Testing Auditory Comprehension in Aphasia:
A Clinical Alternative
to the Token Test

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Basic Assumptions

We all know how important it is to obtain adequate information concerning an aphasic patient's auditory comprehension in order to understand his communicative problems, and to attempt a prediction as to the results of any treatment program. With this assumption as basic, I challenge any of you here today to tell me of a standardized, reliable test that is in use in measuring aphasic behavior which tests auditory processing adequately enough for prediction, counseling and treatment planning. . . (Pause). . . The silence is deafening.

In almost every instance, and most especially with the mildly involved patient, we find ourselves wanting more information about the patient's ability to understand following a PICA, a Schuell test, or the Boston. If you don't, I would either question your curiosity or applaud your experience.

Many clinicians pull out one of many versions of the--as many of you are aware, I say "the" with a great deal of reluctance--Token Test. I will not belabor my questions about the psychometric or clinical value of the Token Test family. I have done so enough at a past Clinical Aphasiology Conference (Berry, 1973). Let me just say that I feel that most--except the revised Token Test by McNeil/Prescott--Token Tests are simply screening tests which can indicate the presence or absence of auditory processing problems. Only Brookshire (C.A.C., 1972) to my knowledge has shown how the Token Test can be used, in this case in combination with the PICA, toward actual clinical management. So in a nutshell, I am saying the same thing that DeRenzi and Vignolo said in 1962 in developing the original Token Test. We need a more refined method of testing auditory processing associated with aphasia. So, if we assume this as a premise, what should a clinical test of auditory comprehension provide?

Test Criteria

Actually many of the criteria stated by DeRenzi and Vignolo (1962) apply and should still be met. Let me paraphrase and take some editorial liberties in stating these criteria.
(1) The format should be practical with regard to time and materials.
(2) Intelligence as a variable should be controlled so that any adult with normal intelligence can perform at the designated expectation level.
(3) Reliability--temporal, interjudge, and internal consistency-- should be documented.
(4) The output response required should have minimal motor constraints to avoid confounding of results.

(5) There should be adequate sampling of functional comprehension skills so that the tester/clinician can plan a treatment program if indicated.

It is the last of these criteria where many standardized tests of aphasic behavior prove inadequate, especially for patients who have sustained minimal infarction involving the language areas. Therefore, clinicians often find themselves probing further with "tests" that are non-standard, relying heavily upon the individual data base (i.e., experience) of that clinician. This may be adequate for the very experienced clinical aphasiologist; however, the rookie suffers in such situations. So, what can be done?

Hypothesis

Well, I feel that the PICA task continuum could be expanded to answer most clinical questions concerning the type and degree of auditory comprehension breakdown. The handouts that you've been given (See Appendix A) reflect some preliminary work on this hypothesis. So, this presentation truly fulfills the spirit of the so-called "minor clinical presentations" at this conference. It is a non-data based idea presented for your review, feedback, and usage--if you see fit.

Many of the proposed auditory PICA subtests in this battery are not original, as I'm sure Bruce (Porch) recognizes. Some, at least in structure, were part of Bruce's experimental battery in the development of the PICA. Some can be found in somewhat altered form in the "Kiddie PICA." The ideas for some subtests came from a number of colleagues, and a few were original. There is not enough time for me to go through the rationale, scoring, and interpretation for each of the twelve subtests; but let me hit at a few critical points.

(1) SCREENING: PICA Auditory Screen 1 and 2 have been designed to eliminate the need for "the" Token Test, which, as I've said, is merely a screening procedure. If a patient does well on Screen #1, it is unlikely he will report auditory processing difficulties. If deficits are picked up here, however, the second screen can help zero in on differential aspects of length and complexity. Then, of course, the actual battery can be used in conjunction with the standard PICA to document the extent and type of auditory dysfunction.

(2) FORMS: The handouts have been designed to be used as scoring sheets, if copied. The item score can be registered next to the number for that item and an element in error can be circled to isolate any deviant psycholinguistic patterns that are noted by the response. This combines the ability to use a multidimensional scoring scale as well as psycholinguistic description.

