*L2 Acquisition of Reference Time of Eepistemic Modality in English
by L1 Thai Speaking Children*

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Abstract

This paper reports the results of an experimental study which aimed to test whether L2 children have acquired the syntactic patterns which indicate the reference time of the epistemic modal complements in English. It was hypothesized along with the Full Transfer/Full Access position (Schwartz and Sprouse 1996) that the Thai L2 learners of English would start off with their L2 knowledge, and later develop a target-like grammar by accommodation of UG.

A truth value judgment task was designed to trace the L2 learners' temporal interpretations of the modal statements. The participants were asked to judge whether a certain modal statement is OK or NOT in felicitous and infelicitous contexts. The L2 learners were classified according to their L2 proficiency levels: high, mid, low. The results of the experiment show that the L2 children particularly from low proficiency groups allowed interpretations which are not possible for the modal statements in English, but whose counterparts are possible in Thai. This suggests that the initial state of the L2 learner's interlanguage is based on L1 knowledge. However, since the L2 children provide a relatively small number of the target-like interpretations, we are not able to argue for evidence of access to UG in L2 acquisition in this study.

In addition, the findings from the experiment lead to speculation about what meaning elements need to be acquired prior to others in order for the L2 learners to be able to express the meaning which results from interaction between modal meanings and aspect. The knowledge about tense and aspect may pre-determine the knowledge about the reference time of the modal statements or vice versa. If this is the case, the L2 children may not acquire certain properties if they have not yet acquired the others. This is an open area for further research.

Key words: *epistemic modality, child L2 acquisition, adult L2 acquisition, the poverty of stimulus, L1 transfer*

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1. Introduction

The fact that L2 learners appear to acquire the complex and subtle properties of language which could not be induced from L2 input has led researchers in the area of second language acquisition, under Generative Approach, to the argument that L2 grammar, like L1, is constrained by UG. Nonetheless, the extents to which UG and L1 knowledge facilitate L2 acquisition are debatable.

Apart from the issue of the role of UG in L2 acquisition, the role of L1 has always been of interest among the researchers. In learning second language acquisition (L2), the learners, as generally accepted, tend to rely on their native language (L1) because they come to the task of second language acquisition with their L1 knowledge, which is constrained by UG. As a result, L1 properties may be transferred and observed in their interlanguage.

The roles of UG and L1 in SLA are always controversial. As a result, three basic positions concerning the accessibility of UG as well as the involvement of L1 knowledge have been proposed i.e. *Direct Access, Indirect Access, No Access*. The next section discusses these three positions.

1.1 No Access

No Access to UG hypothesis has always been associated with Critical Period Hypothesis (CPH) by Lenneberg (1967): the acquisition of a language is not possible after puberty, in its strong version, because parts of the brain which function for language acquisition no longer operate. An implication of this argument is that the innate properties i.e. UG, is not available to L2 adult learners. As a result L2 adult learners seek for alternative means i.e. general problem-solving for language learning (Clahsen and Muysken 1986).

Similarly, in the strong version of *No Access* position, it is claimed that, during the course of SLA, UG which is available for L1 acquirers, is no longer accessible to L2 learners. The unused parameters values are pruned. The evidence which the proponents of this position use in formulating the hypothesis are the differences between child L1 and adult L2 acquisition such as the variation of the L2 adult learners' ultimate attainment. Given that the UG, which is a system of principles that constrain L1 grammar, inevitably guarantees success in first language acquisition, L2 adults should master the L2 competence in the same way as in their L1 acquisition if the L2 learners appear to have access to UG (Scharchter 1988: 221). The L2 adult learners should not fail to achieve the complete state of L2 grammar.

If the No Access to UG hypothesis, particularly its weak version, holds for adult L2 acquisition, then the adults' L2 knowledge would be limited to the properties that are only instantiated in their L1, and they can not go beyond UG-based knowledge which is not available in their L1 grammar. This hypothesis seems to be flawed since some recent research (c.f. Kanno 1998, Dekydspotter 2001, Slabakova 2001, Marden 2005) on L2 acquisition reports that adult learners are able to develop UG-parameter values

which can not be induced from their L1 grammar. This therefore suggests that adult learners have access to UG.

