

Acquisition of English Modals: An Interlanguage Study in the Japanese Setting*

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1. The aim of this study

The area we are interested in in the present paper is termed by Corder (1973) error analysis or interlanguage studies. Its basic assumption is that learners have their own language system at every developmental stage of learning, which is not the same as that of the target language but rather a new 'system'. The system is unstable and transitional in nature and comes to approximate the target language as learning develops. If we can describe in linguistic and/or psycholinguistic terms the nature of interlanguage and the process of its approximation to the target language, it will provide us with important information for structuring the syllabuses and teaching methods as well as a fuller understanding of language acquisition.

In the present study, we confined the area of competence to the semantic structure of English modals, and aimed to describe the characteristic features of the transitional systems of English modals which Japanese learners show at the intermediate learning stage. In other words, we wanted to specify the interlanguage grammar of modals by Japanese learners of English.

2. Semantic structure of English modals

According to Cook (1978), there are three factors involved in the semantic structure of English modal verbs: (1) epistemic vs. root modals, (2) internal vs. external negation and (3) present vs. past meaning.

(1) Epistemic vs. root modals

Epistemic modals modify the propositional content of the sentence and deal with or assess the truth value of that propositional content. If a speaker utters a sentence which includes an epistemic modal, he is saying how true he thinks the proposition is. For example, when a speaker says "John can be lying", he is saying how possible the proposition "John is lying" is. More specifically, epistemic modals deal with the possibility and necessity of the proposition. Root modals, on the other hand, relate an agent to an activity and deal with permission, obligation and ability. If a speaker utters a sentence including a root modal, he is attempting to direct the course of future events or to exercise control over people's

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behavior. When a speaker utters "You can smoke in the lounge", he is permitting the addressee to smoke in the lounge.

(2) External vs. internal negation

Since modal structures are semantically two verb structures which contain a modal verb and a main verb, it is possible that either the modal verb or the main verb is negated. When the main verb of a proposition component is negated, it is referred to as *internal negation*. On the contrary, when the modal verb of a modal component is negated, it is called *external negation*. The following are examples of external and internal negation.

External neg: John cannot be lying.

Analysis: It is *not* possible that John is lying.

Internal neg: John may not be lying.

Analysis: It is possible that John is *not* lying.

(3) Present vs. past tense

English modal verbs have present and past tense forms. The present tense forms have present tense meanings, but past forms have either past or present meanings. The past tense forms have a past time meaning and any ambiguity is usually resolved by the discourse context and the use of past time adverbials.

The semantic structure of English modals can be analyzed in terms of the combination of the components of these three factors. Diagram 1 shows every theoretically possible combination of those components and Table 1 the surface realization of these underlying semantic structures of the English modals, *May*, *Can*, *Have to* and *Must*. (Asterisks indicate that there are no linguistic realizations in English.)