(3) SCORING: Special scoring indications are noted on the forms and are open for discussion. If the individual stimulus sheets are not used for scoring, a separate coding sheet can be devised and letters can be subscripted for certain linguistic errors for each subtest. In this way, a separate score sheet can be used without losing the element of psycholinguistic description of response errors (see example in Appendix A).

Challenge

I realize that in 1973, at this Conference, I chastised DeRenzi and

Vignolo for publishing a test without adequate reliability data, and here I am doing the same thing or at least a variation on the same theme. Well, since 1973, I've noticed that the Token Test family has actually grown in popularity; so, I figured why not join them if you can't beat them.

This presentation is actually being issued in the form of a challenge. If any among you agree with any of my contentions and would like to collaborate on the research necessary to refine and gather the data to make this proposed battery meet the test criteria stated earlier, speak up. I'd like to put together a clinical measure of auditory comprehension that could give even the novice clinical aphasiologist enough data to plan therapy for auditory processing problems. I think this can be done, but I'll need some help.

APPENDIX A

PICA SUPPLEMENT

AUDITORY SCREEN 1

<u>INSTRUCTIONS</u>: Can you see all of these objects? (gesture) I want you to do some things with them; do <u>exactly</u> what I say. Ready? Here's the first one.

<u>STIMULUS ITEMS</u>: (Tester may say, "o.k., next one" as a <u>filler</u>.)

_____1. After you put the <u>Tb</u> next to the <u>Kf</u> touch the <u>Cb</u>.

_____2. Pick up the <u>Cg</u> but first put the <u>Pn</u> to the left of the <u>Ky</u>.

_____3. Pick up the <u>Pn</u> and then put the <u>Fk</u> to the right of the <u>Qt</u>.

_____4. Before you put the <u>Kf</u> next to the <u>Pl</u> pick up the <u>Cg</u>.

_____5. Touch the <u>Fk</u> but first put the <u>Cg</u> to the right of the <u>Mt</u>.

_____6. Before you put the <u>Qt</u> on top of the <u>Cb</u> pick up the <u>Pn</u>.

_____7. Touch the <u>Pl</u> and then put the <u>Tb</u> to the left of the <u>Kf</u>.

_____8. Before you put the <u>Mt</u> under the <u>Qt</u> touch the <u>Fk</u>.

_____9. After you put the <u>Ky</u> on top of the <u>Mt</u> touch the <u>Tb</u>.

_____10. After you put the <u>Cb</u> under the <u>Ky</u> pick up the <u>Pl</u>.

_____ = $\overline{X}$

<u>CUE</u>: Model the appropriate sequence with no auditory input, pause (1 - 2 sec.), then repeat a 2nd time.

<u>SCORING</u>: (1) Score 12, 11 for inappropriate sequence.

       (2) Score 7 for single segment error (noun, verb, preposition).

       (3) Circle element in error

       (4) Code error above element

       (5) Code X for delay > 5 sec.

PICA SUPPLEMENT

AUDITORY SCREEN 2

INSTRUCTIONS: See these objects? (gesture) I want you to listen carefully and just what I tell you to do with them. Ready? Here's the first one...(pause).

STIMULUS ITEMS: (Tester may use filler for control.)

_____1. Point to the <u>Tb</u> and then the <u>Ky</u>.

_____2. Hand me the <u>Cg</u>.

_____3. Before you put the <u>Pn</u> under the <u>Fk</u>, pick up the <u>Cb</u>.

_____4. Which one is used for <u>cutting meat</u>?

_____5. After you give me the <u>Fk</u>, turn over the <u>Qt</u>.

_____6. Point to the <u>Qt</u>, then the <u>Kf</u>, and finally the <u>Tb</u>.

_____7. After you put the <u>Pl</u> next to the <u>Qt</u>, pick up the <u>Pn</u>.

_____8. Where is the one used <u>for lighting fires</u>?

_____9. Point to the <u>Ky</u>.

____10. Point to the <u>Cb</u>, and then the <u>Kf</u>, and the <u>Mt</u>.

_____ = $\overline{X}$

CUE: "Listen carefully now." Repeat a second time using appropriate gestures to indicated action concepts and using prosodic stress on critical sentence elements.

SCORING: (1) Score in box for 1st item (list order).

(2) Score 12, 11 for inappropriate sequence.