1.2 Direct Access

This position is sometimes referred to as *Full Access (without Transfer)*. According to this position, as suggested by its label, L2 learners have direct access to UG, and employ the principles of UG in setting parameter values in their second language. The proponents of this position argue that the initial state of interlanguage is not L1 grammar, but UG. They deny the role of L1 properties in L2 acquisition. That is, the parameter values in L1 do not affect the course of L2 acquisition because the L2 learners have parallel competence: L1 competence (S_s) and L2 competence (S_t) (Cook and Newson 1996: 291).

Flynn (1987, 1989, 1996) and Flynn and Martohardjono (1994) argue that L2 learners use principles and parameters isolated in L1 acquisition to construct L2 grammar. At the early stage of L2 acquisition, L2 learners recognize a match or a mismatch of parameter settings in L1 and L2. If the settings between the two languages match, the learners do not assign a new value to the parameters. On the other hand, if a mismatch is observed, a new value will be assigned by the facilitation of UG.

Epstein et al. (1996; 1998) argue against the partial-access hypothesis, the weak version of No Access to UG position, that L2 learners have full access to UG. There are new parameter settings in L2 acquisition. Parameter resetting is not possible since the parameter values in L1 are fixed, and cannot be reset (Epstein et al. 1996: 686). The results from Martohardjono's (1993) study of the acquisition of *wh*-movement in English by non-native speakers of English were assumed to confirm the new parameter settings in L2 acquisition.

In her study, Martohardjono (1993) tested the L2 leaners's L2 knowledge of UG principles governing syntactic movement i.e. *wh*-question movement in English. The subjects, including speakers of Chinese, Indonesian and Italian were asked to judge the grammaticality of sentences. Martohardjono found the same patterns in the subjects' responses across L2 groups. That is, regardless of whether *wh*-question movement is instantiated in the subjects' L1 or not, the subjects tend to reject the sentences which violate the UG principles. Given that the corresponding sentences e.g. *wh*-question-*in-situ* in Chinese and Indonesian are grammatical, the Chinese and Indonesian speakers' L2 knowledge of ungrammaticality therefore cannot be derived from their L1. Martohardjono's view is that the source of this kind of knowledge must be UG principles (1993).

Although the results of the two studies appear to confirm the prediction of the Direct Access position, they are questionable. As Slabakova (2001: 14) points out, the subjects in the studies were not beginners of English. Accordingly, they did not demonstrate the initial state of the L2 acquisition. This, therefore, cannot disprove the role of L1 knowledge at the initial state of L2 acquisition, which is a fundamental conceptual of Indirect Access to UG hypothesis.

1.3 Indirect Access

This position acknowledges the role of L1 and UG in L2 acquisition. The proponents of this position argue that the initial state of L2 acquisition is L1 grammar. That is, L2 learners start off with their L1 grammar. They adopt L1 parameter values they have in dealing with L2 input. As a result, L1 properties can be observed in L2 learners' interlanguage. If the L1 grammar fails to accommodate the L2 grammar, 'restructuring' or 'parameter resetting' may occur (White 2003: 61). The L2 grammar is then constrained by UG.

Schwartz and Sprouse (1996) proposed the Full Transfer Full Access Model based on their findings from a longitudinal study of the acquisition of German word order and nominative case by a Turkish-speaking child in 1994. Schwartz and Sprouse argue that the initial state of the L2 acquisition is the entirety of L1 knowledge, which is constrained by UG – with the exception of the phonetic matrices of lexical/morphological items. Subsequently, if the learners fail to assign the L1 existing parameter values to an L2 parameter, there will be 'restructuring' or 'parameter resetting' by the apparatus of UG (Schwartz and Sprouse 1996: 40-41).

Schwartz and Sprouse (1996: 42) additionally argue that although the L2 development is guided by UG, which constrains L1 grammar, the final state of L2 acquisition will not necessarily resemble the final state of L1 acquisition, because of the lack of input necessary for restructuring e.g. negative evidence, or the obscurity or scarcity of the positive evidence. Nevertheless, the cognitive processes underlying L1 and L2 acquisition do not necessarily differ. The course that L2 development takes is determined, in part, by the initial state, in part by input, in part by the apparatus of UG, and in part by learnability consideration (Schwartz and Sprouse 1996: 41).

