

Audio-Visual Channel Effects on the Mentally Retarded (2)

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AUDIO-VISUAL CHANNEL EFFECTS ON THE MENTALLY RETARDED (2)

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Introduction

In the article on memory test of the mentally retarded (Shingyoji, 1981) it was found that there is insignificant relation between chronological age and recall score, whereas mental age is significantly relative to recall score, and the most effective presentation media and channel is motion picture, visual channel. Besides above primacy and recency effects in recall was found in the mentally retarded as in normal subjects.

Those results were obtained by the experiments using single channels as presentation method such as visual nonverbal or auditory verbal. It is widely known that dual audio-visual channel presentation is most effective and visual single channel presentation is more than auditory. The present paper describes an experiment of dual presentation and comparison of single presentation with it.

Method

Subjects: Sixty-three subjects, selected from a special school, were classified into ten groups (A-J) according to CA as in Table 1. IQ of the subjects ranged from 32 to 94. All of the subjects have normal hearing and vision.

Table 1 Subjects (N=63)

Group	Number	CA Mean	IQ Mean (S.D.)
A	4	10:03	56.75 (6.29)
B	5	11:10	54.20 (11.21)
C	5	10:01	41.20 (5.36)
D	6	13:08	82.00 (7.21)
E	7	14:06	58.71 (6.73)
F	5	15:10	42.80 (3.70)
G	6	16:04	80.33 (7.47)
H	7	17:03	57.56 (7.18)
I	6	17:07	59.00 (8.18)
J	12	18:00	40.30 (4.76)

Materials: Apparatus and stimulus materials from previous study were again employed. As stimulus material for memorization nine concepts were selected. They are equivalent of information as well as familiar to the subjects in daily life. The concepts were (1) kasa (umbrella), (2) budo (grape), (3) kutsu (shoes), (4) ringo (apple), (5) pan (bread), (6) megane (glasses), (7) kani (crab), (8) isu (chair) and (9) telebi (TV set).

The media of presentation were (1) tape-recorder, (2) slide film, (3) letter (Hira syllabry) written on a board and (4) real thing. Each word standing for the concepts was recorded on magnetic tape in a voice by a female anouncer; slide was 35mm colored film; the letters in Hira syllabary, written in black ink on white kent paper (270mm×390mm) backed with a thick card board, were on 80mm square. The media of presentation were assigned to each group as shown in Table 2.

Table 2 Channel Media of Presentation

Group	Dual Channel Media	Single Channel Media
A	slide + oral	slide
B	letter + oral	oral
C	real thing + oral	real thing
D	letter + oral	letter
E	real thing + oral	real thing
F	letter + oral	letter
G	slide + oral	oral
H	letter + oral	letter
I	slide + oral	slide
J	slide + oral	slide

Presentation: Each item was presented to subjects for two sec at intervals of five sec through the window (400mm×600mm) of the screen made of three boards (1600mm×800mm each). Letters and real things were presented through the open window from behind the screen, and slides were projected by projector from behind the screen on the translucent rear-projection screen fitted into the window. At every presentation the names of stimulus objects were pronounced simultaneously by replaying the pre-recorded tape; slide presentation was synchronized with the tape.

Procedure: The subjects, sitting in a group in front of the screen, were asked to watch carefully the stimuli presented and memorize them. Immediately after the presentation of a series of stimuli they were told to write freely, irrespective of the order of presentation, the names of the presented objects on an answer sheet in Kana or Hira syllabary. Experiment through single channel was conducted after three weeks' intervals with the same conditions as experiment through dual channel.

Results and Discussion

Table 3 and Fig.1 show percentage of correct recall of each group through both dual and single channels. Fig.2 gives percentage of each stimulus item correctly recalled by all groups, which indicates, as most of researches on short-term memory revealed, primacy and recency effects.