Diagram 1

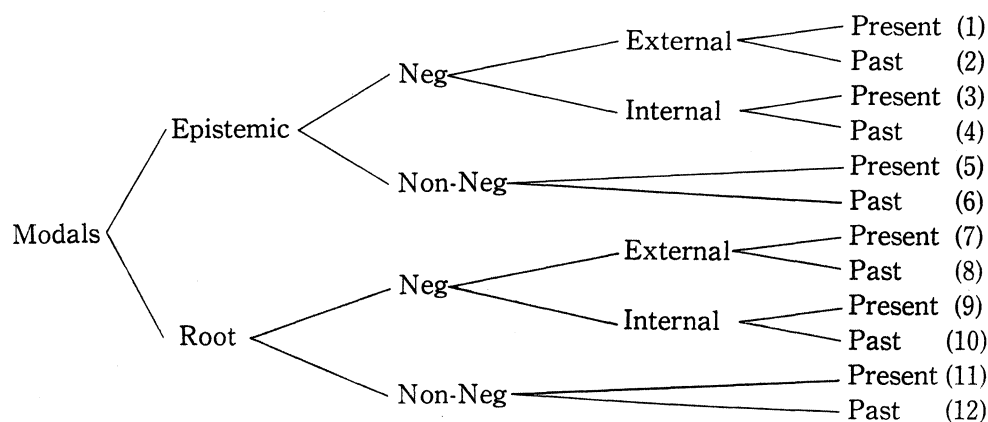


Table 1 Semantic structures of English modals and their surface realizations

Semantic structures	Realizations	Item No.
May		
1 (Ep + Ext + Pres)	*	
2 (Ep + Ext + Past)	*	
3 (Ep + Int + Pres)	He may not succeed.	(1)
4 (Ep + Int + Past)	John might not have been angry.	(2)
5 (Ep + Non-Neg + Pres)	He might be the winner.	(3)
6 (Ep + Non-Neg + Past)	It might have been raining.	(4)
7 (R + Ext + Pres)	You may not go swimming.	(5)
8 (R + Ext + Past)	You might not have bought the bicycle.	(6)
9 (R + Int + Pres)	*	
10 (R + Int + Past)	*	
11 (R + Non-Neg + Pres)	May I borrow your pen?	(7)
12 (R + Non-Neg + Past)	The prisoners might leave the camp when they wished.	(8)
Can		
1 (Ep + Ext + Pres)	He can't be dead.	(9)
2 (Ep + Ext + Past)	It couldn't have been a lion.	(10)
3 (Ep + Int + Pres)	*	
4 (Ep + Int + Past)	*	
5 (Ep + Non-Neg + Pres)	There could be trouble about the plan.	(11)
6 (Ep + Non-Neg + Past)	Voyages could be dangerous in those days.	(12)
7 (R ₁ + Ext + Pres)	You can't leave now.	(13)
8 (R ₁ + Ext + Past)	You couldn't smoke there.	(14)
9 (R ₁ + Int + Pres)	*	
10 (R ₁ + Int + Past)	*	
11 (R ₁ + Non-Neg + Pres)	Could I take the car?	(15)
12 (R ₁ + Non-Neg + Past)	I could go out late yesterday.	(16)
13 (R ₂ + Ext + Pres)	He can't stand on his hands.	(17)
14 (R ₂ + Ext + Past)	He couldn't lift 100 pounds in his childhood.	(18)
15 (R ₂ + Int + Pres)	*	
16 (R ₂ + Int + Past)	*	
17 (R ₂ + Non-Neg + Pres)	He can speak English.	(19)
18 (R ₂ + Non-Neg + Past)	I could swim 100 meters when I was younger.	(20)
Have to		
1 (Ep + Ext + Pres)	John doesn't have to be in town.	(21)
2 (Ep + Ext + Past)	Mary didn't have to be wrong.	(22)
3 (Ep + Int + Pres)	*	
4 (Ep + Int + Past)	*	
5 (Ep + Non-Neg + Pres)	Even the best of us has to die.	(23)
6 (Ep + Non-Neg + Past)	Someone had to be the loser.	(24)
7 (R + Ext + Pres)	I don't have to work on Sunday.	(25)
8 (R + Ext + Past)	He didn't have to take the examination.	(26)
9 (R + Int + Pres)	*	
10 (R + Int + Past)	*	
11 (R + Non-Neg + Pres)	You have to obey the law.	(27)
12 (R + Non-Neg + Past)	He had to refuse the offer.	(28)
Must		
1 (Ep + Ext + Pres)	*	

2	(Ep+Ext+Past)	*	
3	(Ep+Int+Pres)	There mustn't be any water left.	(29)
4	(Ep+Int+Past)	*	
5	(Ep+Non-Neg+Pres)	It must be twelve o'clock.	(30)
6	(Ep+Non-Neg+Past)	*	
7	(R+Ext+Pres)	*	
8	(R+Ext+Past)	*	
9	(R+Int+Pres)	You must not walk on the grass.	(31)
10	(R+Int+Past)	*	
11	(R+Non-Neg+Pres)	I must go now.	(32)
12	(R+Non-Neg+Past)	*	

Notes

Can R₁: permissionCan R₂: ability

3. The outline of the experiment: test materials and the administration of the test

In order to specify the nature of the approximative system of English modals for intermediate learners of English, we prepared a test of English modals, and administered it to the students of Kagoshima University. The contents of the test were strictly based on the above description of English modals.