Acknowledging the importance the issues of UG and L1 in L2 acquisition, an experimental study was conducted to investigate the L2 acquisition of modality in English by Thai-speaking children and adults. It is hypothesized along with the Full Transfer full Access position that the Thai L2 learners of English will start off with their L2 knowledge. Specifically, the Thai L2 learners with low proficiency will allow L1 interpretations which are not possible for certain modal statements in English because they do not know that reference times of modal complements are constrained by certain syntactic patterns. This will be reflected in inaccurate acceptance when the modal statements are presented in temporally infelicitous conditions.

It is also hypothesized that an L2 learner will have access to UG if (s)he demonstrate the knowledge about the syntactic patterns that constrain the reference time of the modal complement. That is, the L2 learner has to consistently accurately accept the modal statements when they are presented in felicitous conditions and accurately reject the modal statements when they are presented in infelicitous conditions. The rate of the accuracy will increase with proficiency levels.

2. Modality: basic concept

Modal expressions are widely recognized to communicate two broad clusters of meanings: epistemic and deontic. Apart from these two clusters of modality, a third type of modality is often proposed, namely, dynamic modality.

Epistemic modality is concerned with speakers' assumption or assessment of possibilities. It indicates the degree of the speaker's confidence e.g. high or less, in the truth of the proposition expressed (Coates 1983: 18). In other words, it concerns an estimation of the likelihood that a certain state of affairs under consideration will occur, is occurring, or has occurred in the possible worlds (Nuyts 2001: 21).

Deontic is also known as 'Directives', where we try to get others to do things. This type of modality is concerned with necessity, unnecessity, obligation, prohibition, and permission (Palmer 2001:7).

Dynamic modality involves ability, intention, and willingness (Palmer, 1990, Hoye 1997).

    (1) She *must* be John's daughter. (epistemic)
    (2) He *must* finish his homework. (deontic)
    (3) Tom *can* run very fast. (dynamic)

2.1 Epistemic modality in English

The set of epistemic modal auxiliaries in English includes *may, might, must, will, should, would,* and *could.* It is generally agreed that modal verbs in English share some formal features with other auxiliaries, such as occurrence with negation, inversion, code, and emphatic affirmation. These features are known as NICE properties (Huddleston 1976). In addition, Jackendoff (1977) points out that an auxiliary generally take verb expressions as their complement.

In English, reference time of the modal complement is sensitive to the situational aspect of verb in the complements (Demirdarche, and Uribe-Etxebarria 2008: 92). In other words, present or future reading of a non-finite verbal complement is determined by the situational aspect or certain types of verbs in the complement, but not temporal adverbials. For example when the verbal complement of an epistemic modal is a stative predicate, which has imperfective aspect, the reference time of the situation can be construed as either present or future as in (4).

    (4) Amina may/might/could/should be in Ottawa (now/tomorrow)
                       (Demirdarche, and Uribe-Etxebarria 2008: 92)

I shall call such linguistic structures '*syntactic patterns*' that indicate the reference time of the modal complement. The combination of a certain modal and a certain type of verbal complement in this case yields a certain reference time of the modal complement. It cannot be derived from either the modal or the verbal complement itself. In other words, the reference time of the modal complement results from the interplay between inherent semantic properties and aspectual properties of the verbal complement.

2.2 epistemic modality in Thai

Linguistic forms in Thai which are often treated as equivalent forms of epistemic modal auxiliaries in English include [Thai] $.\cdot^{3}$, [Thai]^{2}, [Thai]^{1}, [Thai]^{3} [Thai]^{2} and [Thai]^{2}. (Kullayavajijya 1968; Panupong 1970; Sookgasem 1990). In addition, Savetamalya (1987), Indrambarya (1998), Rangkupan (2005) agree that the so-called 'preverbal modals' take non-finite verbs as their complements.

Unlike English, the reference time of the modal complement in Thai is unpredictable regardless of the types or the lexical aspect of the verb. The reference time of the modal complement in Thai is indicated by the temporal adverbial, or the context, as shown below.

(5) a. [Thai]^{1} [Thai]^{2} pen^1 wat^2
Dang   may/might   be   cold
'Dang may have a cold (now, yesterday, tomorrow)'

b. [Thai]^{1} [Thai]^{2} pen^1 wat^2
[Thai]^{3} [Thai]^{1} [Thai]^{4}
Dang   may/might   be   cold   yesterday
'Dang may have had a cold yesterday'

c. [Thai]^{1} [Thai]^{2} maa^1 saaj^5 pru$.\cdot^3$[Thai]^4
Dang   may/might   come   late   tomorrow
'Dang may may/might come late tomorrow'

We can notice that no matter what the lexical aspect of the modal complement is e.g. either imperfective as in (5a), the reference time of the modal complement can be the present, past or future. However, in (5b) and (5c) the reference time of the modal complements can only be past and future respectively due to the presence of the temporal adverbs.

