

Basic Spelling Competence in Adults

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There is virtually complete agreement among competent researchers that the development of linguistic knowledge in human beings is dependent upon the complex interplay of two factors: the learner's inborn capacities and the linguistic environment. Because it is not possible to directly observe the nature of the learner's mental capacities, there has been a great deal of controversy over the exact role that they play in the language acquisition process. Forced as we are to make complicated inferences about the type of language acquisition mechanisms that a child needs for success in the linguistic environment, there will probably always remain serious disagreements over the precise contribution which properties of human nature make to the acquisition of language.

While spelling behaviour is obviously shaped in part by experience and instruction, there is every reason to believe that it is also the product of some very special cognitive abilities. Writing and spelling are characteristically human activities and actually constitute a relatively recent achievement in the history of mankind. A speaking animal for 100,000 years (by even conservative estimates), man's alphabetic activity dates back no more than 3,000 years. Given its relatively recent appearance and its specifically human character, it is hard not to believe that writing activity is integrally dependent upon the existence of some fairly sophisticated set of cognitive capacities that allow human beings to assign a consistent and unitary graphic representation to an infinitely variable stream of auditory signals. Like language acquisition, then, the learning of a system of graphic representation (an orthography) would seem to be dependent on an interplay between some very specific, highly developed mental capacities and some appropriate type of experience with a writing system. Unlike the study of first and second language acquisition, however, it is possible to characterize the precise nature of the contribution which properties of the mind make to the development of graphic skills -- thanks to the existence of a remarkable phenomenon which manifests itself in the pre-school years.

One of the most fascinating aspects of a young child's pre-literate graphic competence is his ability to make use of his knowledge of letter names to write the words of his language (Read 1973, Chomsky 1976). While only a minority of pre-literate children seem to develop their own system of invented spelling, there are, as we shall soon see, remarkable uniformities in the way in which these children use the 26 letter names to represent the 40 or so phonemes of English.

The significance of pre-literate writing for a theory of graphic competence should be obvious. Because pre-school writers spontaneously develop a spelling system without any experience with conventional orthography, their writing constitutes a fairly direct manifestation of those

mental abilities that must have allowed man to develop alphabetic systems of graphic representation for language in the first place. In fact, one might say that pre-literate spelling provides a window that allows us to look into the mind and to assess the contribution that the child's inborn cognitive capacities make to his ability to acquire an orthography.

An examination of the pre-literate writing activity of young children (as documented in Read 1973 and Chomsky 1976) reveals a system of graphic representation that differs from conventional English orthography in a number of remarkable ways. Young pre-literate writers, for example, apparently do not assign any special status to phonemic segments in their writing system. As a result, it is not unusual to find VC or CV sequences as well as diphthongal elements represented by a single graphic symbol (see item 4a in the Appendix). The tendency for pre-literate children to develop the type of 'letter name spelling strategy' exemplified here strongly suggests that the establishment of a one-to-one relationship between graphic symbols and individual phonemic units is not assigned any special priority by the basic cognitive component of graphic competence.

A second important characteristic of pre-literate spelling is the practice of assigning the same graphic symbol to phonemic segments that are phonetically related to each other. We thus find the child using the same symbol for homorganic affricates and fricatives and the same letter for tense-lax vowel pairs with the same approximate place of articulation (see Appendix, 4b and 4c). The sophisticated use of letter names just exemplified suggests that the child has a very precise understanding of the phonetic relationships among the phonemic segments of his language and that he is able to exploit this knowledge to increase the representational range of his spelling system.

A third interesting property of the spelling activity of pre-school children is an apparent nonchalant disregard for the readability of what is written. The orthography, while providing a rudimentary record of the phonetic properties of linguistic form, is typically uni-directional in that spellings can generally not be reliably decoded (see Appendix 4d). Interestingly, the children do not seem to be concerned by the illegibility of their spellings and they typically have no interest in reading what they have written down.

It is important to realize, of course, that the spelling behaviour just described is almost certainly shaped in part by the letter names found in the English alphabet. It is improbable, for example, that a child would use H to represent both /č/ and /š/ (as in Appendix 4a and 4b) if there were a letter with the name 'esh' in the English alphabet. It is likewise also unlikely that the child would use the letter A to represent both /e/ and /ε/ if there were a symbol with the name 'eh' in the English alphabet. These facts notwithstanding, pre-literate spelling activity still provides fairly direct insights into the nature of human graphic competence. Not only does the child develop the graphic conventions exemplified above in a completely spontaneous fashion, the ease with which he adapts to the limitations imposed by the system of English letter names

strongly suggests that there is no conflict between his performance and the special mental abilities that make alphabetic systems of graphic representation possible in the first place.

