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Introduction

Over the past several years, a great deal of attention in applied linguistics research has been directed toward factors believed to play a role in successful second language acquisition. Among the factors which have been subject to investigation, from age to aptitude to acculturation, none has had a greater impact on second language research than that of input to the learner. Research on input conditions has broadened the horizons of second language research from an interest in interlanguage production as a manifestation of processes taking place within the learner to a concern for the learner's linguistic environment and its role in facilitating these processes.

The primary motivation for input research has been the belief that availability of the target language in the learner's linguistic environment is not in itself a sufficient condition for second language acquisition. What seems essential is not merely that target language input be present, but also that the learner understand it. As Corder

(1967) originally pointed out, and has been underlined by Krashen's Input Hypothesis (1980), spoken input must be comprehended if it is to assist the acquisition process.

Guided by this theoretical perspective, much current second language research has focused on identifying what makes input comprehensible to the learner (see, e.g., Blau 1980, Chaudron 1983, 1985, Johnson 1981, Krashen 1980, 1982, Long 1985). The research to be reported below represents a further effort in this area. This is the pilot study of a larger project on second language comprehension under two conditions, both of which have been shown empirically to be widely available in the learner's linguistic environment.

Two Input Conditions Available to L2 Learners

The first condition is characterized by the availability of samples of target input which have been modified *a priori* toward greater semantic redundancy and transparency and less complex syntax. This has been established in studies which have collected actual and intuitive data on speech addressed to non-native speakers (See reviews by Long 1980 and 1983) and also within a pedagogical framework in the simplification of spoken and written materials for language learning (See Honeyfield 1977, and Phillips and Shettlesworth 1975 for critical perspectives in this area). Modifications of input include repetition and paraphrase of linguistic constituents, restriction of lexis to more common and familiar items, addition of clause boundary markers, and reduction in number of embedded and dependent clauses. Figure 1 provides examples of modified input in several of these areas.

Figure 1

Modifications of Linguistic Features in

Input Directions for Assembly Task

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(1) QUANTITY: Increase in the number of words per direction

Baseline: Moving to the top right corner, place the two mushrooms with the three yellow dots in that grass patch, down toward the road. (23 words)

Modified: Move to the top right corner. Take the two mushrooms with the three yellow dots. Put the two mushrooms on the grass. Put the two mushrooms on the grass near the road. (32 words)

(2) REDUNDANCY: Increase in repetition

-Exact/Partial

Baseline: Place the two mushrooms with the three yellow dots in that grass patch, down towards the road. (0 repetitions)

Modified: Take the two mushrooms with the three yellow dots. Put the two mushrooms on the grass. Put the two mushrooms on the grass near the road. (2 repetitions)

-Semantic/Paraphrase:

Baseline: Place the one piece with the two trees right at the edge of the water. (0 repetitions)

Modified: Put the two trees at the top of the water. Put the two trees above the water. (1+1 repetitions)

(3)COMPLEXITY: Reduction in the number of s-nodes per T-unit

Baseline: In the center of the crossroads, right where the three meet, put the dog in the - in the carriage. (2 s-nodes per T-unit)

Modified: Put the dog in the middle of the three roads. (1 s-node per T-unit)

The second condition is characterized by the availability of opportunities for non-native speakers to interact with the native speaker, bringing about modification and restructuring of the interaction by both interlocutors in order to arrive at mutual understanding. Historically, this second condition has been found outside instructional contexts, but recently, through interactive pedagogical techniques such as conversation games, role plays and simulations, it has become available in the classroom as well (See Brumfit & Johnson 1979 and Johnson & Morrow 1981). Modified interaction is a frequent outcome of conversational moves which request input clarification or repetition, seek input confirmation, or check on input comprehensibility. Examples of such moves, labeled and operationalized by Long (1980) as confirmation and comprehension checks and clarification requests, appear in Figure 2.

Figure 2

Modifications of Conversational Features in NS-NNS Conversations

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Clarification Requests

Moves by which one speaker seeks assistance in understanding the other speaker's preceding utterance through questions (including wh-, yes-no, rising intonation, or tag) or statements such as I don't understand, or Please repeat.

