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THE STRATEGY OF THE TOTAL PHYSICAL RESPONSE--AN APPLICATION TO LEARNING JAPANESE.

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AN EXPERIMENT WAS DEVISED TO TEST ASHER'S HYPOTHESIS OF A TOTAL PHYSICAL RESPONSE, WHICH STATES THAT LISTENING COMPREHENSION FOR A FOREIGN LANGUAGE CAN BE ACCELERATED IF STUDENTS ARE REQUIRED TO EMIT A RESPONSE WITH THE ENTIRE BODY. THE SUBJECTS WERE 88 COLLEGE STUDENTS WHO HAD NO PRIOR KNOWLEDGE OF JAPANESE, NO FLUENCY IN A LANGUAGE OTHER THAN ENGLISH, AND WHO WERE NOT LANGUAGE MAJORS IN COLLEGE. THE 67 WHO COMPLETED THE TRAINING WERE HOMOGENEOUS IN LANGUAGE-LEARNING ABILITY, AS EVIDENCED BY TESTS GIVEN BEFORE THE STUDY. THE EXPERIMENTAL GROUP WAS INSTRUCTED THAT A VOICE ON A TAPE WOULD GIVE A COMMAND IN JAPANESE. WHEN THE SUBJECTS HEARD THE UTTERANCE, THEY WERE TO IMITATE THE ACTIONS OF THE INSTRUCTOR IN THE CLASSROOM. THE THREE CONTROL GROUPS LISTENED TO THE SAME COMMANDS BUT RESPONDED BY (1) WATCHING THE INSTRUCTOR, (2) LISTENING TO AN ENGLISH TRANSLATION, AND (3) READING AN ENGLISH TRANSLATION. THE RETENTION OF THE EXPERIMENTAL GROUP TENDED TO BE HIGH AND SIGNIFICANTLY BETTER THAN THAT OF THE CONTROL GROUPS. THE RESULTS ALSO INDICATED THAT THIS STRATEGY PERMITS THE STUDENT TO HAVE EXTREMELY HIGH LISTENING COMPREHENSION FOR NOVEL UTTERANCES, WHICH HAS IMPORTANT IMPLICATIONS FOR LANGUAGE LEARNING. THIS ARTICLE IS PUBLISHED IN THE "INTERNATIONAL REVIEW OF APPLIED LINGUSITICS," VOLUME 3, NUMBER 4, 1965. (KL)

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THE STRATEGY OF THE TOTAL PHYSICAL RESPONSE: AN APPLICATION TO LEARNING JAPANESE

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THE STRATEGY OF THE TOTAL PHYSICAL RESPONSE: AN APPLICATION TO LEARNING JAPANESE

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Il s'agit d'une expérience destinée à mettre à l'épreuve l'hypothèse de la *réponse physique globale,* aux termes de laquelle la compréhension auditive d'une langue étrangère serait accélérée si les étudiants étaient appelés à donner une réponse impliquant le corps entier. Sur un mot de commande, les étudiants imitaient le professeur en exécutant le geste ou mouvement approprié. Pendant vingt minutes la complexité morphologique et syntaxique de ces phrases fut progressivement augmentée, pour aboutir à des commandes relativement longues.

On a comparé la rétention de ces phrases constatée chez le groupe expérimental, qui avait répondu au japonais par des mouvements, à celle constatée chez trois groupes de contrôle, qui les avaient apprises par des méthodes plus traditionnelles.

La rétention constatée chez le groupe expérimental était extrêmement bonne et nettement supérieure à celle des groupes de contrôle. Certaines implications de ces résultats pour l'apprentissage des langues sont discutées.

Im folgenden Artikel handelt es sich um ein Experiment, das die Hypothese der „gesamt-physikalischen Antwort" bestätigen sollte, d.h., daß das auditive Auffassungsvermögen einer Fremdsprache beschleunigt wird, wenn die Schüler zu einer den ganzen Körper ansprechenden Antwort aufgefordert werden. Auf ein Kommandowort ahmten die Schüler den Lehrer nach, indem sie die entsprechenden Gesten und Bewegungen ausführten. Innerhalb von 20 Minuten wurde die morphologische und syntaktische Kompliziertheit fortlaufend gesteigert, um schließlich zu relativ langen Kommandos zu führen.

