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APPENDIX

Appendix A.

Raw Data of Non-verbal Intelligence Test

| Scores	T-8 group	TE-8 group	T-6 group	TE-6 group
		Number of children		
11			1	
12				1
13			2	
14	1		1	
15			1	
16			4	4
17			4	1
18			3	4
19	1	1	4	
20	2	2	1	3
21	2	1	3	
22	3		6	3
23	2	2	2	3
24		1	1	4
25	4	3	2	
26	6	1		
27	3	4	2	1
28	2	5		1
29	3	8		
30	3	3		
31	3	4		
32		1		
33	2	3		
35	1	1		
36		1		
	38	41	37	25

Non-verbal Intelligence Test

The experiment used Raven's Coloured Progressive Matrices (1977) (set A, Ab, B) to measure children intelligence. It is a visual perception task. It is expected that as children are able to discriminate the same and different patterns or match those patterns of visual task, they will be able to do speech perception task.

There are 36 pictures which a part is missing with the correct part being include in six choices under that picture. The tested pictures are listed from the easiest at the first picture to the most difficult picture at the last picture.

One of the tested pictures is shown below:
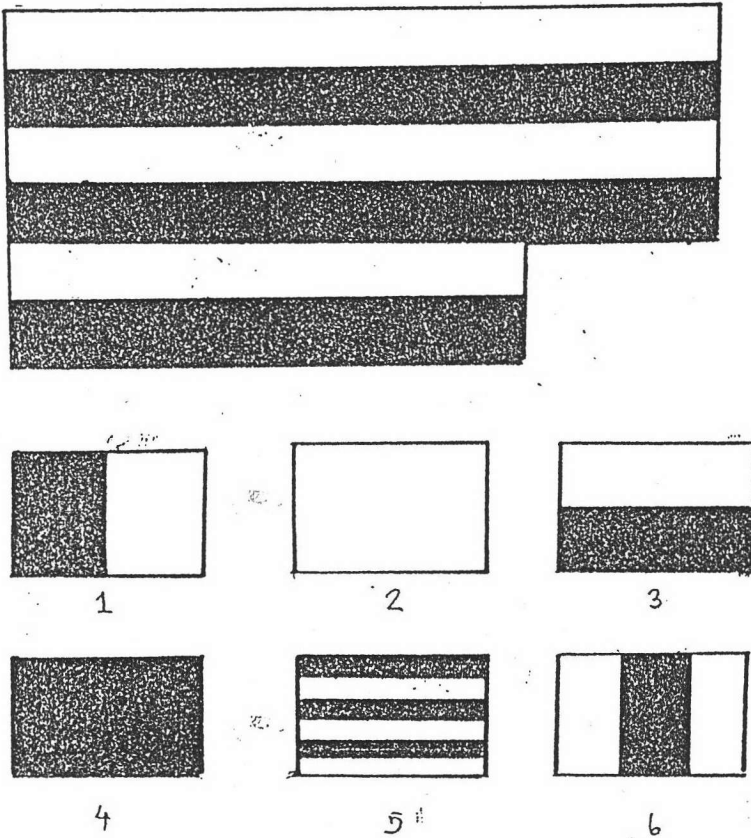
Testing ANOVA

This experiment used MINIPLAN program to test ANOVA. MINIPLAN is a contrast testing program modeled on PSY at the University of New South Wales. The original version was written by Don McNicol, and modified by Satchico Kinoshita for the 6809 basic. A converted version runs on (at least) DOS 2.1 for IBM clones, under BASICA was written by :

Steve Provost,

Department of Psychology,

Australian National University,

GPO Box 4, Canberra, ACT 2601.

The current version was modified for turbo basic at University of New South Wales by :

Kareem Tawansi &Graeme Craft

School of Psychology

University of New South Wales

PO Box 1, Kensington, NSW 2033.

APPENDIX D.

