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ACQUIRED COMMUNICATION DISORDERS IN ADULTS AND NONSPEECH SYSTEMS OF COMMUNICATION.

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INTRODUCTION TO ACQUIRED COMMUNICATION DISORDERS IN ADULTS & NONSPEECH SYSTEMS OF COMMUNICATION

INTRODUCTION

Consideration of research into the relationship between aphasia and nonverbal communication behaviours reveals a clear distinction between theoretical and practical issues, which is unparalleled in the work done with other communication disorders. Most of the studies which explore the understanding and use of gesture by aphasic subjects attempt to validate aspects of one or other neurolinguistic model, and subjects' behaviour on tests of language and gesture is evaluated without reference to their performance in the real world, or their possible communicative needs.

On the other hand, the few studies which attempt to document the learning of nonverbal communication skills by aphasics tend to make no reference to the implications of their findings for neurolinguistic models. This divergence of academic and clinical practice is unfortunate, if only because it makes it difficult for the practising clinician to appreciate the significance of some of the theoretical work. Neurolinguistics, it is apparent, is as yet an infant field of study - practical applications can be drawn from specific experiments, but the tentative and exploratory hypotheses which emerge should not be allowed to become rigid clinical guidelines. Much more research needs to be done before we can even begin to understand how the brain organises linguistic and paralinguistic behaviour. Furthermore, the studies exploring the neurolinguistic implications of aphasic and apraxic impairments in gesture need to be considered, in the context of other research on hemispheric specialisation for gesture, sign and verbal language, and not in isolation (see MVDP Research Information Service: NEUROLINGUISTICS).

Of the questions which emerge from the research considered in this Issue, two perhaps warrant clarification through an introductory summary:

1. What is the relationship between gestural and verbal language disturbance in aphasia?
2. Can aphasic subjects learn to communicate more effectively through nonverbal, rather than verbal channels?

1. What is the relationship between gesture and verbal language in aphasic communication?

If there is a consistent similarity of gestural and verbal language impairment in aphasia, this is taken as evidence for some kind of central associative process controlling verbal and nonverbal symbolic/linguistic behaviour. The arguments in favour of this proposition are put by Duffy, Duffy & Pearson (1975) and Gainotti & Lemmo (1972).

If there is differential impairment of gesture and verbal language, this is evidence for modality specific processes governing verbal and nonverbal symbolic behaviour,

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and this is the argument - broadly speaking - supported by Goodglass & Kaplan (1963) and Varney (1978) and Seron et al (1979).

However, this is a gross simplification of the evidence. For a start, each experiment is very specific, and the main hypotheses are posed, and answered, in slightly different ways (see Table 1). There are criticisms to be made in many cases, of methodology and interpretation of results, which affect the validity of the arguments.

If we take as a starting point, the studies which have concentrated on pantomime recognition, it becomes apparent that there is no very clear relationship between this task, and verbal comprehension, although deficits in each area are often associated. A strong and consistent relationship has been found between reading comprehension and pantomime recognition. Both are visually mediated, but pantomime recognition errors seem to occur when two gestures employ similar movements. These confusions lead to incorrect semantic associations being formed. Unfortunately, there is as yet no evidence which would illuminate further any connection between such confusions and reading errors.

Marshall (1981) has concluded, with respect to these studies... “While the interpretation of pantomime is an interesting skill in its own right, it seems fundamentally misguided to conflate all bodily movements that can have communicative significance”. It is unfortunate that variety of gesture types under scrutiny in Goodglass & Kaplan‘s original study became narrowed down to this one task. The work of Cicone and his associates indicates that some central organiser indeed controls verbal language and the accompanying paralinguistic gestures (as we would expect from the evidence presented by developmental linguistics - see MVDP Research Information Service, Vol.1, No.5 and MVDP Research Information Service: LINGUISTICS). However, breakdown of this process is not unitary, but differentiated according to site of lesion.

TABLE 1
Main Hypotheses and Conclusions Regarding the Relationship Between Aphasic Impairment of Gesture and Verbal Language, in Six Published Papers

Author	Hypotheses	Conclusions
Goodglass & Kaplan (1963)	Disturbances of executive gesture due to central communication disorder? Or apraxia	Disturbances in gesture and pantomime are apraxic in nature, resulting from left hemisphere lesions between posterior frontal and parietal regions. No support for theory of central communicative disorder.
Duffy, Duffy & Pearson (1975)	1. Do aphasics demonstrate distinctive impairment of pantomime recognition when compared to	Aphasia is an impairment of a symbolic competence underlying gestural and verbal communication. Not enough evidence to

	other bran injured and nonbrain injured subjects. 2. What is the relationship between severity of pantomime recognition impairment and severity of language impairment among aphasics?	support notion that verbal and nonverbal modes of communication are independent.
Gainotti & Lemmo (1976)	Investigate 1. The relationship between comprehension of symbolic gesture and verbal language comprehension. 2. The relationship between comprehension and reproduction of symbolic gesture, ie pantomime.	Some central process is affected in aphasia rather than a number of separate processes, but evidence is not sufficient to suggest a generalised symbolic disorder - but some sort of verbal mediation process.
Varney (1978)	Investigates relationship between aural comprehension, reading comprehension and pantomime recognition, to determine whether or not disturbance of symbolic thinking underlies them.	Modality specific processes are dominant in aphasic impairment. Also some kind of asymbolia may be a possibility.
Seron et al (1979)	Explores the visual-perceptive elements in pantomime recognition in order to clarify relationship between it and reading comprehension.	There is a clearcut distinction between linguistic disorders and pantomime recognition - various more or less conventional gesture codes may be disturbed without a parallel disorder in the linguistic code.
Cicone et al (1979) Delis et al (1979)	Investigates the relationship between use of natural paralinguistic communicative gesture, and the nature of aphasic linguistic breakdown.	Either this type of gesture is directly dependent on verbal language, or it comes from the same "central organiser" as speech.

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Aphasia and Sign

Studies are beginning to emerge on aphasic signers - summarised bry Marshall (1981) and Zaidel (1981). It appears that sign aphasia is usually consequent upon left hemisphere injury, and that the overall pattern of aphasia is similar in verbal language and sign (although it is extremely difficult to differentiate apraxia from a genuine sign aphasia). This again would support the notion of a central process which controls linguistic behaviour, whether verbal or nonverbal. The linguistic status of pantomime recognition is to say the least equivocal - what is more, it may be mediated in different ways for different individuals. The debate continues.

(Readers wanting to follow through the arguments presented on this topic are strongly advised to read the papers in chronological order - as in Table 1 - rather than alphabetic as they appear in the text.)

2. Can aphasics learn to communicate more effectively through nonverbal rather than verbal channels?

The experimental evidence discussed above would strongly suggest that aphasics are likely to have difficulties in using nonverbal symbolic communication systems. The evidence from clinical research supports the notion that aphasic clients can learn to make use of sign and symbol systems, but there are important qualifications.

Firstly, there is not enough reliable evidence about groups, and the performance of individuals varies enormously. Certain well motivated individuals are successful, but we are still far from being able to predict which clients will benefit from which system. The work of Saya, with Blissymbolics, is the most useful to date in this respect.

Secondly, a distinction must be made between learning about a system and using it functionally. The barrier between clinically demonstrated skills, and spontaneous use, described by Bailey, is a recurrent problem and may be more crucial to success than all the visuo-motor/perceptual/semantic-sybolic parameters associated with learning, although it has not so far provided the focus of any study.

