
Part I Beginnings

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1 Brenda

The scene: autumn 1949. Picture a newly appointed assistant lecturer, fresh from college and starting on an academic career. Apart from my normal teaching and research duties I was given the opportunity to attend the local Child Guidance Clinic for half a day a week. In those days the members of the clinical team comprised a psychiatrist, a psychologist and a psychiatric social worker. I was, of course, wholly new to the job. I had a degree in psychology but no postgraduate experience or training.

It was at this Child Guidance Clinic that my interest in dyslexia was first aroused. By a remarkable coincidence it was on my first day at the clinic that I met Brenda. Brenda was being referred at the age of 10 because of her poor progress in some aspects of her school work. She was being educated as a day girl at a private school not far from her home.

A report from her headmistress said, 'Appears very bright and is keen to answer in oral work, but ... she is very slow at any written work; possibly she is a little afraid of making mistakes. Her entire inability to spell is her great weakness.'

Tests given by myself and two colleagues showed Brenda to have an IQ of 116 on the Terman–Merrill (1937) test, a reading age of 8.3 years and a spelling age of 8.3 years on the Schonell (1945) reading and spelling tests, and a mental arithmetic age of 7.0 years on the Burt (1947) test. Her vocabulary score on the Terman–Merrill test (17 words correctly explained) gave her a pass at year xiv – far above the norm for her age. The incongruity of these results was clear, though it is interesting that at the time I had failed to appreciate the significance of her low score on the mental arithmetic test – the fact that there was a relationship between dyslexia and calculation difficulties did not become apparent to me until many years later.

Examination by an ophthalmologist revealed nothing defective in her eyesight and a psychiatric examination revealed no serious emotional difficulties. Some years ago, according to her mother, Brenda had confused 'b' and 'd', but this tendency had not persisted. Further tests at the clinic showed Brenda to be right-handed and right-eyed. In the light of the literature available at the time this was, perhaps, a surprising result: for many years the theory persisted that there was an association between dyslexia and 'crossed laterality', that is being right-handed and left-eyed or left-handed and right-eyed. However, my experiences with Brenda, and later with Michael (Chapter 2), led me to be somewhat sceptical from the start about whether there was any relationship between dyslexia and unusual handedness or eyedness (see also Miles, 1993a, Chapter 21, and Miles *et al.*, 1996).

Even in the case of three-letter words she would hesitantly say, 'Is it right?' At one point she wrote, 'het' instead of *yet*; when shown the sentence again, she did not

notice any mistake for about one minute, after which she said, 'I've put "het"', and corrected it. In my experience vertical confusions in dyslexics are not unknown, but, unlike horizontal ones – 'b'–'d' confusions in particular – they are rare.

Since I knew from the literature that some aphasic patients had difficulty in drawing a bicycle, I asked her to do so. For the same reason I also asked her if she could draw a ground plan of her house. Her attempts, as can be seen from my original paper (Miles, 1961, pp. 50–52), were extremely weird. It seems, however, that such curiosities are not typical of dyslexics in general, as I learned when I later gave these two tasks to other dyslexic children. At the time, of course, I had little idea of what was typical of the dyslexic child and what was not. Similarly she had appreciable difficulty over the Koh's Block test (a test similar to what afterwards became the Wechsler Block Design test), where two-dimensional patterns have to be reproduced by three-dimensional blocks, as in the Wechsler (1974) Block Design test. Most dyslexics do well on this item, but there are exceptions (Miles and Ellis, 1981, p. 230). What I would now say is that dyslexia is a variable syndrome: manifestations which have a dyslexic 'feel' to them vary from one individual to another.

Since in her spelling she frequently put the letters in the wrong order (see below), I had wondered if in some sense she 'saw' the letters the wrong way round – though I am still puzzled as to what exactly this might mean. With this idea in mind I asked her to copy written words from a book, writing as fast as she could; she was given to understand that it was a test of speed. When she was in a position to copy words, she made no errors at all. Her writing of letters in the wrong order when she spelled words could therefore not have been due to any kind of 'crossed pathways' in the optical system, such as had been hypothesised by Orton (1989).

