

# The Stagelike Development of Temporal Adverbial Clauses in L2 English: An Organic Grammar Perspective

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## 1. Introduction

This paper explores how second language (L2) grammar develops in its early stages through instructed second language acquisition (instructed SLA), typically delivered as foreign language instruction in the classroom. To examine the progress of L2 grammar, we deal with the learning of L2 English by students in public schools in Japan, whose first language (L1) is Japanese, and focus on how they gradually acquire complex clauses linked with a temporal conjunction *when*, as in 'I loved math *when* I was at school'. Since *when* is one of subordinate conjunctions that are taught in the early stage in instructed SLA in Japan<sup>1)</sup>, it is worth investigating what the students in early learning stages tend to find difficult for linking two clauses in L2 English. Our findings in this paper will be potentially important for a better approach to teaching L2 English grammar for learners of various L1s.

Our data is based on writing samples produced by junior and senior high school students learning English in Japan. Since learning English as a foreign language starts officially in junior high school in Japan<sup>2)</sup>, the data provides a model of the early state of L2 English grammar as to clause combining. It is compared between junior and senior high school students to identify the difficulty and progressive improvement they undergo.

The identified changes in L2 English grammar are analyzed from a theoretical perspective of Organic Grammar proposed by Vainikka and Young-Scholten (2011), who posit that acquiring grammatical elements promotes building from simplex to complex phrase structures, and the L2 knowledge of *when*-clause combining in the early phases is explained in terms of Organic Grammar. Our study may look like a case study using the corpus data, but it will be of importance as it deals with the L2

strategy of linking multiple clauses and how it is acquired in instructed SLA, which has been discussed in few SLA studies.

This paper is organized as follows: in Section 2, the outline of Organic Grammar is presented, and we will see what it predicts in theory as to L2 acquisition of *when*-clause combining. Section 3 describes and compares grammatical characteristics of a conjunction *when* in English and Japanese. Section 4 presents the results of the comparison of the corpus data between the above-mentioned two groups of Japanese students. The results are analyzed from an Organic-Grammar perspective in Section 5, and finally Section 6 concludes the paper.

## 2. Organic Grammar Approach

### 2. 1. What is Organic Grammar?

Organic Grammar (hereafter OG) is one of recent linguistic theories to provide a model of development in L1 and L2 acquisition. Since its underlying concepts and assumptions were tested in a series of Vainikka and Young-Scholten's work, OG has been presented articulately as a theory of L1/L2 acquisition in their 2011 book on the acquisition of German (Vainikka and Young-Scholten 2011; V&YS henceforth).

The term 'Organic' reflects V&YS's view of language development: phrase structure grows organically with time as children grow and their language develops. According to OG, learners' grammar develops through a common path, regardless of their language background, from the initial stage with a simplex structure to subsequent stages with more complex structures over time. For example, (1) shows four developmental stages with corresponding utterances in L2 English<sup>3)</sup>.

(1) Stage 1: *Bread eat.*

Stage 2: *The woman is cry.*

Stage 3: *Someone's die because he have accident.*

Stage 4: *When you reverse, you have to see anybody behind.*

(V&YS 2007: 129-130)

The initial stage (Stage 1) starts with a bare VP with no subject, and L1 may influence the word order (Japanese, in the above case). Copulas

appear at Stage 2, then bi-clausal sentences using conjunctions such as *because* and *when* can be produced at Stage 3 and 4.

## 2. 2. Functional Projections in OG

Each developmental stage in (1) is characterized by functional categories (e.g. aspect (Asp), tense (T)). Since languages vary widely in how functional categories are realized, V&YS assume that functional categories are not directly taken over from L1 to L2 while lexical categories are (e.g. noun (N), verb (V)). So learners need to analyze the L2 input and correctly associate its parts with functional categories (e.g. a past morpheme *-(e)d* with a functional head T).

As for L2 English, the sequence of phrasal development is proposed in the literature, by Hawkins (2001) and V&YS (2007) among others. V&YS's model is illustrated in (2a), and each of the four stages in (1) is arranged in (2b) under its corresponding projection according to V&YS's criteria for stages.

