A Study on the Multidimensional Model:
With Special Reference to English Interrogatives

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0. Introduction

The Multidimensional Model (MD Model), developed by the ZISA group researchers (e.g. Meisel et al., 1981) in German as a second language and subsequently applied to English as a second language (ESL) by Piennemann and Johnston (e.g. Pienemann & Johnston, 1987), is a major attempt to improve traditional studies of natural sequences of acquisition conducted from early 1970s to early 1980s (e.g. morpher, studies) (see Inagaki, 1992, this volume for details). However, although promising, the MD Model does have some problems and it is suggested in Inagaki (this volume) that more studies be conducted which attempt to rectify them. In this paper, one such study is reported.1)

1. Purpose

As has been pointed out in Inagaki (this volume), the stages for ESL acquisition proposed by Pienemann and Johnston need more comfirmatory studies to be validated. That is where this study comes in. More specifically, the purpose of this study is to test the developmental sequences predicted by Pienemann and Johnston, especially one for English interrogatives on junior and senior high school students in Japan, who are learning English predominantly in a classroom environment. This study will be significant in that it examines the validity of the proposal needed to be comfirmed, that the subjects are native speakers of Japanese and that they are classroom leaners. Remember that the only study (see for example Jonston, 1985 and Pienemann et al., 1988) that tested and supported the ESL developmental stages investigated Polish and Vietnamese learners of English in a naturalistic environment (see Inagaki, 1992, this volume for more details). Table 1 below shows the developmental sequence for English interrogatives proposed by Pienemann and Johnston, which is the target of this study.2)

Table 1. Developmental Sequence for ESL Interrogatives predicted
         by Piememann and Johnston (based on Pienemann & Johnston,
         1987; Pienemann et al., 1988; Pienemann & Erben, 1991;
         Larsen-Freeman & Long, 1991)

Stage		Example
1	Single Words	*Why?*
	Formulac	*What's your name?*
X	SVO?	*The tea is hot?*
X + 1	Wh-Fronting	*Why you no eat?*
	Do-Fronting	*Do he work?*
X + 2	Pseudo-Inversion	*There is my purse?*
	Copula-Inversion	*Is she at home?*
	Yes/No-Inversion	*Can you play?*
X + 3	Auxiliary-2nd	*There has he seen you?*
	Do-2nd	*Why did you go?*
X + 4	Cancel-Inversion	*I wonder what he wants to eat.*

2. Subjects

Nine third-year students in junior high school and six first-
year students in high school in Japan aged 14 – 16, who went to a
cram school in Hiroshima, were chosed as the subjects. The school
was a preparatory school for entrance examinations for university,
where they were taught mainly English grammar and translation from
English to Japanese and vice versa twice a week. The author was in
charge of half the classes they attended. In addition, the school
was for advanced students and that the levels of the subjects were
high compared with average junior and senior high school students
in the same years.

3. Data Collection

The following three tasks were used for elicitating the target
structures produced orally in a communicative and unmonitored
situation so that they would be comparable to the interview data
that the MD Model was based on (see Inagaki, this volume).3)

Task 1: Questions about a picture

This is a variant of the task Ellis (1984) used for the
elicitation of oral Wh-questions. This required the subjects to
make up Wh-questions about a picture of a station scene taken from
Heaton (1975: 6) (see Appendix). To ensure that our subjects
produced a variety of Wh-questions, they were told to take a card
for a Wh-pronoun from a box each time they asked a question. Among

the cue cards were two for 'what', one for 'where', 'when', 'who', 'which', 'whose', 'why' and 'how'. There was also one blank card, when the subjects could use any Wh-pronoun they liked. Thus, it was intended that at least ten Wh-questions would be elicited from each of the subjects. Moreover, the subjects were recommended to ask questions about what they really did not know about the picture within 30 minutes after a card was drawn and not to rehearse their question sentences in their heads. The researcher gave a short answer to each question to creat a real communicative situation.

Task 2: Questions about the researcher

The subjects were required to ask questions about the researcher. Again, cue cards indicating what to ask were used. A cue was written on each of the cards in Japanese. There were ten of them and among them were a card for 'shumi' (hobby), 'tabemono' (food), 'eiga' (movie), 'shokugyo' (job), 'ongaku' (music), 'kyodai' (brothers), 'nenrei' (age), 'tabako' (cigarette) and 'hoshii-mono' (what the researcher wants) and one blank card, when they could ask whatever question they liked about the researcher. For example, when the subject drew the 'hobby' card, he was supposed to ask a question about the researcher's hobby and might have said, 'What is your hobby?'. They were again told not to rehearse their questions in their heads. The researcher answered the questions in a brief manner.