During the testing Brenda occasionally tried out the 'look' of words on a rough piece of paper. This suggested an ability to compare the word in front of her with some kind of memorised visual image. I therefore thought it might be interesting to find out to what extent she had auditory imagery as well as visual imagery. When I asked her if she could imagine voices, she replied, 'I can imagine Daddy's – it's an odd voice.' She had no problem in understanding what I meant. I have found no evidence, either at that time or since, that dyslexics are in any way different from anyone else in respect of their visual or auditory imagery. Years later, when I gave the Bangor Dyslexia Test in 1982 (Miles, 1997) to some of my subjects, they did not physically turn in their seats but told me that they imagined themselves doing so. The ability to imagine appears to be in no way deficient in dyslexics.

Dr Simmons, the psychiatrist who was the head of the clinical team, explained to me that he thought Brenda was suffering from a form of aphasia. He believed that there were ways of helping such children with their reading and spelling, though he did not know exactly what needed to be done. He then asked me if I would like to try to give such help to Brenda. Unable to resist the bait, I agreed; and for the next nine months I used to visit her house once a week after school to give her spelling lessons. The sessions lasted for about 30 to 45 minutes.

One of my first tasks was to focus my attention on her spelling errors. I examined both the misspellings which I found in her school books, which were all less than a

year old (see under '1'), and those which she had made on the Burt test when she was being tested at the clinic (see under '2').

This is what I found:

- 1 • whde like to go to es school whte Tome
would like to go to school with Tom
 - a large bees of stfe calld a carpet
a large piece of stuff called a carpet
 - cooking is den on the sotof
cooking is done on the stove
 - the both is to be fond in the bothroom
the bath is to be found in the bathroom
 - he whnet, and his sissder did the whsing
he went, and his sister did the washing
 - she ackte
she asked
 - ofar there
over there
 - it is plasant to bathe and slebas in the sea when it is shmth and cam
it is pleasant to bathe and splash in the sea when it is smooth and calm
 - we kach shreps
we catch shrimps
 - wather is rogff and the spera lashes high in the air it is buter to whach the
anger wafs from a safe disdons up the beech
*water is rough and the spray lashes high in the air it is better to watch the
angry waves from a safe distance up the beach*
 - prty calad catins
pretty coloured curtains
 - he is a dag
he is a dog
- 2 • I saw hre run by in the wet
I saw her run by in the wet
 - A bird nets in the gress gress
A bird's nest in the grass
 - The little kinton
The little kitten
 - I have askt fourty girls ... noen falled
I have asked forty girls ... none failed
 - Imatet there indosty
Imitate their industry
 - Axsplan every santens
Explain every sentence
 - The red hod fall on the wet mad
The red bud fell on the wet mud

- My dog cut his lag on an opon tin
My dog cut his leg on an open tin

It is clearly puzzling that such odd spelling mistakes should occur in the work of a girl who in some ways was clearly very intelligent. This was the basic challenge which was destined to affect my life for over fifty years.

I was given carte blanche by Dr Simmons to explore all possible methods of teaching. I decided to pay special attention to Brenda's spelling rather than to her reading. The programme which I devised for her was based on the assumption that she needed to pay close attention to the mouth movements – in particular the movements of her lips, tongue and vocal chords – when she said a word. It was then necessary for her to associate these movements with particular letters of the alphabet. This was what she had been trying to do already, but the matter was now made consciously explicit to her.

For all its oddity it is clear that her spelling is not unintelligent spelling. My hypothesis was that she was relying to a large extent on the tactile-kinaesthetic information resulting from her tongue and lip positions and movements when she pronounced the words. In other words it was first necessary for her to say the words either aloud or subvocally before she wrote them down, and her spelling was an attempt to put on paper the written symbols for tongue and lip positions and movements, not the written symbols for words as such.

It follows from this hypothesis that confusion between letters is most likely whenever the tactile-kinaesthetic cues are such as to make discrimination difficult. I therefore attempted to analyse her spelling with this consideration in mind.

Mistakes over vowels In the first place little tactile-kinaesthetic information is obtainable by pronunciation of vowels; and it would therefore be evidence in support of our hypothesis if mistakes over vowels were relatively more numerous than mistakes over consonants. This is in effect what we find. Analysis of the above spelling gives the following table.

