DOCUMENT RESUME

ED 185 082 TM 800 075

AUTHOR Phillips, Phyllis P.; Halpin, Gerald
TITLE The Development of More Efficient Measures for Evaluating Language Impairments in Aphasic Patients.
PUB DATE [75]
NOTE 13p.

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adults; *Aphasia; *Equated Scores; Language Handicaps; Language Proficiency; *Language Tests; Rating Scales; *Test Construction; *Test Reliability; Test Validity
IDENTIFIERS *Porch Index of Communicative Ability; Test Adaptations; *Test Length

ABSTRACT

Because it generally took over an hour to administer the Porch Index of Communicative Ability (PICA), a shorter but comparable version of the test was developed. The original test was designed to quantify aphasic patients' ability level on common communicative tasks and consisted of 18 ten-item subtests. Each item resulted in a proficiency rating, ranging from one to sixteen. Two shortened versions of PICA were developed, containing five items selected from each of the original eighteen subtests; these new tests were one-half as long. Subjects were 50 adults (aged 26-78) whose language handicaps were associated with cerebrovascular accident or trauma. Both the original PICA and a new short-form test were administered. Reliability of all test forms was computed, as well as the intercorrelation of short-form scores with various subtest, modality, and overall scores of the original PICA. Results showed that indices of central tendency and variability were virtually equal on both short forms and the long form across all subtests, modalities, and overall score. Test reliability, means, and standard deviations of all forms were also highly similar. Thus, use of the short forms was supported. (Problems associated with particular PICA items are briefly described). (GDC)

THE DEVELOPMENT OF MORE EFFICIENT MEASURES FOR EVALUATING LANGUAGE IMPAIRMENTS IN APHASIC PATIENTS

Phyllis P. Phillips

Gerald Halpin

Auburn University

Two short forms of the Porch Index of Communicative Ability (PICA) were derived using data from 50 adult aphasic patients. Subtest, modality, and overall intercorrelations, internal consistency reliability estimates, means, and standard deviations were computed for both short forms and the full-length test. Results indicate that the short forms are equivalent. Further, they seem to be measuring the same traits as the long form, have only slightly lower reliability, and have practically identical means and standard deviations across all subtest, modality, and overall scores.

As a result of the search for better testing methods to be used with aphasic patients, the Porch Index of Communicative Ability or PICA was developed (Porch, 1967). The primary function of the PICA, widely used in clinics and other centers where language-impaired persons are seen, is to quantify the patient's level of ability on common communicative tasks.

An individually administered power test, the PICA contains 18 ten-item subtests which require the patient to listen, speak, read, write, and gesture at different levels of difficulty. The patient's response for each of the 180 subtest-item combinations is assigned a score of 1 to 16 utilizing considerations of accuracy, responsiveness, completeness, promptness, and efficiency. By averaging all the subtest means, an overall score is acquired. This overall score is "the best single index of the patient's general communicative ability (Porch, 1971, p. 70).

Porch (1971) reported an average administration time of 60.75 minutes with a range from 22 to 143 minutes when the PICA was given to a randomly selected group of aphasic patients. Disimoni et al. (1975), working with patients who had language-specific impairments, reported that it ordinarily took them from one to one and one-half hours to administer the test. These times are agreeable with the usual testing time of one and one-half hours reported by Boone (1972) who, in his review of the PICA, called the length of time required for testing a major weakness. These times are similar to those experienced by present researchers.

Because of the amount of patient and examiner time required to administer the PICA, it seemed most legitimate to ask the question of whether or not the length of the test might be reduced without any serious loss of information. Such a question was especially pertinent since the PICA Manual (Porch, 1967) shows consistently high correlations between the subtests. Such correlations indicate redundancy in the test, an observation made by Disimoni, et al. (1975). Using stepwise regression procedures to demonstrate that accurate predictions of overall scores could be made on the basis of fewer items and fewer subtests, they concluded that it may be possible to develop useful shorter forms of the PICA. However, they did not correct for the bias in the multiple correlations, which would have been substantial since the item and subtest are part of the whole. They further failed to report what kind of reliability might be expected from a shorter form. In addition to the length of the PICA, certain items have undesirable characteristics. A hygiene problem is sometimes encountered by patients' excessively literal demonstration, i.e., putting the toothbrush inside their mouths; the out-dated fountain pen seldom seen or used by most is not a common object to many patients; and many non-smokers reject the cigarette. Modified scoring procedures for the latter have been described by Porch (1971); however, the tester often must guess at the appropriate scoring in such cases.

