Meara 1978

_lognostics

Schizophrenic symptoms in foreign language learners.
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"When people talk to me... it's too much to hold at once. My head is overloaded and I can't understand what they say. It makes you forget what you just heard, because you can't get having it long enough. Its all in different bits that you have to put together again in your head -- just words in the air and that you can figure it out from their faces."

"I can concentrate quite well on what people are saying if they talk simply. It's when they go into long sentences that I lose the meanings. It just becomes a lot of words which I need to string together to make sense."

"When people start talking a lot, I don't take things in. My brain is recording but I'm not getting any response to what is coming into it ... if I carried on, I would just be aware of sound. Everything would just be a jumbled mess."

These quotations from Lawson, McGhie and Chapman (1964) are descriptions by schizophrenic patients of their own difficulty in understanding language. Many monolingual readers may find it hard to imagine just what sort of experience is being described here. But anyone who has learned a foreign language and tried to use it to speak with native speakers will know exactly what is being talked about. The speech of the native speakers somehow eludes your grasp, and though bits of meaning float tantalisingly through your awareness, and certain words stand out starkly against an undifferentiated background of foreign sounds, the whole meaning of what is being said remains uncomfortably obscure.

The purpose of this paper is to suggest that there are some interesting similarities between the results of clinical investigations into the schizophrenic language problems and what we know about the behaviour of foreign language learners. The literature on 'schizolinguistics' is very large indeed, and a paper and this length clearly cannot hope to cover the entire field with any degree of adequacy. This paper is therefore limited to a discussion of the main characteristics of schizophrenic language behaviour, and I have taken as my guide here Maher's (1972) review. The discussion is not intended to be a comprehensive survey, but merely to highlight a number of similarities that do exist, and to suggest that the area deserves to be looked at much more closely than has been the case up till now.

Maher lists four main areas in which the language behaviour of schizophrenics is markedly different from that of normal native speakers:
a) their speech and written language are characterised by abnormally low type-token ratios;

b) their speech is generally less predictable than that of native speakers;
c) schizophrenics do not appear to make much use of sequential redundancies in their perception of language;
d) they produce abnormal word association patterns.

These four types of findings and the ideas that underlie them are discussed in detail in the sections which follow.

A: type token counts

Type-token counts are basically a measure of vocabulary diversity. They are calculated by taking a passage of a standard length, say 100 words, and counting the number of different words that occur in it. The type-token ratio (TTR) is the number of different words (types) divided by the total number of words (tokens). If all the words in a passage are different, then the TTR works out at 1.0. If all the words are identical, the TTR works out at a figure close to zero whose actual value depends on the number of words in the passage. In practice, TTRs usually fall somewhere in between these two extremes. Table 1 shows two passages and their associated TTR's. Notice how the passage which is intuitively 'simpler' has a lower TTR than the 'more difficult' passage.

TTRs are sometimes rather facilely dismissed as merely a measure of vocabulary size. This is an oversimplification, however. There is no reason at all to assume that a speaker with a large vocabulary should be distinguished from one with a small vocabulary over a stretch of language only 100 words long. In a passage of this length, the bulk of the repetitions are accounted for by function words such as ' a', ' the', ' of', etc. Nouns and verbs are rarely repeated in any great quantities. It seems that, for written material at any rate, the TTR is most affected by certain stylistic choices such as the use of simple or complex sentences.

Table 1: ***Examples of TTRs: two biblical passages (Jerusalem Bible translation)***

There was a big dragon in Babylon, and this was worshipped too. The King said to Daniel, "You are not going to tell me that this is no more than bronze? Look, it is alive; it eats and drinks. You cannot deny that it is a living God. Worship it then." Daniel replied, "I worship the Lord my God; he is the living God. With your permission, O King, without using either sword or club I will kill this serpent." "You have my permission," said the King. Whereupon Daniel took some fat and some hair and boiled them up together...

100 tokens; 67 types; TTR 0.67.

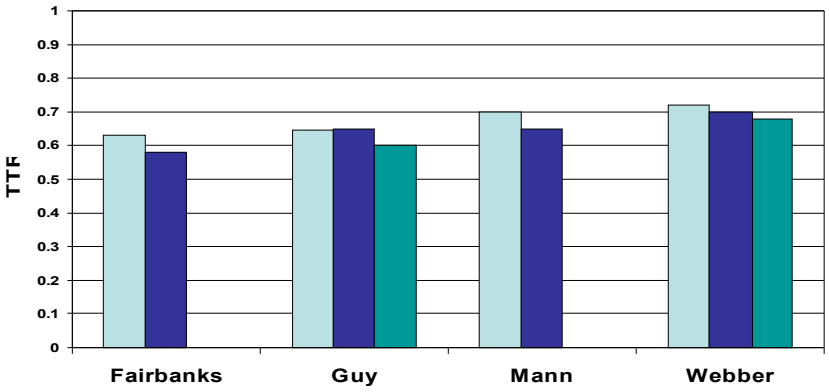
This is what you are to teach them to believe and persuade them to do. Anyone who teaches anything different and does not keep to the sound teaching which is that of our Lord, Jesus Christ, the doctrine which is in accordance with true religion is simply ignorant and must be full of self conceit -- with the craze for questioning everything and arguing about words. All that can come of this is jealousy, contention, abuse and wicked mistrust of one another and unending dispute by people who are neither rational nor informed and imagine that religion is a way of making...

100 tokens; 74 types; TTR 0.74.

