# DYSPHASIC SYMPTOMS IN SCHOOL-CHILDREN AS MANIFESTATION OF CENTRAL DEAFNESS

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This investigation was made on 1,278 school-children, since 1958. The evolution of these children was controlled periodically. In order to comprehend the fine dysphasic symptomatology that we have found in this research, we shall remember previously some notions about „infantile aphasia" and about the scope of the expression: „dysphasia in school-children". Then we shall see the general statement of the study followed in three schools and finally the general diagnoses obtained and some dysphasic symptomes of neurological importance.

## Infantile Aphasia

Ever since the last century congenital aphasia has been described as a condition characterized chiefly by delay in speech acquisition which is not due to any provable abnormality in the articulatory apparatus, in hearing, in psychical processes or in intelligence. Many authors (2, 6, 7, 18, 19, 25, 26) — and among them we ourselves (28, 29, 32, 33, 34, 35) — have paid attention to the characteristics of this condition, having established differential diagnoses by means of sensorial processes (hearing loss), psychic processes (emotional, disturbance early autism) and mental retardations. Differential diagnosis within these clinical pictures may be difficult in the frequent cases that result from the combination from conditions different among themselves. The symptoms of congenital aphasia may be divided into: neurological, psychic and linguistic.

**Neurological symptoms** depend upon the cerebral damage that elicits the condition (in cases when it is acquired); nevertheless, it must be remembered that the cause of congenital aphasia is not always organic: sometimes it is not possible to confirm any damage and the only thing provable is the existence of another disorder of linguistic organization (whether it be dysphasia or not) in the history of some member of the same family. Hallgren (11) was able to show in specific developmental dyslexia that it was an inherited condition, as a result of a mono-hybrid autosomal dominant gene. Ingram (15), on the other hand, extended these ideas to specific developmental dysphasia, as she considered this condition closely related to the former one, a thing which we must undoubtedly accept as a reality. According to the fact that the cause of the congenital aphasia may be organic or specific, upon a neurological examination one can more or less establish the existence of primitive reflexes, „prestance" reaction, catastrophic reactions, etc. Very con-

stantly one may come across deficiencies in lateral dominance (left-handedness, left footedness and left-eyedness, cross laterality).

**Psychic symptoms** have relation principally to the tendency of these children to withdraw themselves and occasionally to isolate themselves. Some are excessively attached to some older person (specially the mother), being exaggeratedly affectionate. On the other hand they may appear restless, shifting, unsteady and rather frequently daydreaming or show other symptoms; such as enuresis, perseverations, night fears, etc. Space and time disorientation, difficulties in synthesizing, disturbances in attention and in abstract memory are very important symptoms to be recognised.

**The linguistic symptoms** have relation chiefly to the difficulties in comprehension of speech and/or of reading and writing. In patients slightly affected the inability in comprehending the current language is small, while on the other hand there are difficulties in articulation which are interpreted as dyslalia, idioglossia or articulatory dyspraxia, and pretty frequently slowness in the acquisition of speech (15, 21, 16, 13). In more severely affected patients one may observe different degrees of delay in the development of language and in the comprehension of speech. It is very rare to find cases showing a great lack of interest in comprehension of language. We shall remember that the evaluation of the comprehension of language may be erroneous in children with articulatory difficulties by supposing they have more comprehension than they really do. In this respect the experience of Luria and Yudovich (22) in two twins with delay in language is very demonstrative.

**Scope of the term „infantile dysphasia"**

In this paper we are going to refer only to children with mild dysphasia since they are the only ones that come to be considered „normal" and are enrolled in ordinary schools. Severe dysphasia — real aphasia — is found in physicians' offices and in hospitals, it is not found in ordinary schools. Before going any further it is expedient to remember that infantile aphasia is being considered by some modern authors — as Barger (4) — „in its generic sense to include varying degrees of impairment in literate abilities, separately or in combination; viz., speech, reading, writing, spelling, arithmetic symbolism, consecutive intellectual action, conceptualization, spatial relationships, perception, and interpretation of communication". The evolution in the notion of infantile aphasia, dysphasia and dyslexia, as well as the historic data referring to these conditions have been treated by the authors of this paper in different works to which the reader is hereby refered (29, 31). By dysphasia one must understand incomplete language function, just as the College of Speech Therapists defines it (9). As we see, the term is very broad including any linguistic deficiency, and in the child any deficiency in the acquisition of spoken, read or written language. In this way it is right to apply to the term the same range that, as we have seen, Barger (4) has given to the term „infantile aphasia".