Die Gedächtnisleistung, die auf diese Kommandosätze bei der Experimentgruppe (physische Bewegung als Antwort auf das gehörte Japanisch) festgestellt wurde, wurde verglichen mit der der drei Kontrollgruppen, die dieselben Sätze nach mehr konventionellen Methoden gelernt hatte. Die Gedächtnisleistung der Experimentgruppe war außergewöhnlich gut und einwandfrei der der Kontrollgruppen überlegen. Einige Konsequenzen dieser Ergebnisse für das Erlernen einer Fremdsprache werden diskutiert.

Asher (1964a) has published a theoretical paper describing a method of learning which he called the *strategy of the total physical response.* In that article, Asher reported pilot studies in which subjects showed unusually long-term retention

[1]) The experiment reported in this article was from a master's thesis written by the first author and directed by the second one at the Child Research Center of San Jose State College.

The first author is now in a doctoral program at Stanford University; the second one is professor of psychology at San Jose State College.

for Japanese when they listened to the Japanese and then were required to make a total physical response. For example, the subjects heard *tate* and immediately stood up, along with the instructor; on hearing *anke,* they walked forward. Other commands were *tobe* (jump), *maware* (turn), *kagame* (squat) and *hashire* (run). The training began with brief one-word utterances, but within thirty minutes the morphological and syntactical complexity was increased to the level illustrated by the following utterances:

Isu kara tatte, kokuban no anata no namae o kese.
Kare no namae o enpitsu de kono kami ni kake.
Sono hana o tsukue kara tori, kanojo no watase.

In these pilot studies subjects ranging in age from school children to adults showed almost perfect retention after periods of two weeks to a year. This learning technique may be seen in a 15-minute sound film entitled, "Demonstration of a New Strategy in Language Learning." The motion picture, produced by Asher, shows the complex level of Japanese structure which three 12-year-old boys were able to attain in thirty minutes of training. The film also provides a sample of retention after one year.

With the data from Asher's pilot studies as a guide, Kunihira tested the hypothesis of the total physical response under controlled conditions.

METHOD

Subjects

The subjects were 88 volunteer college students who (a) had no prior training or exposure to Japanese, (b) had no fluency in any language other than English, and (c) were not language majors in college.

These *Ss* were assigned randomly to one of four groups, with the constraint that each group comprised ten males and twelve females. Of the 88 *Ss* who began the experiment 67 completed the training.

The Modern Language Aptitude Test and a mental ability test, the American College Testing Program (ACT), administered before the study, indicated that the groups who finished the experiment were homogeneous in language-learning ability.

Procedure

Experimental (E) group. The *Ss* (N = 16) in this group were instructed that a voice on a tape would utter a command in Japanese. When the *Ss* heard the Japanese utterance, they were to do exactly what the instructor did. Also, the instructions were *not* to translate the Japanese into English, but to permit the entire body to respond as fully, automatically, and spontaneously as possible. The first command was *"tate"*, and the subjects, along with instructor, stood up. Then they heard *"anke"* and everyone walked forward. Then *"tomare"* (stop), *"kagame"* (squat), *"maware"* (turn), *"hashire"* (run), *"tobe"* (jump) and *"suware"* (sit). *Ss*

listened and physically reacted to the one-word Japanese commands for about eight minutes. An attempt was made to randomize the commands so that this was *not* a serial-learning task.

After eight minutes of training, *Ss* were individually given a retention test. Twenty-four hours later they returned, were given, again individually, a retention test and following this, 10 1/2 minutes of training with utterances which were expanded to the complexity of the following examples:

To ni aruite ike.
(Walk to the door.)

Isu ni hashitte ike.
(Run to the chair.)

Tsukue ni hashitte ike.
(Run to the desk.)

In this second training session of 10 1/2 minutes, *Ss* physically responded to about forty different utterances. After another retention test *Ss* were asked to return in twenty-four hours for the third training session.

In the third training session of 7 1/2 minutes, the complexity of the Japanese was further expanded, as these examples illustrate:

Tsukue ni aruite itte enpitsu to hon o oke.
(Walk to the desk and put down the pencil and book.)

Kami to hon to enpitsu o motte isu ni suware.
(Pick up the paper, book, and pencil, and sit on the chair.)