(3) Circle elements in error

(4) In "polynominal" sentences, score 7 for error on only one noun.

(5) Code X for delay > 5 sec.

PICA SUPPLEMENT

A1

INSTRUCTIONS: Now listen and do just what I tell you to do with the objects (gestur<

STIMULUS ITEMS:

Segment (a)	(b)	(c)	(d)	(e)	(f)
_____After	you put the Tb	next to	the Kf	hand me	the Cb.
_____Before	you put the Cg	by	the Pl	pick up	the Ky.
_____Before	you put the Pn	under	the Fk	hand me	the Mt.
_____After	you put the Kf	on top of	the Pn	hand me	the Pl.
_____Before	you put the Fk	next to	the Cg	pick up	the Qt.
_____After	you put the Qt	beneath	the Cb	pick up	the Fk.
_____After	you put the Pl	by	the Tb	pick up	the Kf.
_____Before	you put the Mt	on top of	the Qt	hand me	the Pn.
_____After	you put the Ky	beneath	the Mt	pick up	the Cg.
_____Before	you put the Cb	under	the Ky	hand me	the Tb.
_____ = $\overline{X}$					

CUE: Model gestural sequence; then give 2nd repeat.

SCORING: (1) Score 12, 11 for inappropriate sequence.

(2) Score 7 (with appropriate segment code) for segment error.

(3) Circle errors or code with letters (a - f).

(4) Code X for delay (11, 13) > 5 sec.

PICA SUPPLEMENT

A2

INSTRUCTIONS: Now point to the ones I say in the right order - just like I say them. Watch; I'll do it first. (Hold cardboard blind up so patient can't see objects - Say, "Cb, Ky, Mt." Remove blind; point to sequence.) Now you do it. (Replace blind.)

STIMULUS ITEMS: (Take away blind after stimulus; replace after response; approximate] one second between objects.)

Segment	(a)	(b)	(c)
_____1.	Tb ...	Cg ...	Pn
_____2.	Kf ...	Fk ...	Qt
_____3.	Pl ...	Mt ...	Ky
_____4.	Cb ...	Tb ...	Cg
_____5.	Pn ...	Kf ...	Fk
_____6.	Qt ...	Pl ...	Mt
_____7.	Ky ...	Cb ...	Tb
_____8.	Cg ...	Pn ...	Kf
_____9.	Fk ...	Qt ...	Pl
_____10.	Mt ...	Ky ...	Cb
_____	= $\overline{X}$		

SCORING: (1) Score 12, 11 for inappropriate sequence.

(2) Score 7 (with segment code) for 2/3 correct.

(3) Circle element(s) in error.

(4) Code X for delay (11, 13) > 5 sec.

PICA SUPPLEMENT

A3

INSTRUCTIONS: I'm going to tell you to do some things with the objects (gestures). Listen carefully and do just what I tell you to do.

STIMULUS ITEMS:

_____1. Before you touch the T̲b̲, pick up the C̲b̲.

_____2. Hand me the C̲g̲ after you point to the K̲y̲.

_____3. Pick up the P̲n̲ after you touch the M̲t̲.

_____4. Before you give me the K̲f̲, point to the P̲l̲.

_____5. Point to the F̲k̲ after you turn over the Q̲t̲.

_____6. Before you hand me the Q̲t̲, point to the F̲k̲.

_____7. Pick up the P̲l̲ after you touch the K̲f̲.

_____8. Before you turn over the M̲t̲, hand me the P̲n̲.

_____9. Touch the K̲y̲ after you give me the C̲g̲.

____10. Before you pick up the C̲b̲, point to the T̲b̲.

_____ = $\overline{X}$

CUE: Give 2nd repeat using function gestures for objects. Prosodically emphasize key syntactic elements.

SCORING: (1) Score 12, 11 for inappropriate sequence only.

(2) Score 7 for only one element error (noun or direction).

(3) Syntax code for errors: adverb = a; verb = v; noun = n.

(4) Circle element in error.

(5) Code X for delay (11, 13) > 5 sec.

PICA SUPPLEMENT

A4

INSTRUCTIONS: Now point to two of the objects in the order I name them.

STIMULUS ITEMS: (Use blind as in A2; no carrier phrase or conjunction; 2 seconds between objects.)

