has a long tradition in grammatical theory, and it is also included in some way in most current formal linguistic theories. But, it is a highly vexed distinction for several reasons, one of which is that no diagnostic criteria have emerged that can reliably distinguish adjuncts from complements in all cases—too many examples seem to fall into the crack between the two categories, no matter how theorists wrestle with them" (Dowty, 2000, p. 1). While Dowty adopted the notations of Categorial Grammar (as shown in example (2)), we will not discuss this framework as it is irrelevant to the present objectives. Let us consider some basic, intuitive characteristics that have driven linguists to distinguish between adjunct and complement regardless of their theoretical perspective (if any) of such differences. Specifically, we examine the common pre-theoretic notions of how adjuncts differ from complements and then build a formal account that satisfies the following conditions:

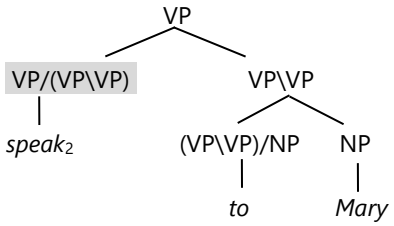
(1) a. Syntax: An adjunct is an "optional element," while a complement is an "obligatory element."
b. Semantics: An adjunct "modifies" the meaning of its head, while a complement "completes" the meaning of its head.
(Dowty, 2000, p.1)

Distinguishing between complements and adjuncts is not a trivial task since there is no clear dividing line between the two (see Toivonen, 2021 and references therein). Dowty argues against the assumption that grammar is a pre-requisite for discourse, that is, a set of schemas that speakers have memorized and that they can draw on when they are uttered. Hence, complements and adjuncts are not fixed but variable. Dowty's dual-analysis hypothesis is founded on the contention that the locative adjunct analysis of all instances of to, from, and other locative prepositions is a preliminary examination that provides language learners a semantic hint or crutch for discerning the idiosyncratic, correct meanings of their nonlocative complement uses, as shown in example (2a) [=Dowty's (10a)]. In this example, a preliminary adjunct analysis of the to-PP (as a locative) allows for a complement analysis of its structure as in example (2b) (=Dowty's (10b)). The point here is that the verbal category (or subcategorization) frame of example (2a) differs from that of example (2b), as indicated in the shaded part in each structure.

(2) a. **Adjunct analysis** [=Dowty's (10a)]



b. **Complement reanalysis** [=Dowty's (10b)]



According to Dowty, under the adjunct analysis, the sentence *John speaks to Mary*, as in example (2a), can be semantically interpreted as "John speaks, and the result of this action is that John ends up in a location next to Mary"—which is not its intended meaning but a rough hint for a learner who has yet to acquire the "speak-to" construction. The complement interpretation of $speak_2$ in example (2b) cannot be the same as that of $speak_1$ in example (2a); rather, it takes the change of place to- "adjunct" as its semantic argument and its meaning can be interpreted as "speak, with the intention that the verbal content of one's speech will end up at a certain place (to-Mary) and will be understood there." Simply put, the proper way to interpret *Mary* here is now built into the meaning of $speak_2$.

The question is raised as to why languages need an adjunct analysis as a "preliminary step" toward a complement analysis. According to Dowty (2000, pp. 10–11), the semantic relations lexicalized in speak to, rent to, and offer to must be learned separately and individually. If language learners could perform adjunct analysis as a beneficial preliminary clue, then their learning burden would be alleviated. The following examination of the dual analysis observed in the EFL context will exemplify the above discussion

involving complements and adjuncts, which may best explain why complements that can be obtained with the least cognitive effort in first-language learning are particularly well suited to our cognitive needs in foreign-language learning as well. Learners are presumed to impose a pattern and order on their learning perceptions, conceptions, and actions to create meaningful and connected experiences that they comprehend and investigate (Mandler, 2004). This presumably leads to the idea that many more adjuncts can be construed as semantic complements of predicates than is typically assumed (e.g., Ernst, 2001; Hole, 2015; Toivonen, 2021). What follows is a detailed analysis of the relevant aspects of non-native language learning.