In preparing test materials, we constructed two different sets of the test, (1) an objective type where subjects are asked to choose a correct answer out of several choices, and (2) a subjective type where subjects are asked to write down their answers themselves. The objective test was intended to test the receptive competence of modals. The subjective one, contrastively, was made so as to check the learner's productive interlanguage strategies in producing modal sentences.

The receptive test is an L_i to L₁ translation type in which the subjects are asked to choose the correct Japanese translation for the 32 English sentences of Table 1. In the productive test, the subjects are asked to translate into English the Japanese translation of the same English sentences as in the objective test. Thus, we aimed to find differences between reception and production.

The test was given to 126 students of Kagoshima University. The reception test (test 1, objective type) was given to 45 Technology majors and the production test (test 2, subjective type) to 62 Science students and to 19 juniors majoring in English. The general English ability or proficiency levels of the Technology students and Science students were judged to be almost the same on the basis of several criteria such as entrance examination scores, etc. English majors were judged to be far superior in proficiency to the other two groups. English majors were called for to obtain clearer information about the interlanguage strategies. (In order to be able to use transitional strategies, quite a high level of English proficiency is required.) The test was given in June, 1980, during the regular class period.

4. Results and discussions

(1) Reception

Table 2 (left column) shows the frequency of errors for each of the 32 types of modal

Table 2 Frequency of errors

Item No.	Structures	Reception	Production
		%	%
1	May (Ep+Int+Pres)	2 (4.2)	8 (12.9)
2	May (Ep+Int+Past)	18 (40.0)	41 (66.1)
3	May (Ep+Non-Neg+Pres)	12 (26.7)	5 (8.1)
4	May (Ep+Non-Neg+Past)	6 (13.3)	47 (75.8)
5	May (R+Ext+Pres)	21 (46.7)	8 (1.3)
6	May (R+Ext+Past)	23 (51.1)	53 (85.5)
7	May (R+Non-Neg+Pres)	0 (0)	0 (0)
8	May (R+Non-Neg+Past)	11 (24.4)	30 (48.4)
9	Can (Ep+Ext+Pres)	3 (6.7)	42 (67.7)
10	Can (Ep+Ext+Past)	6 (13.3)	54 (88.0)
11	Can (Ep+Non-Neg+Pres)	31 (68.9)	12 (19.4)
12	Can (Ep+Non-Neg+Past)	16 (35.6)	46 (74.2)
13	Can (R ₁ +Ext+Pres)	15 (33.3)	7 (11.3)
14	Can (R ₁ +Ext+Past)	0 (0)	49 (79.0)
15	Can (R ₁ +Non-Neg+Pres)	5 (11.1)	18 (29.0)
16	Can (R ₁ +Non-Neg+Past)	7 (15.6)	14 (22.6)
17	Can (R ₂ +Ext+Pres)	0 (0)	2 (3.2)
18	Can (R ₂ +Ext+Past)	0 (0)	12 (19.4)
19	Can (R ₂ +Non-Neg+Pres)	0 (0)	0 (0)
20	Can (R ₂ +Non-Neg+Past)	0 (0)	12 (19.4)
21	Have to (Ep+Ext+Pres)	15 (33.3)	48 (77.4)
22	Have to (Ep+Ext+Past)	10 (22.2)	62 (100)
23	Have to (Ep+Non-Neg+Pres)	8 (17.8)	31 (50.0)
24	Have to (Ep+Non-Neg+Past)	4 (8.9)	48 (77.4)
25	Have to (R+Ext+Pres)	1 (2.2)	22 (35.4)
26	Have to (R+Ext+Past)	5 (11.1)	51 (82.3)
27	Have to (R+Non-Neg+Pres)	0 (0)	12 (19.4)
28	Have to (R+Non-Neg+Past)	1 (2.2)	36 (58.1)
29	Must (Ep+Int+Pres)	8 (17.8)	27 (43.5)
30	Must (Ep+Non-Neg+Pres)	1 (2.2)	10 (16.1)
31	Must (R+Int+Pres)	4 (8.9)	10 (16.1)
32	Must (R+Non-Neg+Pres)	2 (4.2)	0 (0)