If the cognitive capacities that underly graphic competence somehow required the development of a spelling system that established biunique relationships between sounds and letters, one would expect pre-literate spellers to either set aside their attempts at graphic representation and wait (as most children do) for instruction in conventional orthography or to develop a system of diacritic marks, double letters and invented symbols to supplement the letter names of the English alphabet. The fact that pre-literate spellers reject both of these options and press ahead with the orthography characterized earlier strongly suggests a basic compatibility between the properties of this writing system and the cognitive foundations of graphic competence. Our original position on the importance of pre-literate spelling for a theory of graphic competence is thus confirmed and we can now proceed to examine the nature of spelling ability in adults.

In an attempt to determine whether or not invented spelling activity will provide access to the cognitive foundations of graphic competence in adults, we designed the experiment detailed below.

The Study

Design. We devised a mini-alphabet comprising eight alien symbols, each with a corresponding letter name (Appendix 1). Twenty adults, all unilingual English speakers with no training whatsoever in linguistics, were taught this alphabet in the belief that it was used to represent an actual foreign language although in reality all the sounds employed could have been drawn from an English inventory. The teaching and testing procedures were conducted over three consecutive days.

Day one was devoted to teaching the alphabet by means of flash cards, repetition and writing of the symbols. The subjects learned very quickly and were asked to continue their learning at home using any means, visual, auditory or kinaesthetic, with the proviso that they could not write anything in any alphabet other than the one being taught.

The first writing session on Day Two was preceded by a review to determine that all subjects were able to recite, recall, recognize, identify and write the complete alphabet. The subjects were then instructed to write ten consecutive nonsense words that were presented to them orally (Appendix 2).

On the third and final day there was a brief review, again to ensure mastery. The subjects were then presented with 15 consecutive nonsense words, six of which appeared in the set from the previous day.

The nonsense words were structured in such a way that our subjects were faced with a task which we feel closely approximates the dilemma of

the pre-school invented speller. That is, the words contained more phonemes than there were symbols (13 versus 8), there were no letter names consisting solely of a lax vowel, stop, fricative or affricate although the words demanded that each of these types of sounds be represented by the symbols available. At no time was information regarding possible sound/symbol correspondences given to the subjects. Like the children, they literally had to invent their own spelling system. The question is: Can they still do it, or has their graphic competence decayed?

Results. An examination of the ways in which the adults represented the 25 nonsense words indicates a remarkable reliance on the same types of strategies employed by the pre-school invented speller. It is of interest then to compare the adults' performance to some of the particular strategies and distinguishing characteristics of the young pre-literate writer.

Letter Name Strategy (LNS)

Although four different syllable structures were presented to the subjects (CV, VC, GV, VG), a LNS was employed in a highly significant (81.5%) number of cases where it was possible (Appendix, 3a). Even in cases where the subjects had a choice either to represent each and every sound within a word with a symbol or use a LNS (e.g. /yum/ could be represented with three symbols or the letter name /yu/ plus an additional symbol), they preferred to use the letter name to represent the first two sounds in that word.

Representation of a Fricative with a Homorganic Affricate

When asked to represent the fricative /ʒ/, our subjects felt more compelled to use the symbol Π (/č/) which has the same place of articulation rather than use the symbol Φ (/sa/) whose letter name contains a fricative (Appendix, 3b). Like the children then, place of articulation was an important criterion for establishing the correspondence between the sound and the symbol.

Representation of Lax Vowels

Our adult subjects exhibited the same ability to exploit the relationship between phonetically similar sounds that was observed in the children's spelling discussed in the first part of this presentation. This was demonstrated by the tendency of our adult subjects to use the diphthongal letter name Δ (/aw/) to represent the lax vowel /a/ (Appendix, 3c). Another manifestation of this phenomenon is seen in the representation of /a/ with Δ (/aw/). It is not really surprising that Δ (/aw/) should be used to represent both /a/ and /a/. These two vowels are phonetically very close. Indeed the children were found to represent two such phonetically similar vowels with only one symbol.