Meara 1978

A number of studies have investigated the TTRs of schizophrenics. The rationale for this research was that schizophrenics are believed to be given to repetition of words and phrases, and repetitions of this sort have the effect of lowering the TTR -- that is, for a given length of passage, schizophrenics will produce fewer different words than normals. The earliest and most straightforward of the studies are those of Fairbanks (1944) and Mann (1944) and the results of the studies will be found in figure 2. Mann's figures are based on long samples of writing produced by groups of schizophrenic and normal speakers on the subject 'The story of my life'. These essays were broken down into 100 words samples, and the TTR was calculated for each segment. The segmental TTRs were then totalled and a mean figure calculated for each subject. (All other things being equal, the longer the passage the lower the TTR. It is normal to adopt Mann's procedure of breaking long passages down into shorter segments of 100 words in order to avoid the problems that arise when one tries to compare passages of unequal length.) The study by Fairbanks is exactly parallel to that of Mann except that it uses spoken material rather than written, and the subjects were asked to explain the meaning of a number of common proverbs. The discrepancy between the figures is due to the fact that TTRs for written material are generally higher than the spoken language, since the latter commonly contains false starts and half completed phrases which cause the TTR to fall.

Figure 2



TTRs of Normal Native Speakers and Schizophrenics for spoken material (Fairbanks) and written material (Mann). Normal speakers are denoted by light filled bars, schizophrenics by darker bars.
TTRs of Normal Native Speakers and two levels of L2 Learners for spoken Spanish (Guy) and written French (Webber). Native speakers are denoted by light filled bars. Advanced L2 Learners are denoted by darker bars.

Data from L2 learners is also shown in figure 2. The study by Webber compared native speakers and learners on the basis of essays written for the A-level examination in French on the subject "Aujourd'hui on n'a plus le temps d'apprécier la poésie. Discutez." [Today, we don't have time to appreciate poetry. Discuss.] Webber found that only the very best learners (those awarded a grade A pass) had TTRs that were as high as those produced by native speakers. Though there was no

obvious correlation between proficiency as measured by the examination and the TTRs, the lower graded groups all performed significantly worse than the native speaker control group. The study by Guy produces essentially similar results for spoken Spanish. Guy studied transcripts of monologues produced by native speakers and learners of Spanish on the subject of 'Mi familia' [My family]. She too found no difference between the most fluent learners, but a marked difference in mean segmental TTRs between the native speakers and the less fluent learners.

Direct comparisons between the learners' and the schizophrenics' results are not possible here, because the circumstances under which the learner samples were obtained are clearly different from those of the schizophrenics. Furthermore, in both the Guy and the Webber studies, the number of 100 words segments is much fewer than in Mann and in Fairbanks, which means that their results are that much less reliable. Nevertheless, there is a marked similarity between the two sets of data, and the differences between the native English speakers and the schizophrenics on one hand, and the native French and Spanish speakers and learners on the other are clearly of the same general order of magnitude. (The French and Spanish native scores are higher than those of their English counterparts because forms like 'le/la/les' and their equivalents in Spanish are counted as three separate types, whereas in English they will be treated as tokens of the single type ' the'.)

Something which should perhaps be considered here is that the choice of topics in the Fairbanks and Mann studies is not arbitrary. Schizophrenics apparently do not like to talk about themselves, so that '*The story of my life*' is not a neutral topic for them. It is, on the contrary, the stressful one. Similarly, schizophrenics seem to experience some difficulty in explaining the meaning of simple proverbs, so much so that there is a standard test, the *Lafayette Clinic Proverbs Test,* which exploits this difficulty for diagnostic purposes. The work by Webber and Guy chose topics which are much more neutral in this respect, and it is unlikely that the learner groups found the topics intrinsically more difficult than the native speakers. It seems quite plausible that less neutral topics might be found which would cause the learners much more difficulty than the native speakers. This might lead to lower TTRs for even the more advanced learners, and bring their behaviour closely into line with that of the schizophrenics too. Work in progress suggests that explaining proverbs is a particularly difficult task, and produces abnormally low TTRs even in very fluent L2 learners.

B: the predictability of schizophrenic speech

It is often assumed that we process speech and written language one word at a time, but this is a quite inaccurate view of the way language is handled by the brain. Studies of reading and speech perception suggest that a very important component of understanding is ' hypothesis testing'. Instead of treating each item as an unpredictable piece of information, we set up expectations about what the piece of language we are attending to is likely to contain. These expectations work on several levels: there are expectations of a semantic kind, what the passage is likely to be about and what it is likely to say about subject; there are expectations of a syntactic kind, what words and structures are likely to appear next; and there are also low-level expectations operating at the letter or sound level. Understanding language seems to be largely a matter of checking whether these expectations are true or false. If enough of our expectations turn out to be false, then we fail to understand at all. Material which is easy to make true predictions about is easier to understand than more opaque material.

Meara 1978

A very useful way of assessing the predictability of a passage in a relatively objective way is to use the *Cloze Procedure.* This idea was first developed by Taylor (1953) as a way of comparing the relative difficulty of pieces of written material. The procedure consists of taking the passage to be assessed and systematically deleting words from it at regular intervals. Every sixth word is a standard figure. This mutilated text is then presented to a group of people who are unfamiliar with the original passage, and they are asked to fill in the blanks. The easier the passage is, the more likely it is that the testees will find the word that was deleted from the original passage. The percentage of correct responses is taken as a measure of difficulty -- the more correct responses, the easier the passage is considered to be.

There are several important factors that can contribute to correct guesses. The most important of these are the constraints imposed by the normal syntactic patterns of English. Consider the three sentences:

> The _____(1) saw the man coming.
> The man gave a bone _____(2) the dog.
> The dog _____(3) the bone.

In all three cases there are strong restrictions on the type of word which could fill the gap. (1) must be a noun, and (3) must be a verb though in both cases a large number of nouns and verbs could plausibly be used. (2) is rather more highly constrained: a preposition is required, and this must be a word that fits in with ' the dog' being an indirect object of ' give'. A second factor that affects the difficulty of a Cloze Test is familiarity with the subject matter. If you are trying to complete a text that describes the structure of molecules, you are likely to have difficulty finding the right words if your own knowledge of chemistry is minimal. Familiarity with the style of writing is also important: the language of technical journals is very different from the language used in science books aimed at children, and the language used to describe a simple set of actions will not be the same in a novel and a policeman's report to a law court. To score highly on a Cloze test you need to be sensitive to variation of this kind.

