5 The specific developmental speech disorder syndrome

Introduction

The specific developmental speech disorder syndrome is considered by Ingram (1972) to be a descriptive label applied to children with retardation of speech development who are otherwise normal. His views are summarized in Chapter 1. Rutter and Yule (1970) see development delays as representing 'extreme variations in normal development . . . which are related to the continuing growth and maturation of the brain'. The salient features of these delays are also noted in Chapter 1.

Ingram considers it useful for practical and theoretical purposes to regard the heterogeneous group of articulatory and language disorders that fall into this category as a spectrum of disorders which vary from the mild to the very severe. The mild disorders are the *dyslalias* which are defined as the retardation of the acquisition of word sounds but with normal language, that is, articulatory development is retarded. The moderate disorders involve normal comprehension but more severe retardation of word sound acquisition and retardation of development of spoken language, and fall into the category of *developmental expressive dysphasia*. The severe disorders involve greater degrees of retardation of word sound acquisition, impaired development of spoken language and impaired comprehension of speech, and fall into the category of *developmental receptive dysphasias* (see p. 6).

A brief review of the more recent literature on childhood dysphasia is necessary. The review by Eisenson (1968) provides a basis for an appreciation of current concepts.

Definition of childhood dysphasia

A widely accepted definition is that childhood dysphasia is a relatively specific failure of development of language and associated functions. Benton (1964), like Ingram (1972), views it as a spectrum of disorders ranging from a disability in speaking, with near normal speech and understanding, to a disability in both understanding and expression of speech. He sees the concept as one of 'specific' failure because there is no associated deafness, mental subnormality or evident neurological disability.

Clinical features

These have been variously described:

(i) *Auditory functioning* Eisenson (1966) identifies a difficulty in localization of a sound source, inconsistency of response to sounds and poorer functional hearing than would be expected from audiometric assessment. He points out that the child may have mild or moderate hearing impairment detectable by audiometry. However, such impairment is usually insufficient to account for the child's difficulty in dealing with auditory stimuli (Olson, 1961; Worster Drought, 1965) and therefore his functional hearing may be more impaired than the audiometric findings might suggest.

(ii) *Intellectual functioning* According to Eisenson (1968) the child with developmental dysphasia tends to have normal intelligence on non-verbal tests (Stark, 1967; Weiner, 1969; 1972). However, his intellectual performance tends to break down under conditions of stress or awareness of error and, in such situations, perseveration or anger reactions may supervene. Perceptual dysfunctioning occurs in one or more sensory modalities but not in all (Bartak *et al.*, 1975). Finally, the child has relatively good visuomotor functioning (Weiner, 1972).

(iii) *Speech and language functioning* Both Ingram (1972) and Eisenson (1968) suggest that dysphasic children show a spectrum of language impairment as judged by sentence length and complexity, and by grammatical or syntactical performance. Weiner (1972) reports deficiencies in repetition of vowels and sentences, and poor performance on an articulation test. In his view, these findings support the concept of difficulty in coping with the linguistic rules of grammar (Menyuk, 1964; Morehead and Ingram, 1973). Deficiencies in all aspects of auditory-vocal functioning have also been reported (Weiner, 1972).

Theoretical explanations

A wide variety of theories have been advanced to explain the problems involved in dysphasia. The contradictory nature of many of these theories often arises from the contradictions in some of the empirical evidence upon which they are based (Hardy, 1965). Such differences are brought about by many factors—for instance, the ascertainment criteria used in different studies are often different and hence the samples have not been entirely comparable or the tests used have not always been similar (Weiner, 1972).

One theory invokes the concept of defective auditory perception. The proponents of this theory contend that the main mechanism of dysphasia is a defective processing of auditory signals. Hence the dysphasic child may not be able to listen as rapidly as required to perceive and process spoken language (Eisenson, 1968).

Other theories impute both auditory perception and processing difficulties involving defects both in discrimination and in integration of auditory information. An example of this theme is that advanced by McReynolds (1966) who postulates that dysphasics have a defective capacity for storing speech sound. The essential finding is that the child is able to make correct discrimination responses for immediate but not delayed recall. Thus the child may be able to match and discriminate isolated speech sounds but not where the sound is part of a phonetic pattern. Eisenson (1968) advances a further variation on this theme consisting of a poor ability to sequence auditory events in time, and hence a defective capacity to store speech sounds (Stark, 1967; McReynolds, 1966; Monsees, 1968). Eisenson speculates that expressive dysphasia is secondary to primary receptive dysphasia. In his opinion, a child who cannot process speech has a fundamental impairment in those perceptual abilities that are essential for the understanding of language and the acquisition of speech.