On the basis of these findings one would expect perhaps the adult subjects to represent /a/ with the letter Γ (/aj/) as the children do but

in fact this happened in only 8% of cases. Why should it be that the adults were unable in this case to use their proven ability to exploit phonetic relationships? It may well be due to the fact that the diphthong /aj/ functions as a single unit in adult English. If this was the reason, it was the only time a difference in the invented orthography of adults and children could possibly be attributed to linguistic development.

Irrecoverability

As we have mentioned previously, many words written by the pre-literate speller are not readily decodable (Appendix, 4c). This was also observed in the adults' writing. As was mentioned before the vowels in words such as /bač/ and /bač/ were often represented by the same subject with one symbol, Ъ (/Λw/). This makes neither of these two words recoverable with any accuracy. A post-test did establish however that these words were perceived as being distinct from each other.

Inconsistencies exhibited in the children's writing also play a part in preventing the words from being easily recoverable. Likewise the adults' representations contained many inconsistencies. For example, in the spelling of the word /čab/, eleven of the twenty subjects used a different symbol for the vowel on each of the two writing sessions. All subjects seemed however quite unperturbed by the irrecoverability of their writings. At no time did any of them display the need to expand the system by the use of diacritics or any other means. They seemed, like children, to accept the system as being absolutely capable of handling their representational needs.

Interference from English Orthography

There is no possibility that the child is subject to interference from another orthography whereas this is a factor that could influence the adults' performance and therefore warrants some inspection.

Although the evidence for influence from English orthography is actually quite scant we should mention two instances where interference may have been a factor. In the two words which contained the sound /š/, /šajm/ and /ušmu/ (Appendix, 2), that sound was represented by the two symbols Ф Ъ (always in that order) in 17 of the 40 examples we have. It is possible that some subjects may have used two symbols knowing that in English /š/ is represented by the digraph composed of symbols S and H. We do know however that not all of the adults in question were subject to such interference as some said that they felt /š/ was closer to the letter name /če/ and that they added the second symbol /sa/ to 'soften' the sound. The other subjects were unable to say why they had used the two symbols. It is difficult then to determine exactly the amount of interference present.

The other example of interference we noted was in the representation of the sound /Λ/ as in the word /čab/. The vowel in this word is represented in the English orthography by the letter U. You will remember that in our

alphabet we also had a letter with the name /yu/. If interference was a major determining factor in the spellings, certainly it would have surfaced here. In fact of the 120 examples we have of words containing the sound /Λ/ only 28 have the vowel represented with the symbol called /yu/. Clearly then, although some transfer was evident it was very weak.

Discussion

From the data just presented, it seems safe to conclude that the basic graphic competence underlying early spelling activity in children remains essentially unchanged in adults. As the invented spellings of the adults indicate, mature and experienced writers -- like pre-school children -- are capable of spontaneously developing an orthography which provides a rudimentary representation of the phonetic properties of speech but which does not seek to establish a rigorous system of sound-letter correspondences. The finding that graphic competence is apparently not subject to change over time is quite remarkable in light of the fact that related language learning abilities do seem to undergo some modification during childhood and adolescence with the result that the adult's capacity for second language acquisition seems to differ in significant ways from that of the child. Moreover, it is also worth noting that the spontaneous development of a system of 'creative orthography' is, unlike the process of second language acquisition in adults, remarkably free from the influence of the patterns of the native language system.

The purpose of this paper has been to compare the basic graphic competence of pre-literate children and adults and the principal finding has been that the cognitive foundations of writing ability remain essentially unchanged, manifesting themselves in pretty much the same way in the spelling activity of both adults and children. What are the implications of this finding for the ESL teacher? While research with speakers of non-alphabetic languages is necessary to fully substantiate this claim, it would seem that the basic cognitive abilities that underly mastery of alphabetic systems of writing remain essentially unchanged and undiminished in the adult. Moreover, the writer's access to these abilities seems remarkably unfettered by interference from the spelling patterns of his native language. We know, then, that if we give the average adult a set of alphabetic symbols and letter names, he is perfectly capable of devising his own system of graphic representation for a second language. While the adult's invented orthography will almost certainly differ from the conventional spelling system in a number of ways, it will provide a systematic representation of the phonetic structure of the second language -- as he perceives it. It seems to us that in order to fully exploit the adult's spelling ability, he should in fact be encouraged to begin writing in the second language with an orthography which he develops himself. A comparable type of program has been successfully implemented for the first language in elementary school settings (Beers and Henderson 1977; Chomsky 1976) and, given the stability of graphic competence, there is no reason to believe that it would not be appropriate for older students as well. The teacher's role in a spelling program that fully exploits the student's basic graphic competence is two-fold:

1) First, the teacher must ensure that the student's knowledge of the phonology of the second language continues to develop so that he can draw upon his basic graphic competence to work out an accurate graphic representation of the basic phonemic contrasts of the second language. In attempting to achieve this objective, the teacher can use the student's spelling to gain insights into his understanding of the phonetic structure of the second language. Just as a study of the spelling activity of a pre-literate child provides important clues about the way he perceives the sounds of his own language (Read 1973), so the creative orthography that the second language learner is capable of developing will reflect his perception of the sound structure of the language he is attempting to learn.

2) Second, the teacher must undertake the task of guiding the transition from the adult's invented orthography to the conventional spelling system of the language he is learning. This will involve recognizing the fact that the orthography which the adult's special cognitive abilities allow him to spontaneously develop will differ in important ways from the conventional alphabetic orthography of the language he is learning and that there could well be an optimal sequence for the introduction of the standard orthographic conventions of the second language. There is evidence from the study of spelling ability in children that the transition to standard orthography takes place in an orderly developmental sequence (Beers and Henderson 1977; Paul 1976) and it seems reasonable to believe that future research will identify a comparable phenomenon in adults. Instead of bombarding the second language learner with dozens of the spelling rules of English, then, we suggest that he be allowed and encouraged to make use of his basic graphic competence to develop his own 'natural' orthography and that his invented system be gradually modified, in accordance with a pre-determined optimal sequence, until the transition to conventional spelling is complete.

To conclude, we have suggested that adults, like children, have the ability to spontaneously develop an orthography for a language that they are in the process of acquiring and that this orthography should be seen as a desirable first step in the development of a conventional spelling system. It is our belief that this developmental sequence can and should be exploited by the ESL teacher and that the first step in the learning of a new orthographic system should be the spontaneous development of a system of invented spelling. We expect future research to provide further insights into the nature of graphic competence and the ways in which it can be exploited to facilitate the development of second language spelling skills.

Appendix

1. Symbols and Letter Names

Б	/yu/	Ф	/sa/
Л	/če/	Ж	/ma/
Г	/aj/	Д	/lw/
Н	/ub/	И	/ri/

2. First Writing Sessions

1. /saw/ 2. /yum/ 3. /sum/ 4. /čab/ 5. /ras/ 6. /bač/ 7. /sajb/
8. /čab/ 9. /ʌsub/ 10. /sar/

Second Writing Sessions

1. /mub/ 2. /suč/ 3. /sawč/ 4. /bač/ 5. /šajm/ 6. /rus/ 7. /ras/
8. /čab/ 9. /ʌsub/ 10. /ušmu/ 11. /sar/ 12. /yam/ 13. /yumb/
14. /risaj/ 15. /čab/

3. Examples of Spelling Strategies

a. Letter Name

Total times used: 81.5%

e.g. ФИ - /sar/; ЖН - /mub/; ФЛЛ /sawč/; ЕЖНО - /yumb/

b. Segmentation of Affricate -- Representation of š

/šajm/, /ušmu/ - Л (32.5%) or Ф (22.5%) or ФЛ (45%)

c. Representation of Lax Vowels (in words where letter name strategy was not possible)

e.g. /čab/ - Д (/ʌw/) 47.5%; Б (/yu/) 20%
/čab/ - Д (/ʌw/) 54%

4. Examples of Pre-Literate Spelling (Read 1971, Chomsky 1975 & 1976)

a. The use of a single letter to represent VC or CV sequences as well as diphthongal elements

R -are; U - you; NHR - nature; BCAZ - because; MAD - made; LADE - lady; NIT - night; BOT - boat; HOL - hole

b. The use of a letter name containing an affricate to represent a homorganic fricative

HE - she; FEHIG - fishing; KRAFIH - crayfish

c. The use of diphthongal letter names to represent lax vowels with the same place of articulation

E (iy) for I: FES - fish; FLEPR - flipper

A (ey) for ε: LAFFT - left; FALL - fell

I (aj) for a: GIT - got; CLIK - clock; DIKTR - doctor

O (ow) for o: POS - paws; WOTR - water

U (juw) for U: TUK - took; LUKS - looks

d. 'Unidirectionality' - spellings cannot be readily decoded

CAT spells both cat and can't

BAT spells both bait and bet

BET spells both beat and bit

References

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