An example of a Cloze test follows in figure 3.

Given a tool of this sort it is possible to ask two main types of questions. The first kind of question compares the relative difficulty of texts from two different sources -- a typical question of this sort might be whether leading articles from *The Sun* are easier than those found in *The Times* or *The Daily Mail*. The second question compares not passages of text, but groups of people who are believed to be different in some way. Typically here you ask the two groups to complete a single set of Cloze texts and see whether one group scores significantly better than the other. Both these approaches have been used with schizophrenics.

The first approach was used by Salzinger, Portnoy and Feldman (1964). They got schizophrenic patients to produce monologues which were then transcribed and Cloze tests were made out of these transcripts. Similar tests were made up out of monologues produced by a group of normal native speakers, and both sets of tests were given to a second group of native speakers who are

Meara 1978

Figure 3. A Cloze Test

The first way my father tried to make his fortune was the allotment garden. This turned out to be _____(1) large, rectangular plot of land, _____(2) surrounded by a privet hedge. _____(3) hedge was enormous, about six _____(4) thick and more than twice _____(5) high. It had probably not _____(6) cut for years. There was _____(7) to be a gate in _____(8) hedge, but it to us _____(9) days to find it -- not _____(10) it made much difference when _____(11) did, for the weeds inside _____(12) allotment were very nearly as _____(13) as a hedge round the _____(14). clearing the ground was a _____(15). the spade and the _____(16) that we discovered in the _____(17) of the old hut had _____(18) with age and neglect. New _____(19) would cost money, but my _____(20) sold this difficulty by ' going _____'(21). every week he invested half _____(22) pocket money in allotment shares. _____(23) was rumoured that the shares _____(24) payout a fine dividend _____(25) the summer when vegetable _____(26) was at its height.

Answers

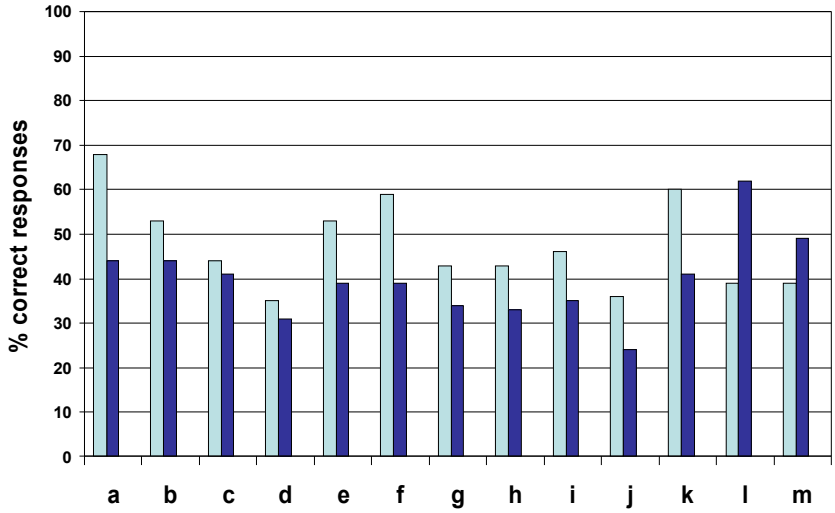
1: a	2: completely	3: this	4: feet	5: as
6: been	7: supposed	8: the	9: some	10: that
11: we	12: the	13: impenetrable	14: outside	15: problem
16: fork	17: ruins	18: rusted	19: tools	20: father
21: public	22: our	23: it	24: would	25: in
26: production				

asked to complete them. The results showed that in 12 of the 13 cases the schizophrenic passage was harder to complete than the passage produced by the matched normal speaker. The results of this study are shown in figure 4.

The main problem with this data is that provides us with no indication as to **why** the schizophrenic passage are harder to complete. Salzinger et al. interpret their results as proof that schizophrenic speech shows 'relatively lower communicability' than the speech of normals, but this is merely a redefinition of the problem, not an explanation of it. All three factors mentioned above could be involved -- the normal judges may not be familiar with the problems that schizophrenics want to talk about; they may be unfamiliar with the stylistic features of schizophrenic speech; or the schizophrenics may be violating the normal syntactic patterns used by native speakers. It is often assumed that the first and last of these are the main reasons for the difficulty, but there is little evidence to support either view. However, a number of other studies have suggested that the main source of difficulty lies with grammatical function words such as prepositions, pronouns and conjunctions, rather than full lexical items such as nouns, and verbs, adjectives and adverbs. No convincing explanation has been offered for this finding.

A similar experiment comparing native speakers and L2 learners is Philpot (1977). She asked native speakers of French and native English speakers learning French at an advanced level to

Figure 4

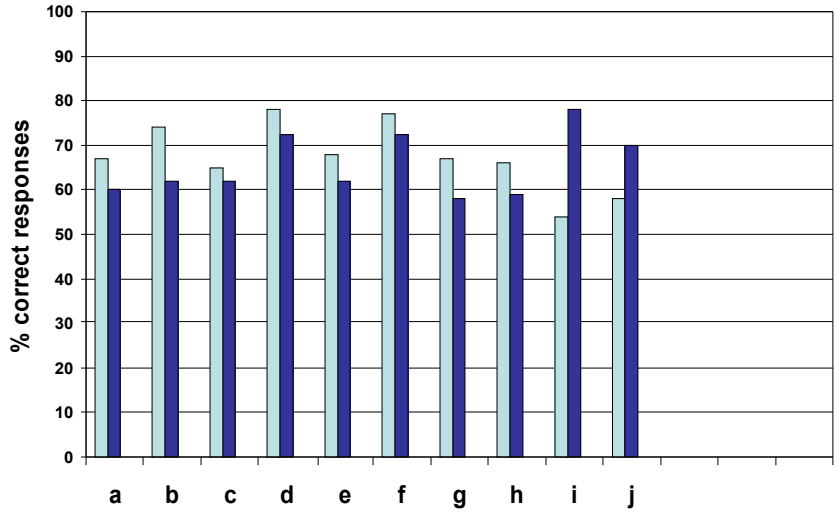


13 matched pairs of schizophrenics and normals compared on the predictability of Cloze tests based on transcripts of monologues. Scores for texts generated from Normals' monologues are shown in light shading. Scores for texts generated from schizophrenics monologues are shown in dark shading.

produce monologues which were transcribed and turned into Cloze tests. These tests were given to a second group of French speakers who were asked to complete them. Figure 5 shows these results.