NS	NNS
ok the one mushroom is below	
	b'low?
below not: it's below	
	what's b'low?
this is above, and this is below	
	b'low
below mhm	
	yes

(3.110-122)

Confirmation checks

Moves by which one speaker seeks confirmation of the other's preceding message through repetition, with rising intonation, of all or part of the message.

NS	NNS
in the center of the crossroads right where the three meet place the dog in the carriage	
	the dog?
mhm	
	in the in the carriage?
in the carriage	
	(12.73-83)

Comprehension checks

Moves through which one speaker attempts to determine whether the other speaker has understood a preceding message

NS	NNS
ok ok moving down to the right place the bumble bee in the girl's hair know which one the bumble bee is?	
	bumble bees?
mhm it's a bug, it's a little yellow bug it goes zzz. that one	
	(8.206-215)

Purpose of the Research

The purpose of the present research was to compare the effects of these two conditions on NNSs' comprehension of input. Under the first condition, the input provided to the NNSs was linguistically modified *a priori*, and there were no opportunities for interaction with the NS providing the input. Under the second condition, the input was not adjusted linguistically; however, the NNSs had opportunities to interact with the NS.

In focusing on these two conditions, this pilot study both continues work already undertaken on input comprehension and, it is hoped, breaks new ground. The claim that input modifications, in themselves, promote comprehension, has already received considerable support. Recent investigations have shown that NNSs achieve more comprehension of information in linguistically modified texts or lecturettes than in their unmodified versions (e.g., Blau 1980, Chaudron 1983, 1985, Johnson 1981, and Long 1985).

In the present research, it was assumed that there would be confirmation of this result among those NNSs who heard linguistically modified input. It was also predicted, however, that the other NNS subjects--those who heard unmodified input but who were given opportunities to interact with the native speaker--would achieve even greater understanding through such interaction. This prediction was based on current theoretical and empirical perspectives on the role of interaction in second language comprehension. Researchers,

particularly, Hatch (1983) and Long (1980 et passim), have proposed that, in the course of interaction, learners and their interlocutors negotiate for message meaning, i.e., they modify and restructure their interaction in order to reach mutual understanding. As a result of such negotiation, learners come to comprehend L2 words and grammatical structures beyond their current level of linguistic competence, and, ultimately, incorporate these items into their own spontaneous productions. Thus, comprehension of L2 input is claimed to be a necessary condition for successful second language acquisition, but interaction, or as Long has stated more specifically, interactional modification, is believed to be the key factor leading to input comprehensibility.

It was therefore predicted that, in themselves, interactional modifications would give rise to whatever input modifications were necessary for the NNSs in the study to understand their interlocutors. For example, when in the course of the interaction the NNSs sought confirmation or clarification of unfamiliar input, or responded to the NS's checks on input comprehensibility, it was believed that the NS would respond by repeating, reducing, or expanding this linguistic material until the NNS could understand it. As demonstrated by the research data in Figure 2, NNSs' requests for clarification and confirmation of native input and NNSs' responses to the NS interlocutor's checks on comprehensibility bring about restructuring of interaction and adjustment of input until understanding is achieved. The present study has sought to measure the effects of such restructuring of interaction on comprehension. In this respect, it is

the first study which has attempted to quantify these kinds of data in order to demonstrate empirically that interactional modification leads to input comprehension.

Research Design: Methods and Procedures

In this study, input comprehension was measured by the performance of nine adult English language learners when following the directions to an assembly task.

The Task

The assembly task required subjects to position 15 items, given one at a time, in designated places on a small background board, illustrated with an outdoor scene. Individual items to be placed included a variety of plant, animal, and human cartoon-like figures, each of which shared at least one feature with one other item in terms of shape, color, or size. The assembly board was illustrated with scenery, including similar cartoon-like figures, and landmarks such as ponds, patches of grass, a skyline, roads and vehicles, and outdoor objects. Each direction included a description of both the item to be placed and the placement site. The purpose of the task was to serve as an authentic context for interaction while providing a valid measure of listening comprehension.

Two versions of the directions to the assembly task were developed to measure listening comprehension under the two experimental conditions. NS-NS interaction on the task was first transcribed and used as the baseline version of the directions. Linguistic

modifications of the baseline script were then carried out to create the premodified lecturette version of the directions. Table 1 provides a quantified comparison of the linguistic features in the baseline and linguistically modified versions of the direction-giving script.