Table 3 Percentage of Correct Recall

Group	Dual channel	Single channel
	Correct recall (SD)	Correct recall (SD)
A	50.00 (21.27)	83.33 (11.11)
B	62.22 (16.85)	55.56 (20.78)
C	68.89 (9.29)	62.22 (12.67)
D	74.08 (16.73)	74.07 (16.72)
E	73.02 (14.13)	76.19 (18.62)
F	66.67 (24.00)	40.00 (25.58)
G	90.74 (8.36)	79.63 (16.35)
H	64.81 (10.92)	73.01 (10.56)
I	72.22 (16.85)	79.63 (19.13)
J	71.11 (26.29)	64.65 (28.03)

Fig.1 CORRECT RECALL BY GROUPS

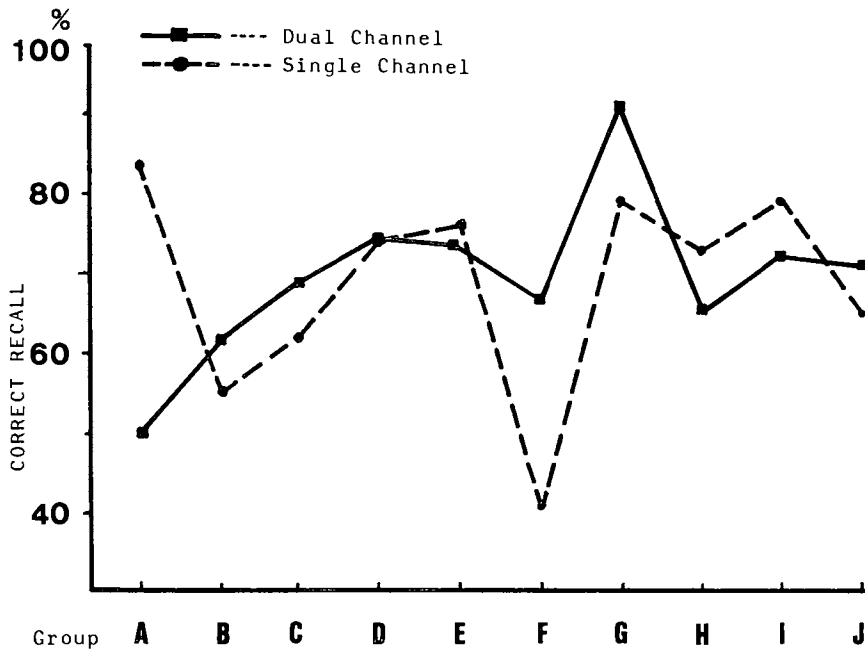
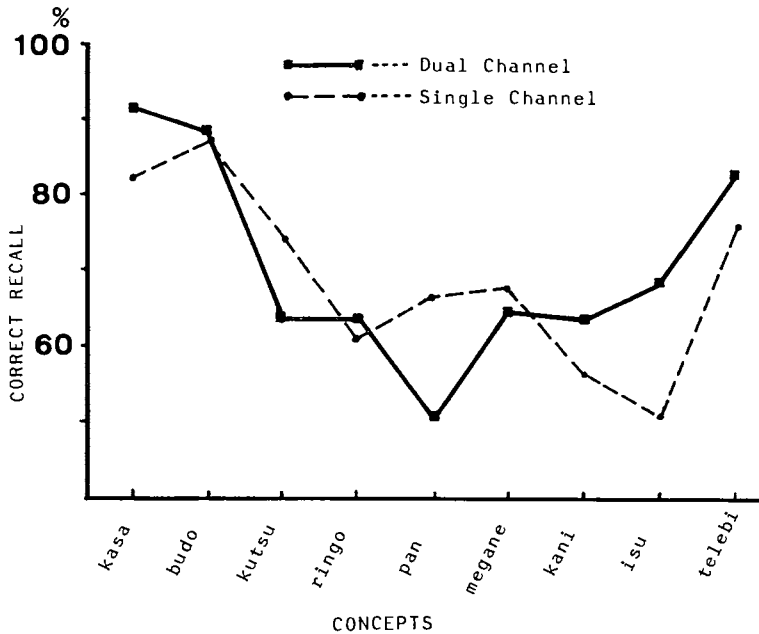


Fig.2 CORRECT RECALL BY CONCEPTS



(1) Dual vs. single channel: Contrary to our expectation it was found that there are only two of ten groups which indicate significant effectiveness of dual channel; those are Group F (Mean CA=15:10, Mean IQ=42:80, $p < 0.01$ by chisquare test) and Group G (Mean CA=16:04, Mean IQ=80.33, $p < 0.05$). Group A recalled much better ($p < 0.05$) through single channel than through dual one, which makes us suppose the redundancy of information interfering rather than helpful.

(2) Single vs. single channel: With regard to the effects of single channel through different media the following could be described. As far as different media is concerned Group A (slide) has significant relation to Group B (oral), Group C (real thing), and Group F (letter) at the 1% level of significance. Next to Group A, Group B (oral) has fairly significant relation to Group A (slide), D (letter), and Group E (real thing) at the 1% level of significance, and to Group F (letter) at the 5% level.