These results are less striking than those of Salzinger et al. in that the differences between the native speakers and the learners are rather less than the differences found by Salzinger, and two of the learners passages appear to be easier than the corresponding native speaker tests. Nevertheless, there is a clear tendency for the learners' passages to produce fewer correct responses. This is a rather surprising finding, since one would have expected the speech of L2 learners to be very much simpler than the speech of native speakers merely because learners have limited language resources at their disposal. The L2 learners do, in fact, use a smaller vocabulary than the natives, and their sentence structure is more simple, and yet, in spite of this, native speakers still find these passages harder than those produced by their fellow L1 speakers. Philpot suggests that her results may actually be an underestimate of the problem, in that she asked her subjects to talk about their families, and this topic is one that lends itself to very predictable statements about relatives. This fact probably explains why Philpot's native passages are much easier than those study by Salzinger et al. It seems reasonable to suppose that had she asked her subjects to speak about things that cause learners much more difficulty, their reasons for liking or disliking something, for example, or any other topic that involves the use of abstract language, then the differences that she found might well have become even more striking.

Figure 5



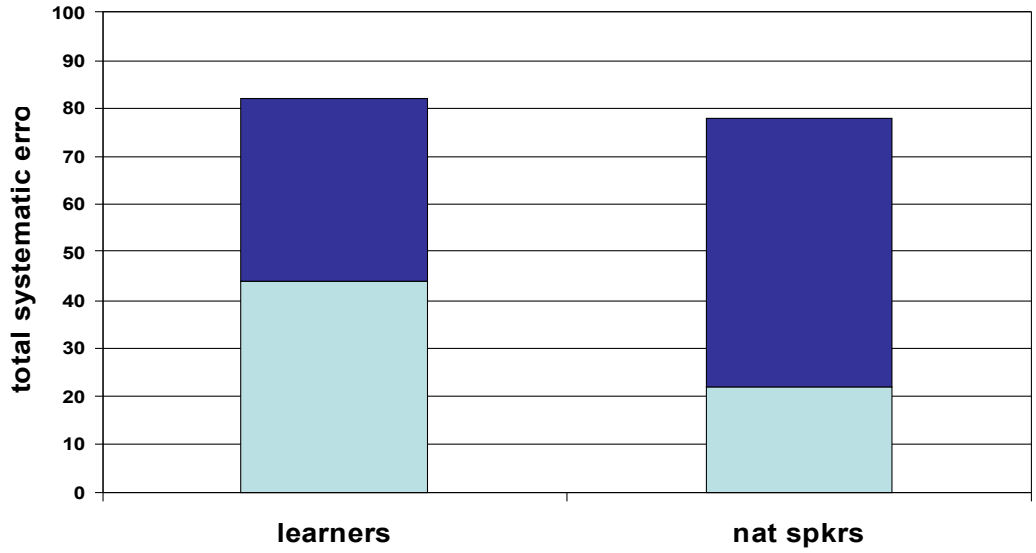
10 pairs of learners and native French speakers as per Figure 4.

The two passages where the L2 learners' score was higher than the corresponding native speakers' score are interesting in that far from being advanced, native like French, they actually consisted of extremely simple sentences which were highly predictable, e.g. *Mon père travaille dans une usine. Ma mère ne travaille pas dans une usine. Elle travaille dans un magasin. Ma soeur travaille dans un magasin aussi.'* [My father works in a factory. My mother doesn't work in a factory. She works in a shop. My sister also works in a shop.] The other passages lacked this repetitive juvenile style. This suggests that the relationship between fluency in writing in a foreign language and predictability as measured by Cloze tests is not a simple linear one; learners attempting to use language which is stylistically closer to native like language are more difficult to understand than those who limit themselves to basic vocabulary and syntax.

Philpot also reports that the characteristic difficulty with function words in schizophrenic passages is also found in the passages of the learners. Systematic errors (errors made by three of the four judges who marked each Cloze passage) were heavily biased towards content words in the native speaker passages. In the learners' passages, however, this difference disappeared: fewer errors were made on content words and almost twice as many on function words. See figure 6. This difference is particularly surprising in view of the very simple sentence structure used by the learners.

Here again, it would be unwise to compare Philpot's study directly with the results produced by Salzinger's schizophrenics. The monologues which she used deal with a different topic, and were obtained under conditions which were slightly different from Salzinger's. More importantly, her

Figure 6



Total Systematic errors, showing errors in function words (dark shading) and errors in content words (light shading).

study uses fewer native speakers to complete the tests, which means that her scores are that much less reliable, and she made no attempt to match her learners for characteristics such as sex and age which might possibly be important variables here. Nevertheless, it is clear that both schizophrenics and L2 learners produce texts which cause the native speaker some difficulty.

The second type of study using Cloze tests, in which schizophrenics are compared with other groups on a single set tests which they are asked to complete, is discussed in section C.