The syntactic structures in question are presumed to make difficulties for native speakers of Thai in acquiring the epistemic modal auxiliaries in English. We have seen that the reference time of the modal complements in Thai is indicated by temporal adverbials, and can be derived from the context. In general terms, Thai L2 learners of English have to acquire the L2 properties which are not present in their L1. In order for Thai L2 learners of English to express correct reference time of the modal complements, they need to acquire those kinds of syntactic structures. In other words, they need to work out what reference time is or is not allowed for certain structures.

3. Research questions

With reference to the differences with respect to the reference time of the modal complements between English and Thai, the questions addressed in the experimental study are as follows.

(1) Do L2 English acquisition patterns show L1 properties with regard to reference time of modal complements?

(2) Can the Thai L2 learners of English acquire the syntactic patterns that indicate the reference time of modal complements?

(3) If the Thai children appear to acquire those syntactic patterns, the next question is, which patterns are acquired early and which patterns are acquired late i.e. by the L2 children with high proficiency?

4. Methodology

4.1 The participants

4.1.1 The control group

17 native speakers of English, aged between 18 – 30 years old were selected as the control group. There were 6 male and 11 female undergraduate and postgraduate students from the University of Leeds. The main purpose of conducting the test with the adult native speakers was to provide a benchmark of target responses for comparison.

4.1.2 L2 children

The L2 children group consisted of 30 Thai-speaking children from Thai monolingual families. They were year 3 and year 4 students who were studying in an English programme at a primary school in Thailand, where English was used as a medium language. They started learning English as a second language at the age of 4. There were 14 female and 16 male children. The children's age at the time of testing ranged from 8 to 10. The age at first exposure was between 5 and 6. The length of their exposure to the target language was between 2 and 5 years.

The L2 children were divided into three subgroups according to their L2 proficiency levels: high, mid, and low. A picture description task adopted from Whong-Barr and Schwartz (2002) and Unsworth (2005) was used to elicit the L2 data. There are 8 children in the high proficiency group, 8 in the mid proficiency group, and 9 in the low proficiency group. The participants of the high proficiency groups have a score of 60% or above. The participants of the mid proficiency groups have scores ranged between 45% - 59%, and participants in the low proficiency category have a score below 45%. The participants who had a score below 20% were not assigned a proficiency level.

4.2 The task

The task consisted of sixteen modal sentences with different syntactic patterns. All test sentences were presented to the participants under three conditions: Present Condition, Future Condition, and Past Condition. So, there were forty-eight test items altogether. Each condition consists of scenarios which have been designed to force

certain temporal interpretations (e.g. present, future, and past) of the test sentences. Examples:

Present Condition

Story: Ben has a bad cold. He did not come to school today.

Prompt: Where do you think Ben is now?

Correct Interpretation: Ben might be at home.

Future Condition

Story: Ben was not feeling well after school. He will not come to school tomorrow.

Prompt: Where do you think Ben will be tomorrow?

Correct Interpretation:Ben might be at home.

PAST Condition

Story: Ben had a bad cold yesterday. He did not come to school.

Prompt: Where do you think Ben was yesterday?

Incorrect Interpretation: Ben might be at home.

Table 1: The test sentences and the target-like responses

Test Sentences	Condition		
	Present (A)	Future (B)	Past (C)
Ben might be at home.	OK	OK	NOT OK
Ben may like the chocolate.	OK	OK	NOT OK
Ben may play football.	NOT OK	OK	NOT OK
He might study math.	NOT OK	OK	NOT OK
The teacher must be angry.	OK	NOT OK	NOT OK
Ben must know the answer.	OK	NOT OK	NOT OK
Jerry will be late.	NOT OK	OK	NOT OK
Ben will miss the bus.	NOT OK	OK	NOT OK
Ben may be playing football.	OK	NOT OK	NOT OK
He might be studying math.	OK	NOT OK	NOT OK
He must be going to the party.	OK	NOT OK	NOT OK
Ben must be cooking the dinner.	OK	NOT OK	NOT OK
Ben might have been at home.	NOT OK	NOT OK	OK
Ben must have cooked the dinner.	NOT OK	NOT OK	OK
Ben's bedroom will have been messy.	NOT OK	NOT OK	OK
Ben will have missed the bus.	NOT OK	NOT OK	OK

The first column shows the test sentences/modal statements. The mark 'OK' represents the reference time which are possible for the sentences, and the mark 'NOT OK' represents the reference time which are not possible for the sentences. Notice that sentence '*Ben might be at home*' and sentence '*Ben may like the chocolate*' allow both present and future interpretations. Therefore, the responses for these two sentences were counted twice i.e. one for present category and another for future category.