Mado ni hashitte itte hon o motte tsukue ni oite isu ni suware.
(Run to the window, pick up the book, put it on the desk, and then sit on the chair.)

In the third and final training period of 7 1/2 minutes, *Ss* physically responded to sixteen different utterances. All the Japanese utterances on the tape were spoken at a conversational rate of transmission. Immediately after training, there was another retention test and *Ss* were invited to return in two weeks for a final retention test.

Control group I. These *Ss* (N = 15) listened to the same tape as the experimental group, but they *did not* execute a physical response. Rather this group sat down and watched the instructor obey each Japanese command to stand, walk, jump, etc.

Control group II. *Ss* (N = 18) in this group sat down, and after listening to each Japanese command on tape they heard the English translation.

Control group III. These *Ss* (N = 18) sat down, and after listening to a Japanese command on tape, they silently read the English translation in a booklet.

Generally, in the retention tests given immediately after training, after twenty-four hours, and after two weeks, the *Ss* in the experimental group acted out their responses and *Ss* in the control group wrote their responses. The only exception

was that for part of the two-week retention test, *Ss* in the *E* group wrote their responses. The purpose of this was to evaluate whether writing would make any difference in the retention of the experimental group.

Scoring of the Retention Tests

The retention tests were scored in terms of *behavioral units.* For example, if the *S* in the experimental group heard "Isu ni hashitte itte hon o mote," he received one point for running, another point if he ran to a chair, another point if he ran to the chair on which there was a book, and a point if he picked up the book on the chair. Therefore, for the utterance "Isu ni hashitte itte hon o mote," the total possible score was four points. The same scoring procedure was used for *Ss* in the control groups except that these people wrote down the English translation for the Japanese. Table 1 shows the total number of possible points for each retention measure.

Table 1

Maximum Possible Score For Each Retention Test

Time After Training	Type of Utterances	Total Possible Score
Immediate	Single-word	16
24-hour	Single-word	16
Two weeks	Single-word I	8
Two weeks	Single-word II	8
Immediate	Short utterance	12
24-hour	Short utterance	12
Two weeks	Short utterance I	10
Two weeks	Short utterance II	7
Immediate	Long utterance	12
24-hour	Long utterance	12
Two weeks	Long utterance I	12
Two weeks	Long utterance II	15
Immediate	Novel utterance	13
Two weeks	Novel utterance	25

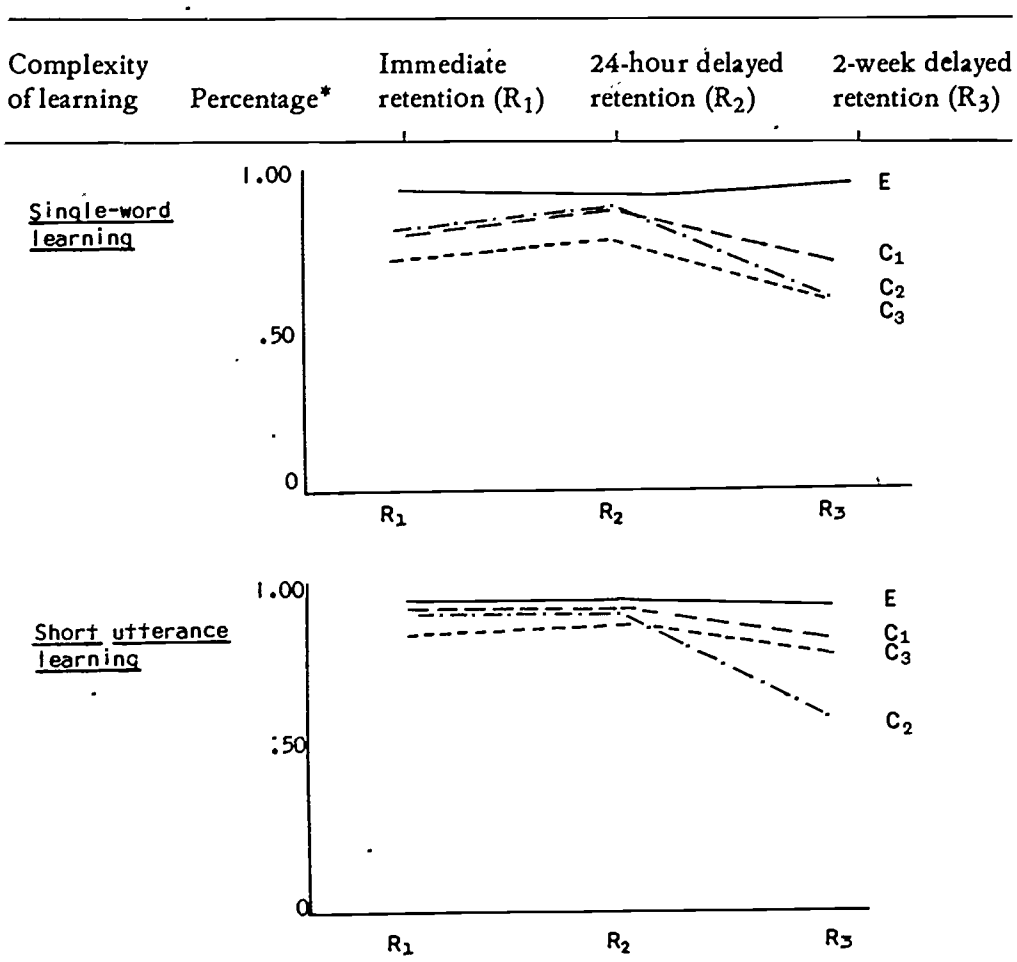
Key. For the experimental group only, I refers to retention tests in which action or physical responses were required and II refers to written responses.