When we consider the learning that takes place within the confines of the clinical session it appears that aphasics are often much more successful with nonverbal methods than with traditional speech therapy which seeks to re-stablish verbal skills. It is not clear quite what factors are operative -the study by Velletri-Glass et al (1973) suggests that the undamaged hemisphere may be playing a crucial part. In cases of left hemisphere damage, the right hemisphere still has access to its original language capabilities (although there may be localised areas of inhibition caused by the lesion on the opposite side). The right hemisphere has a lexical, semantic system, some basic syntax, auditory, but not phonetic comprehension, and recognises printed words as visual wholes (Zaidel. 1981). It thus has the capacity to make limited use of signs and symbols. Whether symbol systems are easier than printed words for aphasics to handle, and why this is so, has not been explored to any great extent.

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Readers who are interested in reading the clinical reports on learning of nonverbal systems for communication are advised to read papers in the following order:

Symbol Systems

- Bailey (1978)
- Ross (1979)
- Saya (1980)
- Velletri-Glass et al (1973)

Signs

- Beukelman et al (1980)
- Skelly (1979)
- Skelly et al (1974, 1975)
- Stuart-Smith & Wilks (1979)

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NOTATIONS USED THROUGHOUT ISSUES

* Papers/Books available for reference from:
Royal National Institute for the Deaf, Library
105 Gower Street, London WC1E 6AH
Tel: 01 3878033

° Papers/Books available from:
Mr. Roger Talus,
BIMH Information & Resource Centre,
Wolverhampton Road, Kidderminster, Worcs.
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GLOSSARY OF TERMS USED IN THIS ISSUE

APHASIA/DYSPHASIA (as defined by Geschwind)
The term is used to describe the disorders of language resulting from damage to the brain.

BROCA'S APHASIA (as defined in Boston Diagnostic Aphasia Examination)
This type of dysphasia results from a lesion involving the anterior portion of the speech area (non-fluent aphasia).

WERNICKE'S APHASIA
The lesion is usually in the posterior portion of the first temporal gyrus. The two critical features of this type of fluent aphasia are:
(1) impaired comprehension and
(2) fluent, but paraphasic speech.

GLOBAL APHASIA
Severe damage in all language areas.

PARAPHASIA
Errors in speech

LITERAL PARAPHASIA
Phonemic errors, e.g. tote for coat

VERBAL PARAPHASIA
Word substitutions often semantically, but not necessarily related, e.g. chair for table.

APRAXIA/DYSPRAXIA (as defined by Liepman)
Loss of power to execute purposeful movement or complex acts in the absence of paralysis and with perfect comprehension of the meaning of the ultimate intentions of commands.

DYSARTHRIA (as defined by Darley)
Comprises a group of speech disorders resulting from disturbances in muscular control. Because there has been damage to the central or peripheral nervous system some degree of weakness, slowness, inco-ordination or altered muscle tone characterises the activity of the speech mechanisms.

ANARTHRIA
Designates speechlessness due to severe loss of motor function of the speech musculature.

DYSPHONICS
Refers to impaired voice, that is voice deviating in some way from normal.

GLOSSECTOMEE/ GLOSSTECTOMY
Surgical removal of the tongue.

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CVA
Cerebral vascular accident.

CA
Chronological age.

CVC/CCC/SVO) - as used in Velletri-Glass et al (1973) reference, this Issue.

CVC
Consonant, vowel, consonant

CCC
Consonant, consonant, consonant

SVO
Subject verb object

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ACQUIRED COMMUNICATION DISORDERS IN ADULTS & NONSPEECH SYSTEMS OF COMMUNICATION

APHASIC/ APRAXIC SUBJECTS

* Bailey, S. (1978)
Blissymbolics for dysphasics
College of Speech Therapists Bulletin, 316, 1978, 4-7

Summary
A case study describing the use of Blissymbols with a globally dysphasic client, over a period of 18 months. The Schuell Minnesota Battery, Ravens Progressive Matrices (RPM) and Koh's Block Design Test were administered at six monthly intervals. Apart from a relapse after one year, possibly due to the onset of epileptic seizures, there was a steady increase in all subtest scores, and on the Block Design. The RPM scores remained stable. Progress may, as the author says, have resulted from the structured repetitive nature of the programme itself.

Early indications of facilitation of oral naming did not develop, nor was the client able to use his skills spontaneously to initiate communication - he did use the chart responsively but mainly in structured situations.

The author found it necessary to adapt the system, to include more nouns at single word level, and not to demand phrases too early. She also felt that the constant association of symbol and written word in the early stages may have been a mistake - he confused the visually similar words, despite the dissimilarity of the symbols. These confusions disappeared when the words were omitted from the chart.

There are interesting parallels here with Saya (1980), who also used the Ravens as a pretest, and also found little spontaneous carryover - and Ross (1979) who also needed to adapt the system, although in different ways, to suit her client.

Clinical Applications
A useful background paper. The use of assessments to attempt to measure the effects of a new programme is of obvious value.

* Beukelman, D., Yorkston, K. & Waugh, P. (1980)
Communication in severe aphasia: effectiveness of three instruction modalities
Archiv. Phys. Med. Rehabil. 61, 1980, 248-252
Cross-Reference
MVDP Research Information Service: TEACHING METHODS

Summary
Study to determine which modality of instruction - verbal, pantomime, or combined - was the most effective in eliciting accurate and prompt responses from severely aphasic persons. Thirty aphasic subjects (below 60th percentile on PICA) completed tasks involving body movement (raise your hand) and object manipulation (comb your hair + comb) in response to each of the three modalities of instruction. Severe limb apraxia was excluded.

Results
These were calculated for accuracy and promptness.

Accuracy
Object manipulation tasks ware performed more accurately with combined than pantomimed only instruction (other differences were not significant).

Body movement tasks were performed more accurately with combined or pantomimed only than with verbal only instructions (there was no difference between pantomimed and combined instructions).

For verbal only instructions, there was no difference between the accuracy scores on each task.

Promptness
Combined instructions consistently resulted in responses which were more prompt than those elicited using either of the other methods of instruction.

Conclusions
The authors conclude that aphasic subjects are not ‘overloaded’ by a two modality instruction (in contrast to Skelly 1979). For single stage commands, responses may be more efficient when instructions are given both verbally and with pantomime.

The presence of mild apraxia in some of the subjects cannot be ruled out.

On object manipulation tasks, the performance of the subjects was similar for both verbal and pantomimed instructions, similar findings to those of Duffy et al (1975) (see page 12).

The findings are felt to apply specifically to single stage commands - caution should be taken in applying them to tasks using longer, more complex commands.

Critical Points
1. Again, the subjects are not differentiated in terms of receptive and expressive abilities.
2. The two tasks involved would seem from the results to be involving different skills, and it is a pity the authors do not explore the differences at greater length.

Clinical Applications
The study suggests that combined pantomime and verbal cues may be helpful in communicating single stage concrete commands.

* Cicone, M., Wapner, W., Boldi, N., Zurif, E. & Gardner, H. (1979)
The relation between gesture and language in aphasic communication
Brain & Language, 8, 324-349, 1979

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Summary
This paper explores the way in which natural, paralinguistic gesture is used ty four aphasic subjects (two Broca‘s - one apraxic; and two Wernicke‘s) in comparison with four control non-neurological subjects, matched for age and educational background. A 30-45 minute informal interview was videotaped. The questions asked were such as to encourage the use of spontaneous gesture.