- (2) a. VP(i) → VP(ii) → FP → IP → CP      (V&YS 2007: 128)  
       b. St. 1                              2        3        4      (Stages in (1))

Let us briefly outline the criteria, for we will adopt (2a) for our analysis in Section 5.

- ◆ VP(i) and VP(ii) crucially differ in whether the word order is similar to L1 or L2.
- ◆ FP (Functional Projection) is an early phrase-like unit not fully analyzed based on L2 input, and its grammatical function is specified later.
- ◆ IP (Inflectional Phrase) is for agreeing the form of verbs with subjects and time.<sup>4)</sup>
- ◆ With CP (Complementizer Phrase) on top of IP, complex subordination (e.g. *when*-clauses, relative clauses with *which*) and interrogative sentences are available.

## 2. 3. Predictions

If the approach outlined so far is on the right track, then OG makes two predictions as to Japanese learners' acquisition of *when*-clause combining in L2 English.

- (3) a. Learners who are able to use *when*-clauses are likely to have acquired IP-related grammar.
- b. The opposite head position between Japanese and English may influence learners' acquisition not only at a VP stage but also at a CP stage.

Prediction (3a) concerns the order of acquired L2 knowledge. Since subordination is one of typical features at a CP stage, learners at this stage are expected to have acquired grammatical features of the previous IP stage. Another prediction (3b) is related to the head position of a phrase<sup>5)</sup>. The head appears in an opposite position between Japanese and English as mentioned in (1) and (2), and this difference may cause a wrong word order even at a CP stage.

## 3. The Internal Structure of *when*-clauses

### 3. 1. English

Let us look at English *when*-clauses in detail to delineate their internal structure. According to Huddleston and Pullum (2002; henceforth H&P), *when* is analyzed as P (preposition) governing finite clauses with subjects and tensed verbs. (4b) may look like a counterexample, but it is still seen as P followed by a finite clause with its subject and tensed copula omitted (i.e. *When he was asked ...*).

- (4) a. His heart sank *when* he heard the news. (H&P 2002: 698)
- b. *When* asked to step forward, he blushed. (*Ibid.*)

H&P classify *when* in the same category of temporal PP as *at* and *before*. One reason is that temporal *when*-clauses have the same distribution as PP. For example, *when*-clauses and PP headed by *at* and *before* in (5) share the same position, specifying the time of leaving.

- (5) He left [<sub>PP</sub> *at* 6 p.m.] / [<sub>PP</sub> *before* dinner] / [*when* his brother arrived].

H&P also point out that *when* can be glossed as PP ‘at the time at which’ containing a relative element (*at*) *which*. This leads us to analyze *when*-clauses as PP containing CP inside. Given this structural view of *when*-clauses, the structure of (5) is illustrated as follows.

- (6) [<sub>IP</sub> He [<sub>I</sub> PAST [<sub>VP</sub> leave  
       [<sub>PP</sub> [<sub>CP</sub> *when* [<sub>IP</sub> his brother [<sub>I</sub> PAST [<sub>VP</sub> arrive]]]]]]]]]

Note that PAST is an inflectional morpheme for tense attached to a verb (often realized as *-(e)d*, as in *walked*), and let us assume here that *when*-clauses occur under VP of upper main clauses<sup>6)</sup>.

Another notable feature is a phenomenon called ‘Sequence of Tense’ between main and non-main clauses. Consider the following utterances.

- (7) a. (i) John said, “Mary *will* be sick”.  
       (ii) John said that Mary *would* /\**will* be sick.  
      b. (i) He left when his brother *arrived*.  
       (ii) He left before his brother *arrived* /\**would arrive*.

In a reported speech (7a-ii), the past form is used instead of the same present form *will* as (7a-i). (7b) shows that the same simple past tense is used in temporal clauses as main clauses regardless of the chronological order in which two events take place.

It follows from the above examples that if I (the head of IP) in main clauses has past tense, it checks I in non-main clauses and passes past tense onto it. In other words, I in *when*-clauses must be checked by I in main clauses and then agreed with its past tense form.