Weiner (1972), on the other hand, feels there is inadequate support for Eisenson's hypothesis as the sole origin of language difficulties. He postulates instead a production difficulty which he bases on the argument that whereas normal children can imitate speech better than they can comprehend it (Fraser *et al.*, 1963), children with delayed speech comprehend grammatical structure better than they can repeat or produce it. Rees (1973) argues that the evidence for an auditory perceptual defect in language and learning disorders is limited. Instead, she proposes a cognitive deficit as the primary problem.

Another theory is that in dysphasia there is a lack of, or a delay in the development of deeper language structures (Chomsky, 1969; Lenneberg, 1966) and hence the difficulty in learning linguistic rules (Weiner, 1969). Yet another point of view is that put forward by Menyuk (1964) who attributes difficulty in coping with the rules of grammar to a deficiency in short-term memory. Perhaps this is the basis of an inability to apply principles and to generalize from one situation to another (Eisenson, 1968).

It is not surprising therefore, that there is no generally accepted theory of dysphasia. Rather, each group of workers implicates a different deficit as the central mechanism of dysphasia.

Validation of our classification of speech retardation

We have already provided a full validation of the breakdown of a group of speech retarded children into two subgroups: (1) Pathological Deviant Children; (2) Residual Speech Retarded Children. We now wish to justify our further classification of the Residual Speech Retarded (RSR) Group into subgroups comprising:

(i) A group with specific speech delay (Specific Speech Delayed Group)
(ii) An Intermediate Group
(iii) A group who are delayed in both speech and walking (General Delayed Group)

Hypothesis

In this section we focus on the group with specific speech delay. This group is of great theoretical interest as not only were the children normal in all respects other than the development of speech at the age of three, but they were advanced in their walking. On theoretical grounds it seems reasonable to put forward the hypothesis that this group had suffered from *developmental dysphasia*, to at least a mild degree. We can test this hypothesis by finding to what extent their later functioning is suggestive of a developmental dysphasia according to features described in the literature. We can further test the hypothesis and validate the classification by studying the performance of the children in the three subgroups, described above in the previous section, on a number of measures and also on data available from the monitoring of these children up until the age of eight.

Findings

1 Audiometric assessment of the Residual Speech Retarded Group and the controls

When assessing children with speech and language difficulties an essential first step is to exclude deafness. Audiometry was therefore undertaken by a senior speech therapist (E.S.) using an amplivox audiometer calibrated to ISO (International Standards Organisation Zero). Each ear was tested separately. From Fig. 1 it is evident that the Residual Speech Retarded Group has slightly greater hearing loss at each frequency for the right ear with the pattern being repeated in the left ear. However, the differences are not significant and, furthermore,

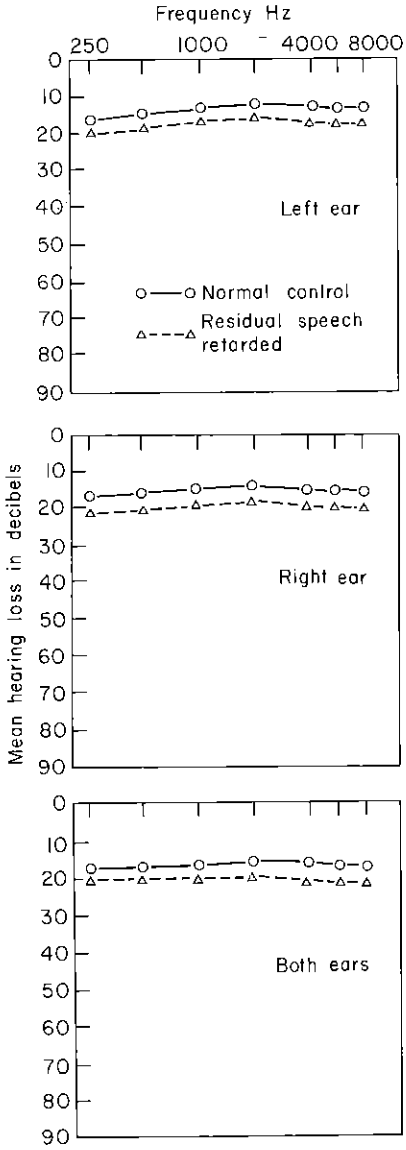

Fig. 1 Mean hearing loss in decibels at each frequency for normal control and residual speech retarded groups

the mean decibel scores fall within the normal range for each ear separately. (The data from our three separate subgroups vary only slightly from that of the Residual Speech Retarded Group as a whole and again the differences between the three subgroups and the controls are not significantly different.)