Results
Generally speaking, the gestures of the aphasics closely paralleled their speech output.

Broca's Aphasics
Gestures were mostly sparse, simple and punctuate - when they occurred they were generally informative and clearly intelligible. More iconic gestures than pointing were used. Occasionally gestures alone were used to compensate for the efforts required by talking, but in general, gestures accompanied the one word utterances produced. Confusions that occurred were the result of speech contradicting gesture (e.g. saying "two" and holding up three fingers).

Wernicke's
Gesturing was frequent, relatively complex, and often elaborated. There was a higher proportion of nonreferential, emphatic and rhythmic gesture. Of the referential gestures, more points ware used than iconic gestures. Gesturing was more unclear or confusing than the other groups, due to unclear construction of ideas, or out of context gestures - a tendency to string referents together in incorrect or confusing ways. The gestures of this group appeared to have lost content, like their speech.

The authors conclude that, although the findings are preliminary and tentative, the evidence supports the theory that either gesture for this group is directly dependent upon language, or it comes from the same 'central organiser' as speech, and so is equivalently affected by aphasia. Thirty other aphasics were informally monitored during the study, and the impressions gained supported this conclusion (three Wernicke‘s aphasics who were young and alert had more success in using gesture, but there were no exceptions among the Broca's aphasics). Aphasic patients on their own, seem to have a lot of difficulty in making spontaneous use of gesture as an alternative channel of communication.

The contribution of apraxia needs to be assessed by a larger study; however, these preliminary results suggest that Goodglass & Kaplan (1963) this Issue, may have been premature in designating all executive gestural disorders as apraxias.

Clinical Applications
As the authors themselves stress, the findings here need to be replicated with larger groups. However, the experience of Fay Thomson and the Therapists who have provided her with case studies on the whole supports these conclusions. Aphasics do not seem to use gesture spontaneously in their communication. When they are taught gesture, they tend to make confusions similar to those of their speech, although they do seem to find it helpful when the Therapist uses gesture to cue

them. A paper by Thomson will report on clinical impressions of the function of gesture with adults with acquired speech and language disorders.

Cicone's paper, and the following paper by Delis et al are by far the most relevant to clinical work, and are strongly recommended. They indicate the kind of problems that aphasic clients may have with signing. It remains for clinicians to determine and document the appropriate therapeutic techniques for treatment.

More research - e.g. detailed case studies - is needed.

* Delis, D., Foldi, N., Hamby, S., Gardner, H. & Zurid, E. (1979)
A note on temporal relations between language and gestures
Brain & Language, 8, 350-354, 1979

Summary
The data contributed by the Wernicke's aphasics in the study by Cicone et al (1979) (this Issue, page 9) was analysed in order to substantiate the observation that these clients tended to gesture at the initial boundaries of embedded clauses which are unrelated in meaning to their main clauses (e.g. they picked another one for me to go). In other words, these Wernicke's aphasics gestured spontaneously at the points in their sentences when language and meaning became detached. The analysis confirmed that this tendency was one of the factors underlying the initiation and form of gesture - others include stress and speech rhythms.

Clinical Applications
The therapeutic implications of these results need to be explored by practising clinicians. Could the therapist interpret such gesturing as a signal that the client is losing his train of thought, and effectively redirect language and gesture through cueing techniques?

Further linguistic analysis of aphasic communication is needed, and would be relatively simple for clinicians to carry out.

* Duffy, R.J., Duffy, J.R. & Pearson, K.L. (1975)
Pantomime recognition in aphasics
J. Speech & Hearing Research, 18, 115-132, 1975

Summary
The questions posed at the beginning of this paper are:
1. Do aphasic subjects demonstrate a distinctive impairment of pantomime recognition when compared to non-aphasic brain injured patients, and normal controls?
2. What is the relationship between the severity of pantomime recognition impairment, and the severity of language impairment among aphasics.

(This study avoids the debate as to whether difficulties in using gesture are aphasic or apraxic in origin, by focusing only on comprehension of gesture.)

Subjects

There were four groups:

1. Aphasic n=44
   Identified by their scores on the Porch Index of Communicative Ability (PICA). Motor-expressive and sensory-receptive problems were not differentiated - the group was considered a representative sample.

2. Right hemisphere damaged n = 30
   No aphasic symptoms.

3. Subcortical damage n = 26
   Including Parkinson's Disease, multiple sclerosis, and cerebellar injuries.

4. Normal controls n = 30
   Age, sex, years of education, time post onset and aetiology were controlled for.

Tests (administered in the following order)

1. Pantomime recognition
   Subjects were shown a pantomime relating to an object, and had to select the relevant object from four pictures. The test was administered nonverbally, and presentation and timing were controlled.
2. Language Tests
   Verbal recognition - subjects were asked to point to the stimulus object on the picture cards when these were named.
3. Naming
   Subjects were asked to name the stimulus object on the picture cards.

PICA scores were used as a general measure of language impairment.

Results

1. As a group, the aphasics performed lower on the pantomime recognition task, and the verbal tasks, than the other groups.
2. Some of the right hemisphere subjects scored more poorly than the controls or the subcortical group on the pantomime recognition - possibly due to specific problems such as visual perception, or to the effects of generalised brain damage.
3. A strong relationship was found between pantomime recognition, verbal recognition and overall PICA scores - which also existed in the control group. The authors conclude that pathology simply reduces the level of overall functioning, rather than changes the relationships between pantomime and verbal abilities.

Duffy et al conclude finally that aphasia is an impairment of a central symbolic ability, reflected in verbal and nonverbal communication deficits. The clinical implication is that aphasic clients will be unable to profit from nonverbal remediation techniques which involve signs and symbols.

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Critical Points

1. The evidence presented is not really strong enough for us to infer that aphasia is a reflection of asymbolia, and is in fact more consistent with the idea of a deficit in verbal mediation (see Gainotti & Lemmo 1976, this Issue). Some aphasics (we do not know which) made no errors on the pantomime recognition tasks, and some subjects with right hemisphere lesions performed rather poorly on it. There is thus no clear one to one relationship between disturbances of gesture and language (see Varney (1978) this Issue, who did construct relevant contingency tables).

   Marshall (1981) this Issue, has criticised this research on the above grounds, and reports research by Alajouanine & Lhermitte, which describes severely aphasic patients with essentially intact nonverbal communication skills. Their conclusion is that the existence of extra linguistic disorders depends on the extent of damage in the tempero-parietal region.

   This discussion illustrates the problems caused when aphasic syndromes are not differentiated in research.

2. A similar study by Varney, this Issue, is methodologically equivalent; however, a test of reading comprehension was included, which showed a stronger relationship with the pantomime recognition task than did any other of the tests. This suggests that part of the correlation between all the tests was due to the visual component they held in common (Marshall 1981).

<u>* Duffy, R.J. & McEwen, W.J. (1978)</u>
A study of the relationship between pantomime symbolism
and pantomime recognition in aphasics
<u>Folia Phoniatrica,</u> <u>30</u>, 1978, 286-292

Summary
The data provided in Duffy's earlier study is analysed to examine the question whether aphasics' difficulty with gestural behaviour is related to the symbolic nature of gesture.

The pantomimes used in the test described are rated on a measure of the arbitrariness of the relationship between a gesture and its referent (e.g. the most "symbolic" gesture was <u>flag</u>, and the least symbolic - most "natural" - <u>cigarette</u>).

