

AN ALTERNATIVE SOLUTION FOR THE FACTOR ANALYSIS OF COMMUNICATION SKILLS AND NONVERBAL ABILITIES OF DEAF CLIENTS¹

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A previous paper by the author (Bolton, 1971) reported a four factor resolution of a 24 variable intercorrelation matrix for a sample of deaf rehabilitation clients. The results were consistent with comparative-experimental studies (e.g., Furth, 1971; Vernon, 1967) and current theoretical positions (e.g., Chomsky, 1968; Lenneberg, 1967). The purpose of this report was to summarize the results of a re-analysis of an enlarged sample using Kaiser's recently developed Little Jiffy Mark III (Kaiser, 1970). The analysis was conducted to clarify the constructs measured and thus to enhance their validity.

Procedures—Sample. The subjects of the original and cross-validation studies (Bolton, 1972) were combined into one sample of 192 profoundly deaf young adults. The median age of the subjects was 20 years, one half were male, one half were black, and the mean performance IQ was 96.

Variables. The 26 variables included 10 rated communication abilities, five Ravens Progressive Matrices Test subscale scores, six Revised Beta subscale scores, the Minnesota Paper Form Board total score, and four Purdue Pegboard subtest scores.² The reader is referred to the original article (Bolton, 1971) for a complete descrip-

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² The addition of two Purdue Pegboard scores increased the number of variables from 24 in the original study to 26. The two scores served to increase the stability of the Psychomotor Skill factor and to increase the reliability of the psychological evaluation of deaf clients.

TABLE 1
 Rotated Factor Matrices for Little Jiffy and Little Jiffy Mark III

Variables	Little Jiffy					Little Jiffy Mark III					M	SD		
	I	II	III	IV	V	I	II	III	IV	V				
<i>Communication</i>														
Hearing (Unaided)				72						82			1.12	0.43
Hearing (Aided)				86						85			1.50	1.08
Speech Reading				68					42	37			2.46	1.13
Reading	48		42	57					87				2.46	1.09
Manual Signs			90					98					3.06	1.35
Fingerspelling			87					90					2.64	1.32
Speech				83					40	55			2.02	1.26
Writing	43		35	58				99	89				2.28	1.02
Manual Signs			90										2.95	1.34
Fingerspelling			87					89					2.62	1.30
<i>Ravens PM</i>														
R1	74										77		10.42	1.74
R2	78										81		9.13	2.81
R3	81										83		6.91	3.17
R4	79										82		7.23	3.43
R5	71										66		3.53	2.76
<i>Revised Beta</i>														
Mazes	67										58		11.24	2.31
Digit Symbol		40		72							49		11.59	3.03
Error Recognition	44			53							50	-31	10.04	2.48
Form Board	72										70		8.02	3.11
Picture Completion	54			53							62		11.49	2.55
Identities		32	34	70							38		10.38	3.10

<i>Minnesota PFB</i>	60	59	28.80	13.07
<i>Purdue Pegboard</i>				
Right Hand	79	70	15.51	2.25
Left Hand	87	87	14.66	2.42
Both Hands	87	88	12.19	2.14
Assembly	70	65	34.95	8.33

Factor Intercorrelations for Little Jiffy Mark III

	I	II	III	IV	V
I	—	48	58	69	48
II		—	50	46	29
III			—	55	25
IV				—	71
V					—

Note.—Factor loadings less than .30 are omitted. Two summary statistics are provided for the Little Jiffy Mark III analysis: Measure of Sampling Adequacy of .87 (very good) and Index of Factorial Simplicity of .93 (excellent).

tion of the communication rating procedures and the psychological tests.

Method. The intercorrelation matrix was factored by two methods: (1) Principal components analysis and VARIMAX rotation of the five components with associated eigenvalues greater than one (Little Jiffy (LJ)), and (2) Little Jiffy Mark III (LJ III). The results of both analyses are contained in Table 1. The first four factors of the Little Jiffy (LJ) solution are almost identical to the original analysis (Bolton, 1971, p. 492); the fifth component was not rotated in the original study.

Results and discussion. The first three factors of LJ and LJ III were readily identified as (I) Nonverbal Reasoning, (II) Psychomotor Skill, and (III) Manual Communication. The fourth LJ factor (IV) Oral-Verbal Communication was split into two highly correlated factors by LJ III. The two factors were clearly (IV) Oral-Verbal Communication and (V) Residual Hearing. It is evident from the LJ III factor intercorrelations that the configuration of factor vectors was altered somewhat. (The fifth LJ factor, which was specific to the Revised Beta intelligence test, reflected a speed of response dimension.) Both the LJ and LJ III solutions were psychologically meaningful: the greater the amount of residual hearing possessed by a deaf person, the better were his oral (speech and speechreading) and verbal (reading and writing) communication skills. But LJ III provided a unique solution: VARIMAX, PROMAX, and MAXPLANE rotations of the first five components failed to separate the Residual Hearing factor from Oral-Verbal Communication. All three rotations produced a splinter factor defined by the Revised Beta subtests. For this particular data set, Little Jiffy Mark III provided a meaningful alternative solution which could not be achieved by other factor analytic programs.

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