The purpose of this study was to identify two short forms of the PICA consisting of 18 five-item subtests and to determine the degree to which the half-length tests intercorrelated with each other on each subtest, the gestural, verbal, and graphic modalities, and the overall score. Further, the purpose of this study was to investigate the parallelism of the subtest, modality, and overall means, standard deviations, and reliabilities for each short-form test and the full-length measure.

Subjects were 50 adult patients ranging in age from 26 to 78 years. All were referred for testing because of language impairment associated with cerebrovascular accident or trauma. The full-length Porch Index of Communicative Ability was administered under standard conditions by examiners who had been formally trained in PICA administration, scoring, and interpretation and who had had experience in using the PICA in a clinical setting.

Two short forms of the PICA were developed utilizing fewer objects in each subtest rather than fewer subtests. Such a procedure was used in order to leave the test virtually unaltered. The same modality response summary and ranked response summary profiles could be used. If, then, reliability coefficients, means, and standard deviations for the short forms and the longer form were comparable and if the two short forms had high intercorrelations, the format of the test would remain the same. The choice of five items per test was made since two short-form tests with an equivalent number of items would

result and the testing time would be cut approximately in half thereby almost doubling testing efficienty. Results of the study by Disimoni et al. (1975) showing that five items accounted for the overall PICA score also support the use of five items in a short form of the test.

ANALYSES AND RESULTS

Pearson correlational procedures were used in the selection of the items for the short-form test. First the score for each item was correlated with each subtest total of which the item was a part. Then the five items having the highest average correlation with subtest totals were selected. The items for the first short-form test were the knife, quarter, pencil, matches, and key. Another test was developed using the items which averaged correlating less well with the subtest totals. These items were toothbrush, cigarette, pen, fork, and comb. Even though the first short-form test was designed to be the best possible five-item test, it was evident when looking at the cofrelations that the two tests thus composed would not differ greatly since the median item-subtest Pearson coefficients uncorrected for spuriousness were .91 for the first five items and .89 for the next five items.

Pearson product-moment correlational techniques were also utilized to determine the degree to which the scores on each of the two derived short forms of the PICA intercorrelated for each subtest, the gestural, verbal and graphic modalities, and overall score. The short-form intercorrelations for the subtests range from .86 to .99 with the gestural, verbal,

graphic and overall score coefficients being .98, .97, .99, and .99, respectively. These coefficients can be interpreted as meaning that the half-length tests are measuring the same traits and both are measuring the same traits as the full-length test.

To determine reliability, a coefficient alpha (Cronbach, 1951) was computed for each of the 18 subtest measures as well as for the gestural, verbal, graphic, and overall measures resulting from each of the short forms and the long form of the PICA. Coefficient alpha is an internal consistency estimate of reliability. As reflected in Table 1, the resulting coefficients for the subtests using all 100 objects from the full-length measure ranged from .91 to .99 with reliability

---

Insert Table 1 About Here

---

coefficients of .97, .97, .99, and .99 resulting for the gestural, verbal, graphic, and overall measures, respectively. For the first five-object short version, the subtest reliabilities ranged from .82 to .99 with the gestural, verbal, graphic, and overall reliabilities being .94, .95, .98, and .98, respectively. For the second five-object test, the subtest reliabilities ranged from .80 to .99 with gestural, verbal, graphic and overall reliabilities being .96, .90, .98, and .97, respectively. The reliability estimates reported here for both the short forms and the longer test compare favorably with the total test internal consistency reliability estimates reported by Porch (1967) where the subtest reliabilities ranged from .82

to .99. Furthermore, it should be noted that the reliability coefficients for each of the short forms are comparable to coefficients for the longer version of the PICA. These data are not consistent with Porch's (1970) undocumented contention that shortening the test would result in a loss of reliability.

Means and standard deviations were computed for the subtest, modality, and overall measures from the full-length scale and the two short versions. In comparing the resulting indices of central tendency and variability which are presented in Table 1, it is apparent that these measures are virtually the same on the short forms as they are on the full-length test across all subtests, modalities, and overall score. Thus, no special conversion would be needed to make scores resulting from these short forms comparable to those resulting from the long form.

CONCLUSIONS

The results of this study do support the conclusion that the Porch Index of Communicative Ability is redundant and that it is feasible to develop short forms of it. Both short forms derived for this study yielded subtest, modality, and overall scores which intercorrelated highly indicating that the traits being measured by the long form can also be measured by either of the shortened forms.

Furthermore, the short forms have respectable reliability which differs only slightly from reliability estimates reported for the full-length test. Also, since the means and standard

deviations of the short forms are practically identical to central tendency and variability measures for the complete 10-object test, no special regression equation or other conversion formula would be necessary in order to have short-form scores comparable to long-form scores.