2 *Global findings on cognitive testing*

Table 12, Appendix 1, shows the scores achieved by the control group and three subgroups of speech retarded children on a variety of tests of cognition and language.

On all but one of the tests of cognition and on most of the tests of syntax the controls proved significantly or very significantly superior to the General Delayed Group. The only exception is on the haptic-visual integration test (of Birch) on which there is no significant difference. The controls are only significantly superior to the Specific Speech Delayed Group on four of these tests, namely, Frostig Test of Visual Perception, English Picture Vocabulary Test of comprehension, and some of the measures of syntax and language maturity—in particular information content and mean sentence length (as measured on the Bus Story Test).

The test of articulation gave some most interesting results. While the articulation of the Specific Speech Delayed Group is significantly inferior to that of the controls, that of the General Delayed Group is not.

Finally, the Specific Speech Delayed Group had better scores than the General Delayed Group on cognitive and language tests, with the exception of auditory-visual integration (Birch's Test) and haptic-visual integration (Birch's Test) and imitation of gestures. Language tests showed only one significant difference between the Specific Speech Delayed and General Delayed Groups and that was on the vocabulary comprehension test (English Picture Vocabulary Test) on which the Specific Speech Delayed Group were superior.

On a graded word reading test (Schonell) the Specific Speech Delayed Group proved to be significantly poorer than the controls but did not significantly differ from the General Delayed Group. As expected, both the General Delayed Group and the Intermediate Group were also significantly inferior to the controls.

Interim discussion

It is important to note that the Specific Speech Delayed Group, compared to the controls, do particularly well on the non-verbal tests of conceptual maturity (Draw-a-Man Test), motor ability (Purdue Peg Board), haptic-visual integration (Birch's Test), visual concepts

(Skemp's Test) and imitation of gesture . They do comparatively poorly on a test of visual perception (Frostig's Test) despite the fact that this is considered to be a non-verbal test. This is discussed later.

On the WISC of all groups the Specific Speech Delayed Group was found to have the greatest performance minus verbal IQ mean difference. The difference, which proved significantly greater than that of the control group (Table 12, Appendix 1), emphasizes the poorer verbal ability of the Specific Speech Delayed Group relative to their nonverbal ability. As expected, the Specific Speech Delayed Group also perform poorly on the test of verbal comprehension (English Picture Vocabulary Test) and their syntax is also inferior to that of the controls, though not always significantly. It was found that the Specific Speech Delayed Group used significantly more simple sentences and fewer elaborated sentences than the controls. In essence, the range of syntax and grammar of the Specific Speech Delayed Group, as expressed in their spoken language, was very much poorer than that of the control group.

Of additional importance is their inferiority to the controls on articulation, as the ages of the children at the time of this assessment was well beyond six years, which is when the majority of children in the general population are expected to have acquired normal and mature articulation (Morley, 1965; Anthony *et al.*, 1971).

Rutter (1972) points out that 'children who are delayed in talking are likely also to be delayed in reading, because both reflect language impairment'. This view is borne out by our findings for all three of our Speech Delayed Groups. Of further interest was the fact that all three Speech Delayed Groups displayed significantly greater difficulty in their ability (see Table 13, Appendix 1).:

(a) to blend units of sound (phonemes), to form words (sound blending subtest ITPA);
(b) to recognize words presented orally when one or more units of sound are omitted (auditory closure subtest ITPA).

According to D'Arcy (1973) discrimination between different units of sound forms an important aspect of learning to read. This is supported by Winitz (1966) who advances the view that 'phonemes are the elemental units of spoken language; they signal semantic distinctiveness'. Therefore, the relative poverty of the Specific Speech Delayed Group (and, indeed, of the Intermediate and General Delayed Groups) on discrimination of word sounds suggests that their reading handicap is not simply associated with poorer verbal and language ability, but also with a residual impoverishment of a more specific aspect of language, namely, word sound—or phoneme—recognition and discrimination.

The General Delayed Group was significantly inferior to the controls on almost all measures used, including verbal and non-verbal tests of cognition and on measures of language and syntax. However, the articulation of this group was not significantly inferior to that of the controls.