3. Methodology

The present study proposes that learners identify the two uses of the morphological verb/noun form and account for their crucial differences by perceiving the transition from an adjunct to a complement structure. As discussed in Section 2, adjuncts can be examined as complements both in syntax and semantics. We argue that Cognitive Grammar (Langacker, 2008) captures this phenomenon and conclude that our comprehension of the distinction between complement and adjunct is foundational to our understanding of many more abstract and complex concepts associated with grammatical items in the target language.

In order to show this, we discuss a study on how Japanese learners process English vocabulary and grammar (Chujo et al., 2013), which found that students do not master entire verb paradigms for all verbs simultaneously but rather learn only some endings with some verbs and often different ones with different verbs, which were left unexplained in Chujo et al. (2013). Note that their major concern was a detailed investigation of how their teaching via a data-driven learning system could help students learn particular grammar items. We believe that putting aside this objective for the moment does not affect the arguments that follow. Revising as needed example sentences used in their research, we provide several pieces of evidence in favor of our claim. We replicated their sentence completion tests that had demonstrated experimental results that did not match the acquisition order of English grammar items observed in Shirahata's (2008).

3.1 Grammar-based instruction

The current study attempts to determine whether English vocabulary and grammar must be introduced gradually with an eye toward the usefulness of an individual item at an appropriate learning stage. We examine whether the dual analysis of adjuncts/complements is justifiable in non-native language learning.

To develop an appropriate grammar-based syllabus for students in a remedial English class, we first identified their specific grammar needs by administering a basic grammar proficiency test to 39 Japanese college students majoring in business economics at a Japanese private university in 2019. This test material was originally designed by Shirahata (2008) and was based on an investigation of English proficiency levels among Japanese elementary and junior high school students. In our experiment, following Chujo et al. (2013), test items that were incorrectly answered by almost 30% of the university students were selected for inclusion in the syllabus and were later targeted in language exercises. Table 1 presents the course syllabus, which we used in the present experiment.

Table 1. Syllabus based on basic grammar items

Week	Spring Semester	Fall Semester
1	Course guidance	Comparison
2	Computer-assisted instruction	Modal auxiliaries (*may*, *shall*, *must*)
3	Computer-assisted instruction	Present perfect
4	Computer-assisted instruction	*Yes-no* questions (*do*, *does*, *did*, *was*, *were*, . . .)
5	**Pretest**	Tense (present, present progressive, past, . . .)
6	Nouns (countable and uncountable)	Pronouns (possessive)
7	Adjectives (participial)	Conjunctions (*if* and *when*)
8	Nouns (possessive)	Relative pronouns (*who*, *which*, that)
9	*Wh*-questions (*what*, *what time* . . .)	Indirect questions (*Do you know where* . . .)
10	Existential *there* (*there is*, *there are*)	Special uses of *it* (time and weather)
11	Review	**Posttest**

3.2 Pre- and posttests

Table 2 below lists our sample questions and answers in the pre- and posttests. Students filled in the blanks by examining each Japanese translation. The test contained 32 questions based on the targeted grammar items shown in the syllabus in Table 1. This study used the same items for the pretest and posttest, but the participants were neither informed about the tests in advance nor given the answers at any time.

Table 2. Pre- and posttest sample questions

1. Nan'nin ka no gakusei wa densha de gakkoo ni kuru some people Gen students Top train by school to come "**Some (students) come to school by train.**"
2. Kore wa watashi no sensei no, ie, desu this Top I Gen teacher Gen house Cop "**This is my (teacher's) house.**"
3. Toshokan no soba ni community center ga arimasu library Gen near in community center Nom exist **"(There) (is) a community center by the library."**
4. Suzuki-san ga kono booshi o watashi ni kureta Suzuki-Pol Nom, this hat Acc I Dat gave **"Mr./Ms. Suzuki (gave) me this hat."**

(The following abbreviations are used above Nom = nominative, Acc = accusative, Gen = genitive, Dat = dative, Cop = copula, Top = topic, and Pol = polite.)