By eliminating items in order to shorten the test, the same subtest, modality, and overall scores resulting from administration of the full-length PICA are also available when a short form is administered. Too, the modality response summary, the ranked response summary, and other profile analyses and interpretations may still be made as suggested by Porch (1971).

The use of the short form made up of the five items having the highest correlation with subtest totals would eliminate the use of certain items having undesirable characteristics. These include the hygiene problem associated with the toothbrush, cigarette, fork and comb; the inclusion of the relatively out-dated fountain pen; and the cigarette that is often rejected by non-smokers.

Additional research might be directed toward further verification of the knife-quarter-pencil-matches, key combination or the toothbrush-cigarette-pen-fork-comb combination found effective in this study or toward the derivation of other object combinations for use as a short-form test. Also, additional data using derived short forms of the PICA for both diagnoses and prognoses with other patients would be meaningful. It does

seem that such research along with results of this study will be most instrumental in overcoming what Boone (1972) called one of the major weaknesses of the PICA -- required testing time which is too long, a time inefficient from the standpoint of both examiner and patient. Useful short forms may enhance aphasic diagnostics.

REFERENCES

Boone, D. R. Review of the Porch Index of Communicative Ability. In O. K. Buros (Ed.), The seventh mental measurements yearbook. Highland Park, N.J.: Gryphon Press, 1972.

Cronbach, L. J. Coefficient alpha and the internal structure of tests. Psychometrika, 1951, 16, 297-334.

Disimoni, F. G., Keith, R. L., Holt, D. L., and Darley, F. L. Practicality of shortening the Porch Index of Communicating Ability. Journal of Speech and Hearing Research, 1975, 18, 491-497.

Porch, B. E. Porch Index of Communicative Ability: Theory and development (Vol. 1). Palo Alto, Calif.: Consulting Psychologists Press, 1967.

Porch, B. E. PICA brainteaser. PICA Talk, 1970, 2, 2.

Porch, B. E. Porch Index of Communicative Ability: Administration, scoring, and interpretation. (Vol. 2) (Rev. ed.). Palo Alto, Calif.: Consulting Psychologists Press, 1971.

Subtest, Modality, and Overall Intercorrelations, Reliability Estimates, Means, and Standard Deviations for the Full-Length PICA and Two Derived Short Forms

		Reliability			Means			Standard Deviations		
Measure	Short Form .r's	Long Form	Short Form #1	Short Form #2	Long Form	Short Form #1	Short Form #2	Long Form	Short Form #1	Short Form #2
Subtest I	.97	.92	.89	.80	6.75	6.63	6.86	4.97	4.48	5.53
Subtest II	.86	.92	.89	.84	8.96	9.18	8.75	6.13	7.59	5.10
Subtest III	.91	.97	.96	.95	9.79	9.16	10.42	4.45	4.67	4.44
Subtest IV	.92	.91	.82	.83	8.82	8.82	8.81	3.65	3.64	3.82
Subtest V	.98	.96	.93	.94	10.51	10.51	10.51	4.90	5.02	5.02
Subtest VI	.97	.98	.91	.94	11.20	11.09	11.31	6.29	6.74	5.94
Subtest VII	.99	.99	.98	.99	10.81	10.81	10.80	4.34	4.39	4.32
Subtest VIII	.96	.99	.99	.95	13.28	13.16	13.40	3.43	3.78	3.14
Subtest IX	.93	.95	.90	.91	8.50	8.32	8.68	3.78	3.69	3.14
Subtest X	.95	.97	.93	.90	11.44	11.50	11.37	4.03	4.02	3.99
Subtest XI	.93	.99	.99	.98	14.45	14.49	14.40	2.23	2.26	2.27
Subtest XII	.98	.97	.94	.91	10.83	10.93	10.73	4.25	4.42	4.12
Subtest A	.99	.99	.98	.98	5.51	5.53	5.49	3.48	3.46	3.52
Subtest B	.96	.97	.96	.93	8.40	8.30	8.49	4.88	5.09	4.74
Subtest C	.96	.97	.95	.92	8.39	8.55	8.23	4.35	4.51	4.26
Subtest D	.95	.98	.96	.95	8.13	8.16	8.09	4.35	4.47	4.33
Subtest E	.97	.99	.98	.96	11.45	11.61	11.28	4.19	4.33	4.10
Subtest F	.92	.96	.96	.88	12.72	12.32	13.12	2.87	3.24	2.61
Gestural	.97	.97	.94	.96	11.32	11.24	11.37	3.07	3.18	3.02
Verbal	.98	.97	.95	.90	8.72	8.67	8.77	3.45	3.40	3.54
Graphic	.99	.99	.98	.98	9.10	9.08	9.11	3.52	3.63	3.43
Overall	.99	.99	.98	.97	10.00	9.95	10.04	2.82	2.88	2.77