The degree of symbolism was not in itself predictive of difficulty in recognition.

Critical Points
Of the twenty-seven items from the pantomime recognition test, only four obtained scores of over four on the scale

1		7
most "natural"	-	most "arbitrary"

Too few of the gestures were abstract enough to test the proposition adequately.

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Clinical Implications

A research project along these lines using Makaton signs, would provide useful information about the relationships between learning difficulty and iconicity of sign in aphasic syndromes.

Enderby, P. & Hamilton, G. (1981)
Clinical trials for communication aids
International J. of Rehabilitation Research, July 1981
For details see MVDP Research Information Service, Vol.1, No.8.

* Gainotti, G. & Lemmo, M.A. (1976)
Comprehension of symbolic gestures in aphasia
Brain & Language, 3, 451-460

Summary

This experiment investigated the relationships between comprehension of symbolic gesture, and verbal comprehension; and between the comprehension and reproduction of symbolic gesture.

Subjects

Twenty-five normal control subjects
One hundred and twenty-eight subjects with unilateral lesions: fifty-three aphasic and twenty-six nonaphasic, with left hemisphere involvement, and forty-nine nonaphasic, with right hemisphere involvement.

Tests

Symbolic gesture

Subjects watched a simple pantomime and identified the object to which it related from a set of three pictures.

In the reproduction task, the examiner gave verbal instructions for carrying out the gesture, and if these failed, acted it and requested the subject to imitate.

Verbal comprehension

The test used is described in a previous paper (not available at time of compiling this Research Information Service Issue) and appears to identify semantic errors.

Results and Conclusions

1. Aphasics found it more difficult than nonaphasics to comprehend the symbolic gestures (but see Critical Points, No.1 below).
2. There was a significantly high correlation between the subjects' performances on the two comprehension tests - verbal and symbolic gesture.
3. There was only a weak relationship between difficulties in understanding gesture, and difficulties in reproducing it. 81% of the apraxic subjects had difficulty in understanding gestures - but so did many of the nonapraxic subjects.

The authors conclude that their finding that almost 2/3rd of the aphasic patients were unable to understand the meaning of simple symbolic gestures, suggests that some

central process is affected in aphasia, rather than a number of separate processes. However, they do not feel that the evidence is sufficient to prove that the basic deficit in aphasia is a generalised symbolic disorder. Rather, they interpret the findings to mean that the pantomimed gestures may have been verbally coded by their subjects, and that what is impaired is verbal mediation "disintegration of the abstract set of relations between verbal sounds and meaning...". This would, of course, account for the strong relationship found between the error rates on the two tests of comprehension.

Finally, it is concluded that, because only a weak relationship was found between comprehension and reproduction of gesture, difficulties in reproducing gesture are due to a true apraxic or executive defect, and very seldom to poor comprehension of the gesture itself.

Critical Points

1. A high cutoff point (the full score) was used to discriminate between normal and pathological performance. In fact, 20/53 aphasics achieved full score on the test of gesture comprehension, and 10/53 made only one error. This suggests that the test used may not in fact have been a powerful enough instrument to detect difficulties in the understanding of gesture - and that the authors' statement that 2/3rd of the patients "were unable to understand the meaning of simple symbolic gestures" depends on how strictly an error rate of 1/10 is regarded.

2. Unfortunately, no aetiologies of the aphasic subjects are given. Thus we do not know how many had predominantly receptive or expressive disorders; or how many had perceptual difficulties affecting reading and writing. These factors would certainly affect performance, and it is a mistake to treat aphasics as a homogeneous group.

3. Furthermore, we are not told anything about the individual correlations. For example, which were the subjects who scored very low on each test - were they the apraxic group, or the nonapraxic group, or a mixture?

4. Little is done to elucidate the relationship between an aphasia affecting the encoding and decoding of gestures, and an apraxia affecting their reproduction, and the authors' conclusions here seem based on false premises. In fact, 81% of the apraxic group (n = 21) did have difficulties in understanding as well as in producing gesture - which might suggest that comprehension problems were associated with the apraxia. The fact that 16/32 nonapraxics also made errors on the gesture comprehension test does not necessarily negate this association. Much depends on the site of lesion, and on the relationships between individual scores on the tests (see Zaidel (1981) this Issue for discussion of apraxia and sign aphasia).

Clinical Relevance

Because of the problems outlined above, it is difficult to draw many practical conclusions from this study. The implication that in clinical tests of pantomime recognition, the process under observation may be verbal mediation, is important for research and clinical practice. It suggests that we should be directing our attention

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more towards the observation of gesture in naturalistic communication (as in Cicone et al; Delis et al (1979)). Elucidation of the role of verbal mediation in the learning of signs for communication, in normal and pathological circumstances, is clearly necessary.

* Goodglass, H. & Kaplan, E. (1963)
Disturbance of gesture and pantomime in aphasia
Brain, 86, 4, 703-720, 1963
Cross-Reference MVDP Research Information Service:
NEUROLINGUISTICS

Summary
This early paper seeks to determine whether disturbances in the use of gesture and pantomime should be regarded as apraxic in origin, or part of a central, aphasic communication disorder. If the disorder is apraxic, then:

1. Imitation as well as spontaneous production should be affected, and

2. disturbances of gesture and pantomime should also be found in the absence of aphasia.

On the other hand, if a central communication disorder is involved, then:

1. the disorder should be found in association with aphasia, and should be correlated with the severity of aphasia, and

2. there should be no accompanying difficulties in purposeful movement per se.

Subjects
Aphasic n = 20
Mild to moderately severe, predominantly expressive aphasics. Global aphasics, and severe receptive aphasics were excluded.

Controls n = 19
Nonaphasic neurological patients, matched for age and performance IQ with the aphasic group.

Tests
Subjects were required to demonstrate a variety of gestural and pantomime tasks (see discussion in Clinical Applications, below, for the distinctions made here).

Results
The hypotheses which would support the notion that gestural disturbances in aphasia reflect an underlying central communication disorder were not supported. Although the aphasic group were significantly inferior to the nonaphasic group in their performance, there was no clear relationship between the severity of aphasia and the degree of gestural deficiency, when auditory comprehension was controlled for. As a group, the aphasics were less able to profit from imitation than the nonaphasic group.

The authors conclude that disturbances in executing gesture and pantomime are best regarded as apraxic in nature, resulting from left hemisphere lesions between the posterior frontal and parietal regions.

Critical Points

There was no screening for limb apraxia prior to experimental testing for the aphasic group. If we are to describe with confidence all executive gestural disturbances as idiomotor apraxias - a disorder specific to movement, where the idea of the movement becomes dissociated from its motor execution - we need to be certain that they are not experienced by aphasics who demonstrate no signs of apraxia. For example, if a Broca's aphasic was able to form the movements appropriate to the gesture, but had difficulties in initiating, in combining gestures into a sequence and in finding the appropriate gesture, this would be a powerful argument in favour of the existence of a central communication disorder (see Cicone et al, this Issue).

The group description is not adequate enough to exclude the possibility that such a subgroup existed among the aphasic subjects - for example, a small percentage were able to improve their performance on imitation, thus running counter to the experimental hypothesis.

(See Zaidel (1981) for discussion of apraxia and sign aphasia.)

Clinical Applications

Distinctions were made in the tests between types of gesture and pantomime, and a qualitative analysis of performance revealed some interesting trends.