Table 1

Comparison of Three Linguistic Features in Baseline, Premodified, and Interactionally Modified Input

	QUANTITY in words per direction	REDUNDANCY in repetitions per direction	COMPLEXITY in s-nodes per T-unit
Baseline input	16.47	0.20	1.20
Premodified input	33.47	2.62	1.02
Interactionally modified input	61.58	12.92	1.28
In comparison to baseline data:			
(1) Premodified input is...	twice as much	13 times more redundant	less complex
(2) Interactionally modified input is...	four times as much	65 times more redundant	slightly more complex

The pre-modified lecturette was pre-tested on 10 native English speakers, who demonstrated 100 percent accuracy on all items. The same lecturette was then given to 25 non-native English speakers of low intermediate proficiency. Based on their performance on the task, fifteen of the most discriminating items (those with an item discrimination index of .20 or better) were chosen for use in the present study. Kuder-Richardson 21 item reliability of the non-native pre-test was .83, indicating that the test was a reliable measure of listening comprehension.

Subjects

The nine NNS subjects in this study, all adults, represented a variety of native language backgrounds, including French, Spanish, Portuguese, Chinese, Japanese, and Korean. All were enrolled in pre-academic, low-intermediate ESL classes. They were assigned randomly to one of the experimental conditions.

Data Collection

Using the two versions of the task directions, data were collected under Conditions (1) and (2). Under Condition 1, labelled as the Pre-Modified Input Condition, the subjects heard the linguistically adjusted script read by a female native speaker, but were not allowed to interact with her. The subject and the native speaker sat back-to-back, and each was given the assembly task board and the items to be placed.

Under Condition (2), called the Interactionally-Modified Input Condition, the directions, provided by the same female native speaker, were read from the baseline input script. However, the subject and the NS were positioned face-to-face and prior to the start of the task, the subject was encouraged to seek verbal assistance from the NS for any difficulties in following the directions. In addition, the NS was instructed to monitor the NNS's comprehension throughout the task. To insure that the outcome of the task would be based on this kind of verbal interaction only, a screen separated the interactants so that the NS could neither see nor participate in the physical selection and placement of items. To maintain the interactive format, the screen covered only the assembly area, allowing the interlocutors to see each other's faces.

Under both conditions, comprehension was measured by the percentage of items in the assembly task which the learner, following the NS's instructions, selected accurately and placed in the correct position. One point each was given for selection and placement of each item. The data collection under both conditions was video- and audiotaped and transcriptions were made for detailed analysis of the data.

Hypotheses

In attempting to answer the research question, "Do interactional modifications make input comprehensible?", two hypotheses were formed. Based on current claims from SLA theory and on observational evidence from informal review of NS-NNS conversations, it was predicted that:

(1)Triggered by interactional modifications, the same kinds of linguistic adjustments that were put into the pre-modified input in Condition (1) would arise spontaneously during the interaction of Condition (2). Among these would be repetitions, paraphrase, lexical and syntactic simplification--in short, any linguistic modifications which would make the linguistic content of the directions more redundant, transparent, manageable, and by implication, comprehensible to the NNSs.

(2) The NNSs in Condition (2), who heard an initially unmodified text of directions, but were allowed to request and respond to assistance in completing the assembly task would show greater comprehension of directions to the task than those subjects in Condition (1), who had heard the linguistically premodified version, without such interaction.

Results and Discussion

Some support was found for both hypotheses tested in this pilot study. However, since only nine NNSs participated in the research, firm conclusions must await additional evidence. Further data collection is underway in order to provide a larger data base from which to seek empirical support for theoretical claims regarding the effects of interactional modification on second language comprehension.

Hypothesis 1

In support of the first hypothesis, it was found that opportunities for the NS and NNSs in Condition (2) to interact during completion of the assembly task resulted in linguistic modifications to the directions which were qualitatively comparable to and quantitatively more numerous than those linguistic modifications which had been built into the text of directions for Condition (1).

Table 1 provides a breakdown of linguistic features of the original, baseline input, the linguistically modified version used as premodified input in Condition (1), and the linguistic modifications which resulted from the interaction in Condition (2). These results have been categorized in terms of Quantity, Redundancy, and Complexity of the input.