### 3.2. Japanese

Among various temporal expressions, common markers *to* ‘when’ and *toki* ‘time’ should be regarded as Japanese counterparts to English *when* (cf. Thompson et al. 2007: 238). As (8) shows, *to* and *toki* need clauses preceding them.<sup>7)</sup>

- (8) a. Taro ga kuru /\*kita to, Hanako wa kaetta.  
 T. NOM come / came when H. TOP left  
 'When Taro came, Hanako left.'
- b. Taro ga kuru / kita toki, Hanako wa eki ni ita.  
 T. NOM come / came time H. TOP station at was  
 'When Taro was coming / came, Hanako was at the station.'

Since Japanese is a head-final language, *to* and *toki* occur at the end of temporal clauses unlike English *when*. In addition, while past and non-past verbs are used in *toki*-clauses, *to* has a restriction on verb tense: only non-past tense is allowed within *to*-clauses.

As for the Sequence of Tense phenomenon observed in 3.1, such inter-clausal phenomena are rarely found in Japanese. The verbs in temporal clauses in (8) are not necessarily matched with past tense of main clauses. Even though the unchanged verb form is non-past, an event it expresses is interpreted as a past event in relation to the event time of main clauses.

It should be noted about Japanese clauses in general that some elements such as subjects are often omitted when they are understood from a context. In (9), for example, the understood subject of *to*-clause is unpronounced, but the sentence is perfect and even sounds natural.

- (9) Taro o miokuru to, Hanako wa kaetta.  
 T. ACC see-off when H. TOP left  
 'Hanako saw off Taro, then she left.'

English and Japanese temporal clauses are different in this respect: while English *when*-clauses must have subjects and tensed verbs, Japanese temporal clauses allow the omission of subjects.

To summarize our findings so far, let us illustrate the structure of Japanese temporal clauses. The clause structure of (8) is shown below.

- (10) [<sub>IP</sub>[<sub>CP</sub> [<sub>IP</sub> (T.-NOM) [<sub>VP</sub> come] N-PAST/PAST ] ] *to/toki* ] H.-TOP ...]

Note that N-Past and Past refer to non-past and past morpheme attached to the stem of verbs typically as *-u* and *-ta*, respectively, and *to* and *toki* are analyzed to appear in CP. It seems unclear how this CP and main clauses are structurally connected, so I will temporarily assume the CP to be generated under VP of upper main clauses similarly to English *when*-clauses.

## 4. Corpus Surveys

### 4.1. Survey 1

In order to identify grammatical change of L2 English in the early stages, I conducted a survey of Japanese students' written English using the database called *JEFLC Corpus* (Japanese EFL Learner Corpus; see Tono 2007 for details). This corpus has a collection of approximately 700,000 words from English essays written by 10,000 junior and senior high school students in Japan. All essays were about six topics familiar to students, and each essay was written within 20 minutes without using dictionaries.

First, samples containing *when*-clauses written by junior high school students (in the second year, aged around 14) were collected from the corpus. The collected samples were further sorted according to time context (i.e. past, present, or future), and finally 61 samples describing past context were kept and analyzed as the first dataset. Since most of the students for this dataset have just learned *when*-clauses in L2 classroom, it is used as a landmark to observe the earliest stage of L2 English grammar for clause-combining.

The following survey results were obtained: the rate of grammatically acceptable samples was 14.7% (9 out of 61 samples). Two examples are shown below.

- (11) a. When I found it, someone came into my classroom.
- b. When grandfather was young, he started his own office.

Other samples, on the other hand, were unacceptable to a small or large extent. Two kinds of remarkable mistakes were (i) clause-final *when* and (ii) the lack of main clauses. 7 samples of (i) (11.5% to the total) and

7 samples of (ii) were found, and two examples of each kind are shown below ([JP:] stands for a Japanese word in place of an intended English expression).