4.3 The procedure

The experiment began with a warm-up session to familiarize the participants with the task and to check whether or not they understand the task. The warm-up session consisted of 5 short stories, which were different from the real task. The participants were asked to judge whether sentences sounds OK or NOT OK based on the stories or scenarios provided. The participants who have developed a target-like grammar were expected to say the sentence is 'OK' when the sentences were presented under the right conditions, or when the reference time of the modal statements is felicitous to the reference time of the scenarios. They were also expected to accurately reject or say the sentence is 'NOT OK', if they found the sentences not temporally felicitous to the scenarios.

5.   The results

5.1 Control group's results

There were several test sentences which many of the native speakers accepted/rejected as the researcher expected in some conditions, and there were also several test sentences which many of the native speakers did not accept/reject. These results suggest that the temporal interpretations of these test sentences are more variable than assumed.

Since the results of the test performed by the adult native speakers show that the temporal interpretation of some test sentences are more variable than assumed, I decided to put aside the test items and the conditions in which the adult native speakers did not provide the expected responses. I considered the responses provided by the L2 children and the L2 adults for these sentences separately. These items are shown in Table 2.

Table 2: The test sentences for which the adult native speakers did not provide the responses as expected

The test sentences	Conditions
Ben must know the answer.	Present
Ben may be playing football.	Future
He must be going to the party.	Present, Future
Jerry will be late.	Present
Ben will miss the bus.	Present
Ben may like the chocolate.	Present

5.2 L2 children's results

5.2.1   L2 child results per proficiency group

Surprisingly, the L2 children from the high proficiency level did not perform consistently better than did the L2 children from the low proficiency group. They provided a higher percentage of the accurate rejection responses than did the L2 children from the low proficiency group only for the future modal statements. In addition, the L2 children from the low proficiency group provided a higher percentage of the accurate rejection responses than did the L2 children from the high proficiency group for the present modal statements. Given that this surprising data could result

from unusual performance of an individual child, I decided to closely look at the individual child's responses for the modal statements in which the L2 children did not provide the responses as expected, and I found that the L2 children with the same proficiency level did not obviously perform differently from each other. Therefore, it was possible that the L2 children's knowledge about the syntactic patterns indicating the present reference time lagged behind the L2 children from the mid and the low proficiency groups.

Table 3: The L2 child results per proficiency group: the responses for the modal statements which have different reference time

The syntactic patterns	Groups	Accurate rejection		Accurate acceptance		Inaccurate acceptance		Inaccurate rejection	
		n	%	n	%	n	%	n	%
Future	High	21/64	32.81	42/56	75.00	43/64	67.19	14/56	25
	Mid	16/64	25.00	45/56	80.36	48/64	75.00	11/56	19.64
	Low	20/72	27.78	49/63	77.78	52/72	72.22	14/63	22.22
Past	High	24/64	37.50	26/32	81.25	40/64	62.20	6/32	18/75
	Mid	15/64	23.44	18/32	56.25	49/64	76.56	14/32	43.75
	Low	27/72	37.50	26/36	72.22	45/72	62.5	10/36	27.78
Present	High	29/96	30.21	43/56	79.76	67/96	69.79	13/56	23.21
	Mid	32/96	33.33	42/56	75.00	64/96	66.67	14/56	25
	Low	36/108	33.33	54/72	85.71	72/108	66.67	9/72	14.29

Besides, in regard to the inaccurate acceptance responses, the L2 children from the high proficiency group provided the inaccurate acceptance responses for the present modal statements more than did the L2 children from the low proficiency group.

As for the L2 children from the mid proficiency level, they generally did not perform better than the L2 children from the low proficiency group for the future and the past modal statements.