Quantity of Input: Modification of the baseline data resulted in twice as many words per direction and, as a result of interaction, an average of four times as many words were produced. Thus, as predicted, interaction triggered even more words per direction than had been built into the premodified directions.

Input Redundancy: This category showed even greater differences between the three kinds of input, with 13 times more repetitions per direction in the premodified input and 65 times as many as a result of interaction.

Input Complexity: By design, modification of the baseline text for

use as premodified input in Condition (1) reduced the number of s-nodes per T-unit in this version (1.02 s-nodes/T-unit in the premodified input vs. 1.20 in baseline). However, the prediction that interaction would also lead to less input complexity was not supported by the results. Instead, interaction led to relatively more complex input (1.28 s-nodes per T-unit). These fractional differences in complexity seem quite small; however, when considered in light of the range of complexity in all three versions of the input, i.e., one to two s-nodes, the .26 differential between the premodified and interactionally modified input turns out to be fairly substantial.

Overall, then, input modified through interaction was, as predicted, more plentiful and more redundant than the pre-modified input. However, contrary to the original prediction, interaction led to more complex input.

Hypothesis 2

The second hypothesis was also supported by results of the present study. As shown in Table 2, overall scores, based on accuracy of selection and placement of task items for the 15 directions, indicated that subjects from the interactive group showed greater comprehension than the group given no opportunities for interaction. This result was statistically significant for the selection portion of the task. Mean scores were also higher for the interactive group on the placement portion of the task; however, one of the subjects in this condition, Subject 12, performed poorly on placement (although comparably on selection) compared with the rest of his group. This caused so much

variation in the findings on the placement part of the task that even though the interactive group performed about 18 percent better than their non-interactive counterparts, this result did not reach statistical significance.

Table 2

The Effects of Interaction on Comprehension of Direction in the Assembly Task

	Mean Selection Score	Mean Placement Score	Mean Combined Score
Condition 1: (+Premodified input -Interaction)	79% (11.80)	60% (9.00)	69% (20.80)
Condition 2: (-Premodified input +Interaction)	93% (14.00)	78% (11.75)	86% (25.75)
Difference in mean score attributable to interaction	15% (2.20)	18% (2.75)	16% (4.95)
t-value	3.20	1.15	1.17
p (significance level of difference for one-tailed t-test. df=11)	<.005	N.s.	N.s.

An item analysis indicated a fair degree of confidence on all but two items. The K-R 21 Reliability Coefficient for the test on the whole was .76.[2] All items were shown to discriminate at about the .3 level except for the two which had negative discrimination indices.

Additional Analyses of Individual Directions

Of the 15 individual directions on the test, there were four directions which showed a highly facilitating effect for interactional modification on comprehension of input, and four which showed an apparent negative effect: On Directions 1, 8, 11, and 15, subjects in Condition (2) showed greater comprehension than subjects in Condition (1). However, on Directions 3, 6, 13, and 14, the Condition (1) subjects displayed the same amount of comprehension as subjects in Condition (2) or actually had higher scores. This information is indicated in Table 3.

Table 3

Differences Between Condition 2 and Condition 1 Groups' Mean Scores

On Each Direction in the Assembly Task

Scoring criterion:	Selection	Placement	Combined score	
Direction 11	60%	60%	60%	Greatest
Direction 8	40%	75%	58%	positive
Direction 1	40%	60%	50%	effect
Direction 15	60%	35%	48%	of interaction
Direction 9	20%	55%	38%	
Direction 5	0%	60%	30%	
Direction 7	0%	40%	20%	
Direction 2	20%	10%	15%	
Direction 4	10%	0%	5%	
Direction 14	0%	-5%	-3%	Apparent
Direction 12 (*)	-30%	15%	-8%	negative
Direction 13	0%	-25%	-13%	effect
Direction 3	0%	-25%	-13%	of
Direction 6	0%	-30%	-15%	interaction
Direction 10 (*)	0%	-50%	-25%	

NOTES: Directions are ordered according to the size of the difference between the total comprehension scores of the Condition 2 and Condition 1 groups.