Table of Values for the F Distribution

Degrees of freedom in Denominator	1	2	3	4	5	6	7	8	9	10	11
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.30	2.25	2.20	2.16
	7.68	5.49	4.60	4.11	3.79	3.56	3.39	3.26	3.14	3.06	2.98
28	4.20	3.34	2.95	2.71	2.56	2.44	2.36	2.29	2.24	2.19	2.15
	7.64	5.45	4.57	4.07	3.76	3.53	3.36	3.23	3.11	3.03	2.95
29	4.18	3.33	2.93	2.70	2.54	2.43	2.35	2.28	2.22	2.18	2.14
	7.60	5.42	4.54	4.04	3.73	3.50	3.33	3.20	3.08	3.00	2.92
30	4.17	3.32	2.92	2.69	2.53	2.42	2.34	2.27	2.21	2.16	2.12
	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.06	2.98	2.90
32	4.15	3.30	2.90	2.67	2.51	2.40	2.32	2.25	2.19	2.14	2.10
	7.50	5.34	4.46	3.97	3.66	3.42	3.25	3.12	3.01	2.94	2.86
34	4.13	3.28	2.88	2.65	2.49	2.38	2.30	2.23	2.17	2.12	2.08
	7.44	5.29	4.42	3.93	3.61	3.38	3.21	3.08	2.97	2.89	2.82
36	4.11	3.26	2.86	2.63	2.48	2.36	2.28	2.21	2.15	2.10	2.06
	7.39	5.25	4.38	3.89	3.58	3.35	3.18	3.04	2.94	2.86	2.78
38	4.10	3.25	2.85	2.62	2.46	2.35	2.26	2.19	2.14	2.09	2.05
	7.35	5.21	4.34	3.86	3.54	3.32	3.15	3.02	2.91	2.82	2.75
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.07	2.04
	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.88	2.80	2.73
42	4.07	3.22	2.83	2.59	2.44	2.32	2.24	2.17	2.11	2.06	2.02
	7.27	5.15	4.29	3.80	3.49	3.26	3.10	2.96	2.86	2.77	2.70
44	4.06	3.21	2.82	2.58	2.43	2.31	2.23	2.16	2.10	2.05	2.01
	7.24	5.12	4.26	3.78	3.46	3.24	3.07	2.94	2.84	2.75	2.68
46	4.05	3.20	2.81	2.57	2.42	2.30	2.22	2.14	2.09	2.04	2.00
	7.21	5.10	4.24	3.76	3.44	3.22	3.05	2.92	2.82	2.73	2.66
48	4.04	3.19	2.80	2.56	2.41	2.30	2.21	2.14	2.08	2.03	1.99
	7.19	5.08	4.22	3.74	3.42	3.20	3.04	2.90	2.80	2.71	2.64
50	4.03	3.18	2.79	2.56	2.40	2.29	2.20	2.13	2.07	2.02	1.98
	7.17	5.06	4.20	3.72	3.41	3.18	3.02	2.88	2.78	2.70	2.62
55	4.02	3.17	2.78	2.54	2.38	2.27	2.18	2.11	2.05	2.00	1.97
	7.12	5.01	4.16	3.68	3.37	3.15	2.98	2.85	2.75	2.66	2.59
60	4.00	3.15	2.76	2.52	2.37	2.25	2.17	2.10	2.04	1.99	1.95
	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72	2.63	2.56
65	3.99	3.14	2.75	2.51	2.36	2.24	2.15	2.08	2.02	1.98	1.94
	7.04	4.95	4.10	3.62	3.31	3.09	2.93	2.79	2.70	2.61	2.54
70	3.98	3.13	2.74	2.50	2.35	2.23	2.14	2.07	2.01	1.97	1.93
	7.01	4.92	4.08	3.60	3.29	3.07	2.91	2.77	2.67	2.59	2.51

Note: Light number = .05 level of significance,

Heavy number = .01 level of significance.

Source: From Fallik and Brown. (1983).