To sum up, the majority of the findings on the Specific Speech Delayed Group fit in with the pattern which one would expect if this group had suffered from developmental dysphasia. For example, children in this group achieved significantly better scores than those in the General Delayed Group, who are more likely to be suffering from general intellectual retardation. Further, one would have expected of the Specific Speech Delayed Group:

(i) A wide verbal–performance discrepancy on the WISC—which was found.

(ii) A near-normal level of conceptual maturity compared with the controls—which was found.

(iii) Reasonable comprehension—this would have been expected if the Specific Speech Delayed Group suffered only from an expressive dysphasic disorder with near-normal comprehension of speech. However, their significantly poorer scores on the EPVT lead to the conclusion that their disability extends beyond expression to comprehension difficulties as well.

(iv) Near-normal functioning on a test of visual perception, but this was not found. The significantly poorer performance by our Specific Speech Delayed Group as compared with the control group, on the Frostig Developmental Test of Visual Perception, raises the question of brain damage as children with varying degrees of brain damage have been reported to be inferior on this test (Maslow *et al.*, 1964; Frostig, 1966). However, there are doubts about the validity of the Frostig as a test for brain damage and this theme is examined in some detail in Chapter 10, p. 171. We have sought corroborative evidence from clinical-neurological examination but none was found. Furthermore, there was no suggestive evidence of brain damage in our Specific Speech Delayed Group on the remaining cognitive tests.

(v) Near-normal motor functioning (on the Purdue)—which was found.

(vi) Near-normal ability to imitate (Bartak *et al.*, 1975)—which was found.

(vii) Near-normal ability with visual concepts (on the Skemp)—which was found.

(viii) Comparatively poorer syntactical and articulatory development—which was found.

(ix) Comparatively poorer functioning on a test of education achievement—which was found.

(x) Finally, the differences between the controls and the Specific Speech Delayed Group should be narrow on performance tests, wide on verbal tests, but very much wider on tests of language and educational achievements. The actual discrepancies are according to expectation: performance IQ, 2 points; verbal IQ, 7 points; reading quotient, 12 points; language quotient, 13 points. On balance then, the weight of evidence strongly supports our hypothesis that the children in the Specific Speech Delayed Group have a pattern of cognitive functioning reminiscent of a continuing developmental dysphasic disorder. On the other hand, the pattern of the General Delayed Group is that of widespread cognitive impairment, syntactical impairment but not articulatory impairment. This strongly supports the view that this group is suffering from general retardation rather than a more circumscribed impairment.

3 Cognitive tests—pattern of subtest scores

(a) *ITPA subtests*

The next step was to study the psycholinguistic abilities of the three subgroups on the assumption they would show differences in profile and patterns of subtest scores which might provide clues to the nature of the language deficit in the three subgroups. Figure 2, which compares the profiles of the subtests of the ITPA, reveals that compared to the control group:

(i) The General Delayed Group have significantly poorer results on each of the ten subtests. This is similar for the Intermediate Group, except on the subtest measuring visual reception on which they did not significantly differ from the controls (Table 13, Appendix 1).

(ii) The Specific Speech Delayed Group have significantly poorer results than the controls on four subtests—auditory association, verbal expression, grammatic closure and auditory sequential memory. They do not differ from the controls on those tests which rely heavily on the interpretation of tasks involving the visual modality, but differ significantly on those that rely on the auditory modality. The one exception to this pattern is the auditory reception subtest where the differences between the controls and the Specific Speech Delayed Group approach the 5% level of significance only. Furthermore, the Specific Speech Delayed Group was not significantly superior to the Intermediate Group on any subtest.