(*) Directions 10 and 12 have negative coefficients of discrimination and thus should not be relied upon to give accurate information regarding differences of comprehension between the two groups.

comparison was made of linguistic modifications in these directions in order to determine which input features modified through interaction contributed most to comprehension. As shown in Table 4, on those directions where interaction produced the greatest difference in comprehension between subjects in the two conditions, there was also a large and significant difference in the quantity of input which the two groups received (87.94 words per direction for Condition (2) vs. 34.75 for Condition (1)). However, this difference was not so large on those directions where interaction did not make a difference in comprehension (53.06 words per direction for Condition (2) and 31.00 for Condition (1)).

Similarly, with regard to the redundancy in the input which the subjects received, there was a significant difference between the two groups, i.e., on those directions in which interaction brought about an increase in comprehension, there was also a significant increase in the mean number of repetitions per direction. Condition (2) subjects heard an average of 13.38 repeated words per direction while Condition (1) subjects heard 4.25, a difference of 9.13 repetitions per direction. This differential was not as large on those directions for which interaction did not have a positive effect. Here, there was only a difference of 3.81 repetitions per direction between the two groups.

Unlike the great differences in quantity and redundancy of input which were found between the two groups on those directions with a high position effect for interaction, minimal differences were seen in the complexity of the input which both groups received on directions with

either facilitating or negative effects for interaction on comprehension. The difference in means of s-nodes per T-unit for the two groups on those directions which showed the greatest positive effect for interaction was 0.16, while this difference for those directions with an apparent negative effect for interaction was a comparable 0.15. Along with the overall result of this study, these detailed analyses suggest that quantity and redundancy of input aid the learner's comprehension, but that complexity may not be a critical factor.

One final comparison of those directions which showed the most facilitating effect and those with an apparent negative effect on comprehension indicated differences among them in the number of interactional adjustments such as confirmation and comprehension checks and clarification requests. Previous studies comparing effects of modified and unmodified input on comprehension have restricted themselves to consideration of features of input but not interaction, focusing only on linguistic features such as T-unit complexity in s-nodes, number of words, and number of repetitions. The present research has drawn attention also to the relationship between facilitation of input comprehension and modifications in the structure of subjects' interactions with the NS. It was found that on those directions in which the greatest amount of comprehension was shown, there were also significantly more modifications of interactional structure. As indicated in Table 4, there were an average of 5.00 NS-NNS interactional modifications on those directions which showed the greatest positive effect for comprehension vs. 3.25 on those

directions on which interaction did not have as high an effect on comprehension.

Table 4

Features of NS Input Modified Through Interaction

Which Contribute Most to Comprehension

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1 LINGUISTIC FEATURE ADJUSTMENTS

1.1 Quantity - measured in words per direction

	Mean for Condition 2 Group	Mean for Condition 1 Group	Difference of Means
Directions 1,8,11,15	87.94	34.75	53.19
Directions 3,6,13,14	53.06	31.00	22.06

(t=2.24; df=6; p<.05)

1.2 Redundancy - measured in repetitions per direction

	Mean for Condition 2 Group	Mean for Condition 1 Group	Difference of Means
Directions 1,8,11,15	13.38	4.25	9.13
Directions 3,6,13,14	9.31	5.50	3.81

(t=2.10; df=6; p<.05)

1.3 Complexity - measured in s-nodes per T-unit

	Mean for Condition 2 Group	Mean for Condition 1 Group	Difference of Means
Directions 1,8,11,15	1.16	1.00	0.16
Directions 3,6,13,14	1.15	1.00	0.15

2 CONVERSATIONAL FEATURE ADJUSTMENTS

Measured by the total number of clarification requests, confirmation checks, and comprehension checks per direction

	Mean for Condition 2 Group
Directions 1,8,11,15	5.00
Directions 3,6,13,14	3.25

(t=1.47; df=6; p<.1)

Overview

This pilot study, though limited to nine NNSs of English, has indicated that interaction generated a larger quantity of input and greater redundancy of input, both of which helped to make a linguistically complex version of directions more comprehensible than those given without interaction, as a premodified text. Questions remain regarding the mechanism by which these input modifications are brought about during the course of interaction. It appears from the present analysis that interactional adjustments such as comprehension and confirmation checks and clarification requests may be the means by which input is repeated or reworded until understanding is reached.