C: use of contextual redundancy

Evidence for Maher's third claim that schizophrenics do not make use of sequential redundancies in their receptive use of language, can be found in the way schizophrenics handle Cloze tests based on normal speech or writing. If schizophrenics do not make use of structural information, they would be expected to perform very badly on Cloze tests, where, as we have already seen, information of this sort is a major contributor to the production of correct answers. Schizophrenics do indeed perform badly, both on tests of written material, and on tests produced out of transcripts of spoken material (Honigfeld 1963). Salzinger's interpretation of this is that schizophrenics are heavily influenced by immediate stimuli, and in a Cloze test situation the answers they provide will often fit in with one reading of the immediately surrounding context words, but will violate the more long-term constraints or be at odds with the wider meaning of the passage.

Here too there is a parallel with L2 learners. There is a considerable body of evidence to suggest

that learners perform much worse than native speakers on Cloze tests. Oller (1973) in his review of this work has argued that appropriately chosen tests can distinguish between native speakers and even very advanced learners, and there appears to be a close correlation between ability to score highly on foreign language Cloze tests and scores of complex tests of achievement in the language, so much so that Cloze tests are regularly used in experimental work has an index of overall competence in the foreign language.

It is unfortunate that most of the research work on Cloze tests has concentrated almost exclusively on the number of correct answers made on a test; wrong answers have been largely neglected. Schizophrenics and L2 learners both produce the same sort of low scores on these tests, but we do not know whether this is because they make similar sorts of errors, or for some totally extraneous reason. Clearly more research in this area is needed.

Some rather more technical data relevant to Maher's third claim comes from a whole series of studies using statistical approximations to English. These are specially constructed word lists in which the relationship between adjacent words is systematically manipulated to produce strings of words which resemble normal English more or less closely.

A zero-order approximation to English is simply a list of words selected at random from a source such as dictionary.

A first-order approximation is a list of words that takes into account in the fact that certain English words are much more frequent than others. Such a list can be produced by selecting words at random from a continuous text. The main difference between these and zero-orders of approximation is that they contain a high proportion of grammatical function words such as 'a', 'the', 'and', etc.

A second-order approximation to English is a list in which each adjacent pair of words could be fitted together into a normal sentence. A list of this sort is produced according to the procedures shown in figure 7. The procedure can be modified to produce higher orders of approximation, by increasing the amount of context provided. In general, an Nth order approximation is produced by providing N-1 words of context, and asking subjects to invent a sentence in which they could occur together. Examples of several orders of approximation to English will be found in Table 7.

To modern readers the whole idea of statistical approximations is rather strange. They are based on theoretical descriptions of language which are old-fashioned and discredited, and are very much out of step with recent work in linguistics. When the idea was first canvassed (Shannon 1948), however, it was taken up with considerable interest by psychologists as a tool that could be used to investigate the role of syntax and grammatical organisation in the way that we process linguistic material. The first study of this kind was that of Miller and Selfridge (1950). They asked normal subjects to listen to statistical approximations of various lengths in an immediate recall task. It was found that higher orders of approximation were recalled far better than lower orders, but that except in the case of very long strings, there was very little difference in recall of third order and higher orders of approximation. This finding is extremely robust, and has been replicated under a wide variety of different conditions.

Table 7: Approximations to English: ***derivation of a second-order approximation***
The first subject is presented with a stimulus word and asked to use it in a sentence. From this sentence the word that follows the original stimulus word is given to a second subject who is asked to use it in a second sentence. The word that follows the stimulus word in this sentence is in turn given to a third subject who produces a further sentence, and the whole process is repeated with new subjects indefinitely. The second-order approximation consists of all the stimulus words in their appropriate order.

Example

house	the house **needed** a new roof
needed	I needed **to** get something to eat
to	to **be** or not to be, that is the question
be	will you be **free** tomorrow
free	beer will be free **after** the revolution
after	after **he** left, we all went out
he	he **is** my brother
is	it is **true** that he was old
true	true **love** never dies
love	did John really love **Mary**
Mary	Mary **had** a little lamb
had	a good time was had **by** all
by	by **all** accounts we should have gone
all	all **the** jewels were stolen
the	the **food** was excellent

the resulting second-order string is:

house needed to be free after he is true love Mary had by all the food ...

20-word approximations to English from Miller and Selfridge (1950)

1st-order approximation
tea realising most so the together home and for were wanted to concert I posted he her it the walked...
2nd-order approximation
sun was nice dormitory is I like chocolate cake but I think that book is he wants to school there...
3rd-order approximation
happened to see Europe again is that trip to the end is coming here tomorrow after the package arrived yesterday...
4th-order approximation
the first list was posted on the bulletin he brought home a turkey will die on my rug is deep...
5th-order approximation
road in the country was insane especially in dreary rooms where they have some books to buy for learning Greek.

Data for schizophrenics comes from a study by Lawson, McGhie and Chapman (1964) which is basically a replication of the Miller and Selfridge study, but using schizophrenic patients and a normal control group. Lawson et al. found that the normal controls produced standard results, curves that rise sharply from first order approximations, levelling off beyond this point. This was not true of the schizophrenics, where there is only a slight improvement with higher orders of

approximation, an increase which is much less marked than that found with normal subjects. These results are shown in figure 8, and this figure also shows results from a similar experiment with foreign language learners Meara (1978). This study compared students learning French and native French speakers on a set of approximations to French (Taylor and Moray 1960). Meara's native speakers show standard results very similar to those of Lawson's native speakers, but the marked improvement that the native speakers show is missing from the scores of the learner group.

Here again, direct comparisons between the learners and the schizophrenics are ruled out. Meara's study uses different orders of approximation to those of Lawson. Furthermore, it is not easy to compare the effects of approximations across the two languages because of the effects of gender and agreement rules in French which are not found in English. In theory these ought to have the effect of making the middle orders of approximation (2nd and 3rd orders) less list like, and therefore easier to remember, thus accentuating the difference between low and high orders of approximation to French. Nevertheless, in spite of these problems there is once again some similarity between the results of the schizophrenics and L2 learners.