- (12) a. (i) We finished this work when its very very happy.  
          (ii) I was relax, when [JP: gunmen] came here.  
               (Telling a story in a dream)
- b. (i) When I five years old.  
          (ii) When I was went to home from school.

In (12a), the learners seem to misunderstand the sequence of 'a clause + *when*' as a temporal clause, and the wrong *when*-clauses should be corrected as 'When we finished this work, ...' and 'When I was relaxed, ...'. (12b) lacks main clauses whose event time is to be specified by *when*-clauses. The above data suggest that these learners might not know the word order of *when* in its clause nor the usage of *when*-clauses as a dependent clause within a whole independent sentence.

Turning to *when*-clauses, related mistakes were found in 12 samples (19.6%): 5 samples lacking past tense, 4 without verbs, and 3 without subjects within *when*-clauses. (13) shows an example from each mistake type (the underbars stand for where subjects or verbs are missing).

- (13) a. But I was on my house when I'm watching a rabbit.  
       b. I got up, when I     sad.  
       c. So I wanted to run when     saw a which [witch].

*Am* (I'm) in (13a) must be *was*, matched to past tense of the main clause. In (13b), the missing predicate can be *was* or *felt*, but the intended sentence should be like 'When I awoke (from the dream), I felt sad'. And in (13c), the missing subject is *I* and it must not be omitted here.

Similar mistakes were found in main clauses. There were 11 such mistakes (18.0%) in main clauses, where the verb form was not past, and the subject or the verb was missing.



- (14) a. When I was around 5 years old, I *hate* dark room.  
 b. When my family went to [JP: trip], my mother and father  
 always \_\_ different breakfast.  
 c. When I study, \_\_ couldn't talk with my friends.

The fact that more than one third of the students had some mistakes about subjects and verbs in *when*- or main clauses suggests that the basic structure of finite clauses might be still hard to acquire in the early stages when clause-combining is taught.

Before going on to next section, let us summarize the above survey results. The rate and number of correct and incorrect samples classified according to types of mistakes are summarized in Table 1. The data below will be compared to the survey results of senior high school students' writing samples in next section.

**Table 1. Results of Survey 1**

	Items	Rate	Samples	Example
1	Correct samples	14.7%	9 (out of 61)	(11)
2	Remarkable mistakes	23.0%	14	
	(i) Clause-final <i>when</i>	11.5%	7	(12a)
	(ii) No main clauses	11.5%	7	(12b)
3	<i>When</i> -clauses	19.6%	12	(13)
4	Main clauses	18.0%	11	(14)

## 4. 2. Survey 2

To compare with the data from junior high school students observed above, I collected written samples of *when*-clauses by senior high school students using the JEFLL Corpus in the same way as Survey 1. 82 samples containing *when*-clauses in past context were found, and the students who wrote the collected samples were all in the second year of senior high school in Japan, aged around 17, about three years older than the students in Survey 1. Since they have a longer learning experience of L2 English in a classroom context, it is expected that their accuracy rate is higher than the younger students in Survey 1.

The survey results were as follows: first, the rate of correct samples

was 32.9% (27 out of 82 samples). (15) shows two of the correct samples.

- (15) a. When I was a junior high school student, I saw a very strange dream.  
 b. One day, when he went to the beach, he found a beautiful woman who were in trouble.

Samples with slightly ungrammatical mistakes such as 'When I heard it, I was *shock*' are excluded from the group of correct samples, but in 41 samples including them (50%) the Sequence of Tense (i.e. past tense in main and *when*-clauses) is correctly maintained.

Remarkable mistakes which deviate from the basic usage of *when* were also found in 8 samples (9.7%), but this rate is much lower than Survey 1 (23.0%), and 'head-final *when*' mistakes like (12a) in the previous section were not found at all. This fact seems to be a big difference between the two surveys. The wrong samples all lacked main clauses, as one of them shows in (16) below.

- (16) When I listened the songs first.

Mistakes related to *when*-clauses were found in 7 samples (10.9%): 5 samples lacking past tense, and only 2 without the unit of subjects + tensed verbs. (17) shows an example from each mistake type.