Table 3 Mean of total errors and means of errors for each modal (Reception)

	Σ	N	\bar{X}	%
Mean of total errors	235	32	7.3	(16.2)
Means of errors of each modal				
May	93	8	11.6	(25.8)
Can	83	12	6.9	(15.3)
Have to	44	8	5.5	(12.2)
Must	15	4	3.8	(8.4)

Table 4 Mean of errors for the components of factors, for each modal (Reception)

Modal	Component	Σ	N	\bar{X}	%
May	Ep	38	4	9.5	(21.1)
	R	55	4	13.8	(30.7)
	Neg	64	4	16.0	(35.6)
	Non-Neg	29	4	7.3	(16.2)
	Int Neg	20	2	10.0	(22.2)
	Ext Neg	44	2	22.0	(48.9)
	Pres	35	4	8.8	(19.6)
	Past	58	4	14.5	(32.2)
Can	Ep	56	4	14.0	(31.1)
	R	27	8	3.4	(7.6)
	Neg	24	6	4.0	(8.9)
	Non-Neg	59	6	9.8	(21.8)
	Pres	54	6	9.0	(20.0)
	Past	29	6	4.8	(10.7)
	No realizations of Int Neg.				
Have to	Ep	37	4	9.3	(20.7)
	R	7	4	1.8	(4.0)
	Neg	31	4	7.8	(17.3)
	Non-Neg	13	4	3.3	(7.3)
	Pres	24	4	6.0	(13.3)
	Past	20	4	5.0	(11.1)
	No realizations of Int Neg.				
Must	Ep	9	2	4.5	(10.0)
	R	6	2	3.0	(6.7)
	Neg	12	2	6.0	(13.3)
	Non-Neg	3	2	1.5	(3.3)
	No realizations of Int Neg and Past.				

Table 5 Mean of errors for the components of factors, for all modals (Reception)

Component	Σ	N	\bar{X}	%
Ep	140	14	10.0	(16.1)
R	95	18	5.3	(8.5)
Neg	131	16	8.2	(13.2)
Non-Neg	104	16	6.5	(10.5)
Int Neg	32	4	8.0	(13.0)
Ext Neg	99	12	8.3	(13.4)
Pres	128	18	7.1	(11.5)
Past	107	14	7.6	(12.3)

structure. Based on this frequency table, several indicator values were calculated so as to specify the aspects in which the subjects had difficulty in the reception of modals. They are

(1) mean value of total errors (Table 3), (2) mean values of errors for each of the 4 modals, *May*, *Can*, *Have to*, and *Must* (Table 3), (3) for each modal, mean values of errors of each of the contrasting components of the 3 factors and one subfactor, Ep/R factor, Neg/Non-Neg factor, Int/Ext Neg factor, tense factor (Table 4) (some were impossible to calculate due to lack of realizations of structures), (4) Across the four modals, mean values of errors for each of the contrasting components of the 3 factors, and one subfactor (Table 5).

As is shown in Table 3, the mean values of error frequency for each modal are 25.8% for *May*, 15.3% for *Can*, 12.2% for *Have to*, and 8.4% for *Must* making the mean value for total errors 16.2%. This means that *May* is a difficult modal verb while the others are relatively easy in reception. As is evident from Table 4, the difficulty of *May* was caused by the components of Root (30.7%), Negative (35.6%) and Past (32.2%) and, in the case of negation, especially by the component of External Negation (48.9%). The contribution of Root component contradicts a general tendency, for across modals the Epistemic component is far more difficult than the Root component (See Table 5). The difficulty of Root *May* could be attributed to the fact that, in the case of *May*, the Root modal combines only with External Negation and the Epistemic modal only with Internal Negation and External Negation is much more difficult than Internal. *Can* is a relatively easy one but still Ep (31.1%), Non-Neg (21.8%) and Pres (20.0%) components seem to be difficult, and, contrary to general tendency, Pres and Non-Neg components seem more difficult than Past and Neg, respectively. The Non-Neg case could be partly accounted for by the fact that there are only realizations of Ext Neg in the surface structure and the negation structure is rather simple in that sense. The case of the Pres component remains to be solved. *Have to* and *Must* are also easy modals and the more difficult components are Ep and Neg in each case, which is consistent with the general tendency.