Additional data are currently being gathered to generate more support for these first attempts at demonstrating empirically that interaction facilitates input comprehension and to determine the effects of specific input and interactional features on this process. It is hoped that these findings will contribute to second language acquisition theory and provide a framework for the development of learning materials and instructional techniques.

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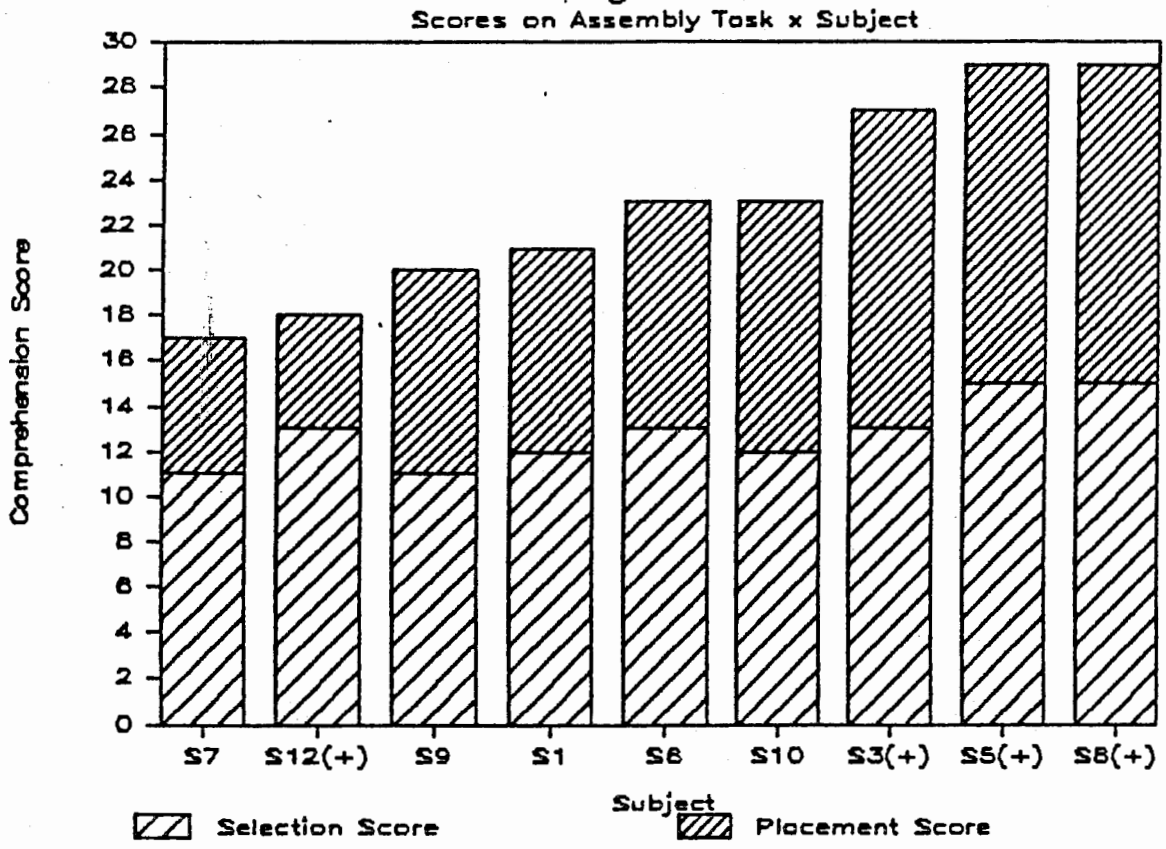
1. This article is a revised version of a paper presented at the 1985 TESOL Summer Meeting, Georgetown University, Washington, D.C., July 13-14, 1985. The research reported in the article was funded by a grant from the University of Pennsylvania Research Foundation.

2. This figure is slightly lower than that of the pre-test (.83) due to the fact that there were fewer items on this version.

Figure 3



NOTES: Subjects S1, S6, S7, S9, and S10 performed the task under Condition 1 (+ Premodified input, - Interaction).

Subjects S3, S5, S8, and S12 performed the task under Condition 2 (- Premodified input, + Interaction). These subjects are indicated with a (+) sign in the figure.

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