- (17) a. When I *don't* have breakfast so much, I was so hungry that I couldn't study in the morning classes.  
 b. When \_\_\_ at the school festival, I was busy.

*Don't* in (17a) must be corrected as *didn't*, and the missing part in (17b) should be filled with *I was*, or *I attended* (the school festival). The rate of this kind is not so high as Survey 1 (19.6%).

Instead of the relatively low rate of mistakes in *when*-clauses, similar mistakes in main clauses were found in as many as 24 samples (29.2%), and all the mistakes lied in the wrong tense selection.

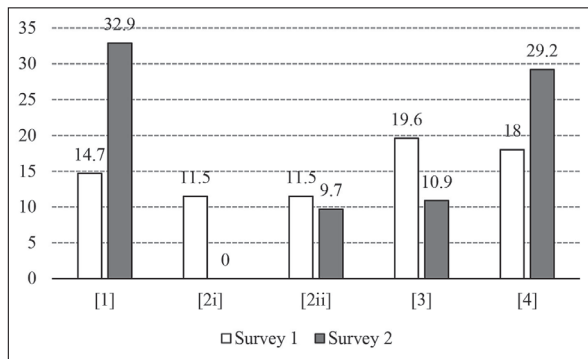
- (18) a. But when I was child, I *have* seen a dream.  
 b. So, I *am* hungry when I didn't have breakfast.

Subjects and verbs appeared in all main clauses, but all the verbs were in present tense as (18) shows except for one sample using *to* infinitive (e.g. 'I usually *to drink* juice when ...').

Let us summarize the results of Survey 2 observed so far and compare them with the results of Survey 1. The rate of correct and incorrect samples is listed according to types of mistakes in Table 2 below. For comparison, the results of two surveys are shown in Figure 1, where white and gray bars indicate the rates in Survey 1 and 2, respectively.

**Table 2. Results of Survey 2**

	Items	Rate	Samples	Example
1	Correct samples	32.9%	27 (out of 82)	(15)
2	Remarkable mistakes	9.7%	8	–
	(i) Clause-final <i>when</i>	0.0%	0	
	(ii) No main clauses	9.7%	8	(16)
3	<i>When</i> -clauses	10.9%	7	(17)
4	Main clauses	29.2%	24	(18)



**Figure 1. Comparison of two survey results**

## 5. Analysis

### 5. 1. Main difference between two groups' performances

First of all, to see if senior high school students in Survey 1 (SSs) were more accurate in producing *when*-clauses than junior high school students in Survey 2 (JSs), the correct rates in [1] in Figure 1 were compared using Welch's t-test followed by F-test. The test showed that the accuracy difference between SSs and JSs was statistically significant ( $\alpha = .05$ ,  $p < .01$ ), which suggests that Japanese senior high school students are more likely to know how to produce *when*-clauses in English than junior high school students.

Then, let us take a closer look at [2i]. It shows that the 'head-final *when*' was observed in JSs' data while it was not in SSs'. This implies that JSs have not fully acquired the word order of L2 English yet, so some of them remain in the initial VP(i) stage. On the other hand, no 'head-final *when*' in SSs' samples suggest that SSs seem to have finished the VP(i) stage completely and proceeded to the following stages.

Unlike [2i], [2ii] shows no significant difference between the two groups ( $\alpha = .05$ ,  $p = .74$ ). It seems that *when*-clauses are correctly analyzed as CP headed by *when*, but some JSs and SSs have not learned that *when*-CP must be embedded in main IP clauses. This '*when* under main clause' scheme is syntactically complex (i.e. [<sub>IP</sub> main clause [<sub>CP</sub> *when*-clause ]]), so they have not reached a CP stage yet.

### 5. 2. *When*-clauses vs. main clauses

Let us turn to [3] next, which shows the incorrect rate about mistakes found within *when*-clauses. The rate is higher for JSs than SSs and it shows a marginal significance according to a statistical test ( $\alpha = .05$ ,  $p = .066$ ). Lack of subjects, lack of tensed verbs, and non-past tense on verbs were frequently found in JSs' samples, but much less were found in SSs', which were only wrong with tense choice. The difference seems to come from their analysis of IP and CP. Both groups have noticed that *when* takes some phrase-like chunk after it, but JSs tend to wrongly analyze *when* as P followed by any phrase, while SSs have learned that *when* should take IP-finite clauses. This is illustrated in the following scheme.