McGhie (1966) has argued that the results of the schizophrenics on this and other similar tasks involving linguistically structured material suggest that they process language in a way which is quite unlike the processing of normal people. Normals seem to assimilate speech in quite large units, 'chunks' of about three or four words, and it is this ability which makes it possible for us to understand speech at normal delivery speeds. Schizophrenics do not appear to be able to do this, and McGhie suggests that instead of grouping words into appropriately phrase-sized chunks, they seem to process each word as a separate item. This causes an overloading of the perceptual mechanisms, and the consequent failure in understanding. My own work with L2 learners suggest that this idea is an oversimplification, and only partially correct. There is some evidence that learners do organise foreign language material into chunks, but these chunks are much smaller than those used by native speakers, and the basis of the organisation is unclear. It is clear, however that both learners and schizophrenics make a rather limited use of syntactic patterns that are available in this sort of material.

D: word associations

The fourth characteristic of schizophrenia discussed by Maher is Word Associations. It is often assumed that the word associations of normal people are essentially unpredictable and idiosyncratic. In fact, normal native speakers produce surprisingly similar responses to given stimulus words. The standard norms of word association (Postman and Keppel 1970) show that when asked to respond to TABLE, 80 percent of subjects reply with **chair**; given MAN, 75 percent respond with **woman**; given DARK, 82 percent respond with **light**. Not all associations are as highly predictable as this, of course, but generally speaking the single most common response accounts for nearly 40 percent of all the responses made to any stimulus word. There are two main types of response. **Paradigmatic associations** are those where the response falls into the same syntactic category as the stimulus. Examples of paradigmatic responses to DOG would be **animal**, **cat,** or **bone,** where both stimulus and response words are nouns. Paradigmatic associations to BLACK might be **white** or **dark** where both stimulus and response words are adjectives. **Syntagmatic associations** are responses where the stimulus and response belong to different

Meara 1978

Figure 8a

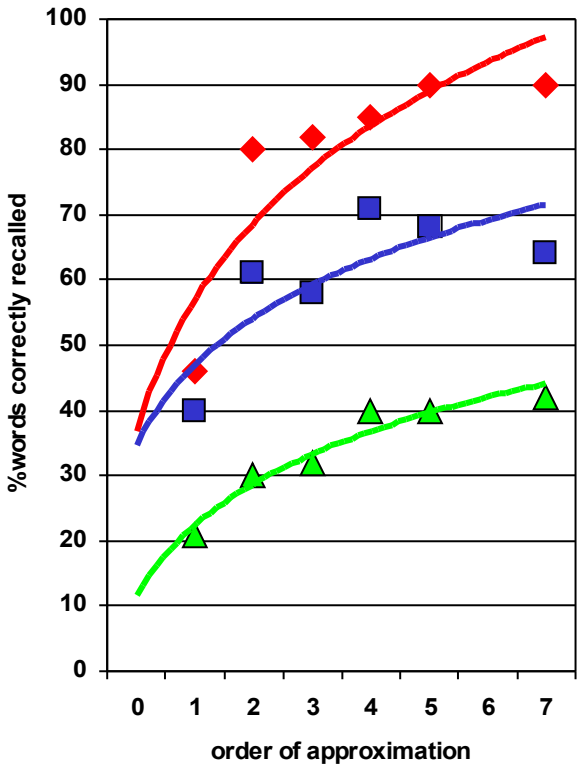
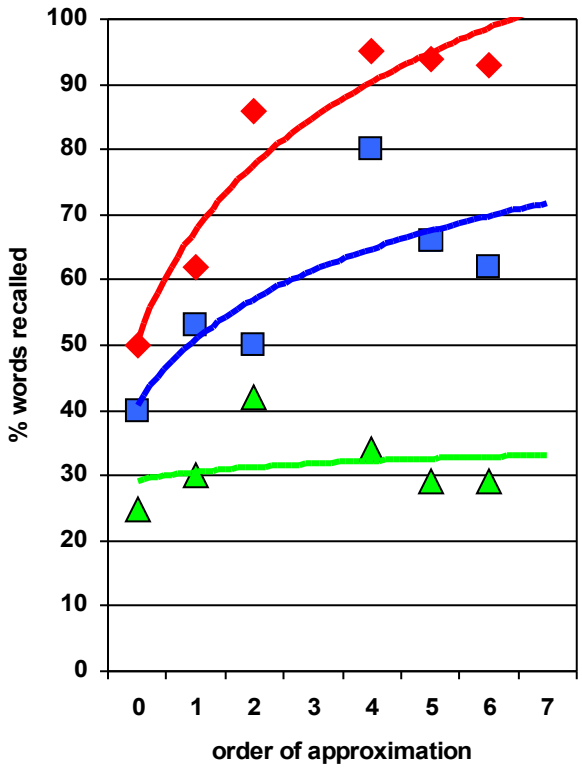


Figure 8b



Recall of Statistical Approximations to English by normal speakers and schizophrenics.
Top line: Native speakers 10 word strings
Middle line: Schizophrenics 10 word strings
Bottom Line: Schizophrenics 20 word strings.

syntactic categories. For DOG typical syntagmatic associations would be **black**, or **barks**; for BLACK typical syntagmatic associations would be **beetle**, **night**, or **pitch**. Most of the research work on word associations of normal adults indicates that the majority of their responses tend to be paradigmatic ones. Syntagmatic responses are much more common in the response repertoire of children, but they appear to adopt more paradigmatic types of response and the age of seven or eight.