As for the effects of each component across all four modals, Ep seems to have more strongly affected the learner's learning of modals than Root. (See Table 5). In other words, the Ep component (16.1%) was more difficult than Root (8.5%) for all the modals. As for the difference of effect in Neg and tense factor, there is a general tendency that Neg (13.2%) and Past (12.3%) are more difficult but the difference is not great enough to be significant.

In order to check the statistical significance of the difference of errors between the contrasting components of the three factors and one subfactor, we used the chi-squared test. Table 7 is the chi-squared statistics and the interpretation of the results. The χ^2 test showed that there were significant differences in proportion between those pairs of contrasting components except for between Pres and Past in *Have to*, Ep and Root in *Must*, and Neg and Non-Neg, IntNeg and ExtNeg, and Pres and Past across modals.

(2) Production

Table 2 (right column) shows the error frequency in the production test in which subjects were asked to translate Japanese into English. Since the target English sentences were the same as those of the reception test and the subjects of this test were judged by several criteria to be as proficient as those who sat the reception test, it was concluded to be reasonable

to compare these two sets of data. In scoring the production test, only the modal part was evaluated to keep balance between reception and production since in the reception test only the understanding of modals was checked.

As is clear from the comparative results of Table 2, production is much more difficult than reception. As is shown in Table 6, the mean value of errors in production is 25.5 (41.1%) in contrast with the mean of 7.3 (16.2%) for reception. The difference is significant at the 0.01 level (Table 7, No. 17). This means about two and half times as many students made errors in production as in reception. A comparison of each item shows that with a few exception (item 3, 5, 11, 13, 32) most of structures were more difficult in production than in reception.

Table 6 Mean of total errors and means of errors for each modal (Production)

	Σ	N	\bar{X}	%
Mean of total errors	817	32	25.5	(41.1)
Means of errors for each modal				
May	192	8	24.0	(38.7)
Can	268	12	22.3	(40.0)
Have to	310	8	38.8	(62.6)
Must	47	4	11.8	(19.0)

Table 7 The Chi-squared Test by the 2×2 Contingency Table

* represents: $P < 0.05$
 ** represents: $P < 0.01$
 N.S. represents: No Significance

1. May: Ep vs. R

	Ep	R
Pass	142	125
Failure	38	55

$\chi^2 = 4.1899^*$ with 1 d.f.

2. May: Neg vs. Non-Neg

	Neg	Non-Neg
Pass	116	151
Failure	64	29

$\chi^2 = 17.7600^{**}$ with 1 d.f.

3. May: IntNeg vs. ExtNeg

	IntNeg	ExtNeg
Pass	70	46
Failure	20	44

$\chi^2 = 13.9655^{**}$ with 1 d.f.

4. May: Pres vs. Past

	Pres	Past
Pass	145	122
Failure	35	58

$\chi^2 = 7.6694^{**}$ with 1 d.f.

5. Can: Ep vs. R

	Ep	R
Pass	124	333
Failure	56	27

$\chi^2 = 51.4289^{**}$ with 1 d.f.

6. Can Neg vs. Non-Neg

	Neg	Non-Neg
Pass	246	211
Failure	24	59

$\chi^2 = 17.4395^{**}$ with 1 d.f.

7. Can: Pres vs. Past

	Pres	Past
Pass	216	241
Failure	54	29

$\chi^2 = 8.8977^{**}$ with 1 d.f.