Table 1.1. Numbers of correct and incorrect spellings of consonants and vowels by Brenda

	Correct	Incorrect
Consonants	316	36
Vowels	160	58

Adapted from Miles (1961)

It is clear from this table that Brenda was making a larger proportion of errors over vowels than errors over consonants (note 1.1).

If we are dependent simply on the tactile-kinaesthetic data arising from tongue and lip positions and movements, it is often difficult to tell whether a vowel occurs

or not. Our hypothesis therefore explains how it was that Brenda was able to string consonants together with no vowels at all and sometimes add vowels in the wrong place. Examples of the first type of mistake are 'stfe' and 'shmth', and of the second, 'spera', 'slebas' and 'sotof'.

Where the superfluous vowel is inserted, it is probable that Brenda was saying the word extra slowly. This may well have been the result of an attempt to be extremely careful, and it is worth calling attention to the large expenditure of effort which spelling involved for her. As I wrote at the time in my 1961 paper, 'We may be quite sure that for the developmental aphasic spelling is extremely hard work.'

The inclusion and omission of the letter 'e' appears for Brenda to have been a matter of guesswork. No doubt she had been told that some words carried the final mute 'e', but had no means of telling when it was or was not required. Thus she included an unwanted final 'e' in 'whde', 'whte', 'Tome', 'stfe' and 'ackte' and omitted a required final 'e' in 'bees' (*piece*) and 'sotof' (*stove*).

Mistakes over consonants If our hypothesis is correct, one would expect all or most of the mistakes over consonants to occur when the tactile-kinaesthetic cues are least informative. This is in fact what we find. Three main classes of mistake will be considered first, namely (i) the substitution of an incorrect letter, (ii) the addition of an incorrect letter and (iii) the omission of a letter.

There are no tactile-kinaesthetic cues for distinguishing a soft 'c' from an 's' or a hard 'c' from a 'k'. This would explain why *catch* is spelt with a 'k' ('kach'), why 's' is substituted for 'c' in *distance* ('disdons') and *sentence* ('santens'), and why 'c' is substituted for 's' in one of the spellings of *asked* ('ackte'). The 'd' in *asked* is in fact pronounced as a 't', which would explain the substitution of 't' for 'd' in both 'ackte' and 'askt'); and substitution of 'd' for 't' in *distance* ('disdons') and *sister* ('sisssder') is made particularly easy because of the s-sound immediately beforehand and the schwa sound which follows.

As regards position of the lips 'b' and 'p' are similar to each other as are 'f' and 'v'; in both cases the only differences are in voicing, and these are sometimes minimal. Examples of confusion over 'b' and 'p' are 'slebas' for *splash* and 'bees' for *piece*. Examples of confusion over 'f' and 'v' are 'ofar' for *over*, 'wafs' for *waves* and 'sotof' for *stove*. There is the further complication in this case that Brenda lived in Wales, where the v-sound is represented by a single 'f' and the f-sound by 'ff'. Even those who speak no Welsh may come across place names (e.g. Llanfairfechan) and notices (e.g. PREIFAT – private) where the 'v' sound is represented by an 'f'.

The examples cited in this section account for 14 out of the 36 mistakes.

The addition of 's' after 'x' in 'axsplan' (*explain*) is phonetically intelligible if we assume Brenda to have been saying the word slowly and carefully. The addition of 'h' after 'w', as in 'whde' (*would*), 'whte' (*with*), 'whnet' (*went*), 'whsing' (*washing*) and 'whach' (*watch*) is also understandable if we assume that she knew that in some cases 'w' would be followed by 'h'; in that case the absence of tactile-kinaesthetic

data would make the decision whether to include or omit the 'h' a matter of guess-work. Few speakers are strict in sounding the 'h' in *where*, *what* etc.

The examples cited in this paragraph account for a further six out of the 36 mistakes.

There are no tactile-kinaesthetic cues for determining whether there are two *t*'s in *better*, two *f*'s in *stuff*, or two *l*'s in *failed*, nor are they represented by any very definite tongue or lip movements. This explains five out of the 36 mistakes.