Task 3: What's in the bag?

This is the task which Reppy (1980) and others used to elicit oral questions. The task is considered especially suited for elicitating Yes/No questions. In this task, an object was put in a black bag and the subjects were required to keep asking questions about it until they reached a correct answer. The researcher usually gave as simple answers as possible such as 'Yes, it is' and 'No it isn't' to the questions asked. Here again, the subjects were reminded not to rehearse their questions.

Thus, a total of 436 questions were elicited, which were tape-recorded and later transcribed in normal orthographey for the subsequent analysis (see Inagaki, 1992 for the full transcription of the data).

4. Data Analysis

At first, we analyzed the data, focusing on the interrogative structures proposed by Pienemann and Johnston and shown in Table 1. However, the result showed that Pienemann and Johnston's

framework was not comprehensive enough to cover a variety of interrogative structures produced by our subjects.4) Therefore, we decided to modify and expand Pienemann and Johnston's framework in some ways so that the majority of our data might be indentified in terms of what rules they had and thus where they should be placed in the proposed developmental stages. The modified developmental stages are shown below in Table 2.5)

Table 2. Modified Developmental Stages for English Interrogatives

Stage		Example
I	Single Words (SW)	*Chalk?*
		How often?
	Formulae (F)	*How old are you?*
		What is this?
X	SVO?	*It's* soft?
		I know it?
	Wh-Subject (Wh-S)	*Who* cut the ticket?
		What's in the box?
	There+be-?	*There's* other one here?
X + 1	Do-Fronting (Do-F)	*Do* you smoking?
	Copula-Fronting (Co-F)	*Is* your hobby is reading?
		Is it smell good?
	Wh-Fronting (Wh-F)	*What* is your occupation?
		When the train start?
X + 2	Pseudo-Inversion (P-I)	Who *is the running man?*
	" " (there)	How many *are there?*
	Copula-Inversion (Co-I)	*Is that* a ball?
	Co-I (there)	*Are there* at the Sogo?
	Auxiliary-Inversion (A-I)	*Can you* eat?
		Have I used it?
	Do-Inversion (Do-I)	*Do you like* music?
		Do it sell in the store?
	Did-Inversion (Did-I)	*Did you see* Terminator II?
X + 3	Does-Inversion (Does-I)	*Does Mr. Shimamoto have* it?
	Copula-2nd (Co-2)	Why *is the boy crying?*
	Co-2 (there)	Why *is there* no people around the cart?
	Auxiliary-2nd (A-2)	When *will the train leave?*
	Do-2nd (Do-2)	When *do people use* it?
	Did-2nd (Did-2)	What *did he eat* lunch?
	Does-2nd (Does-2)	Why *does the boy cry?*
X + 4	Cancel-Inversion (Ca-I)	I wonder where he *wants to* eat.

Focusing on the structures above, we calculated the number of occurrences of each optional rule (e.g. SVO? and Do-F) and the rate of application of each obligatory rule (e.g. Co-I and A-2) on its obligatory occasions. Then, following the ZISA researchers, we conducted implicational scaling to see if these structures were implicationally related.

In addition, we examined another aspect, that is, whether a question had a subject-verb inversion in a 'simple sense' and whether the inversion was sentence-internal or not. Inversion in a simple sense means that there is subject-verb inversion whether or not there is agreement of subject and verb in person and number, or that of main verb, and auxiliary or copula, or realization of proper tense. This was necessary to distinguish, for example, the following two sentences:

    1) When the train start?
    2) Where is the train go?

In both sentences, Wh-F is correctly applied but Does-2 is not. However, the important difference between the two is that only in sentence 2), the 'simple' inversion is performed. Without looking at the inversion in a simple sense, this kind of difference would never been revealed. Furthermore, the distinction between internal-inversion (I-I) and non-internal inversion (N-I-I), both in the simple sense, was made to see if the relative difficulty of the former predicted by the MD Model really existed (see for example Pienemann et al., 1988; Inagaki, this volume). Hence, we regarded I-I and N-I-I as two obligatory rules, whose rate of application on their obligatory occasions was also calculated.

Thus, in terms of these rules, both optional and obligatory, we analyzed the data, classifying them into 32 categories with each of them having a different manifestation of a certain combination of the rules (see Inagaki, 1992 for the full classification of the data.6), 7)

5. Results and Discussion

Tables 3 and 4 below show the rate of application of the N-I-I and I-I rules and the implicational analysis of the acquisition of English interrogatives respectively.