_____1. Tb ..... Cb

_____2. Cg ..... Ky

_____3. Pn ..... Mt

_____4. Kf ..... Pl

_____5. Fk ..... Qt

_____6. Qt ..... Fk

_____7. Pl ..... Kf

_____8. Mt ..... Pn

_____9. Ky ..... Cg

____10. Cb ..... Tb

_____ = $\overline{X}$

CUE: (Take away blind) "Where is the _____ and the _____?"

SCORING: (1) Score 12, 11 if order is reversed

(2) Score 7_a for error in first element and 7_b for second.

(3) Code error choices above items.

(4) Code X for delay $>$ 5 sec.

PICA SUPPLEMENT

A5

INSTRUCTIONS: Listen carefully and do just what I say.

STIMULUS ITEMS:

_____1. Point to the Tb but first touch the Cb.

_____2. Show me the Cg but first point to the Ky.

_____3. Where is the Pn but first find the Mt?

_____4. Touch the Kf and then show me the Pl.

_____5. Find the Fk and then where is the Qt?

_____6. Where is the Qt but first find the Fk?

_____7. Show me the Pl and then touch the Kf.

_____8. Find the Mt and then where is the Pn?

_____9. Point to the Ky but first show me the Cg.

_____10. Touch the Cb and then point to the Tb.

_____ = $\overline{X}$

CUE: Pantomime the appropriate sequence: wait approximately 2 - 3 seconds and give a second repeat.

SCORING: (1) Score 12, 11 for inappropriate time sequence.

(2$_a$) Score 7$_a$ for object error in first half of response only.

(2$_b$) Score 7$_b$ for object error in second half of response.

(3) Circle error elements.

(4) Code X for delay $>$ 5 sec.

PICA SUPPLEMENT

A6

INSTRUCTIONS: Now once again, do exactly what I tell you to do with the objects (gesture).

STIMULUS ITEMS:

_____1. Put the Tb next to the Cb.

_____2. Put the Cg to the left of the Ky.

_____3. Put the Pn on top of the Mt.

_____4. Put the Kf to the right of the Pl.

_____5. Put the Fk with the Qt.

_____6. Put the Qt under the Fk.

_____7. Put the Pl by the Ky.

_____8. Put the Mt beside the Pn.

_____9. Put the Ky beneath the Cg.

_____10. Put the Cb on the Tb.

_____ = $\overline{X}$

CUE: Pantomime appropriate sequence while giving second repeat.

SCORING: (1) Scores of 12, 11 when items are reversed with direction correct.

(2$_a$) Code (a) if first noun element is incorrect.

(2$_b$) Code (b) if second noun element is incorrect.

(2$_c$) Code (d) if directional element is incorrect.

(3) Circle error element.

(4) Code X for delay $>$ 5 sec.

PICA SUPPLEMENT

A7

INSTRUCTIONS: Now do <u>EXACTLY</u> what I tell you to do with the objects (gesture).

<u>STIMULUS ITEMS</u>:

_____1. Hand me the <u>Tb</u>.

_____2. Point to the <u>Cg</u>.

_____3. Point to the <u>Pn</u>.

_____4. Point to the <u>Kf</u>.

_____5. Hand me the <u>Fk.</u>

_____6. Hand me the <u>Qt</u>.

_____7. Point to the <u>Pl</u>.

_____8. Hand me the <u>Mt</u>.

_____9. Hand me the <u>Ky</u>.

_____10. Point to the <u>Cb</u>.

_____ = $\overline{X}$

<u>CUE</u>: Pantomime appropriate gesture and object function while repeating a second time

<u>SCORING</u>: (1) Scores of 12, 11 apply to inappropriate direction.

(2) Code X for delay $>$ 5 sec.

PICA SUPPLEMENT

A8

INSTRUCTIONS: Finish these sentences by pointing to what I leave out. Don't say anything; just point. (Gesture with finger over mouth – then point).

STIMULUS ITEMS: As in PICA IX.

      _____1. ... Tb

      _____2. ... Cg

      _____3. ... Pn

      _____4. ... Kf

      _____5. ... Fk

      _____6. ... Qt

      _____7. ... Pl

      _____8. ... Mt

      _____9. ... Ky

      _____10. ... Cb

      _____ = $\overline{X}$

CUE: Gesture the function of the object as a second repeat is given.