There have been a large number studies of the associations made by schizophrenics. Some of these, for example the original study by Kent and Rosanoff in 1910, give examples of schizophrenics whose associations are bizarre by anyone's criteria. Such cases do not appear to be typical, however. More recent work makes only modest claims about the associations of schizophrenics. The most commonly discussed characteristics are the claims that schizophrenics

produce a large number of 'clang' associations, where the response is related to the form of the stimulus word but not to its meaning, and that their responses are more idiosyncratic than those of normals. Maher is actually rather suspicious of this work. He reports some recent work which suggests that schizophrenics have difficulty in recognising individual words when they are spoken. Most of the word association data comes from studies where an auditory presentation was used, and Maher argues that the variation found in schizophrenic responses may simply be due to misunderstandings of the stimulus words.

Word association data for learners is extremely fragmentary, but what evidence there is once again points to a broad similarity between learners and schizophrenics. Riegel and Zivian (1972) report that learners of German make more varied responses than those of native speakers. This finding is surprising, as learners must have a smaller vocabulary than the native speakers, and one might expect this to lead to a greater number of similar responses rather than vice versa. Cook (1977) additionally reports that learners of German produce large numbers of syntagmatic associations, a claim that has also been made for the schizophrenics, and similar results have also been reported by Meara (1978) for learners of French. Some typical examples of learner responses are shown figure 9.

The bulk of these forms are simply phonetic or spelling responses of one form or another, particularly rhymes. Section (b) shows a number of other responses which are quite typically 'schizophrenic'. Obviously the learners here made mistakes, but similar errors in schizophrenics are usually classified as 'neologisms' and account for a large proportion of these Ss' abnormal responses. Section (c) shows a set of associations where the response is a normal French word, but an error has clearly been made in reading the original stimulus word. Meara's learners also produced a large number of 'grammatical' associations such as MOU ~ **molle;** DUR ~ **dure;** BLANC ~ **blanche;** RECEVOIR ~ **reçu**, where the response is the same word as the stimulus, but appears in a different grammatical form. These associations are perhaps caused by students deliberately learning these forms as pairs at vulnerable stages of the learning process. This type of response is not found with schizophrenics in English, but there are relatively few pairs of this sort in English, and I have been unable to find any word association data from French schizophrenics which would allow direct comparisons.

Abnormal associations such as the ones listed here are frequent in learners, even at an advanced level, with about 50% of all responses produced being ones which are never made by normal native speakers.

E: discussion

The importance of the similarities discussed in the foregoing sections lies in fact that all the types of language behaviour studies mentioned have been used as the basis for clinical tests of schizophrenia. One of the main symptoms of schizophrenia, disturbed thought, is very difficult to assess directly, and tests of abnormal language behaviour have often been used as a substitute.

Meara 1978

Figure 9: Abnormal word associations produced by Learners of French

a) Associations where the form of the stimulus strongly influences the form of the response:

sombre ombre	claire verre	tige tigre
mou mousse	mou mouche	mou sou
agneau genou	marteau oiseaux	marteau chapeau
main pain	main faim	voleur vouloir
lisse livre	lisse glisser	sifflet soufflet
doux deux	doux choux	rue rouge
pied pierre	fourneau journaux	fille fil
dur mur	joie jour	
lune lunette	tapis assis	

b) neologisms

manger bouver	marteau ceau	rue citie
desirer plaisirer	roi reigne	fleur tirige

c) other abnormal associations

mou vache	**See text**
tige animal	Presumably reading **tigre** for **tige**
lent pâques	Reading **lent** as an English word
prêtre argent	Reading **prêtre** as **prêtre** perhaps?
rivière mère	Intending **mer** perhaps?
citoyen limon	Confusing **citoyen** with **citron**
araignée étoile	The normal response is **toile**

Salzinger et al. Conclude their study of close tests with the following remarks:

> 'what about the future of Cloze procedure for the study of psychopathology? One of the arguments in its favour is, of course, the fact that the technique differentiates speech samples not only of chronic schizophrenics but also -- and this is probably more important -- of schizophrenics who do not have the many obvious symptoms by which almost anyone can recognise a chronic patient. We will most likely investigate the usefulness of (Cloze) scores as a prognostic and diagnostic index since it provides a great deal of information on the basis of very short speech samples.' (p858-859)

The obvious danger here is that any test of this sort will catch in its net not just genuine schizophrenics, but also bilinguals who are operating in their weaker language, and there is a serious risk of misdiagnosis if linguistically crude measures of this sort are applied inappropriately.

Exactly the same difficulty arises with the second use of close tests: asking suspected schizophrenics to fill in Cloze tests based on normal speech. This particular technique has not been used as a diagnostic tool as far as I am aware, but there does exist a standard test, the *Word in Context test*, which operates on the same basic principles (Salmon et al. 1967). This test consists of a series of reading passages each of which contains a rare English word. The testee is asked to read the passage, and at the end to answer a multiple choice question about the meaning of the word. If the wrong answer is given, then a second passage is read in which the meaning of the word is clearer, and this passage too is followed by a multiple choice test about the meaning of the word. Two further passages are available if the testee still fails to find the right meaning for the word in question. The similarity between this test and standard Cloze procedure will be apparent. In both tests, the testee is required to use information from the surrounding context to fill out what is functionally a blank. Clearly it would not be surprising to find foreign learners who produce typically low 'schizophrenic' scores on this test. Copple's *Test of Sentence Completion* also has much in common with Cloze tests (Mabry 1965). This test consists of a set of incomplete sentences which the testee is asked to complete, and the complete versions are then scored on a number of criteria which reflect how close the responses to a correct answer. This test is apparently used a lot in the Soviet Union, and it is claimed that there is a high correlation between some of the criteria used in scoring and the results of more complex diagnostic procedures (Rogovin 1973). Non-native speakers might be expected to have difficulty with this test too.

Claims that type-token ratios can be used to discriminate between normal native speakers and schizophrenics have been made by Silverman (1973).