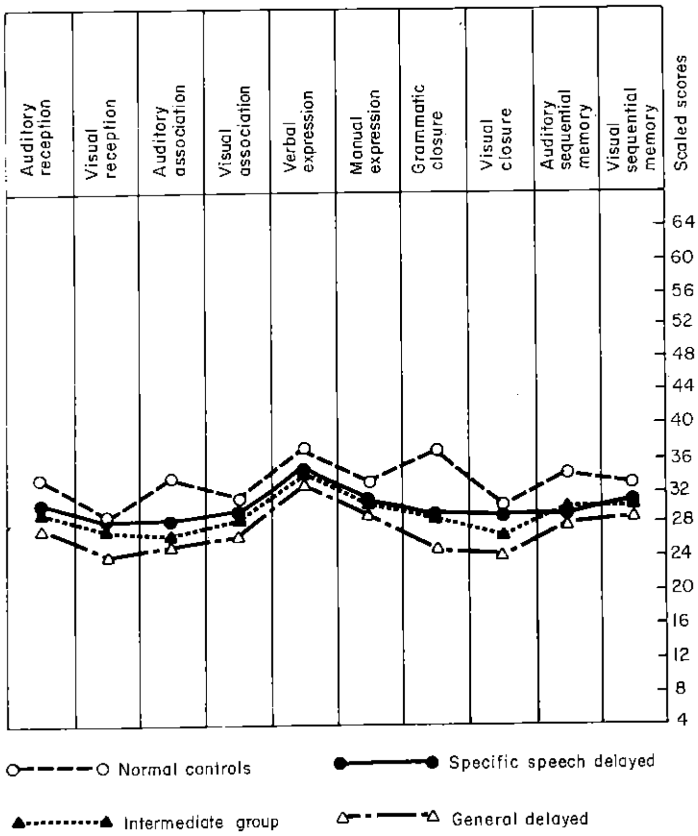

Fig. 2 ITPA profile of mean scaled scores for normal control, 'specific speech delayed, intermediate and general delayed groups

Interim discussion

At the age of seven, the three subgroups of speech retarded children have residual linguistic difficulties. The extent of the difficulties is closely tied to their previous prowess or delay in walking.

The Specific Speech Delayed Group are significantly inferior to the controls on tasks which are heavily reliant on auditory or verbal functioning, but not on tests which are dependent on visual input (visual reception, visual association, visual closure, visual sequential memory) or on motor or manual language output (manual expression). It is of importance to note the tests in which these children have residual specific difficulties. These include:

(i) description of familiar objects—e.g. ball, an envelope, etc. (verbal expression);

(ii) correct completion of a statement in which grammatical elements such as plurals, tenses, comparatives and superlatives are the key features (grammatical closure);
(iii) completion of a verbal statement according to an understanding of verbal analogies, e.g. 'bread is to eat, milk is to . . .?' (auditory association);
(iv) production from immediate memory of sequences of digits (auditory sequential memory). Children in the Specific Speech Delayed Group therefore have poorer language abilities than would be expected from their global intelligence.

The poor performance on grammatic closure is in accord with the view that dysphasics have difficulty in coping with the linguistic rules of grammar (Menyuk, 1964; Lenneberg, 1966). The inferior performance on tests which heavily rely on the auditory modality is consonant with the contention that dysphasic children have a basic defect in processing and sequencing auditory signals, that is, that they suffer from a form of auditory imperception (Eisenson, 1968; Stark, 1967). In this respect, it is interesting to note that the Specific Speech Delayed Group did badly on the test of auditory sequential memory but not on the test of visual sequential memory.

In summary, the overall pattern of tests on the ITPA again supports the hypothesis that the Specific Speech Delayed Group previously suffered from a type of developmental dysphasia.

(b) *WISC subtests*

Our results are presented in both tabular (Table 14, Appendix 1) and graphical form (Fig. 3). The pattern of WISC subtest scores from the various groups are broadly similar. The main findings are:

(a) The General Delayed Group is significantly inferior to the controls on eight of the ten subtests and the difference on another subtest, object assembly, just falls short of statistical significance.
(b) The Intermediate Group is significantly poorer than the controls on six subtests, four of which belong to the verbal scale.
(c) The Specific Speech Delayed Group is significantly poorer than the controls on four subtests, three of which are verbal (information, similarities and vocabulary) and on one performance subtest (picture arrangement).
(d) The General Delayed Group is significantly poorer than the Specific Speech Delayed Group on arithmetic (verbal scale) and on picture completion, block design and coding (performance scale). Thus the Specific Speech Delayed and General Delayed