Mistakes also occurred in connection with the letters 'l', 'm', 'n' and 'r'. Thus there is no cue to indicate the presence of an 'l' in *would* or in *calm* ('whde', 'cam'). The 'm' in *shrmps* is not a sound prominent in normal speech, which makes sense of Brenda's 'shreps'; and the converse to this appears to have happened when she put in the extra 'n' in *kitten* ('kinton') – presumably she knew that sometimes the extra 'm' or 'n' is needed even though it is not heard. The *r*'s in *coloured* and *curtains* are not represented in English by tongue or lip movements; hence we have 'calad' and 'catins'; 'indosty' for *industry* appears to be the result of rather slipshod pronunciation.

The examples in this paragraph explain a further seven mistakes.

'Rogff' for *rough* accounts for a further one. There remain the extra 'h' in *smooth* ('shmth'), the omission of 'h' in *splash* ('slebas') and 'a bird nets' for *a bird's nest*. In the case of 'a bird nets' it is not at all clear what has happened. It is possible that Brenda was confused and simply put in an 's' randomly without having time to work out where exactly it should go.

At first glance it might seem that Brenda's spelling is full of what at the time, following Orton (1937), I called 'reversals' – letters misplaced as a result of directional confusion. A closer examination, however, will, I think, reveal that there are relatively few clear-cut cases of this. Thus 'whde' and 'whsing' are not necessarily examples of a misplaced 'h'; the 'h' may simply have been added to the 'w' as in 'whde' and 'whach'. Even 'hre' for *her* may not be what Orton would have called a 'kinetic reversal'; the 'e' may simply be a mute 'e', as in 'stfe' and 'whde'; 'noen' for *none* is similarly ambiguous. To start the word *school* 'cs' clearly indicates some uncertainty over letter order, as does 'nets' for *nest*, but putting letters in the wrong order need not imply 'kinetic reversals' in Orton's sense (see also Chapter 3, comment no. 3).

Since the main problem for Brenda was that of determining the correct vowel, I directed my energies in the first place to trying to find a way of helping her over this. To start off, she was required to draw five columns in an exercise book. The first was headed by the word *bag*, the second by the word *beg* and the third, fourth and fifth by the words *big*, *bog* and *bug*. Each column had a 'noise', which was its vowel sound with the consonants on either side being removed. Using the International Phonetic Association (IPA) script it is possible to symbolise these five noises as æ, e, i, ɒ and ʌ.

Brenda was asked to make the 'noises' for each column in turn, concentrating on the mouth movements as she did so. The 'noise' could easily be associated with a particular letter, and thus any word with the same 'noise' as, say, *bag* would necessarily

have to have the same letter, namely 'a', as its vowel. *Cat*, *ham* etc. would go in the *bag* column; *cot*, *dog* etc. would go in the *bog* column, and so on. The consonants were left in the main to look after themselves since, apart from 'f' and 'v' and a few other pairs, the phonetic distinction between them is not difficult to make.

The next stage was to introduce a new set of 'noises'. The 'noises' chosen were the long 'a', the long 'i' and the long 'o' (IPA script, *ei*, *ai*, *ou*) and the three columns were headed by the words *tame*, *time* and *tome*. Brenda was required to pay attention to the contrast between the 'noise' *æ* (short 'a') and the *ei* 'noise' (long 'a'), and was told that when the long vowel occurred an 'e' was necessary at the end. Thus *mate* carries a final 'e', whereas *mat* does not. (Only three columns were introduced into her book here. Columns corresponding to the long 'e' and the long 'u' could have been made (*i*: and *u*:), to allow for words such as *gene* and *tune*, but this seemed an unjustifiable complication at this early stage since most words with the *i*: 'noise' are not spelled 'e-blank-e', and words ending 'u-blank-e' are not only few but sometimes have different pronunciations, e.g. *tune* and *fluke*. At the present stage simplicity was essential.

Further 'noises' were introduced in a systematic way – 'ai' and 'oa', as in *pain* and *moat*, and words ending in 'ea' and 'ee', such as *sea* and *see*. Brenda was told that she would simply have to remember which words went like *pain* and which like *tape*, which like *moat* and which like *hope*, which like *sea* and which like *see*, etc. I explained that in these cases she might sometimes be unlucky and guess wrong, but this would not be her fault, provided she set about the task in the way I had taught her.