RESULTS

Primary findings

The curves in Figure 1 show that whether retention was measured immediately after training, twenty-four hours later, or after two weeks, the experimental group was superior to the control groups. Not only was the experimental group's retention higher for different periods of time, but this group was also superior no matter whether the complexity of the Japanese utterances was single-words, short, long, or novel utterances[2]).

Figure 1



*) The percentage was the proportion of correct points for a group in relation to the total number of possible points of a particular retention measure.

Key.

E = Experimental Group
C_1 = Control Group I
C_2 = Control Group II
C_3 = Control Group III

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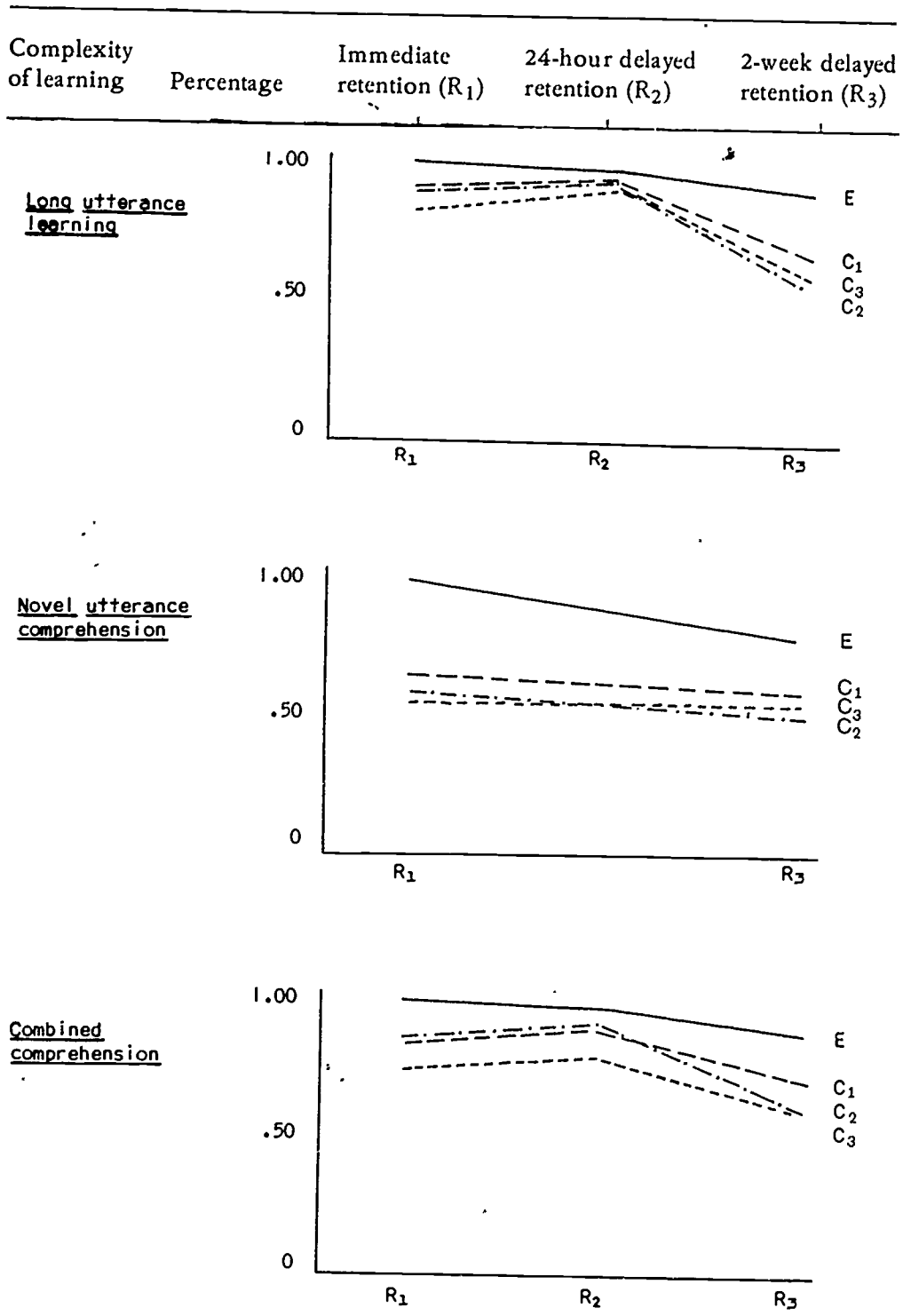
[2]) Novel utterances were recombinations of elements previously learned by *S*. The recombination resulted in a string which *S* had never heard before.