1. Type of gesture
   Subjects had few problems executing natural and conventionalised gestures (shrug, thumbs down), perhaps because these items are overlearned and affectively charged. Simple pantomime (pretended actions referring to objects) and complex pantomime (a narrative sequence) were more difficult. This suggests a possible hierarchy of tasks in teaching sign for communication.

2. Vocal overflow
   Emission of exclamatory remarks while gesturing occurred significantly more often in the aphasic than the control group, though the percentage was small (16%). This phenomenon is of therapeutic interest, suggesting that use of gesture may in some cases facilitate speech (see Skelly et al (1974) this Issue).

3. Body part as object
   Aphasics, particularly those with poorer gestural ability, demonstrated a tendency to use hands or fingers to represent intended objects. It would be interesting to determine the proportion of Makaton Vocabulary, or other signs, which are performed in this way, and to see whether these are the easiest for aphasic clients to learn; or to determine whether or not this tendency is predictive of difficulties in signing.

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4. Effect of age on gestural ability
   The trend was for the quality of gestural movements to deteriorate with age more consistently than the number of movements attempted.

* Marshall, J.C. (1981)
Clues from neurological deficits
In Bellugi, U. & Studdert-Kennedy, M. (Eds)
Signed and Spoken Language Biological constraints on linguistic form, pp.275-290
Dahlem Konferenzen, 1980, Wernheim : Verlag Chemie GmbH
Cross-Reference
MVDP Research Information Service: NEUROLINGUISTICS

Summary
This is a very helpful review of current neurolinguistic theories about the relationship between language and gesture.

* Ross, A.J. (1979)
A study of the application of Blissymbolics as a means of communication for a young brain damaged adult
Brit. J. Disorders of Communication, 14, 2, 103-110

Summary
A case study describing the introduction of Blissymbolics for functional communication with an 18 year old girl, brain damaged as a result of a road accident four years previously. Reading and auditory verbal comprehension were reasonable. Expressively she was anarthric, and gesture was severely limited by paresis of muscles, involuntary movements and inco-ordination. She had hearing and visual problems.

Blissymbols proved very successful with the girl, who learnt to communicate extensively, and began typing longer and more complex messages than she had done previously. Some modifications of the system were necessary to suit her very individual needs - e.g. a relatively large number of symbols had to be introduced early in order to give her an idea of the range and flexibility of communication possible.

Clinical Applications
A useful paper to read as background to using Blissymbols with this type of client.

* Saya, M.J. (1980)
Blissymbols : An alternate system of communication
for the nonverbal adult aphasic patient
Human Communication, Spring 1980, 43-49

Summary
This study examined the application of Blissymbols to ten adult aphasic clients, who had not achieved any functional communication after a minimum of three months conventional therapy.

Diagnosis
All had left CVA leading to aphasia.

Communication Profile
Each was given the complete PICA, and eight subtests from Schuell's Minnesota Test for the Differential Diagnosis of Aphasia (including AI, A2, A5, B1, B2, B3, B4).

Therapy
One half - one hour sessions, 3 x 5 times weekly for two months.

Blissymbol Score (BSS)
Administered at the end of teaching period - total number of symbols used to describe a set of pictures chosen to elicit maximum communication. On the basis of these scores, clients were rank ordered, and the list divided into equal halves: higher BSS and lower BSS.

BSS Correlations
To determine what other learning or neurological tests were predictive of a successful Bliss user, high BSS group were administered the following subtests:

ITPA - auditory reception, visual reception, visual association, visual closure, manual expression

Raven's Coloured Matrices - A, Ab B

Results/Clinical Applications
Predictors of success in learning Blissymbols
Tests
When the two groups were compared on PICA and Schuell, PICA did not discriminate between them - however, an effective Bliss user must achieve a minimum 70% or better on tasks of auditory comprehension, and unimpaired ability to match visually. Schuell visual subtests further suggested a minimum 70% accuracy in recognising printed words (match word to picture, printed word to spoken word).

Among the effective Bliss users, there was a strong association between performance, and the Raven's Coloured Matrices tests, and the ITPA subtests of visual association and visual closure.

Other factors
A higher BSS is likely when the subject is younger. (Mean CA high BSS 53 years, low BSS 68 years); when the CVA was suffered two years or more prior to teaching (mean lapse of time - high BSS 6.8 years, low BSS 8.8 months), and when the patient was motivated to communicate (attempted to use any other form of communication). It is hypothesised that the long term CVA patient may be more willing to consider an alternate system of communication because of a longer past history of verbal communication failure. This factor clearly interacts with others, as evidenced by four of the scores: the highest BSS scorer (BSS 41) and one of the

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lowest (BSS 6) had both suffered CVA's two years before: and the BSS scores were very close (27 and 25) for two subjects with three year and four months time lapses.

Functional use of Blissymbols
None of the group, even the high scorers who did well in training and conversation sessions, used the system functionally in their own environments. The author suggests that a separate programme is needed to train users and their associates to generalise the system.

Critical Points
Some more information about how symbols were selected - were they tailored to individual communicative needs, for instance? - learning problems, if any, and clients' attitudes to functional use; and involvement of associates, might have clarified the reasons why there was so little carryover.

Otherwise this is a very useful paper with obvious applications - the caveat being that ten is a very small number when you are talking about predictive tests. A group of therapists in an area or district could easily replicate this work with a larger group of subjects.

Seron, X., Van Der Kaa, M.A., Remitz, A. & Van der Linden, M. (1979)
Pantomime interpretation and aphasia
Neuropsychologia, 17, 661-668, 1979

Summary
This paper follows the work of Varney (1978), and explores visuo-perceptive aspects of pantomime recognition in order to elucidate the relationship between reading comprehension and pantomime recognition.

Subjects
Aphasics n = 27
Fourteen Wernicke' s; nine Broca's; four Global aphasia, unilateral lesions.
Controls n = 20
No neurological disease, of compatible chronological age.
Tests
Aphasic Severity
"Aphasia severity rating scale" - (Goodglass & Kaplan, reference supplied).
Verbal Comprehension - few details
Reading Comprehension - few details
Pantomime Recognition
As in Duffy et al (1975). On the multiple choice array of three pictures, the stimulus object was paired with two types of distractor.
Semantic distractor Had a conceptual relationship with the stimulus (e.g. piano - harp).
Morphological distractor Here a similar hand shape was involved in both the stimulus and the distractor, e.g. eating an apple - blowing up a balloon/ Playing the piano - hands on a desk.

Additionally a distinction was made between whether the distractor object was in the same orientation as the stimulus object.

In this way, the authors hoped to discover whether the errors made were semantic or perceptual in type.

Finally, forty normal subjects rated the relationship between gesture and object for the stimuli and the distractors as: possible and usual, possible but unlikely, or impossible.

Results
No relationships were found between scores on the pantomime recognition task and severity of aphasia, and there was no significant difference between the syndromes in their performance profiles. The visuoperceptive parameters did not have an effect, nor did the presence or absence of semantic paraphasia in the subjects.

A strong and significant relationship was found between pantomime recognition and reading comprehension, and, (less strong) verbal comprehension.

The authors conclude firstly that scales evaluating general levels of communication may not adequately reflect specific verbal disorders. With regard to the factors influencing error scores on pantomime recognition, they suggest that a wrong interpretation of the relationship existing between the movement of the gesture and its referent may be involved, with the plausibility of the distractor playing the main part (errors were more likely when the relationships between stimulus and distractor had been rated as possible on the scale) - i.e. the difficulties reflect disturbances of the perception of movement - object relations.