The class mean improved by an average of 8.3 percentage points from 76.5% to 84.8%. The pre- and posttests had standard deviations of 14.1 and 10.1, respectively. Wilcoxon signed-rank test performed on the pre- and posttest scores showed a significant increase with a significant difference at 1%, $z = 3.60$, $p = .0003$, $r = .77$, indicating that the students improved their remedial grammar skills.

Table 3 shows some of the grammar items and questions that the students significantly improved on. Percentages refer to students who answered them correctly.

Table 3. Items showing the greatest improvements among participants

No.		Pretest (May)	Posttest (December)
1	*Past tense (irregular verbs)* Mr./Ms. Suzuki (gave) me this hat.	56%	84%
2	*Possessive pronouns* This blue book is Yuki's, but that red one isn't (hers).	68%	89%
3	*Possessive nouns* This is my (teacher's) house.	58%	88%

4. Results and Discussion

Reconsidering the role played by complement/adjunct identification in the process of learning a non-native language, this study hypothesizes that a proper understanding of the complement/adjunct distinction can significantly facilitate language learning. Such a view is closely linked to Dowty's underlying argument that "a complete grammar should provide a dual analysis of every complement as an adjunct, and potentially, an analysis of any adjunct as a complement." (Dowty, 2000, p.1) The experimental results confirm that this is indeed the case. The following subsections examine what this implies as well as why it is motivated by some examples in our pre-and post-tests and integrate the concept of dual analysis discussed above into Cognitive Grammar.

4.1. Discussion of Table 3

Cognitive Grammar does not consider semantic (and conceptual) content and phonological autonomy relevant to head status (Taylor, 2003; Langacker, 2008). For example, the plural form (e.g., *books*) is derived from the base noun (e.g., *book*); hence, in the resulting form, the affix (*-s*) is a more essential and fundamental component. Following this analysis, the semantic character of the word is determined by the affix that makes *books* what it is—a plural noun. Thus, the noun *books* is headed by the affix *-s*. Notably, the grammatical morpheme (e.g., *-s* or *-ed*) functions as a head that manipulates lexical properties and relations.

Shirahata (2008) reported that Japanese EFL learners acquire irregular past verbs before regular past verbs, which was largely supported by our test results (section 3.3) even though he did not explain why. Meanwhile, we explain this phenomenon as follows: When students acquire (and produce) an irregular past verb such as *gave* (example 1 in Table 3), they need not analyze the word to determine its meaning. That is, the irregular past verb is a head in its own right because of the absence of a past morpheme such as *-ed*. Psycholinguistic studies have also demonstrated that high-frequency forms are stored even if they are fully regular. Therefore, one would naturally expect full forms such as *gave* to be stored in the lexicon because of their high frequency.

The findings in Table 3 suggest that many students correctly used irregular past verbs such as *gave* for the reasons stated above. Thus, learners perceive irregular items as heads and retain them almost effortlessly. Meanwhile, as Shirahata (2008) argued, learners find English regular past verbs (e.g., *walked*) slightly more difficult to learn. These words normally consist of two morphemes, such as *walk* and *-ed*, with the past morpheme functioning as a head that takes the verb as its argument. The morpheme often determines the core meaning of the word (here, tense) in unmarked contexts. One plausible explanation is that Japanese learners of English tend to select the base verb *walk*; these learners consider the morpheme *-ed* as a non-head and, therefore, do not retain it in their memory for long. Simply put, such learners have yet to identify the relation between heads and non-heads in regular past verbs, which is a major reason they do not learn some grammatical items (e.g., regular past verbs, regular plural nouns) as quickly as expected. However, we expect students to shift away from this ineffective mode of identification at an appropriate point in their development.

We now focus on possessive pronouns (e.g., *hers*) and nouns (e.g., *my teacher's*), as seen in items 2 and 3 in Table 3. The participants selected the possessive morpheme *-'s* as the head, which is made possible by the corresponding Japanese expression form indicating possession (i.e., *-no* (genitive) or *-no mono* (genitive thing)). Generally, the existence of corresponding words in one's first language readily draws a learner's attention to the item, presumably helping them learn it.