Figure 1 (cont.)



Generally, the inferences based on the curves in Figure 1 were statistically confirmed in tables 2, 3, 4, and 5. Specifically, in Table 2, for *single word utterances,* the experimental group had significantly better retention than control groups I and III, but not control group II. For *short utterances,* as seen in Table 3, the trend

Table 2

Retention of Single-Word Utterances

Groups Compared	M_1	M_2	S_1	S_2	t	Level of Significance (One-tailed test)
Experimental and Control I						
Immediate	14.37	12.46	2.27	2.64	2.16	.025
24-hour	14.75	12.86	1.48	2.74	2.40	.025
Two weeks						
Part I	7.50	6.46	.89	1.84	2.00	.05
Part II	7.50	6.86	1.09	1.50	1.34	.10
Experimental and Control II						
Immediate	14.37	14.72	2.27	1.67	.51	NS
24-hour	14.75	14.16	1.48	2.45	.82	NS
Two weeks						
Part I	7.50	6.66	.89	1.49	1.94	.05
Part II	7.50	6.88	1.09	1.23	1.52	.10
Experimental and Control III						
Immediate	14.37	10.27	2.27	4.16	3.49	.005
24-hour	14.75	10.27	1.48	4.29	3.95	.0005
Two weeks						
Part I	7.50	5.72	.89	1.84	3.51	.005
Part II	7.50	5.94	1.09	1.73	3.08	.005

Key.

M_1 refers to the mean of the experimental group and M_2 refers to the mean of a control group.

S_1 is the standard deviation of the experimental group and S_2 the standard deviation of a control group.

t is a statistic which indicates whether there would be a difference between means of two groups if the experiment were repeated many times. Generally, the larger the *t*, the higher the probability that the difference between treatments is a reliable difference.

favored the experimental group, but the differences were not significantly greater except two-weeks after training. For *long utterances,* the *t*s showing the superiority of the experimental group's retention in Table 4 were highly significant (usually beyond the .005 level) in all cases except twenty-four hours after training. For *novel utterances,* Table 5 suggests that the experimental group demonstrated a dramatic advantage that was highly significant beyond the .0005 level.

Generally, the control groups did not show significant differences in retention among themselves. Twelve of fifteen E tests were *not* significant at the .05 level.