Concerning the effectiveness of single channel through the same media data indicator that relations of groups (A-J, D-F and B-G) are significant at the 1% level, and of groups C-E, I-J at the 5% level.

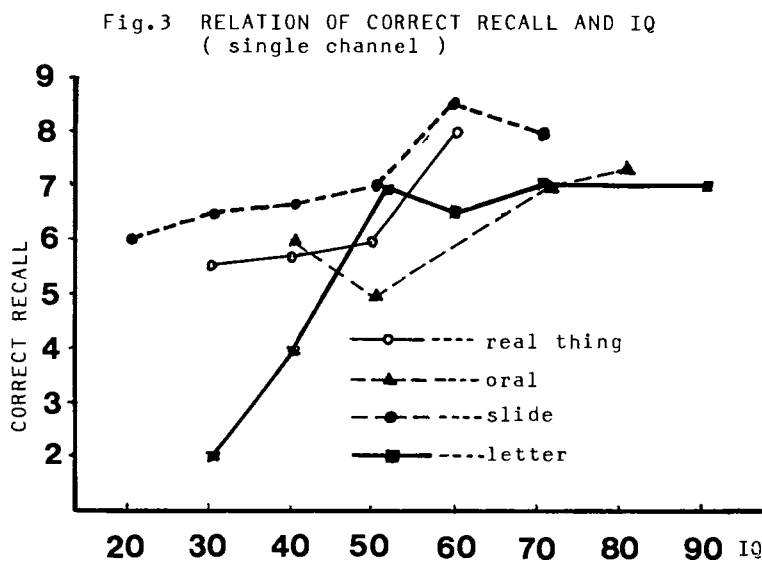
(3) Dual vs. dual channel: As far as different media is concerned Group A has remarkably significant relationship to other groups except Group B at the 1% level and to Group F and H at the 5% level; this might be supposed due to the lowest CA (10:03) and lower IQ (Mean 56.75) of the subjects.

Next to Group A, Group G (slide+oral) is significantly relative to Groups A, B, C, D, E, F, H, I and J at the 1% level. No significant relationship, however, was found among the other groups, but this does not necessarily mean that there is no significance, because the variety of subjects condition varies so widely according to CA and IQ that we could not easily conclude.

(4) In terms of IQ: Considering recall score according to IQ level it is found that at the high level (Group D and G, Mean IQ 82.00 and 80.33) there is significant relation between Group D and G only through dual channel ($p < 0.01$). This means that, irrespective of the same high IQ, the difference of media effects on memorization.

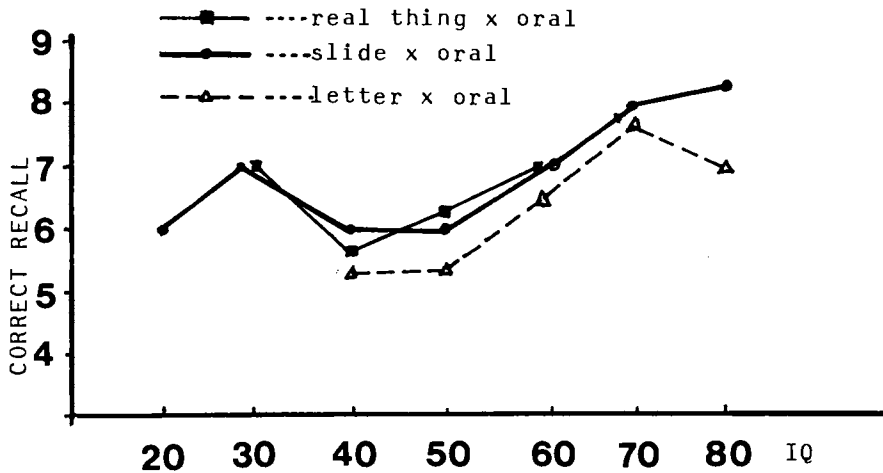
Another finding is that at the middle level of IQ, Group A has significant relation to Group E (real thing+oral) and to Group I (slide+oral) at the 1% level of significance, and to Group H (letter+oral) at the 5% level. The other is found among some groups through single channel; those are between Group A and B ($p < 0.01$), B and E ($p < 0.01$), B and I ($p < 0.01$), and B and H ($p < 0.05$).