In due course I introduced her to words ending in 'ay' and 'ight' and also to 'oo', 'ou' and 'oi'. At this point it was possible to introduce words containing more than one syllable, such as *avoid* and *loiter*, as were words ending in the suffix '-ation'. Once Brenda had become familiar with the suffix '-ation', it was possible for her to spell much longer words—provided they were regular – such as *procrastination* or *contamination*.

In general the purpose was to give her rules to follow whenever this was possible, rather than present her with the formidable task of having to remember every word in the language by heart.

As far as Brenda was concerned the method had its ups and downs. She seemed to take to both the method and the teacher satisfactorily, but progress was by no means uniform. Thus one report, six months from the start, reads: 'Evening of despair. Brenda had a cold, which may account for some of it. Even so she showed remarkable disability. Starting with "point" she could not even make the "oi" "noise". We went laboriously through other words that I had put on a list, with Brenda guessing wildly at the 'p' and 'e' correct noises. "Pain" was started with the letters 'p' and 'e'. Definite relapse ... we shall never get far at this rate.' The report for the next week, however, is more encouraging: 'Brenda much brighter again this evening. Cold better. Went through last time's list without much trouble.'

An incidental difficulty with the method used (quite apart from its failure to allow for the many irregularities in the English language) is that vowels are pronounced

differently in different regions. Brenda was not alone in finding *bag* and *beg*, as pronounced by me, hard to distinguish.

At one point, towards the end of the teaching sessions, Brenda was asked to place her tongue on her upper lip and to spell without using either of them. This does not, of course, eliminate altogether the possibility of cues derived from mouth movements, or of images of mouth movements, but it is a restriction which would be expected, if my main thesis about her spelling is correct, to make matters very difficult for her. She immediately said: 'This is cruel', and among other misspellings she produced 'imagination' for *imagination*, 'armodelo' for *armadillo*, 'amatomegal' for *anatomical* and 'buciful' for *beautiful*. At the same session I questioned her directly about her progress. She explained that she could see the words now in a way in which she could not before. 'It just came. I can see them in my brain's eye (sic); before I was just guessing.'

The teaching sessions were discontinued after about nine months owing to her family's change of home. Unfortunately no final spelling test was given as a check on her improvement, but a year and a half later, in reply to a follow-up by the Child Guidance Clinic, her headmistress wrote: 'Her form mistress says that she has made steady (although not spectacular) progress in spelling and seems quite hopeful about her.'

The following extract from her school work was obtained:

An Adventure out at sea

We had decided to go on a boat for a week. We packed our things, and ordered a boat. Next day we were off ... It was about four o'clock, when we arrived, so we got tea rightaway. Ann, our friend was putting a cake on the cloth, when she slipped and disappeared. We called, and called, but we could not find her. Worried and frightened we ran over the green slopes calling all the time, but we could not find her.

We made our way down to the beach, but as we arrived there we found Ann's sandals on the sands, and foot prints round about. Trembling with frighten we followed the prints, though I did not want to, but follow them we did. The led us to a cave covered with seaweed. We pulled the seaweed down, and there was Ann tied to a rock. Hurriedly we untied her, only to find three men there.

Roslie told us to run. Run we did, and reached the Police station looking like scarecrows with seaweed hanging from us. We told the Police, who ran up and caught the men. We received a big reward.

I shall return in Chapter 3 to a discussion of some of the theoretical issues raised by Brenda's case. A lesson which I learned from the very start was that, if children such as Brenda are to be helped, it is necessary to carry out a thorough and detailed examination of their spelling errors.

RECOLLECTIONS

On one occasion I remember telling a colleague of Welsh birth that Brenda could not easily hear the difference between *bag* and *beg*. He replied that, as I had said the

two words, he could not hear any difference either! He was a native Welshman, and I think his difficulty may have been caused by my unfamiliar pronunciation. I was told later by my colleague E.L. Tibbits, Lecturer in Speech Education, that, in north Wales, if I had said 'baag' the sound would have been picked out more easily.

NOTE

Note 1.1 Chi-squared ($df\ 1$) = 26.23, $p < 0.001$.