Table 3. Rate of Application of N-I-I and I-I

Subjects Rules	A	B	C	E	F	G	H	J	K	L	M	N	O
N-I-I	0.44	1.0	0.94	1.0	1.0	1.0	1.0	0.85	1.0	1.0	0.83	0.88	1.0
I-I	1.0	0.89	0.82	1.0	1.0	1.0	0.91	0.9	1.0	1.0	0.93	1.0	1.0

Table 4. Implicational Scale for the Acquisition of English
Interrogatives

Stage	Subjects Rules	B	O	E	F	G	K	L	C	A	N	M	H	J
I	SW	0	2	0	0	1	1	4	2	0	4	9	1	5
	F	3	5	5	4	6	4	3	4	3	2	5	4	3
X	SVO?	0	0	0	0	0	0	0	1	5	1	2	0	2
	There+be-?	0	0	0	0	0	0	0	0	0	1	0	0	0
	Wh-S	x	(1.0)	x	x	(1.0)	(1.0)	(1.0)	x	(1.0)	x	(1.0)	x	(1.0)
X+1	Do-F	0	0	0	0	0	1	0	0	1	0	1	0	0
	Co-F	0	0	0	0	1	0	2	0	0	1	0	0	0
	Wh-F	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
X+2	P-I	1.0	(1.0)	(1.0)	1.0	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	1.0
	P-I(there)	x	x	x	x	x	x	x	(1.0)	x	x	x	x	x
	Do-I	1.0	1.0	(1.0)	1.0	(1.0)	1.0	0.75	1.0	(1.0)	0.71	(0.5)	1.0	0.86
	Co-I	1.0	1.0	1.0	1.0	(0.67)	0.75	1.0	1.0	0.14	1.0	0.71	(1.0)	0.8
	Co-I(there)	x	x	(1.0)	x	x	x	x	x	x	(0.0)	(1.0)	x	x
	A-I	(1.0)	(1.0)	x	x	x	x	(1.0)	x	x	(1.0)	x	(1.0)	(1.0)
	Did-I	x	x	x	(1.0)	(1.0)	(1.0)	x	(0.0)	x	(1.0)	x	x	x
X+3	Do-2	(1.0)	1.0	1.0	1.0	(1.0)	0.8	(1.0)	1.0	0.75	(1.0)	0.71	(1.0)	(1.0)
	Does-I	x	x	x	x	x	(1.0)	(0.33)	x	x	(0.0)	(1.0)	(0.0)	x
	Co-2	(1.0)	1.0	1.0	(0.0)	1.0	(1.0)	(0.0)	(0.33)	x	x	(0.0)	(1.0)	(0.0)
	Co-2(there)	(1.0)	x	x	x	x	x	(1.0)	x	x	x	x	x	x
	A-2	(1.0)	(1.0)	x	x	(1.0)	x	(1.0)	x	x	x	x	x	x
	Did-2	x	x	(1.0)	x	x	x	x	(0.0)	x	1.0	(0.5)	x	(0.0)
	Does-2	(0.0)	x	0.0	(1.0)	0.75	(1.0)	(1.0)	(0.5)	0.6	x	(0.67)	0.25	(0.67)
X+4	Ca-I	(0.0)	x	x	x	x	x	x	x	x	x	x	x	x

Note: 0: No instances of an optional rule are available.
    x: No contexts for an obligatory rule are available.
   ( ): The number of obligatory contexts is less than four.
  0.0: No application of an obligatory rule in its obligatory context is observed.

Table 3 appears to indicate that there is no difference in difficulty between N-I-I and I-I or even to show that one subject (i.e. A) has more difficulty in performing N-I-I. However, careful analysis of the data considering the result of the implicational analysis in Table 4 reveals that this is rather misleading. We will return to this point later.

At first sight, Table 4 may show that there is no clear implicational relationship among the stages and that all the subjects have reached Stage X + 3 although the structures at Stage X + 3 tend to obtain lower scores thus indicating relative difficulty of them. A closer examination of the data, however, enables us to place two subjects (H and J) at Stage X + 2.

Firstly, it has to be stated that of the 56 instances of correct application of Do-2 produced by all of our subjects, only 3 did not have a 'Wh-pronoun do you + VP?' structure (e.g. F-2.3. What do you want?) and that of all the 4 cases of non-application of Do-2, 3 had a subject other than 'you' (e.g. M-1.9. Why is the

children cry?).8) Therefore, presumably, the Wh-pronoun do you + VP? structures were used as 'patterns' and did not represent true instances of Do-2, which required complex sentence-internal operations. Thus, the high scores of Do-2 compared with other structures at Stage X + 3 in Table 4 should not be seen as evidence for that stage unless its instances include ones which do not have the Wh-prounoun do you + VP? patterns. As far as the instances of Do-2 in the two subjects' interlanguages were concerned, they all had the Wh-pronoun do you + VP? patterns.