EXPERIMENT TITLE: fricative perception experiment

NO. OF GROUPS: 4   ⟨subject groups⟩
NO. OF REPEATS: 12   ⟨a number of subjects in each group⟩

GROUP CONTRASTS: ⟨language and age variables⟩ [table 2.2 in chapter 2]

A1	-1	-1	1	1	language
A2	-1	1	-1	1	age
A3	1	-1	-1	1	language × age

REPEAT CONTRASTS: ⟨sound pairs and ISI⟩   [table 2.3 in chapter 2]

B1	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	ISI
B2	-1	-1	-1	-1	-1	5	-1	-1	-1	-1	-1	5	NP vs P and PNP sound pairs (C1)
B3	4	-1	-1	-1	-1	0	4	-1	-1	-1	-1	0	P vs PNP (C2)
B4	0	-1	1	1	-1	0	0	-1	1	1	-1	0	within PNP (C3)
B5	0	-1	0	0	1	0	0	-1	0	0	1	0	(f-θ) vs (s-ʃ) (C4)
B6	0	0	1	-1	0	0	0	0	1	-1	0	0	(f-ʃ) vs (s-θ) (C5)
B7	-1	-1	-1	-1	-1	5	1	1	1	1	1	-5	ISI × C1
B8	4	-1	-1	-1	-1	0	-4	1	1	1	1	0	ISI × C2
B9	0	-1	1	1	-1	0	0	1	-1	-1	1	0	ISI × C3
B0	0	-1	0	0	1	0	0	1	0	0	-1	0	ISI × C4
B1	0	0	1	-1	0	0	0	0	-1	1	0	0	ISI × C5

DI Scores of the 4 Subject Groups

GROUP 1 (N= 12) : DI scores of each subject in each group

```
1 2 3 4 5 6 7 8 9 10 11 12
Mean
      0.583
          0.208
              0.708
                  0.292
                      0.917
                          0.875
                              0.333
                                  -0.042
                                      0.875
                                          0.250
                                              0.667
                                                  0.875
```

GRAND MEAN: 0.545   : T- 6 group

GROUP 2 (N= 12)

```
1 2 3 4 5 6 7 8 9 10 11 12
Mean
    0.292
        0.042
            0.875
                0.375
                    0.917
                        0.833
                            0.250
                                0.000
                                    0.917
                                        0.583
                                            0.917
                                                1.000
```

GRAND MEAN: 0.583   : T- 8 group

GROUP 3 (N= 12)

```
1 2 3 4 5 6 7 8 9 10 11 12
Mean
    0.375
        0.125
            0.625
                0.458
                    0.500
                        0.917
                            0.375
                                -0.083
                                    0.750
                                        0.208
                                            0.708
                                                0.958
```

GRAND MEAN: 0.493   : TE - 6 group

```
GROUP   4   ( N= 12 )

 1   2   3   4   5   6   7   8   9   10   11   12
Mean
      0.333
            0.125
                  0.917
                  0.375
                        0.958
                        0.750
                        0.417
                              -0.042
                                    1.000
                                          0.667
                                                0.792
                                                      0.917

GRAND MEAN:        0.601      :   TE - 8 group
```

ANALYSIS OF VARIANCE TABLE $\qquad F_{(1,44)} = 4.06$

BETWEEN SUBJECTS ANALYSIS

CONTRAST	SSQ	df	MSQ	F
A 1	0.043	1.000	0.043	0.128
A 2	0.766	1.000	0.766	2.254
A 3	0.174	1.000	0.174	0.511
ERROR	14.948	44.000	0.340	