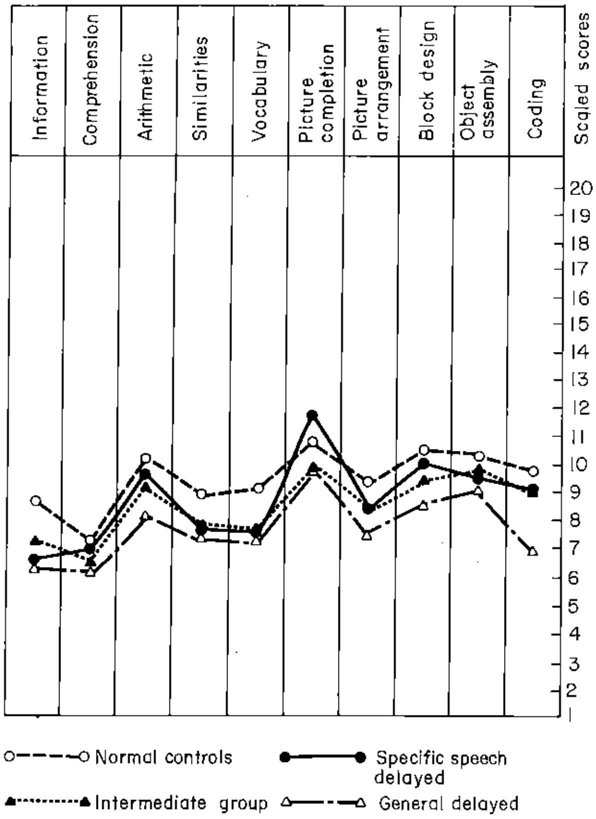

Fig. 3 WISC profile of mean scaled scores for normal control, specific speech delayed, intermediate and general delayed groups

Groups are differentiated from each other mainly by their differing abilities to carry out non-verbal tasks.

Intellectual functioning and 'dysphasia'

There are comparatively few reported studies on the *specific* intellectual abilities and impairments of dysphasic children. In this section our aim, therefore, is to compare patterns of impairment as displayed by our Specific Speech Delayed Group with the clinical descriptions of dysphasic children as described in the literature. The pattern of intellectual functioning of our Specific Speech Delayed Group is based on their performance on the WISC. This battery consists of 12 subtests, 10 of which have been used in our study, and thus allows for a pattern approach (Cohen, 1959; Glasser and Zimmerman, 1967; Sattler, 1974).

As a basis for interpreting our WISC findings we have decided to use Cohen's Factor Analytical Model, with particular reference to the analysis at 7½ years which is the age which is most relevant to our study. The major factors defined by Cohen (1959) are shown in Table I. Cohen sees *verbal comprehension I factor* as a reflection of verbal knowledge influenced mainly by 'formal education', and *verbal comprehension II* as 'the application of judgement to situations following some implicit verbal manipulation'. The *perceptual organization factor* is regarded as a non-verbal factor which reflects the ability to interpret and/or organize visually perceived material against time and the *freedom from distractability factor* as a measure of the ability to attend or concentrate.

Table I *Subtest with loadings of important primary factors* (derived from Cohen, 1959)

	Factor A	Factor B	Factor C	Factor D
	information	picture arrangement	arithmetic	comprehension
	arithmetic	block design	digit span[a]	vocabulary
Subtest	similarities	object assembly	picture arrangement	picture completion
	vocabulary	mazes[a]		
Interpretation	verbal comprehension I	perceptual organization	freedom from distractability	verbal comprehension II

[a] We did not include these subtests in our study

Using the interpretation proposed by Cohen (1959) we can attempt to describe the nature of intellectual functioning of our Specific Speech Delayed Group as highlighted by their score on each of the WISC subtests. We have used a simple method which involved grouping the subtests under the factor headings proposed by Cohen. We have then compared the scores of the Specific Speech Delayed Group and control group on the subtests in terms of their particular factor grouping. Our findings show that on all four subtests which constitute the *verbal comprehension I factor* as described by Cohen, our Specific Speech Delayed Group do poorly, significantly so on three of them (that is, on information, similarities and vocabulary). As for Cohen's *verbal com-*

prehension II factor, our Specific Speech Delayed Group again do worse than the controls, though significantly so on only one of the three subtests (that is, on vocabulary) with important loadings on this factor.

The only subtest of the WISC non-verbal scale on which our Specific Speech Delayed Group are significantly poorer than the controls is picture arrangement. Further, it is of interest to note that this subtest forms both part of Cohen's *perceptual organization factor* and of the *freedom from distractability factor* at the age level of $7\frac{1}{2}$ years.

In summary, then, the specific area of intellectual impairment of our Specific Speech Delayed Group is predominantly in the sphere of verbal reasoning in terms of both verbal comprehension factors described by Cohen. This is in general agreement with clinical and other findings in studies of dysphasic children (Eisenson, 1968; Weiner, 1972; Bartak *et al.*, 1975). To a lesser extent there are deficits of perceptual organization and concentration as measured by the picture arrangement subtest. We accept that the latter interpretation is based on the strength of only one subtest and it therefore must be viewed with caution. Nevertheless, this finding is reminiscent of Eisenson's (1968) observation that dysphasic children are inclined to lose sight of the principle necessary for completion of a task which in our view constitutes a form of distractability.