At the lower level of IQ it is between Group C (Mean IQ=41.20) and Group F (Mean IQ=42.80) through single channel that was recognized significantly relative. The result apparently comes from the difference of media, real thing for Group C, and letter for Group F which is rather difficult when memorizing. As far as IQ is concerned, dual channel is more effective for subjects at lower level of IQ, particularly for subjects at learning through the media of letter and oral (Fig. 3 & 4).



(5) In terms of CA: As Table 4 shows, Group C through dual channel shows better recall score than Group A whereas it does worse score through single channel.

Fig.4 RELATION OF CORRECT RECALL AND IQ
(dual channel)



Significant relation of all groups in the single channel is due to IQ, not to CA, while groups in the dual channel achieved rather good scores owing to CA, not to IQ. Fig. 5 & 6 indicate the relation of correct recall to CA and that except through slide media low CA is slightly related to correct score.

Table 4. Groups with Significant Relation

Dual Channel	Single Channel
A - C **	A - C **
F - G **	A - B **
A - J **	F - G **
	A - J **
	B - H *
	C - E *

****-p<0.01 ***-p<0.05

From above mentioned the followings are recognized: 1) Dual channel is more effective than single as is widely known, but it is not always effective for the subjects with low IQ, which suggests interference of redundancy of information. 2) Visual media is more effective than auditory, which is also recognized widely. 3) Non-verbal media is better than verbal for low IQ and low CA subjects. 4) Under the same condition: A) Under the same condition of media IQ and CA are significantly related to good recall, particularly high IQ has remarkably significant relation to better recall. B) Under the same channel, irrespective of CA, better IQ results in better recall, with slight relation to modality of media. C) Under the same IQ CA and media more effective, irrespective of channel; but media has significant meaning for low IQ subjects. D) Under the same CA good recall is achieved by media and IQ; high IQ, irrespective of any media, could achieve better recall.

Fig.5 RELATION OF CORRECT RECALL TO CA
(single channel)

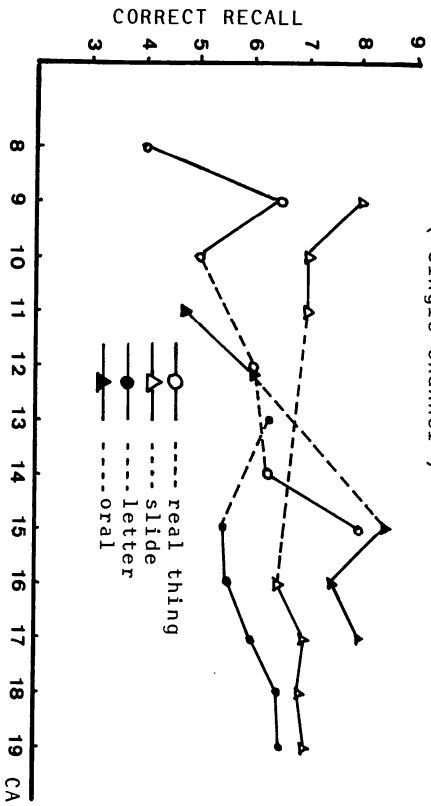
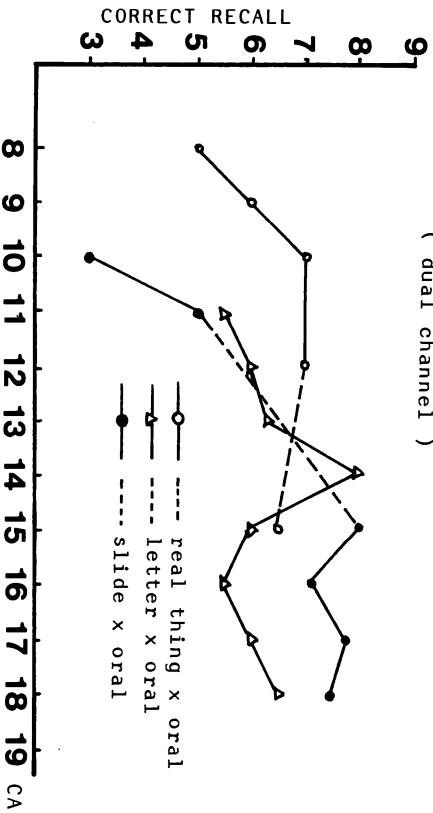


Fig.6 RELATION OF CORRECT RECALL TO CA
(dual channel)



Consequently we could suggest that for low IQ subjects dual-visual-concrete presentation of information is advisable.

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