

The Nonword Decoding Test

Introduction

It has been claimed that "nonword reading requires skills that are not needed for word reading" (Campbell and Butterworth, 1985, p. 437). But for most readers, unlike RE, the subject of Campbell and Butterworth's case-study, a non-alphabetic route to reading is scarcely an option. A recent review (Rack et al., 1992) argues convincingly that phonological processing is the core deficit in dyslexia. This core of difficulty may interact with other skills and difficulties the dyslexic has (variety may be expected within any group) and be concealed to some extent by effective teaching. Dyslexics may occupy different positions in a continuum of severity (Snowling, 1993), ranging from phonological dyslexia to surface dyslexia.

The use of nonwords is well-established as a research tool in dyslexia and is revealing *because* reading is a quest for meaning; an analogy would be experiments into the effects of gravity on the human body which are done in space, in conditions of weightlessness. An inability to decode nonwords highlights the grapheme-phoneme translation difficulties which may lie at the heart of an individual's specific learning difficulties. However, whole-word guessing may also be, in part, the product of the instructional methodology the individual has encountered (Johnston and Thompson, 1989) or the result of a developmental imbalance, with reliance upon visual information outstripping phonological, in the more able child (Johnston, 1993).

In any event, a test of nonword reading is an essential source of diagnostic information, with relevance for teaching. It is perhaps helpful to think of reading progress as covering ground, not laid out by *rules* (the Napoleonic view of written language as a universal legal code), but consisting in *structures* (more a Darwinian view, with species and types). Thus the *-old* structure is usefully grasped as a family: *cold, bold, told, fold, sold, gold*.

The Nonword Decoding Test, therefore, establishes the subject's degree of familiarity with the possibilities of written English orthography. This is a matter of mapping morpho-phonemic letter-patterns onto underlying phonological representations. Consider the serial cumulative addition of letters, whose sound, and combinations of sounds, are all known, in the following example:

- *g* guh (vocalized with a *schwa*)
- *ng* this is familiar as a blend or digraph, common in English
- *ing* this confirms the common participial ending
- *ving* this promises to become a word such as moving on the same hypothesis
- *vingt* now we have the French numeral for twenty, a homophone of the word for wine - an utterly different interpretation of the orthography based on the underlying representations of French phonology which differ largely from those of English.

Knowledge of the forms of printed words builds upon experience of phonological, morphemic and syntactic units within spoken English. Naturally, therefore, it is much harder to acquire even an easily pronounced, syllabically regular word in Japanese. Consider, for example, *karoshi*, meaning "death from overwork". Since the forms of these sounds are not closely related to familiar English words, the apparatus of phonological memory is less well equipped to learn them. The nonwords in this test avoid, in the main, being either homonyms (but *poot* = put and *sode* = sewed) or analogues of real words (but *hount* is one letter different from *mount* and *fount*). Except for the last two, the words are not affixed (e.g. re-present-ation). The order reflects the nonwords' empirically established level of difficulty: *cim*

and *gep* are among the hardest words to read correctly, with their softened initial consonants. (Yet the utility of the soft *c* rule is 96%, as opposed to the soft *g* rule's 64%: Adams, 1990 p. 262). *Hij* and *kaphridge* are not like English words (most words beginning *ka-* are imports: *kaolin* comes from the Chinese) but are unambiguously decodable.

Administration

The individual is shown the nonwords one line at a time. The test was trialled using the following instructions as standard:

Here are some made-up words. They are not real words, so you cannot guess them. But you can read them. Try these.

The individual's responses are recorded using some convenient phonetic transcription. Of particular interest is any tendency to lexicalize - the conversion of nonword to a real-word near approximation (*slimp* = slide, *poot* = pool).

The test may be discontinued after 6-10 failures. But as the purpose is not to obtain a score but to probe decoding technique, this is a matter of discretion. For instance, the longer words in the last three lines do not demand significantly more knowledge of grapheme-to-phoneme correspondence rules, but, requiring the individual to construct polysyllabic words after assembling the appropriate phonology, challenge memory capacity.