Rank order and gaps between WISC subtests

Another way of studying our data is to compare the rankings of the mean subtest scores of the groups studied. The rankings are shown in Table II. It will be seen that, on the verbal scale, rankings of the Intermediate Delayed Group and the General Delayed Group are similar to those of the controls. Interestingly, our Specific Speech Delayed Group and Rutter's dysphasic group have identical rankings. However, on the performance scale it is our Specific Speech Delayed Group and the controls that have identical rankings while the General Delayed Group and Rutter's dysphasic group have similar but not identical rankings.

After ranking the mean subtest scores and using the studentized range statistic (Q) for correlated data and testing for a significant gap between subtests we found that:

(a) On the WISC verbal subtests the gap between arithmetic and comprehension for the controls was significant ($p < 0 \cdot 01$). For the Specific Speech Delayed Group there was a significant gap between arithmetic on the one hand, and information, comprehension, vocabulary (all $p < 0 \cdot 01$) and similarities ($p < 0 \cdot 05$) on the other. For the General Delayed Group the only significant gap

Table II *Ranked order of mean scores on subtests of WISC*

	Controls	SSD	ID	GD	Rutter's dysphasics
Verbal					
Arithmetic	1	1	1	1	1
Vocabulary	2	3	2	3	3
Similarities	3	2	3	2	2
Information	4	5	4	4	5
Comprehension	5	4	5	5	4
Performance					
Picture completion	1	1	1	1	2
Block design	2	2	3	3	1
Object assembly	3	3	2	2	3
Coding	4	4	4	5	5
Picture arrangement	5	5	5	4	4

SSD = Specific Speech Delayed Group; ID = Intermediate Delayed Group; GD = General Delayed Group.
High rankings e.g. 1,2,3 = higher mean scores; low rankings e.g. 8,9,10 = lower mean scores

was between arithmetic and comprehension ($p < 0{\cdot}05$). These findings simply suggest that the Specific Speech Delayed Group have a specific verbal deficit.

(b) On the WISC performance subtests for the controls there was no significant gap between the tests. For the Specific Speech Delayed Group the mean for picture completion was significantly higher than that for picture arrangement ($p < 0{\cdot}01$). For the General Delayed Group the mean for picture completion was again significantly higher than that for picture arrangement ($p < 0{\cdot}05$) and for coding ($p < 0{\cdot}01$). This suggests that these two latter groups have an impairment on Cohen's factors B, C or both.

In summary, the pattern of verbal scale subtests of the WISC suggests that the Specific Speech Delayed Group and control group were performing differently. Some workers (Eisenson, 1968) have suggested that the dysphasic child performs patchily on intelligence tests. Looking at the graphs of subtests both on the WISC and the ITPA it is evident that the profiles of the speech groups are very similar to that of the controls but more depressed. A suggestion of pacthiness, though not marked, is evident in our Specific Speech Delayed Group. However, there are degrees of dysphasia and it is only the extreme cases that are likely to show most of the characteristics described in the literature (Oslon, 1961; de Ajuriaguerra, 1966; Eisenson, 1968; Weiner, 1972; Bartak *et al.*, 1975). As it is unlikely that our Specific Speech Delayed Group have a severe degree of dysphasia they cannot be expected to show all the features described but at least they show verbal impairment and possibly distractability.

Rank order and gaps between ITPA subtests

The exercise described above can be repeated in relation to the ITPA subtests (Table III). The differences in patterns of rankings are immediately evident. First, on the auditory association subtest the three speech groups have low rankings (in other words, have low scores) compared to those of the controls; second, on the grammatic closure subtest the three speech groups rank low compared to ranking of the controls; and, third, on the manual expression subtest, the three speech groups rank high whereas the controls rank low. These findings suggest that all three speech groups do badly on auditory sequential memory, auditory association and also on grammatic closure, but that they do relatively well on manual expression. Table III, therefore, highlights the findings reported in Chapter 3.