WITHIN SUBJECTS ANALYSIS

CONTRAST	SSQ	df	MSQ	F		
B 1	0.002	1.000	0.002	0.011		
B 1*A 1	0.062	1.000	0.062	0.391		
B 1*A 2	0.444	1.000	0.444	2.781		
B 1*A 3	0.085	1.000	0.085	0.532		
ERROR	7.031	44.000	0.160			
B 2	12.934	1.000	12.934	231.295	*	C1
B 2*A 1	0.001	1.000	0.001	0.025		
B 2*A 2	0.313	1.000	0.313	5.588	*	C1 × age
B 2*A 3	0.334	1.000	0.334	5.967	*	C1 × language
ERROR	2.460	44.000	0.056			
B 3	1.692	1.000	1.692	7.401	*	C2
B 3*A 1	0.026	1.000	0.026	0.112		
B 3*A 2	1.055	1.000	1.055	4.613	*	C2 × age
B 3*A 3	0.042	1.000	0.042	0.185		
ERROR	10.060	44.000	0.229			
B 4	3.760	1.000	3.760	28.517	*	C3
B 4*A 1	0.167	1.000	0.167	1.264		
B 4*A 2	0.260	1.000	0.260	1.975		
B 4*A 3	0.010	1.000	0.010	0.079		
ERROR	5.802	44.000	0.132			
B 5	27.376	1.000	27.376	214.342	*	C4
B 5*A 1	0.105	1.000	0.105	0.826		
B 5*A 2	0.574	1.000	0.574	4.496	*	C4 × age
B 5*A 3	0.012	1.000	0.012	0.092		
ERROR	5.620	44.000	0.128			
B 6	8.970	1.000	8.970	44.866	*	C5
B 6*A 1	0.064	1.000	0.064	0.319		
B 6*A 2	0.001	1.000	0.001	0.007		
B 6*A 3	0.105	1.000	0.105	0.528		
ERROR	8.797	44.000	0.200			

* significant F value

B 7	0.272	1.000	0.272	6.902	* ISI × c1
B 7*A 1	0.003	1.000	0.003	0.079	
B 7*A 2	0.009	1.000	0.009	0.220	
B 7*A 3	0.006	1.000	0.006	0.141	
ERROR	1.735	44.000	0.039		
B 8	0.026	1.000	0.026	0.154	
B 8*A 1	0.151	1.000	0.151	0.909	
B 8*A 2	0.013	1.000	0.013	0.079	
B 8*A 3	0.001	1.000	0.001	0.003	
ERROR	7.285	44.000	0.166		
B 9	0.844	1.000	0.844	7.799	* ISI × c3
B 9*A 1	0.042	1.000	0.042	0.385	
B 9*A 2	0.094	1.000	0.094	0.867	
B 9*A 3	0.510	1.000	0.510	4.718	* ISI × c3 × language × age
ERROR	4.760	44.000	0.108		
B 10	0.158	1.000	0.158	1.487	
B 10*A 1	0.105	1.000	0.105	0.996	
B 10*A 2	0.105	1.000	0.105	0.996	
B 10*A 3	0.158	1.000	0.158	1.487	
ERROR	4.661	44.000	0.106		
B 11	0.033	1.000	0.033	0.419	
B 11*A 1	0.012	1.000	0.012	0.151	
B 11*A 2	0.689	1.000	0.689	8.857	* ISI × c5 × age
B 11*A 3	0.033	1.000	0.033	0.419	
ERROR	3.422	44.000	0.078		

ประวัติผู้เขียน

นางสาวสุพัตรา พันธ์โสตถี เกิดเมื่อวันที่ 2 มีนาคม พ.ศ. 2511 ที่อำเภอเมือง
จังหวัดนครปฐม สำเร็จการศึกษาปริญญาตรีอักษรศาสตร์บัณฑิต สาขาภาษาอังกฤษ คณะ
อักษรศาสตร์ มหาวิทยาลัยศิลปากร ในปีการศึกษา 2532 และเข้าศึกษาต่อในหลักสูตร
อักษรศาสตร์มหาบัณฑิต ที่จุฬาลงกรณ์มหาวิทยาลัย เมื่อ พ.ศ. 2533 ปัจจุบันรับราชการที่
กรมทรัพยากรธรณี กระทรวงอุตสาหกรรม