Likewise, all of the other instances provided by subjects H and J which seemed to be evidence for Stage X + 3 might have been produced as patterns. We would regarded H-1.1. Why is he running? and H-2.8. What are you going to be? as a 'Wh-pronoun is he/she/it + VP?' and a 'Wh-pronoun are you + VP?' pattern respectively and H-1.9. Which does he like better, tea or coffee?, J-1.1. Where does she go? and J-1.5. Which does he get the train? as 'Wh-pronoun does he/she/it + VP?' patterns. The fact that these structures tended to be used more correctly and were sometimes even overused not only by the two subjects but also by others (e.g. A-2.6. What is it want now?, K-2.10. What are you do for living? and J-1.2. What does he crying?) lend support to the contention.

Thus, we did not find any evidence for 'productive' use of any rules at Stage X + 3 in H's and J's utterances as we did in the other subjects' (e.g. O-1.4. Why is this child crying? and K-1.7. When does train start?), concluding that the two subjects had not yet reached Stage X + 3.

It is not clear whether our subjects had reached Stage X + 4 because of few instances of Ca-I. However, the fact that the only two obligatory contexts for Ca-I, in which no rule-application was observed, were produced by B (i.e. B-3.6. Do you think have I ever seen it? and B-3.7. Do you think where have I seen their?), who was one of the most advanced learners of our subjects, might suggest that they had not.9)

Therefore, it can possibly be concluded that the developmental stages for English interrogatives, originally proposed by Pienemann and Johnston and later modified and expanded by us were supported. It should be recognized, however, that due to the similarities of the subjects' level, the finding was limited to the implicational relationship among Stage X + 2, X + 3 and X + 4 at most.

Another important finding in the present study is related to

one of the problems with the MD Model (see Inagaki, 1992, this volume), which is also present in Table 4. The problem is that if the learners had reached Stage X + 2 or X + 3, why did they still produce some instances of the rules at lower stages, especially those of the optional rules which were ungrammatical seen from the target language standard (i.e. SVO?, There+be-?, Do-F and Co-F)? One notable example was subject A, who was placed at Stage X + 3, but still produced as many as five instances of SVO? and one instance of Do-F. The ZISA group's researchers relate this kind of phenomena to the concept of 'learner's orientation' (e.g. Pienemann et al., 1988). That is, 'simplifying' learners (those who prefer communicative efficacy to accuracy) tend to apply the processing operations they are capable of to a restricted number of linguistic contexts thus leaving some 'gaps' when move to a new stage. On the other hand, 'norm-oriented' learners prefer accuracy rather than efficient communication and try to apply the processing operations they acquired to every possible context. It is interesting to note that this explanation fits well to subject A, who seems quite advanced developmentally but still leaves a number of gaps as well as uses SVO? quite often. It seems plausible that subject A's five instances of SVO? were related to her orientation toward 'simplifying'. In other words, she could have possibley inverted the SVO? sentences but still adhered to SVO? perhaps to reduce the processing demands (e.g. Meisel et al., 1981) and thus obtaining communicative efficiency.10) From this observation, we, although tentatively, hypothesized that the use of SVO? (and possibly There+be-?) by the learners who were shown to have reached the stages higher than X reflected their orientation toward 'simplifying'. We could also find some indication that the use of SW was also related to 'simplifying'. That is, subjects N, M and J, each of whom provided a number of SWs, had two instances of SVO? (M and J) or one instance of both SVO? and There+be-? (N).11)

Coming back to Table 3, the point stated above suggests that all the instances of non-application of N-I-I (resulting in SVO?) were possibly the products of 'simplifying' orientation since our subjects had all reached Stage X + 2 or X + 3. On the other hand, the non-applications of I-I may have resulted from the processing demands it had since the learners who produced them (i.e. B, C, H, J and M) more or less had difficulty in applying the rules at Stage X + 3, where I-I was made possible. Thus, as the MD Model predicts, I-I seems to be more difficult than N-I-I despite the

surfaced similarity between the two shown in Table 3.12)

However, it has to be pointed out that the subjects performed
N-I-I and I-I most of the times and most of their errors were
concerned with agreement of 'do'/copula and main verb (e.g. M-1.5.
What does the man doing? and E-1.6. Where is the train go?) or
less commonly, that of 'do' and subject (e.g. M-1.8. Where does
the parents go? and H-3.6. Where do it sell?) in I-I. This may
indicate that the subjects were fairly aware of the inversion
rules of interrogatives perhaps due to the instruction they had
received in class but that the operations involved in I-I with
agreement were highly complex. 13)