SCORING: (1) As on PICA

        (2) NOTE – It is a 5 level response to verbalize.

        (3) Code X for delay > 5 sec.

PICA SUPPLEMENT

A9

INSTRUCTIONS: I'm going to spell the names of each object (gesture). Wait until I'm through and point to the one I spell.

STIMULUS ITEMS: (Do not say the word first. Spell slowly in list order.)

_____1. Toothbrush

_____2. Cigarette

_____3. Pen

_____4. Knife

_____5. Fork

_____6. Quarter

_____7. Pencil

_____8. Matches

_____9. Key

_____10. Comb

_____ = $\overline{X}$

CUE: Say name first; spell a second time.

SCORING: (1) As on PICA

(2) Code X for delay $>$ 5 sec.

PICA SUPPLEMENT

A10

INSTRUCTIONS: Now I'll (gesture) say the name of each one and when I pull this (indicate blind) away (pull away blind), you point to (gesture) it.

STIMULUS ITEMS: As in PICA X with 5 second delay (use stop watch) before removing visual blind.

_____1. ....Tb

_____2. ....Cg

_____3. ....Pn

_____4. ....Kf

_____5. ....Fk

_____6. ....Qt

_____7. ....Pl

_____8. ....Mt

_____9. ....Ky

_____10. ....Cb

_____ = $\overline{X}$

CUE: (Do not use blind .... gesture) "show me the _____."

SCORING: (1) As on PICA

(2) Code X for delay > 5 sec.

SUPPLEMENTARY PICA TESTING

NAME: M. M.

EXAMINER: N.E.

DATE: 3/12/76

TEST ITEMS	TEST A1	TEST A2	TEST A3	TEST A4	TEST A5	TEST A6	TEST A7	TEST A8	TEST A9	TEST A10
Toothbrush (Tb)	15	9	12	9	15	15	13	15	15	15
Cigarette (Cg)	15	9	13	15	12	7a	15	15	15	15
Pen (Pn)	7c	15	15	15	15	15	15	15	13	15
Knife (Kf)	7e	11x	9	15	15	13x	15	15	13	15
Fork (Fk)	7e	13	15	15	15	15	15	15	15	15
Quarter (Qt)	15	15	13	15	13	15	15	15	15	15
Pencil (Pl)	13x	12	15	15	15	15	15	15	15	15
Matches (Mt)	15	15	15	15	15	15	15	15	15	15
Key (Ky)	6b,d,e	15	15	15	15	13x	15	15	13	15
Comb (Cb)	7e	7a	13	15	15	13	15	15	15	15
TIME										
AVERAGE	10.7	12.1	13.5	14.6	14.5	13.6	14.8	15.0	14.4	15.0

COMMENTS: A1 - 10 administered after PICA; PICA VI = 15.0, X = 15.0, IX = 14.6

DATA SHEET

APPENDIX B

Discussion

Q: How long did it take you to come to this ordering of the subtests?

A: The ordering of the subtests is the first ordering. A lot of work needs to be done to think about ordering as one of the variables in administration. There was some forethought that went into this particular ordering. I didn't want the order to be either an absolute one from difficult to easy or vice versa. So you can see some alternating of difficulty though the battery is generally less difficult at the end.

Q: In our Clinic, we are finding such a problem with the Token Test. You test a person and then you are not sure what your problem is--is it a comprehension problem or is it a retention problem? We don't really know how to interpret that (the Token Test), and I think this is great.

Q: I share your bias on the Token Test; but I also wonder if maybe administering the standard Token Test to back up results on this (the PICA supplements) wouldn't be more powerful and give us some frame of reference as to our past experience.

A: Oh, I'm not saying that we should necessarily junk it (the Token Test). What you're suggesting would be a logical thing to do for validation purposes and if nothing else, just to do the study (of both tests) simultaneously. Why not!

Q: This is really good; I'm glad to see this for our high level patients too. I am wondering if you have experimented with what level patients can take this.

A: That's the reason for the screening (tests), first of all. I usually do the two screening subtests very early (prior to the PICA) which is part of an evaluation sequence in our hospital. If then after giving the PICA, I realize that more auditory comprehension testing would be indicated, (then one or more of these auditory supplements are selected and administered).