Scoring criteria

To count as correct, responses must accord satisfactorily with pronunciation rules. For the most part the words admit of only one pronunciation, but note certain alternatives:

NONWORD	PREFERRED PRONUNCIATION	ACCEPTABLE VARIANT
bos	boz	boss
dar	as in car	
poot	as in boot	put
bune	boon or byune	
jow	as in cow	joe
liel	as in file	as in real
salder	as in alder	
toag	(one syllable)	
cim	sim	
gep	jep	

Words sounded letter by letter, but not blended, are not acceptable.

Scoring

The use of the NWDT is primarily clinical or qualitative, that is, to see what decoding technique the individual has. However, based on a small clinical sample (n = 64), the scores correlate $r = 0.850$ with the Differential Ability Scales test of Word Reading (single word naming). For comparison, this is a very similar relationship to that which may be observed between Word Reading and Spelling ($r = 0.852$, $n = 113$).

This regression has been used to give some simple "reading age" equivalences, for poor readers only, as follows:

Nonword Decoding Test			
raw score	reading age		
	from		to
0-6	5:1	-	6:1 0
7-12	7:1	-	7:7
13-16	7:10	-	8:3
17-21	8:9	-	9:9
22-24	10:3	-	11: 9
above 24	above 12:0		

Interpretation

About 75% of poor readers read nonwords at a level below what would be predicted, by regression based on the performance of normal readers, on the basis of their word recognition skills (Rack, 1989; cited in Rack et al., 1992). If an individual's reading ability on an acceptable test of single word recognition (BAS, DAS, WRAT, WORD) is markedly better than the coding skills apparent on the NWDT, the implication is that the phonological route is relatively weak and has been compensated for, to some extent, by acquisition by sight of whole words. This pattern of visual or whole-word recognition, in the absence of word attack skills, is characteristic of phonological dyslexia. General inaccuracy (omission and addition of letter-elements) is a feature, as is a tendency to impose a whole-word solution, overriding the orthography or pattern of letters on the page. Real word orthographic neighbours are preferred (*ipsidom* = imposition, *salder* = soldier).

However almost all proper names, however common, are nonwords in this sense (Grundon's of Mortlake), as are many commercial and brand names. Most children will not have read most names before. The absence of a phonological capability in an individual's reading repertoire is the mark of a significant disability.

Psychometric construction

The data for the NWDT were gathered in 1993-4 from a clinic sample of 61 individuals, 49 male and 14 female, aged from 5.8 to 17.4 decimal years, for whom high quality concurrent assessment data were available.

Cronbach's *alpha* (see, e.g. Cronbach, 1990), performed on all the individual item responses, was 0.931; that is, the test was highly internally reliable.

Ferguson's *delta* (see, e.g. Beech and Harding, 1990), a measure of discrimination power, was computed at 0.980; that is, the test discriminates exceptionally well among individuals of all kinds.

The norms, which are only indicative, were derived from these individuals' concurrent scores on the well-standardised test of Word Reading in the Differential Ability Scales (DAS; Elliott, 1990). The construction of the DAS, utilising item response theory, provides for an interval Ability scale, which in turn equates directly to age equivalent scores.

It was thus possible to construct a table of age-equivalent scores for unimpaired individuals of the same age for raw scores on the NWDT. The 39 items of the test had previously been selected on the basis of observed facility values, so as to cover an approximately smooth gradient of difficulty, with superfluous items at all levels being eliminated.

Martin Turner,
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References

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Stimulus set:

bos	op	ig	et	dar
slimp	grash	blit	petrang	lenk
pren	strilt	tef	freggy	hij
quarn	scad	poot	sost	sode
jeal	hife	hount	durl	bune
jow	liel	ipsidom	salder	toag
cim	cardonite	sprinderpilling	kaphridge	
gep	phoncher	concenated		
dissantomified	apprixengilate			