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A Measure of PICA Ordinality

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Since the Porch Index of Communicative Ability was published in 1967, concern has been expressed pertaining to several aspects of its unique multi-dimensional scoring system. Among the first formally presented concerns, Prescott and McNeil (1973) questioned the statistical validity of using parametric statistics with unproven data. More recently, Silverman (1974) questioned the utility of using mean scores from PICA subtests as being representative of patient performance. Van Demark (1974) more directly addressed the issue of how mean scores can be interpreted. Both Silverman and Van Demark refer to, and accept Porch's contention that PICA scores are at least ordinal. As Van Demark states, "Porch further suggests that treating the PICA data as if it were based on an interval scale causes little danger as long as interpretation is handled conservatively'" (p. 510). A study by Labovitz (1970) supports this statistical contention but emphasizes the fact that the data must be at least ordinal. Implied is that ordinality is needed to allow for judgements of severity and for interpretation of mean scores to be made. Ordinality implies that a score of 6 is higher or better than a score of 3, though not necessarily twice as good. Ordinality then,specifies a hierarchial relationship of a set of values such as the sixteen PICA values.

The rationale for ordering the sixteen categories of the PICA was not an inadvertent factor in the construction of the test. It was in fact carefully evaluated clinically and validated with other's perceptions of communicative hierarchies. Clinically, Porch stated that the rank ordering of his categories seemed to correspond to case history descriptions of patients during the recovery process. He also described a clear correlation between his categories and those arranged hierarchially by Kaplan (1959)

and by Jones and Wepman (1961). In addition to these two methods of validating the ordinality of the PICA categories, twelve naive speech pathologists arranged the categories in a "clinically logical order." Results of a Spearman rank order correlation, a Kendall's coefficient of concordance, and the average value of the r's confirmed his rank ordering with values all above .89 (Porch, 1967). All of this suggested an operative rationale for the present ordering of the sixteen PICA categories.

What seems to have been overlooked in the literature to that point in time however was the potential difference between a logical hierarchial ordering of categories represented by some behavior, and a hierarchial ordering of observed behaviors represented by some category. In other words, it may be one task to hierarchially arrange descriptions of behaviors and a very different task to observe behaviors themselves and make hierarchial judgements. Likewise the progressive steps in the loss or recovery of aphasia may have little to do with the acceptability of communicative forms.

In addition, it has been our clinical experience to observe several patients at any one overall or modality percentile who communicate very differently; some "better" than others.

Ordinality of the PICA scoring system then must be considered in at least two ways. First, is a consideration of the hierarchial ordering for purposes of judging behaviors as to severity of brain damage and/or aphasia. In other words, a demonstrated hierarchy for those behaviors on the sixteen point scoring system either in loss of function with insult, or return of function after insult. Clinically, our opinion is in agreement with Porch, that patients do recover in a hierarchial manner correlated with the sixteen PICA categories, although no empirical evidence for this exists.

Our concern is, however, for another distinctly different type of ordinality, that being, to determine whether or not the numerical PICA values correspond hierarchially to the ordered perceptions of behaviors associated with those numerical values. In other words, a type of ordinality related to acceptability of performance or an ordinality for "Functional Communication".

Purpose:

The purpose of this investigation was to determine PICA ordinality in terms of communicative acceptability as determined by a group of judges.

Procedures:

To accomplish this purpose the following procedures were followed: 1.) Eight PICA subtests were arbitrarily chosen in an attempt to find subtests representative of the variety of behaviors demonstrated by the PICA. These were subtests I, II, IV, VI, XII, A, B, and F. (A description of which is found in figure 1.)

2.) Following subtest selection a single PICA stimulus item, the comb, was chosen in an attempt to control for possible scoring variation between stimulus items. A single item was also chosen for subtest F. (Shown in figure 1.)
3.) A videotate was made for each of the selected subtests demonstrating the PICA score responses of 1 through 15, with the exception of a perseverative 5 and an unintelligible-undifferentiated 3. All responses demonstrated on the videotape were examples selected from the PICA scoring manual -Vol. II (Porch, 1971). In addition, an attempt was made to select a median behavior since it was recognized that a range of behaviors exist for any one scoring interval. All recorded examples were of responses as demonstrated by one of the authors.

Examples of a 15 response and of a 1 response were always presented first and second respectively for each subtest and identified as the outer limits of behaviors to be seen. Following presentation of these responses all of the remaining responses were presented for each subtest in a random order. A 10 second segment of blank tape followed each response and allowed for score decision. The initial subtest instructions were always presented with the first two examples on the tape. Standard PICA administrative procedures were followed for all other examples such as repeats and cues. The subtest order was randomized on the videotape.