The percentage of the responses provided by the L2 children from the three proficiency groups was compared, using Kruskal Wallis Test by split file by group. The purpose of the test was to check whether or not the L2 children from the three proficiency groups behaved significantly regarding the types of the responses and the conditions. The results of the test show that the percentage of the responses provided by the L2 children from the three proficiency groups was not significantly different in every condition. This confirms that there was no connection between the L2 children's performance and their L2 proficiency. In other words, regardless of L2 proficiency levels, the L2 children's performance was not significantly different.

5.2.2   L2 child individual results
The individual L2 children's results in Table 4 show that majority of the L2 children have not acquired the syntactic patterns indicating the reference time of the modal complement. There was a small number of L2 children who appear to have acquired some syntactic patterns. Also, it can be noted that the L2 children who appear to have

acquired some of the syntactic patterns were from different proficiency groups. These results suggest no connection between L2 proficiency and performance.

Table 4: The L2 child individual results: the successfully acquired modal statements

The participants	Proficiency levels	Types of modals statements			
		Present n = 4	Future n = 3	Past n = 4	Total n = 11
L2CHI04	M	1	2	1	4
L2CHI06	H	1		2	3
L2CHI07	H	1		2	3
L2CHI15	M	1		1	2
L2CHI05	L	1	1		2
L2CHI13*		1	1		2
L2CHI20	H			1	1
L2CHI18	M			1	1
L2CHI25	L			1	1
L2CHI17	L		1		1
L2CHI03	L		1		1
L2CHI11*		1			1
L2CHI27	H				
L2CHI16	H				
L2CHI29	H				
L2CHI19	H				
L2CHI22	H				
L2CHI24	M				
L2CHI01	M				
L2CHI30	M				
L2CHI28	M				
L2CHI10	M				
L2CHI09	L				
L2CHI14	L				
L2CHI21	L				
L2CHI02	L				
L2CHI08	L				
L2CHI23*					
L2CHI12*					
L2CHI26*					
Total		7/120	6/90	9/120	
%		5.83	6.66	7.5	

* The L2 children whom were not assigned proficiency level because their proficiency scores were very low.

6. Discussion
Now we turn to our original research questions. The first question is concerned with the issue of the L1 transfer, while the second question is related to the issue of the poverty of the stimulus. The third question addresses the acquisition order.

6.1 Do L2 English acquisition patterns show L1 properties with regard to reference time of modal complements?

The answer to this question is 'YES'. The L1 interpretation has been observed in the L2 participants' interpretation of the modal statements in English. The evidence that supports this claim is the percentage of the target-like L1-compatible responses and percentage of the non-target L1-compatible or L1-transfer responses given by the L2 children. Given that L1 interpretations which are possible both for the modal statements in English and their counterparts in Thai entail the accurate acceptance when the English modal statement were presented in felicitous conditions, the inaccurate acceptance for the modal statements in the infelicitous conditions, on the other hand, was evidence for L1 knowledge involvement.

In addition to L1 transfer in conditions that are licit in English, both L2 children allowed interpretations which are not possible for the modal statements in English, but are possible for whose counterparts in Thai. For example, they accepted the sentence '*He might study math*' to be OK even when it was presented in Present and Past conditions. Therefore, we are able to conclude that there was L1 transfer in child L2 acquisition.

6.2 Can the Thai children acquire the syntactic patterns that constrain the reference time of modal complements in English?

According to the L2 child individual results, it seems that the L2 children have not acquired the syntactic patterns that constrain the reference time of the modal complements in English. On the other hand, the L2 children's knowledge about the syntactic patterns and the reference time are rudimentarily developing. Although the L2 child group and individual results show that the L2 children provided the target-like L1-compatible responses for the modal statements in the right conditions, this does not show that the L2 children know the reference time of the modal statements. They just accepted the test sentences to be OK without knowing that those test sentences have the same temporal interpretation as their counterpart in Thai.

In addition, we have seen that the L2 children's percentage of the target-like L1-incompatible responses e.g. the correct rejection, which reflect pure L2 knowledge about the reference time of the modal complements, is very low. The L2 children were not able to reject the modal statements when the modal statements were presented in infelicitous conditions. In other words, they did not know what interpretations are not possible for the certain syntactic patterns.