6. Conclusions and Suggestions for Future Research

In conclusion, the present study was perhaps significant in
that it modified and expanded Pienemann and Johnston's
developmental stages for ESL interrogatives and that it showed
that at least in the domain of interrogatives, the 'universal'
speech processing constraints proposed by the MD Model might be
applicable to Japanese junior and senior high school students
learning English in a classroom environment. However, as has been
pointed out, it had several limitations and any strong claim is
not yet warranted (see Inagaki, 1992 for details). Therefore, the
following types of research need to be conducted in future:
1) More confirmatory studies to examine whether the modified and
   expanded developmental stages for English interrogatives are
   valid. Such studies ought to include more elementary learners
   and are hopefully longitudinal. Some kind of techniques for
   identifying 'patterns' systematically and filling the 'gaps'
   should also be devised.
2) More studies to closely investigate the relationship between
   instruction and the modified developmental stages.
3) More studies to examine the developmental stages for other
   grammatical structures predicted by Pienemann and Johnston.
   Such studies should also consider the points stated in 1) and
   2) above.
   Finally, it is only hoped that the present study has provided
some guidelines or a framework for conducting the types of studies
suggested above.

Notes
1) This paper is based on Chapters 3 and 4 of Inagaki (1992).
2) See Inagaki (1992) for the reasons for the focus on English

interrogatives.

3) To ensure that the data obtained really reflected our subjects'
'natural' speech and also that the subjects were true classroom
learners with little input outside the classroom, we conducted a
questionnaire immediately after each session. As a result, two of
the subjects (i.e. one third-year student in junior high school
and one first-year student in high school), who took longer time
to finish the tasks and had full of hedges and self-corrections,
were found to have been extremely grammar-conscious during their
sessions. Thus, their data were excluded from the subsequent
analysis. All of the subjects were found to be classroom learners
with minimal contact with English-speaking people outside the
classroom and a maximum of one-month stay in an English-speaking
country.

4) The result of the initial analysis is reported in Inagaki
(1991).

5) Space precludes further discussion of each rule and why it is
placed at a certain stage (see Inagaki, 1992 for such discussion).
It should be noted, however, all the rules are devised and placed
at their stages according to the speech processing demands they
have on the learners (see Pienemann et al., 1988; Inagaki, 1992,
this volume).

6) When the subject corrected his utterance (e.g. I have it, too?
(eh) Do I have it, too?), the first utterance was used for the
analysis since we regarded it as more 'natural'.

7) Still, 15 utterances were excluded from the analysis due to the
difficulty of their identifications from the perspective of the
proposed rules (e.g. How many people in the picture?).

8) The alphabet at the begining of an instance indicates the
subject number. The second number refers to the kind of task
performed and the last one shows when the instance was provided.
For example, F-2.3. means the third question asked in Task 2 by
subject F.

9) It is not clear whether eight of our subjects, who were third-
year students in junior high school had had instruction in Ca-I,
while the others had. If they had not, it must have been the
reason that they did not produce any obligatory contexts for Ca-I.

10) All of her instances of SVO? had a copula (e.g. A-3.6. Its
color is white only?) and the fact that she actually produced one
instance of Co-I (A-3.7. Is it chalk?) lends support to this
claim.

11) It could further be speculated, although this was not clear in

this study, that the use of D-F and Co-F by leaners at Stage X + 2 or above might also be related to 'simplifying' orientation.

12) Attributing the instances of lower stages (e.g. SVO?) and the 'gaps' that our subjects produced to 'learner's orientation', however, is not enough to really support the modified developmental stages. As for the former, it should be shown, for example, that the learners who produced SVO? could potentially give inversion to it, which was, luckily enough, apparent in Table 4. With regard to the latter, it ought to have been shown that the rules that the subjects did not produce could in fact be used by them if their obligatory contexts were present or otherwise if they were taught them (this (teaching) was done by Pienemann, 1987 cited in Pienemann et al., 1988).

13) See Inagaki (1992) for the discussion about the use of each rule. Briefly, it was found that there might be a varying degree of difficulty even among the rules at the same stages and that 'patterns' seemed to have been used extensively (e.g. 'Wh-pronoun is X?' (e.g. F-1.2. Who is that man?), 'Do you + VP?' (e.g. B-3.3. Do you like it?) and 'Wh-pronoun do you + VP?' (e.g. G-2.5. What do you want?)).

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Appendix: The Picture Used for *Task 1* (Heaton, 1975: 6)