Word associations have been used very frequently for diagnostic purposes. Namyslowska (1972) for example, claims that schizophrenic tendencies can be reliably tested by measuring the number of 'individual reactions' produced by testees on a standard test. She reports that her schizophrenics produced an average of 21 individual reactions for the Kent-Rosanoff list of 100 words -- about twice the figure for normals. A major problem here is that different language communities tend to have rather different rates of stereotypy in their word association norms, so that for example individual responses are more commonly produced by French and German speakers and they are by English speakers (Rosenzweig 1970). My own work with L2 learners suggests that they too tend to produce rather higher numbers of individual reactions than Namyslowska's figure, even allowing for the fact that learners as a group make abnormal associations anyway.

A slightly more subtle measure of word association abnormalities is Moran's *Scale of Relatedness* (cf. de Wolfe 1973). In this test a standard list of 25 words is used, and the testee's responses are scored from 0-3 depending on their closeness to the stimulus words. Moran (1953) suggests the following criteria:

0 no answer or other multiword response;
1 single word response which bears no relationship to the stimulus word.

e.g. FAITH ~ **box**

2 single word response which is very indirectly all loosely related to the stimulus
e.g. STRONG ~ **physical**

3 subject produces a single word response which is closely related to the stimulus word.

Despite the looseness of these criteria, which appear to be very subjective, and to rely heavily on evaluations made by the tester, Moran claims that the reliability of scoring is very high. The test appears to discriminate schizophrenics from normals in that the former produce very low scores, and de Wolfe claims that there is a very high correlation between scores on this test and other tests of thought disorder. De Wolfe also claims that the test is sensitive to day-to-day variation in a single subject. Non-native speakers could be also relied on to produce low scores on the test, however, not just because they are likely to fail to respond to some of the words because they do not know them, but also because there is strong tendency for L2 learners to produce clang associations -- associations that are similar in form to the stimulus, but have no meaning relation to it. Such associations would score only one point on Moran's criteria, and lead to scores considerably lower than those of normal native speakers.

F: **conclusions**

It is not my purpose here to propose that foreign language learners are schizophrenic in some sense, although this is a view which has been advanced fairly seriously in some quarters (cf. for example, Clarke 1976). Nor do I intend to argue that the language problems of schizophrenics are essentially no more serious than those of foreign learners. This would obviously be a gross and inaccurate oversimplification. There are, however, two important ideas that seem to emerge from the data presented here. The first idea is that great care needs to be taken by people who work with schizophrenics who are also bilinguals. We have seen that there is a tendency for researchers to develop simply administered linguistic tests which give results that are broadly in line with more complex evaluation procedures. We have also seen how these tests do not discriminate very clearly between real schizophrenics and L2 learners operating in their weaker language. If these tests are used as clinical instruments with bilinguals, there is a very real danger that 'schizophrenic' symptoms would appear merely because the bilinguals were being tested in their weaker language. As far as the UK is concerned, this means that it would be unwise to use tests of the sort I have described on native Welsh, Gaelic or Irish speakers, or on suspected schizophrenics who belong to immigrant groups and do not normally use English. Since language tests play a central role in diagnosing schizophrenia, it seems important that special tests based on their native language should be developed for groups like this, and the testing should be carried out as far as possible by someone who has more than a passing acquaintance with the language the patients speak as their mother tongue.

The second point of importance is that there is clearly room for a much more vigorous dialogue between those of us who work in clinical linguistics and those of us whose primary concern is language teaching and the problems of L2 learners. The split between these two areas of study is almost total. Few people working on schizophrenia appear to have any knowledge of language teaching, or to be aware of the problems of foreign language learners except on an anecdotal level. Few language teachers have any experience of pathological aspects of language. This is clearly a very unhealthy state of affairs: the two areas have much more in common than is usually believed,

and have much to offer each other, both in terms of information and of research methods.

On the language teaching side, there is a great deal to be learned by studying the language behaviour of L2 learners in the same way as other pathological deficits have been studied. Research on foreign language learning has in the past relied rather too heavily on methods and frameworks imported from linguistics, and has ignored the more psychologically based approaches which have characterised the study of language pathologies, and which might in some ways have the more revealing. There are, for example, only a handful of in-depth individual case studies of either adults or children learning foreign languages, and very few linguists have the training necessary to carry out detailed experimental work of the kind that is commonplace in clinical circles. This has led to the peculiar sort of isolation in which certain questions are never asked, simply because no one has the necessary training and backing to carry out research, and because the concepts they are operating with do not engender questions of this sort. Two areas in particular seem interesting and surprisingly neglected. The first of these is what might broadly be called the biological bases of foreign language behaviour. Many people start to learn their foreign languages after the onset of puberty, and after language has been lateralised to the dominant hemisphere of the brain. It would not be surprising to find that this led to some important differences in the way the brain handles foreign language materials. Is a foreign language represented in the non-dominant hemisphere? Is it represented in the non-cortical structures of the brain? These are questions about which practically nothing is known. It would also be of interest to know whether the drugs which have such marked effects on the language behaviour of schizophrenics also affect the performance of foreign language learners. Research of this sort is largely limited to studies of the effects of alcohol on fluency in a foreign language. The second neglected area is the interface between personality and language learning. A number of studies have looked at the way personality traits affect success in language learning, but apart from some work on the relationship between IQ and child bilingualism, there has been very little work on the after-effects of learning a language on personality. This is a rather surprising omission when one considers the many claims made by educators about the advantages of learning a language. These claims appear to be largely in substantiated.

On the clinical side, the finding that learners show some of the same symptoms as schizophrenics is clearly an important one. It means that the symptoms are not peculiar to schizophrenia, and since they occur in a population which is otherwise quite normal, certain types of explanations of the symptoms should perhaps be looked at more critically. More generally, since some of the problems in schizophrenia are linguistic ones similar to those of learners of foreign languages, it might be possible to adapt methods and materials used for language teaching and testing L2 learners for use with schizophrenics. This is particularly true of recent developments in the individualisation of foreign language programmes. Such an approach should be readily adaptable for remedial treatment of single patients.

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