Finally, the authors conclude that there is a clear-cut distinction between linguistic disorders and pantomime recognition, since lexical semantic factors do not seem to have influenced errors.

Critical Points
It is a pity that the authors do not offer more discussion about the relationships between verbal and reading comprehension and pantomime recognition, and that they do not consider the role of verbal mediation (Gainotti & Lemmo (1976)).

Clinical Applications
The suggestion that the source of confusion in correctly interpreting pantomime lies in movement parameters needs further investigation, but would be of significance when teaching signs to aphasic clients.

* Skelly, M. (1979)
Amer-Ind Gestural Code based on universal American Indian Hand Talk
Elsevier Press, New York, 1979
Cross-Reference
MVDP Research Information Service: TEACHING METHODS ASSESSMENTS

Summary
A practical guide to the use of Amerind in the treatment of a wide variety of communication disorders: aphasics, oral-verbal apraxics, cancer surgery patients, and the mentally retarded. The first section describes the results of practical research over a number of years with these clients, which have provided the basis and rationale of the programme. The second section provides clinical guidelines for assessment, treatment and evaluation.

Research Reports
Some of the projects described are reported elsewhere, and are reviewed separately in this Issue, (see Skelly et al (1975),Skelly et al (1974)).

Projects using aphasic populations
Seven, involving a total of 181 subjects are reported. Unfortunately, there was no attempt to standardise the data, so that factors such as treatment methods, length of treatment, environment, clinician's experience, degree of reinforcement, etc., vary from project to project. Even more crucially, there is no attempt to differentiate among aphasic syndromes, although the number of oral-verbal/limb apraxias are usually mentioned. It is hardly surprising therefore, that the results are heterogeneous.

Project 6 n = 20
This was Skelly's own project. All clients achieved to varying degrees, a repertoire of signals and practical use of it. None had functional speech or much gesture at the outset. Signals seem chiefly to have been used to express needs and wishes. Ten clients achieved some accompanying verbalisation.

Project 7 Field reports on aphasia
A few of the relevant results are highlighted:

A. n=40
Treatment - 3-6 months; 2-4 x weekly; clinicians = 8
No facilitation of verbalisation was reported for any of this group. 37 used signals to express needs.

B. n=67
Clinicians = 10
Data not quantifiable. Dissatisfaction was expressed about transfer from clinical to self-initiated use.

C. n=20
Treatment - 12 months; clinicians = 6
Table of subject descriptions provided
Gestural scores on PICA subtest increased for clients who learnt to signal (see Skelly et al (1974) - this was not so with apraxic clients).
All clients achieved some use of signs - range 30-200.

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D. n=10
Treatment - 3-20 months
Tables provided
This is the most adequately reported of the projects. 7/10 subjects improved in their scores on the Aphasia Language Performance Scales, where performance had plateaued prior to Amerind training. Improvements were also noted for some subjects on receptive vocabulary (PPVT) and visual/abstract reasoning (Raven's Progressive Matrices).
A reduction in the severity of aphasic and apraxic involvement was noted in ALPS'S performance - in fact the greatest improvements were made by the most severely affected clients (see Project F, for conflicting result).

E. n=7
Treatment - 10 months; 1 x weekly; clinician = 1
5/7 acquired use of self-initiated code to serve daily communication needs. Main factors appeared to be: need/desire to communicate; number and frequency of opportunities to communicate; acceptance and reinforcement of signals by family and staff.

F. n=17
4/17 had such severe problems, including manual apraxia, that gesture was unsuccessful at any level. Only 4 used gesture successfully outside the clinic, and 3 of these communicated basic needs only.
These varying results do suggest areas for further research, of a more rigorous nature.

Among the clinical guidelines suggested in the second section of the book are the following:

Acquisition of Amer-Ind by different patient groups
1. The progress of surgical cases, with adequate hearing and verbal intelligence, and of apraxics with no aphasic involvement, seems to be mainly dependent on the level of motivation.

2. Aphasics, and the mentally retarded, need a very concrete approach initially, which stresses the association between signal and referent, and provides immediate reinforcement.

Transmission
A number of projects, utilising different signallers and recipients, demonstrated that Amerind is usually about 80% intelligible to uninstructed viewers. Clients can therefore make themselves understood very easily outside the clinical setting.

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Testing

Skelly presents her own assessments, which are presumably available to the clinician, whether or not it is planned to use Amerind:

- The Skelly Action Test of Auditory Reception of Language

- The Skelly Comparative Apraxia Test: Oral and Manual

- The Amer-Ind Scale of Progress

She suggests using the Analysis of Patient Task Strategy section from the Leiter International Scale, to evaluate the client's approach to testing, (section presented in full).

These tests are all worth considering, particularly if you are planning an assessment of your own.

Prognostic Indications

These included:
1. Eye contact
2. Imitation of movement, especially hand movements
3. Self-generated gesture
4. Use of index finger to point

Clinical Planning
1. Video-recording is the best way of developing self-monitoring. Use of a mirror was ineffective. Modelling the client's imprecise gesture was helpful.

2. Structuring treatment sessions around a particular topic is a useful way of providing a meaningful context, and aiding retrieval.

3. Daily practice sessions should relate closely to the day's treatment session as well as to the client's needs.

4. Verbal facilitation

   Better results were achieved when the client initiated vocalisations spontaneously, than when the therapist tried to initiate speech. The use of signals may suppress jargon.

5. Modality of input

   Skelly's field data indicated that it was best to use signal only in training. Use of simultaneous speech seemed to distract many clients, of all syndromes. It assisted clients to have the two presented sequentially - first the signal, then the speech.

Clinical Programming

Detailed programmes for all syndromes are given.

A Note on Amerind and British Sign Language

Amerind was originally selected as the most appropriate system for the needs of adults with acquired speech problems, because in comparison with American Sign Language (ASL), the gestures are far more concrete, and are easily interpreted by viewers (intelligibility level averages about 80%). British Sign Language (BSL) signs, however, appear to have a higher degree of iconicity, and may be less complex in form, than their ASL equivalents. When comparison of a basic vocabulary is made between BSL and Amerind, there may be little overall difference in intelligibility. Also when Amerind is used at a more advanced level of communication, involving the agglutination process, it may be more complex than the equivalent BSL structure.

We need more information on the ease of transmission of Makaton/ BSL signs to a naive audience, as well as details of the factors influencing learning of Makaton by adults with acquired speech and language problems.

In conclusion, this book offers a valuable source of information, not only for clinicians who are using Amerind, but for all who work with these types of clients. The value of Amerind as a supplementary communication tool for adults with intact language is demonstrated; however, its function for aphasic - and retarded - groups, needs further research.

Skelly, M., Schinsky, L., Smith, R.W. & Fust, R.S. (1974)
American Indian Sign as a facilitator of verbalisation
for the oral verbal apraxic
J. Speech & Hearing Disorders, 39, 4, 444-455, 1974

Summary

This paper explores the effect of gesture, trained synchronously with speech, in verbalisation with apraxic clients. Six oral and verbal apraxics, with no functional speech, who achieved higher scores on the gestural than verbal subtests of PICA, were involved. Prior therapy ranged from nil - 20 months. Training took place over six months. Instruction began with teaching natural gestures (e.g. beckoning, shrugging), and integration of these into communication. Topic-related Amerind signals were then introduced, and speech was trained synchronously. Families were informed of the programme, and consulted frequently about the selection of signals for individuals.