Subjects:

Subjects were twenty-six female graduate sutdents in Speech Pathology, who were currently involved in an introductory aphasia class. By questionnaire and a short confrontation examination it was determined that all subjects had no functional knowledge of the PICA scoring system.

All subjects were instructed for the general task of watching the videotape and making a judgement after each behavior, by marking one of nine spaces on an equal appearing interval rating scale, In addition, all subjects were familiarized with the five categories of accuracy, completeness, promptness, efficiency and responsiveness of the PICA. They were not however told of any hierarchial relationship for these categories.

All subjects watched the videotape simultaneously without interaction between subjects and all responses were played in the random order in which they had been recorded.

Analysis:

Following the ratings by the judges a table was developed identifying all possible combinations of two PICA scores and their positional relationship, for each subtest investigated, and for the overall of these subtests. For example, 15 was compared to

14, 15 to 13, 15 to 12, 14 to 13, 14 to 12, etc..

Using the example of the 15/14 comparison, each response by the judges was then placed on the table in terms of whether the rating was 15 higher than 14, 15 lower than 14, or 15 equal to 14. Following this data tabulation the percentage of judgements in each category was determined.

These data were subjected to a series of chi square analyses (Hays, 1963) to determine whether or not the resulting distributions deviated significantly from those which could be considered as random. An alpha level of .05 was chosen for these data.

It was determined that the vast majority (82%) of chi square analyses indicated that the distributions were not random. In our opinion a conservative approach was warranted for questioning the ordinality of PICA scores as rated by the judges. Consequently, it was arbitrarily decided that unless 70% of the judges agreed on the positional relationship of two items the ordinality of those items would be subject to question. For example, if a 15 was judged to be higher than a 14 by at least 70% of the judges that ordinal relationship was not questioned. If however, a 15 was judged to be lower or equal to a 14 by at least 70% of the judges that ordinal relationship was judged to be a questionable one.

Results:

Table A represents the percentages of judges who rated responses in a questionably ordinal fashion. It can be seen that for the 15/14 combination for subtest I. only 48% of the judges rated a 15 response higher than a 14 response. Consequently 52% rated a 14 as being equal to or higher than a 15 response. Since, 70% of the judges did not indicate the 15 score higher than 14, by our criterion, this hierarchial relationship appears to be a questionable one. The other entries on Table A represent the other score combinations that appear to be questionably ordinal. Twenty-seven percent (27%) of the total score combinations studied were judged to have a questionable ordinal position from that dictated by the PICA.

Table B represents the percentages of judges who by our criterion rated responses in a definite nonordinal fashion (3% of the total). For example, for subtest IV. 74% of the judges rated a 13 response to be higher than a 14. Likewise, it can be seen that for those subtests investigated, a consistent reversal of incomplete delay (11) and self correction (10) occurred. Repeats (9's) were also consistently judged better than incomplete (12's) and incomplete delayed responses (11's).

A difference across subtests was also found. For the two verbal subtests (4 and 12) and the two graphic subtests (A and B) judges consistently rated repeats and self-corrections higher than incomplete and incomplete delayed responses.

It appears then that the dimension of responsiveness was often interchanged with the dimension of completeness. In other words, 9's and 10's were consistently and to a significant degree judged as being better than 11's and 12's.

Discussion:

The results of this investigation are presented as preliminary data, however if supported with additional research have several implications for interpretation of the PICA as well as implications for treatment.

If the PICA does not possess an ordinality for "Functional Communication" as our data suggests, we must make more conservative judgements, not about how much aphasia the patient has, or about how much he will recover from this aphasia, but rather, how this measured level of performance relates to the acceptability of his communication outside the clinical setting.

Not only were categories of behaviors rated as nonordinal in this study, but modalities of communication were judged differently. If, through additional research a type of ordinality could be established for acceptability of communication and a statistical weighting procedure for importance of different modalities developed, we might be able to establish a measure for functional communication more objective than the Functional Communication Profile developed by Taylor (1963) and more valid than that of the PICA developed by Porch (1967).

Likewise, this hierarchial information, if found to be generalized to other judges (i.e., non-speech pathologists), could change our focus of treatment. For example, we might set as higher therapeutic goals,the ability to self-correct or summon and utilize repeats and cues as opposed to accepting grammatical or syntactical incompleteness; since self corrections, repeats, and cues appear to be communicatively more acceptable. In addition, the hierarchial relationships that do exist appear to be different for different tasks or in other words for different subtests.