- (19) a. JSs: [<sub>IP</sub> main clause [<sub>PP/FP</sub> *when* [<sub>XP</sub> a phrase ]]]  
 b. SSs: [<sub>IP</sub> main clause [<sub>CP</sub> *when* [<sub>IP</sub> subject + tensed verb ]]]

(19a) indicates that in JSs' L2 grammar *when* is still being analyzed, and for the time being it is P, or the head of an unknown functional projection FP taking any phrase XP. In contrast, (19b) shows that SSs have analyzed *when* as a CP-element taking IP (or at least a subject-verb continuum).

In spite of the different analysis of *when*-clauses between two groups, tense mistakes in *when*-clauses were commonly found in both groups. Tense is supposed to be in I, but the question is why I in lower *when*-clauses lacks past tense while the one in upper main clauses properly has. This is illustrated in the scheme (20) below (here a symbol Ø stands for no tense).

- (20) \*<sub>[IP</sub> Subject [<sub>I</sub> PAST [<sub>VP</sub> ... [<sub>CP</sub> *when* [<sub>IP</sub> Subject [<sub>I</sub> PRES/Ø (no tense) [<sub>VP</sub> ...]]]]]]

Notice that tense in the lower I in (20) looks quite similar to Japanese tense illustrated in (10) in Section 3.2. Unlike English *when*-clauses, I in Japanese *to/toki* clauses do not have to be in the same past tense as the main clauses. This leads us to consider that some JSs and SSs analyze I in *when*-clauses wrongly in a similar way to L1 Japanese. I consider that students have already acquired finite clauses and tense in I within a single IP, so it is sure that they have reached an IP stage. However, when CP appears in-between two IPs to link them (in this case *when*), a lower I must match a higher I in tense, for example as past tense. I assume that this agreement between two Is is acquired in a CP stage and thus the students are not in a CP stage yet.

Another question comes from [4] in comparison to [3]: why did SSs make less tense mistakes in *when*-clauses than JSs, but more in main clauses? Interestingly, a statistical test proves no significant difference between JSs and SSs ( $\alpha = .05$ ,  $p = .12$ ), so not just SSs but also JSs may have difficulty marking tense in main clauses embedding *when*-clauses. As we observed in (18) in Section 4.2, SSs' samples show that *when*-clauses were produced almost perfectly with the correct choice of past

tense. This fact means that the students are expected to be in a CP stage because they have acquired the structure of *when*-CPs and how to link them to main clause IPs.

Even though they are in a CP stage, the high rate of this mistake type suggests that it is difficult to mark main clause IPs as past when linked to other clauses. One possible explanation is that their analysis of related L2 inputs might lead them to a wrong generalization that past tense marking is enough only within non-main clauses: a misanalysis that a past-tensed *when*-clause governed under a main clause IP can specify the time of an event expressed in the upper IP.

Taking into account overall characteristics of collected samples, the discussion so far is summarized in Table 3 below. An asterisk (\*) in each cell indicates the stage that evidence suggests JSs' and SSs' L2 grammar of *when*-clause combining has reached.

**Table 3. JSs' and SSs' stages of L2 English**

	VP	FP	IP	CP
JSs	*	*	*	
SSs		*	*	*

The state of JSs' L2 grammar ranges widely from a VP to an IP stage, with a CP stage unmarked due to their low correct rate and incomplete analysis of *when*-clauses as FP or 'P + XP'. SSs' L2 grammar, in contrast, starts from at least an FP stage, mainly stays at an IP stage, and reaches a CP stage. SSs at the CP stage are likely to produce *when*-clauses almost properly, but it seems even more challenging to mark tense correctly for two IP clauses linked by *when*.