By the end of the project, all six clients had developed some spontaneous oral verbal production. Three used over 200 words, and three word sentences, one used about 175 words, and two word combinations. Signal use was about 70-100 in the group.

When the PICA was repeated, the verbal scores had improved for all the group, but - contrary to expectation - the gestural scores did not.

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Critical Points

1. In their introduction, the authors discuss the problem of how to differentiate expressive aphasia from apraxia; however, they make no attempt to evaluate whether or not their subjects were aphasic as well as apraxic. Two subjects had intact comprehension, two, appear to have had moderate comprehension problems, and in two there is no indication of the level of comprehension.

   Recent research (Cicone et al 1979) and experience of Makaton Vocabulary Development Project Therapists, suggests that aphasia, as distinct from apraxia, may affect use of gesture (see this Issue, page 9). The omission in this paper of any discussion about the interaction of expressive and receptive language problems with success in the programme, is unfortunate, and limits the applications to be made from the paper.

Clinical Applications

1. Transmission of signals
   The authors suggest that the signaller should indicate context, time and place reference, and the number of signals he proposes to agglutinate, in order to help the viewer understand his signals. This is obviously applicable to Amerind only - and, one would suppose, is inappropriate where a subject has comprehension problems, or difficulties in expressing ideas, in word or sign.

2. Facilitation of speech
   Spontaneous vocalisation was aided by:
   - self-monitoring through video, rather than a mirror (this also helped in teaching use of the signals)
   - group recitation in unison, followed at once by individual trials seriatim.

3. Relevance of PICA gestural subtest
   It is of interest that the clients' ability to learn the propositional use of gesture had no effect on their PICA gesture scores. This implies that the two skills are different - a conclusion which is supported by the ambiguous results of research into pantomime tests (see Marshall, J.C. (1981), this Issue, page 20). It would be useful to know just how separate they are - the subjects' range on the PICA gestural subtest was 11.93 - 14.22. Would a very low score on the test predict difficulties in the learning of gesture for communication? This relationship warrants further exploration in view of the need to establish criteria for the introduction of nonverbal systems. Here the criterion was a differential on the PICA between gestural and verbal scores - which may, or may not, be valid.

* Stuart-Smith V.G. & Wilks, Y. (1979)
Gesture program : A supplement to verbal communication for severely aphasic individuals
Australian J. Human Communication Disorders, 7, 2, 37-50, 1979

Summary

An account of a pilot study which explored the teaching of conventionalised gestures for communication to four severely aphasic subjects (Boston Diagnostic Aphasia Examination). With three subjects, regular verbal therapy had achieved

limited success, and gestural communication was felt to be a more realistic goal for all. A total of 45 gestures were taught, mainly ideographic or conventional in nature (e.g. yes - nod head; wash - mime). A few gestures were less obvious (man - hold arm out to one side and flex muscle). They were designed to be clear and unambiguous when used with one hand.

Two control groups of nonaphasic adults were used to validate the selection of gestures. 50% of the gestures were used spontaneously in response to questions, and 76% of the gestures were correctly identified. A target level of 61% - the lower end of the range of correct identification scoring by the normal group - was used as an aim for the aphasic group.

The gestures were taught in eight weekly 2½hour sessions, using films, role play and demonstrations with real objects. Two sessions for families and ward staff were held.

At the end of this period, 2/4 had attained the target level, and one showed no improvement. Factors which had a negative influence were thought to include the following:

1. Pre-morbid personality
2. Family dynamics - especially a lack of communication
3. Difficulties in utilising comprehension skills which were low at the outset
4. Preserveration
5. Body apraxia (although one of the successful subjects had a body apraxia)

Critical Points

1. More information of a descriptive nature is needed here - on the degree and quality of spontaneous use of gestures; its effect, if any, on verbalisation; on the understanding and use of the programme by families; and on the content of training and counseling sessions.

2. There is no information on how the aphasics subjects' learning - receptive and expressive - of individual gestures compared to the normal group.

3. Specific criticism is made in the literature review of Makaton and Amerind, on the grounds that too much new learning is required, because the gestures are not automatic, and that fine manual dexterity is required (Makaton) - and that the differentiation of signs is too complex and discrete (Amerind). Teaching principles fundamental to these two systems are ignored:
   (i) that it is possible to select the signs to be taught and thus avoid differentiation in meaning which is beyond the subjects' capability

   (ii) that fine manual movements are not necessary for the subject, whose attempts, however gross, will be accepted, and then shaped to an appropriate level for communicative clarity.

   In fact it is clear from the programme that a high proportion of the gestures taught are similar, or identical, to the ideographic Makaton signs (e.g. baby,

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clothes, drink, sleep). The gestures which were not ideographic had to be taught and explained to the group in the same way as more abstract Makaton signs.

The crucial question is the balance of ideographic and abstract signs, and its effect on learning and generalisation. This is not explored by the authors.

Clinical Applications

1. This paper may be welcomed for its attempt to identify the factors affecting gesture learning by aphasics (see Results). The authors felt that in retrospect, the group should have been run intensively over ten consecutive mornings, and that a counselling group for families and ward staff should have been held concurrently, perhaps run by a Social Worker or Psychologist in close liaison with the Therapist.

2. The paper affords an example of a very modest piece of research which would be well within the means of the working therapist. We urgently need more case studies of this type, which offer more detail about processes of teaching and learning.

Varney, N. (1978)
Linguistic correlates of pantomime recognition in aphasic patients
J. Neurology, Neurosurgery and Psychiatry, 41, 564-568, 1978
Cross-Reference
MVDP Research Information Service: NEUROLINGUISTICS

Summary

Followed Duffy et al (1977) in investigating the relationship between pantomime recognition and linguistic functioning, to determine whether or not a disturbance of symbolic thinking underlies both processes. Two receptive language abilities - aural comprehension, and reading comprehension, were of particular interest. It was hypothesised that because pantomime recognition and reading comprehension are both visually mediated, reading comprehension might be more relevant than aural comprehension.

Subjects

Aphasic	40, left cerebral lesions, performing below 5th percentile on a standardised expressive language test
Control	20 patients hospitalised for non-neurological reasons

Tests

Three tests of the Multilingual Aphasia Examination (reference supplied) - visual naming, aural comprehension and reading comprehension.

Pantomime recognition

Subjects viewed pantomimes on video, and selected the corresponding drawing from an array of four.

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Results
There was a close relationship between pantomime recognition and reading comprehension, as evidenced by a high correlation (higher than the other between test correlations) and examination of the association between individual subject performance on each of the four tasks.

Impaired pantomime recognition was always associated with reading comprehension defects of at least comparable severity. The converse however, did not always apply - some subjects with intact pantomime recognition had reading impairments.

The findings suggested that there may be no essential relationship between defects in pantomime recognition and aural comprehension - half of the aphasics with impaired aural comprehension showed intact pantomime recognition, and there was one subject with the converse relationship.

Varney leaves open the question of whether a supralinguistic impairment - ‘asymbolia’ may affect nonverbal and verbal abilities in certain subjects.