Conclusion:

In conclusion, there appears to be more than a single type of ordinality. The ordinal relationship of the behaviors associated with the 16 PICA categories has been demonstrated by aphasiologists. This ordinality,however,differs significantly from that hierarchially rated by judges for acceptability of communication. This fact (if confirmed through additional research) greatly affects the validity of our interpretation of the PICA in terms of its relationship to performance outside the clinical setting. Equally important,or possibly more important,is the fact that therapeutic strategies may also change depending on the individual hierarchy for a specific task.

Our intention with this investigation is not to discredit the PICA either as a detector or quantifier of aphasic-like behavior; nor is it intended to discredit the concepts it purports as a treatment planning tool. It is however our intention to investigate one type of information relative to the PICA's ordinality, which may contribute to its most valid and clinically useful interpretation.

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FIGURE I.

SUBTEST	OUTPUT	TASK
I.	Verbal	To discuss the test object, differentiating its primary characteristics.
II.	Gestural	To demonstrate the function of the object.
IV.	Verbal	To name the object.
VI.	Gestural	To point to the object whose function is given verbally by the examiner.
XII.	Verbal	To imitate the name of the object.
A.	Graphic	To write a sentence about the function of the object.
B.	Graphic	To write the name of the object.
F.	Graphic	To copy a geometric form.

PICA SUBTESTS USED

FIGURE II.

15	Complete
14	Distorted
13	Complete delayed
12	Incomplete
11	Incomplete delayed
10	Corrected
9	Repetition
8	Cued
7	Related
6	Error
5	Intelligible
5	Rejection
* 5	Perseveration
4	Unintelligible
* 3	Minimal
2	Attention
1	No response

*not used in this study

PICA SCORING SYSTEM

TABLE A

CATEGORY COMBINATIONS	SUBTESTS I	II	IV	VI	XII	A.	B.	F.	O.A.
15/14	48								
15/13					67				
14/13		48	7	56	7	N.S.	22	15	N.S.
14/12		70	48				56	41	
14/11		52	67	59			63	56	
14/10			19		63	56	N.S.	41	57
14/9		63	22	48	44	30	30	41	45
14/8			N.S.				63	56	
13/12		56		63					
13/11		4		37					
13/10		52	48	63		59	N.S.		60
13/9	52	33	70	N.S.		N.S.	22	56	46
13/8							67		
12/11		26	70	26	7	41	N.S.	52	43
12/10	26	41	7	30	7	4	19	30	20
12/9	22	22	15	22	11	4	11	19	16
12/8	44	41	33	33	33	11	26	33	32
12/7	44		67			N.S.	56		
12/6							56		
12/5			67						
11/10	11	44	0	67	15	0	11	22	21
11/9		26	15	41	15	0	7	11	52
11/8	59	59	15	63	52	11	30	25	61
11/7	56		52			30	48		70
11/6			59			63			
11/5	59		44						
10/9	26	30	N.S.	19	N.S.	22	26	22	27
10/8	63	52		48			63	48	64
10/7	67								
9/8	70	63	59	70				59	69

TABLE A (CON'T)

CATEGORY COMBINATIONS	SUBTESTS I	II	IV	VI	XII	A.	B.	F.	O.A.
7/6		22	56	19	52	63		4	49
7/5		11	48	26	63			15	55
7/5		67		44				7	
7/4		26		44	70			7	63
7/2				56				37	
7/1								48	
6/5	7	30	19	22	30		52		59
6/5	37	59	48	37	59		37	67	54
6/4	N.S. 33	41	52	41	37		37	70	47
5/5		67		33	44	33	70	11	44
5/4	67	33		37	26	22	11	4	35
5/2				48			48	67	
5/1				70			63		
5/4	26	0	19	15	4	11	26	22	15
5/2	63	22	59	30	63		59		30
5/1		59	63	44	23		70		
4/2		59	67	33			56		
4/1			67	44			70		
2/1		52	0	26	26	0	26	15	40

Percentage of judges rating initial category in combination better than second.

N.S. - Non-significant Chi Square.

TABLE B

CATEGORY COMBINATIONS	SUBTESTS I	II	IV	VI	XII	A.	B.	F.	O.A.
13/14			74						
10/12			70		82	89	70		
10/11	70		89		70	96	82	70	
9/12		81	70	70	82	93	82		72
9/11			82		85	100	89	74	
9/10				74					
8/12						74			
8/11						78			
6/7								89	
5/6	74								

Percentage of judges rating initial category in combination better than second.