A promising explanation for such findings is to do with the cognitive factors or real world experience. It is possible that cognitive ability and real world experience play a part in the acquisition of the epistemic modality. Previous research on L1 acquisition of the epistemic modality reveals that epistemic modality is acquired late. Even for a child native speaker of English, the signs of an adult-like understanding of the logical meaning of the epistemic modals may not appear until the children are seven years old (cf. Shields 1974; Byrnes and Duff 1989; Noveck, Ho, & Sera 1996). For these reasons, it might not be very surprising to see that the L1 children (aged between 8

and 9) in the current study appear to have acquired only a few of the syntactic patterns because their relevant knowledge is not fully developed. Rather, it is in the early stages.

The task of the acquisition for Thai children must be even more difficult. The Thai children have to acquire the knowledge about the epistemic modality in Thai and English at the same time. We have seen that the means for expressing the reference time of the epistemic modal complements in Thai is different from English. The acquired L1 knowledge in this case cannot entirely accommodate the acquisition of the L2 knowledge.

6.3 *Which patterns are acquired early or which patterns are acquired late?*
The L2 child results per proficiency group have shown that the L2 children's knowledge about the syntactic patterns which indicate the reference time of the modal complement is rather rudimentary. In addition, the L2 child results per proficiency groups show no clear evidence in support the early or late acquisition of a certain syntactic pattern. Nonetheless, in terms of syntactic patterns, the L2 child individual results showed an interesting trend. That is, L2 children were likely to have acquired the past modal statements e.g. '*Ben might have been at home*' and '*Ben must have cooked the dinner*' prior to the other patterns.

My speculation about this L2 children's acquisition order is that the modal statements '*Ben might have been at home*' and '*Ben must have cooked the dinner*' have the syntactic pattern which consists of morphological markers i.e. HAVE –EN. It might be easier for the children to acquire the temporal meaning which is morphologically marked. The L2 children may look for explicit markers for signaling the temporal meaning.

On the other hand, the future modal statements (e.g. '*Ben may play football*', and '*Ben might study math*'), which have the syntactic pattern MAY/MIGHT AN EVENTIVE VERB, do not contain any morphological markers. In other words, the temporal meaning is implicitly marked. This syntactic pattern is therefore more difficult for the L2 children to acquire.

7. Conclusion and Evidence for Full Transfer Full Access Hypothesis
The L2 results obtained from the experiment show that L1 properties (e.g. L1 interpretations) were observed in child L2 acquisition. Given that the L2 participants with different L2 proficiency levels were assumed to be representatives of L2 acquirers at different developmental stages, the L2 participants with lower proficiency were then assumed to be in the early stages, while the L2 participants with high proficiency were assumed to be in the later stages. Accordingly, the very high percentage of the target-like L1-compatible responses and the very high percentage of the non-target with L1 or L1-transfer responses provided by the L2 participants with low proficiency, suggested a full transfer of L1 properties at the early stage of the acquisition, hence the initial state of the interlanguage. The L2 participants with mid

and high proficiency, on the other hand, provided a comparatively smaller percentage of the target-like L1-compatible responses and of the non-target with L1 or L1-transfer responses. This suggested that the rate of L1 transfer tentatively decreased as the L2 proficiency accelerated.

The L2 child results show that none of these L2 children in the current study had acquired the syntactic patterns that constrain the reference time of the modal complements in English. Therefore, we are not able to argue for evidence of access to UG in child L2 acquisition in this study. Given that the reference time of the modal complement results from the combination of a certain epistemic modal and a certain type of verb, it is possible that an L2 child will not acquire the reference time of the modal complements until their knowledge about these two linguistic realms is fully developed.

It is possible that UG is not directly involved in the acquisition of the reference time of the modal complements. Rather, it constrains the acquisition of the two linguistic realms which mutually constitutes the reference time of the modal complements. This might be the way in which UG involves in the L2 acquisition of the syntactic patterns. As we do not obtain evidence of access to UG in child L2 acquisition, it is also possible to acknowledge the role of general cognitive ability. In other words, the reference time could be a general cognitive property, but not to do with UG at all. The children's cognitive ability required for the acquisition of the reference time of modal statements may not be fully developed. Consequently, the L2 children have not acquired the syntactic patterns that indicate the reference time of the modal complement.

Moreover, we have seen that the L1 interpretations were observed in the data of the L2 children with lower proficiency levels, this is therefore counter evidence for Direct Access to UG position, which deny the role of the L1 knowledge in L2 acquisition. By and large the findings of the current research support the Full Transfer/Full Access Hypothesis.

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