Table 3

Retention of Short Utterances

Groups Compared	M_1	M_2	S_1	S_2	t	Level of Significance (One-tailed test)
Experimental and Control I						
Immediate	11.62	11.26	.88	.96	1.08	.20
24-hour	11.50	11.06	.89	1.38	1.04	.20
Two weeks						
Part I	9.43	8.26	1.03	2.05	2.02	.05
Part II	6.12	5.53	.95	1.59	1.26	.20
Experimental and Control II						
Immediate	11.62	11.22	.88	1.06	1.19	.20
24-hour	11.50	10.88	.89	1.52	1.40	.10
Two weeks						
Part I	9.43	5.11	1.03	2.51	6.40	.0005
Part II	6.12	5.05	.95	1.29	2.67	.01
Experimental and Control III						
Immediate	11.62	10.27	.88	2.69	1.90	.05
24-hour	11.50	10.55	.89	2.22	1.58	.10
Two weeks						
Part I	9.43	7.00	1.03	2.52	3.60	.005
Part II	6.12	5.72	.95	1.36	.98	.20

Key. See Table 2.

Table 4

Retention of Long Utterance

Groups Compared	M_1	M_2	S_1	S_2	t	Level of Significance (One-tailed test)
Experimental and Control I						
Immediate	11.81	10.73	.54	1.62	2.51	.01
24-hour	11.50	10.93	1.26	1.33	1.21	.20
Immediate (after 2nd training)	22.93	19.33	.25	3.63	3.96	.0005
Two weeks						
Part I	10.56	8.13	1.54	2.69	3.10	.005
Part II	13.31	10.46	1.84	3.64	2.77	.005
Experimental and Control II						
Immediate	11.81	10.72	.54	1.90	2.21	.025
24-hour	11.50	10.83	1.26	1.50	1.38	.10
Immediate (after 2nd training)	22.93	19.77	.25	3.13	4.02	.0005
Two weeks						
Part I	10.56	6.50	1.54	2.95	4.92	.0005
Part II	13.31	9.33	1.84	3.08	4.48	.0005
Experimental and Control III						
Immediate	11.81	9.72	.54	2.76	2.97	.005
24-hour	11.50	10.44	1.26	2.57	1.49	.10
Immediate (after 2nd training)	22.93	18.22	.25	3.73	5.03	.0005
Two weeks						
Part I	10.56	6.77	1.54	3.13	4.37	.0005
Part II	13.31	9.94	1.84	3.03	3.83	.0005

Key. See table 2.

Table 5

Groups Compared	Comprehension of Novel Utterances M_1	M_2	S_1	S_2	t	Level of Significance (One-tailed test)
Experimental and Control I						
Immediate	12.62	8.26	.71	1.48	10.50	.0005
Two weeks	19.18	14.40	2.88	4.59	3.49	.005
Experimental and Control II						
Immediate	12.62	7.27	.71	1.99	10.14	.0005
Two weeks	19.18	12.05	2.88	4.12	5.77	.0005
Experimental and Control III						
Immediate	12.62	6.88	.71	1.74	12.22	.0005
Two weeks	19.18	12.83	2.88	4.34	4.96	.0005

Key. See Table 2.

Secondary findings.

The Modern Language Aptitude Test and the mental ability measure (ACT) had almost zero-order validity coefficients for the criterion measures of the experimental group. However, the correlations were quite high, especially when the predictor was the MLAT, for each of the control groups.

A graphic analysis of the variability of each group's criterion performance indicated that only the members of the experimental group tended to cluster compactly together near the maximum score on each of the criterion measures. Probably this extreme range attenuation accounts for low validity coefficients with the predictor measures.

DISCUSSION

It is interesting that the technique of a *total physical response* demonstrated the greatest power for complex Japanese as exemplified in long utterances and novel utterances. The novel utterance is especially important because it approximates what is meant by *fluency* in a language. The desired terminal behavior in language learning is not merely the repetition of the exact corpus that has been learned. It is not enough for output to equal input. Rather, fluency means that the student can generate novelty by articulating utterances he has never heard before, but which are recognized by the native speaker as grammatically acceptable. What has

Table 6

Validity Coefficients for the Modern Language Aptitude Test (MLAT) and the Mental Ability Test (ACT)