Varney suggests that if two linguistic abilities are mediated in the sane sensory modality - e.g. visual - pantomime recognition and reading comprehension : aural sound recognition and aural verbal comprehension - then they will be similarly impaired. This would imply that the processes controlling them are modality specific. However, Varney is somewhat ambiguous in his conclusions. In connection with reading deficits, he suggests that there are two determinants - “a supralinguistic impairment (asymbolia?) which also affects nonverbal abilities (i.e. pantomime recognition) and a specific linguistic impairment which only affects reading comprehension”

Clinical Applications
The strong relationship between reading comprehension and pantomime recognition found by Varney and Seron et al (see page 23) suggests that the level of reading comprehension may be predictive of the degree to which a client is able to profit from pantomime cues to comprehension. We need more research, along the lines perhaps of Saya this Issue, to determine if this is the case, and what the critical levels are.

Velletri-Glass, A., Gazzaniga, M. & Premack, D. (1973)
Artificial language training in global aphasics
Neuropsychologia, 11, 95-103, 1973
Cross-Reference
MVDP Research Information Service: NEUROLINGUISTICS

Summary
This is an experimental investigation of the capacity for symbolic thought in seven globally aphasic clients, who had suffered massive lesions to the dominant left hemisphere. They had no functional verbal expressive ability, and erratic comprehension for a few words. Written comprehension was better, although only for single three-letter words.

The Premack symbol system and training procedures derived from work with primates was used (see MVDP Research Information Service, Vol.1, No.1, p 18-19).

Pre-experimental testing of various language functions was carried out. 5/7 subjects could sort words from non-words, both with CVC structure, and they could spell jumbled CVC words, in the absence of semantic comprehension they could not consistently match words to pictures. They could not sort potential (CVC nonsense syllables) from non-potential words (CCC nonsense syllables). They could not sort words into word class, discriminate singular from plural, or construct or identify simple meaningful grammatical sentences to match a picture. They could, to varying degrees, sort pictures into different conceptual classes.

This behaviour implies that words are in part stored as visuo-verbal units, separately from their meaning or semantic correlates, and that the right hemisphere could scan a given subset of letters, and match to an internal unit. Clients tended to manipulate the letter orders randomly until a word was made.

Similar behaviour has been observed by the right hemisphere of split brain subjects.

So the processes explored in this paper are assumed to reflect the capacity of the right hemisphere to learn about syntactic relationships between symbols when these are directly taught (see Zaidel, E. (1981), this Issue). The subjects were able to learn such relationships.

The programme moved from the expression of relations between objects to the construction from jumbled elements of simple SVO sentences to describe an action carried out by the experimenter.

-	Object	Symbol	Object	First task
	Cup	Same	Cup	
	Cup	Different	Spoon	
-	Symbol	Symbol	Symbol	Final task
	Andrea	Pour	Water	

Two of the subjects completed the programme successfully - it is of interest that one of these displayed no ability to sort words from non-words, or spell in the pre-experimental testing. The authors state that the progress of the remaining subjects indicated that they too would have progressed to this level if training had been completed - in fact they were discharged before this was possible.

The implications of this paper are considerable. With regard to the debate as to whether aphasia impairs modalities selectively and independently or should be considered as a unitary deficit in symbolic thinking, it is clear that symbolic thought should not be regarded as solely the province of the left hemisphere. Thus aphasia does not imply asymbolia, but will affect the capacity for symbolic thinking to varying degrees, depending on site and extent of lesion, and involvement or otherwise of the right hemisphere.

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Critical Points
Some information on how the subjects' performance on the pre-experimental tests affected their learning of the symbols would have been illuminating.

Clinical and Research Applications
These results have positive clinical implications since it appears that even a global aphasic with no ability to recognise words (as tested here) can learn to manipulate symbols. However, we need more research to evaluate:

1. The effect of the teaching paradigm. Is the Premack approach (similar to that used in NONSLIP and the Deich and Hodges programme - MVDP Research Information Service, Vol.1, No.1) which sets out to teach about language, better suited to the needs of these clients than one which teaches communication?

2. What would the ability of these subjects have been to use symbols to communicate desires, needs, ideas? It is more difficult to construct a communicative proposition yourself than to order a set of given elements to describe a given proposition.

3. For optimum communication, a system which uses a symbol matrix, with written words, is preferable to one whereby symbols have to be selected and ordered. Could the subjects have pointed to symbols on a matrix at each level of the task? or is this, as one suspects, inherently more difficult?

4. Although the subjects showed prior to the experiment, that they could not order words meaningfully, could they have been taught to do so if the programme had used words instead of symbols? or was it the unfamiliarity of the symbols which permitted new learning to take place in the absence of a preconceived set of responses to familiar stimuli?

* Zaidel, E. (1981)
Clues from hemispheric specialisation
In Signed and Spoken Language: Biological constraints on linguistic form
Bellugi, U. & Studdert-Kennedy, M. (Eds) pp.291-340, Dahlem Konferenzen, 1980, Weinheim: Verlag Chemie GmbH
Cross-Reference
MVDP Research Information Service: NEUROLINGUISTICS

Summary
This review of research into hemispheric specialisation for sign and spoken language contains a section on sign aphasia, and a particularly illuminating discussion of the relationship between apraxia and executive sign aphasia.

Briefly, ideomotor apraxia seems to affect single simple gestures, including imitation. Conventionalised gestures such as waving are less affected than gestures descriptive of object use without the object being present, and the most difficult task is imitation of meaningless gestures.

Ideational apraxia is more likely to impair whole phrases or sequences of gesture, and has been described as a deficit in the conceptual organisation of motor sequences involving the manipulation of objects, so that neither can such actions be performed, nor can pictorial sequences of them be arraged.

Zaidel admits that "the relationship between aphasia and apraxia in general remains an open problem in neuropsychology".

There is not yet sufficient evidence to determine whether or not executive sign aphasia exists distinct from apraxia. Ideational apraxia usually involves aphasia, but not conversely. (The failure of some researchers, (e.g. Goodglass and Kaplan (1963)) to adequately differentiate and describe their apraxic subgroups confuses the issue.)

DYSARTHRIA

* Hagan, C. (1978)
Assistive communication systems for the anarthric and severe dysarthric patient: A rationale for their use and criteria for their selection
Scand. J. Rehab. Med. 10, 163-168, 1978
See: MVDP Research Information Service, Vol.1, No.8 COMMUNICATIONS AIDS

Perry, A.R., Gawel, M. & Rose, R.C. (1981)
Communication aids in patients with motor neurone disease
BMJ, 282, 1690-1693
See: MVDP Research Information Service, Vol.1, No.8 COMMUNICATION AIDS

Skelly, M., Schinsky, L., Smith, R.W., Donaldson, R.C. & Griffin, J.M. (1975)
American Indian Sign : A gestural communication
system for the speechless
Archives of Physical Medicine & Rehabilitation, 56, 156-160, 1975

Summary
An early project exploring the use of Amer-Ind as a compensatory communication tool for clients with intact language, but functional difficulties impairing speech - glossectomees, laryngectomees, dysphonics, dysarthrics and apraxics. Amer-Ind, rather than ASL was selected because the naive viewer finds it very easy to interpret. Amer-Ind signals are highly iconic, whereas the majority of ASL signs have no obvious relationship to their referents (see discussion of Amer-Ind and BSL, this Issue).

Sessions were 2 hours weekly, over 6 months. All the subjects achieved some degree of success, varying according to ability and handicap, with using the system in "life situations". The six apraxic clients took longer to learn and use the system, perhaps because they had to adapt to the one hand variant, but by the end of the project, five had acquired 60-90% of the signals.

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