Table 4 shows two grammatical items and questions in which students initially improved (after 5 weeks) but later showed no improvement (after 15 weeks): *there is/are* and the plural forms of regular nouns *(-s)*.

Table 4. Items with initial improvements that were later lost

No.		May	July	December
1	*There is/are* (There) (is) a community center by the library.	70%	91%	68%
2	*Plural forms of nouns (regular)* Some (students) come to school by bus.	78%	92%	77%

4.2. Discussion of Table 4

The findings in Table 3 also explain the data in Table 4. Based on the first example, the grammatical item there is should be identified as a non-head (here, an adjunct) because the immediately following string, a community center by the library, logically represents a proposition despite its lack of an overt predicate, as students successfully understood it as the proposition a community center is located by the library. This allowed them to interpret the fragment with no additional cues from the existential expression there is. Hence, they made no conscious effort to produce an adjunct (or modifier) phrase representing an existential meaning.

Building on the claim that heads are generally more prominent in speech comprehension and production (Hilpert, 2019), we conclude that students learn head items earlier than they do non-head items. As previously discussed, however, this relation is neither static nor categorical and is rather dynamic and changeable in the learning process. Future research must be conducted regarding this matter.

This analysis based on head/non-head identification also applies to the second sentence in Table 4. The plural *-s* attached to the base noun student is perceived as a head that designates a plural number of entities (students). Recall that, in Cognitive Grammar, affixes function as heads, taking nouns as their arguments. However, for some learners, *-s* does not initially function as a head but as a non-head. Such misidentification may cause difficulty in the retention of regular verbs.

5. Conclusion

This study applied the dual-analysis model to the problem of complement/adjunct identification in non-native language learning. It addressed morphology-related issues in Table 3 (possessive pronouns/nouns and past tense (irregular verbs)) and presented the problematic forms there is/are and the plural *-s* in Table 4. Its main analysis focuses on how a learner identifies the head of an English expression, that is, how they distinguish the "head" (the constituent that determines the syntactic category of the word or phrase) from "non-heads" (complements or modifiers), which critically facilitates their understanding (and production) of multimorphemic words such as *books* (Taylor, 2003). Such a semantic distinction presumably influences a learner's acquisition of grammatical items, as confirmed by the results in Tables 3 and 4. This study has demonstrated a systematic process of semantic (and syntactic) distinction in learning, which at first glance seems at odds with the proposed unambiguous meaning of lexical items.

The dual hypothesis may help to determine how lexical items and their meanings are introduced. The dual nature of lexical categories confirms the long-standing assumption that word meanings are easier for learners to grasp when they are illustrated with typical rather than unfamiliar examples (Hole, 2015; Toivonen, 2021). Simultaneous multiple analyses are strongly consistent with the general approach to language articulated by cognitive grammar. The principle behind dual analysis can be termed cognitive economy, which may best explain why and how this basic level is well suited to meet our cognitive needs.

This study also argued that learning strategies would be more successful if they were supported by appropriate cognitive access routes, which can also be investigated (and explained) using concepts from cognitive grammar. We have shown that a proper understanding of the role of complements/adjuncts from a cognitive grammatical point of view offers insights into some of the complexities of non-native language learning and provides a basis for constructing an elaborate learning model of non-native language learning (Ringbom, 2004).

5.1 Study limitations and future research

Finally, we discuss the limitations of the study and possible avenues for future research. While the study suggests that learning strategies supported by cognitive access routes can enhance success, it's important to recognize that the findings may not apply universally. Different learners, contexts, and languages may yield different results. Future research directions include educational applications: Investigate practical ways of incorporating cognitive access routes into language teaching. How can teachers adapt their strategies based on cognitive grammar findings? In terms of long-term effects, we will explore whether cognitive access routes lead to sustained language proficiency or whether they have diminishing returns over time.

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