Q: You say you use the screening tests. Can you tell me a little bit more about that?

A: If scores below 15 are consistently noted on the first auditory screening supplement, then the second one is administered in an attempt to isolate the level of the problem. However, if the patient performs normally or simply with a generalized elongated latency of response, possibly indicating generalized intellectual impairment, then the second screening subtest is generally not administered. This screening procedure plus the standardized PICA usually are enough to develop a strategy for selecting any remaining auditory subtests from this battery that might be needed to more fully define the auditory comprehension problem noticed by the clinician.

Q: Why should I use this as opposed to the Revised Token Test (McNeil and Prescott)?

A: That's up to your conscience.

Q: What does this test do that the Revised Token Test doesn't?

A: I have some question about the use of geometric shapes because I don't know where these concepts fit into a linguistic redundancy continuum or a functional language continuum. That's one of the problems I have with the original Token Test. Does it, in fact, tap the factor of intelligence as well as language to a significant degree? There is also a question as to which hemisphere is being primarily tapped by using geometric shapes. I don't think that we linguistically process shapes in our environment. We see them and we deal with them in almost everything. There's a rectangle right there on the wall, but I don't look at that and say "rectangle" if I were asked what it was. I say that's a portion of the wall. So I think that's part of my problem.

Q: But the data suggest that that's not a problem, that intelligence is not a factor.

Q: Do you ever have any feeling that in trying to test comprehension with some of these PICA supplements on patients with apparent lack of auditory comprehension problems in everyday environments that we aren't coming to a point where we are almost scrounging around looking for comprehension problems that aren't really there? And especially with auditory comprehension tasks that require, in addition to processing, a complex sequence of the motor act?

A: That's an excellent point.

Q: Have you made an effort to control within a subtest whether or not the existence of related items within a command affect the difficulty of that item?

A: No, there hasn't been any work done on this. Once again, this presentation conforms to the philosophy of a <u>minor</u> <u>clinical</u> <u>presentation</u> in that it's just a clinical idea thrown out for your perusal.

Q: The only way we can find out about auditory comprehension is in trying to probe into the patient's auditory system and the only way that you can do this is by methodically varying the tasks, using a whole variety of tests, and see which ones he breaks down on. That tells us what's happening inside his system. So this effort is really a good one. It is not a question of which is better (Token Test versus PICA), but why are we doing it; and I think that there are some things this test can do and the Token Test can't and vice versa. Finally, the strength of these tests eventually as probes would be established if we could gather some norms on a large random sample of aphasics so that we'd know where he is on the task continuum which would also apply to treatment--if you believe in treating on the fulcrum of the curve and all that stuff. I would also hope that we could all agree on the scoring so that we can standardize. Some of these subtests are in the children's PICA, and you are going to drive clinicians bananas if you use different scoring systems on these tasks in the two populations.

A: That's the reason for this challenge.

Q: I accept.

Q: I notice that all of your responses were either pointing or manipu-
lating objects. I'm wondering if you don't need some control tests
to decide whether it's a pointing response you're measuring or
auditory comprehension. (This clinician described a patient who was
able to easily verbalize his understanding of commands but could not
point to or manipulate objects.) So I'm wondering if you don't need
some things like yes/no questions.

Q: To that point, some clinicians on my staff have been doing a test
which is still preliminary where they compared the recognition versus
the action and found a remarkable difference; and while it's a pre-
liminary study, it's had some fairly sophisticated statistical input
and I had strong feelings that it is more than a motoric response.

A: It very well might be, especially with these things that require a
lot of sequential motor ability. You know if you get into how to
test longer and longer and longer units, it usually requires longer
and longer and longer motor responses. That is one of the problems
that we have to address ourselves to in this testing.

Notation: The above discussion was taken from a less than perfect audio
tape of the discussion that followed my presentation. My apologies to any
clinician who was concerned enough to comment but whose comments could not
be included due to the quality of the tape. It will also be noted that
some editorial liberties have been taken to save either space or for the
purpose of clarification. I certainly hope that these editorial liberties
are accurate to the intentions of those who were so gracious to have
commented.