Table III *Ranked order of mean scores on subtests of the ITPA*

	Controls	SSD	IG	GD
Verbal expression	1	1	1	1
Grammatic closure	2	7	6	7
Auditory sequential memory	3	5	4	4
Visual sequential memory	4	2	2	3
Auditory association	5	10	10	8
Auditory reception	6	4	5	5
Manual expression	7	3	3	2
Visual association	8	6	7	6
Visual closure	9	8	9	10
Visual reception	10	9	8	9

See footnote to Table II

When we tested for a significant gap between pairs of subtests within each of the groups, as described previously, we found:

(a) *Controls* The mean scores of verbal expression and grammatic closure are both significantly higher than those of manual expression ($p < 0{\cdot}05$), visual association ($p < 0{\cdot}05$) and visual closure and visual reception ($p < 0{\cdot}01$).

(b) *Specific Speech Delayed Group* The mean score on verbal expression is significantly higher than the lowest mean scores on six of the remaining subtests. The high ranking on the verbal expression subtest may seem surprising. However, as this is mainly a test of ability to name and describe the salient features of common place objects (e.g. button, envelope) rather than a test of wide-ranging verbal expressive fluency, we do not consider that very much importance should be attached to this subtest.

(c) *General Delayed Group* The pattern is roughly similar to that of the Specific Speech Delayed Group in terms of a significant gap between the mean score verbal expression (which is ranked highest) and the lowest mean scores on six of the remaining subtests. While this technique is intended to identify the pattern of subtest scores *within each group* and not to compare mean subtest scores between groups, the findings on this subtest are of little importance for the reasons given above.

Conclusion

We have demonstrated that, among the wider population of children who suffer from speech delay at the age of three years, there is a subgroup of children who have no demonstrable neurological disorder, who are of normal non-verbal intelligence and whose differences from the controls cannot be attributed to an adverse social environment, as this had been controlled.

Hence this group, with specific speech delay, can be considered to be suffering from a continuing developmental speech disorder and can credibly be categorized as a specific developmental dysphasic group. Such children have not only articulation problems but also a number of other significant impairments. The pattern of impairments is not clear-cut—and this is evident from those subtests which require varying degrees of comprehension for their successful completion. On the one hand there are significant deficits on relevant subtests of the Illinois Test of Psycholinguistic Abilities (such as auditory association, grammatic closure and auditory sequential memory), of the WISC (information, vocabulary and similarities) and on the English Picture Vocabulary Test. On the other hand, there are important subtests on which no significant impairments occur and these include the ITPA (such as auditory reception, visual association and visual closure) and the WISC (comprehension).

In addition, the Specific Speech Delayed Group, compared with the controls, displays inconsistent expressive language deficits—for instance, on the ITPA they have a significant deficit of verbal expression but no impairment of manual (motor) expression. Thus the language disabilities of the Specific Speech Delayed Group are of a mixed variety—they include defects in comprehension and expression of language. Such defects are patchy but nevertheless appear mainly to occur in relation to the auditory and vocal modalities as opposed to the visual and motor modalities.

Some workers have demonstrated that dysphasics have difficulty in ordering or sequencing material. Children in our Specific Speech Delayed Group have difficulties in relation to auditorily presented material. There is no evidence of motor difficulty (on the Purdue Pegboard) and little evidence of visuo-spatial difficulty. Bartak *et al.* (1975) found articulation deficits in their dysphasic group and we have found similar deficits in our Specific Speech Delayed Group. On the other hand, our General Delayed Group has proved to be delayed or impaired on almost all tests used but did not have significant defects of articulation.

It would seem that there are at least two clearly identifiable subgroups: first, those who start with specific delay and end with a pattern of functioning reminiscent of the syndrome of developmental dysphasia described in the literature; second, those who are delayed both in speech and walking and who are subsequently found to function poorly on nearly all the tests used except that of articulation.

The above findings amply demonstrate that outcome is closely tied to the generality of impairment as indicated by delay on development milestones.

In a previous chapter we report that a quarter of the speech retarded children had had specific speech delay. We therefore calculate that specific speech delay occurs in 1% of the child population.

In some ways our findings are unsupported by the work of others. For instance, Lenneberg *et al.* (1964) studied children with Down's syndrome, and found a strong relationship between language development and motor development especially with regard to age of walking and this is reminiscent of our General Delayed Group. On the other hand, as Mittler (1972) points out, late language development does not necessarily imply subnormality of intelligence. Our research helps to clarify the picture by distinguishing between groups of children—one with specific delay of speech who have greater potential for catching up, and the other with delay in both speech and walking who later prove to have widespread impairment.