## 6. Conclusion

The surveys and analyses in the previous sections have examined how the L2 English grammar of Japanese students develops in the early stages in an instructed EFL context. The principal focus was on the grammatical characteristics of temporal clause-combining with a conjunction *when*, and its stage-like development was identified through the JEFLL corpus survey of two sets of written samples

produced by Japanese junior high and senior high school students (each abbreviated as JSs and SSs above). Our investigation was done from a theoretical viewpoint of Organic Grammar, and main findings are briefly summarized below.

- ◆ L2 English of JSs is characterized by VP-stage mistakes such as the wrong position of *when* in L1 order and the independent use of *when*-clauses without main clauses, which are not observed in L2 English of SSs.
- ◆ *When* is being analyzed lexically or functionally in L2 English of JSs and SSs: JSs tend to analyze *when*-clauses as PP or FP while SSs tend to analyze them more accurately as CP taking IP (or, CP-like clauses that contain a 'subject + predicate' phrase).
- ◆ Even for students at a CP stage, who already acquired a simplex IP clause, proper tense marking for IPs seems difficult when IPs are linked together by *when*.

These findings bring us some pedagogical implications for instructed EFL teaching and learning. Listed below are three steps of explicit grammar instruction of a temporal conjunction *when* planned especially for beginners like junior high school students. These steps for instruction are designed based on each of our findings summarized above.

- ◆ Help students understand that subjects and verbs consist a basic clause. Then lead the student to notice the difference of word order between English and Japanese (e.g. *when* you come vs. *anata ga kuru to*). [Word order]
- ◆ Teach them that '*when* + clause' needs another clause for an event. Using '*When* + Clause 1, Clause 2' as a model, let them practice until they get used to it. [Clause linkage]
- ◆ Help them find a verb in Clause 2. Then let them find out the time the verb expresses: is it present, or past? Show some examples and lead them to notice the same tense is used in both Clause 1 and Clause 2. [Tense choice]

This paper has focused solely on *when* and its clausal realization in L2 English. In order to reveal how clause linkage works and is acquired in L2 grammar, we obviously need to extend our focus to other subordinate conjunctions such as *that*, *if*, *because*, to name a few. Also, we have not provided a clear explanation of tense marking across the linked main and non-main clauses in a rational manner. These issues need investigating further and I will leave them for future studies.

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## Notes

- \* This research was supported by Grants-in-Aid for Young Scientists (JSPS KAKENHI Grant No. 18K12439). The work presented in this paper is based in part on my presentation titled 'An Organic Grammar approach to temporal *when*-clause combining in instructed SLA' at the 18th International Conference on Teaching, Education and Learning (Sept. 18, 2019) held in Universitas Al Azhar in Jakarta, Indonesia.
- <sup>1)</sup> This is true as far as I searched several textbooks used in Japan, where *when* is introduced as one of question words, and then as a conjunction similar to other ones like *that* and *if*.
- <sup>2)</sup> Recently English has been taught earlier in elementary schools in Japan, but grammar instruction is not common in this stage. The data used here was made open to public in 2007, so the current situation is not relevant to learners involved in this study.
- <sup>3)</sup> Each of the wrong sentences in Stage 1, 2 and 3 is meant to say '(I) eat bread', 'The woman is crying', and 'Someone has died because he had an accident'.
- <sup>4)</sup> T is more common in the recent literature, but I and T can be used interchangeably. Here we use I to follow V&YS's terms.
- <sup>5)</sup> Head is a core structural element assumed in syntax: A phrase XP has X as its head, for example V 'eat' in VP 'eat bread' and P 'in' in PP 'in Jakarta'.
- <sup>6)</sup> We will not observe the PP/CP structure of *when*-clauses in more detail. I am in favor of a semantics-based analysis where there exists in fact a null P-head corresponding to the gloss 'at the time'. See Hall and Caponigro 2010 for details.
- <sup>7)</sup> The following abbreviations are used in the glosses: ACC: accusative case, NOM: nominative case, (N-)PAST: (non-)past, TOP: topic marker.

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