Criterion Measures	Predictors: MLAT				ACT			
	E N = 16	C_1 N = 15	C_2 N = 18	C_3 N = 18	E N = 16	C_1 N = 15	C_2 N = 18	C_3 N = 18
Immediate Retention								
Single-word	−.22	.27	.41	.37	.09	.44	.47	.46
Short U.	−.01	.46	.65	.55	.12	−.15	.80	.24
Long U.	.15	−.06	.36	.60	.44	−.26	.19	.30
Novel U.	.20	.43	.26	.67	.11	.28	.45	.30
Composite U.	−.06	.62	.72	.71				
Retention after 24 hours								
Single-words	−.01	.56	.61	.38	.04	.39	.62	.46
Short U.	−.13	.60	.28	.63	.12	.03	.33	.21
Long U.	−.02	.46	.33	.61	.26	.06	.14	.17
Composite U.	−.06	.74	.55	.61				
Retention after two weeks								
Single-word (I)	−.21	.57	.31	.19	.10	.11	.13	.34
Single-word (II)	.11	.46	.24	.46	−.02	.08	.13	.57
Short U. (I)	.21	.53	.18	.53	−.03	.12	.09	.17
Short U. (II)	.34	.40	.23	.43	.32	−.11	.33	.23
Long U. (I)	.29	.64	.43	.43	−.06	.33	.37	.16
Long U. (II)	.50	.68	.42	.47	.30	.33	.44	.41
Novel U.	.39	.63	.44	.53	.40	.32	.51	.40
Composite U.	.54	.74	.45	.54				

Key.
E = Experimental Group
C_1 = Control Group I
C_2 = Control Group II
C_3 = Control Group III

been demonstrated in this paper is that Asher's strategy of a *total physical response* permits the student to have extremely high listening comprehension for novelty when novelty is defined as utterances in combinations which the student has never heard before.

The next major finding was that retention for the technique of the *total physical response* tends to remain stable and near maximum for long periods of time. In the experiment reported here, data were collected only for retention after two weeks, but in a pilot study (Asher, 1964a), one subject tested a year after training still showed better than 90% retention.

A curious finding in the experiment here reported is that the members of the experimental group alone tended to cluster compactly near the maximum score on each of the retention measures. This phenomenon, the reduction of individual differences within the experimental group, should be explored in further studies.

As to further research, Asher (1964a) has listed these as some of the unsolved problems:

> How important is a total physical response? Is physical response a gradient in which velocity and permanency of learning are a function of how much of the body is in action? Or is physical response necessary if it can be shown that an inactive observer with a set to learn can achieve as much as the subject in motion?
>
> Will the subject at some point in the listening training spontaneously begin speaking?
>
> When in the listening training should speaking be introduced, if at all?
>
> Will listening fluency accelerate later acquisition of speech?
>
> What is the age parameter for the achievement of listening fluency by adults and children?
>
> If there is an automatic transfer in Japanese from listening fluency to reading of Romaji, does this suggest that with other languages, the better the phonetic fit between the spoken language and the orthography, the greater the transfer from listening fluency to reading? For instance, the transfer would be extremely high for Spanish but lower for Russian (Asher, 1964b).
>
> What complexity of morphology, syntax, and abstraction can be achieved with the technique of total physical response?

SUMMARY

An experiment was designed to test Asher's hypothesis of a *total physical response,* which states that listening comprehension for a foreign language could be accelerated if students were required to emit a response with the entire body. For instance, when they heard the Japanese utterance *"tate"*, they immediately stood up; hearing *"aruke"*, they walked forward. Other commands were *"mawaru"* (turn), *"tomare"* (stop), *"tobe"* (jump), *"hashire"* (run), and *"suware"* (sit). Within twenty minutes the morphological and syntactical complexity was increased to the level illustrated by the following examples:

> Tsukue ni aruite itte enpitsu to hon o oke.
> (Walk to the desk and put down the pencil and book.)
>
> Mado ni hashitte itte hon o motte tsukue ni oite isu ni suware.
> (Run to the window, pick up the book, put it on the desk, and then sit on the chair.)

The retention of the experimental group, who responded physically to the Japanese cue, was compared with three control groups who learned by more traditional methods.

The retention of the experimental group tended to be extremely high and significantly better than that of the control groups. The implications for language learning were discussed.

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