**Statement of the study followed in the schools**

In 1958 we started to study 478 children, apparently normal, that had finish-

ed the lower and higher first grade. About this study we published a work later (32). In 1959 we worked with 300 children who were just six years old before they entered primary school. The study of these children went on during the years 1960 and 1961, but also during these years there began a study of other groups of children in the same conditions, including successive groups of 200 and 300 children. A team of physicians, psychologists, technicians and teachers, especially trained, made this task possible. In order to carry out this study, three large schools, subject to the Department of Education of the Province of Santa Fe, and of different economical and social were chosen in the city of Rosario and they produced the most significant data, considering the areas in which they are located, within the social structure of the city. The said schools were the following:

School no. 60: central zone. Population of a high economic and cultural level; parents: professionals and business men. Dwelling: comfortable houses and apartments.

School no. 56: intermediate zone: Population of more modest economical and cultural conditions than the preceding school.

School no. 120: peripheral zone. Population, in general, of a low economic and cultural level; small shopkeepers, labourers, day labourers, irregular or transient workers. Dwelling: humble homes, slums, huts.

The study comprised the following points:
1 - Study of hereditary and family factors. 2 - Study of environment. 3 - Study of the fundamental periods of motor, linguistic and toilet control development. 4 - Study of illnesses, damages, high fevers and convulsions. 5 - Examinations of the characteristics of the voice and language used by each child. 6 - Neuro-psychic examination with reference to the following factors: a) Extensibility - Tonus - Posture. b) Synkinesias - Paratonias - Reflexes. c) „Sursaut" (scare) reactions and others. d) Motor co-ordination - awkwardness. e) Direction - Precision - Distance. f) Walking - Running. g) Typology. h) Nervousness. i) Attention and comprehension. j) Visual, auditory and motor realization memory. k) Temporo-spatial orientation. l) Stereognosis. m) Body image knowledge. n) Behaviour. o) Psychometry: Terman and Merrill, Raven, Bender, Goodenough, Lourence Filho (ABC). 7 Otolaryngological examinations of the phono-articulatory apparatus and of the hearing. 8 - Special examinations (made in some cases; for example, E.E.G.). 9 - Detailed examination of the language (in children with language problems).

**General diagnoses obtained**

To confront the diagnoses we must remember again that, when we speak of dysphasic school children, we never refer to those severe cases which are taken spontaneously to the doctor's office, but to those children who are considered normal by their parents and as such are admitted in the ordinary schools. According to our statistics, **69 per cent of the children that enter ordinary schools give no signs of maturative, neurological or psychic problems which may make learning at school difficult. In 6 per cent of the children that enter the first grade one notices immaturity regarding chronological age** and from the neurological and psycho-motor point of view. **In 18.66 per cent of these children that enter school one may suppose difficulties in the acquisition of reading and writing** (these difficulties being very pro-

nounced in 4 per cent, in whom temporo-spatial disorientation and disturbances in attention and memory are conspicuous; in 12 per cent one finds as many simple delays in the acquisition of reading and writing as dyslexia properly speaking; finally, 2 per cent would include children with severe dyslexia). **We still have to consider 6.33 per cent of children who show a process of mental weakness upon entering primary school** and who, if they are not timely discovered, may lead to diagnostic mistakes and to errors in interpreting infantile problems in school children. The apparent non-concordance of these results with those of some foreign statistics, the synthesis of which can be found in different works (20), is due rather to the different extension given to terms such as dyslexia or dysphasia than to a real discrepancy. The findings of dysphasia-dyslexia diminishes as the age-average of the school-children increases. That is why we felt obliged to speak, for example, of „dyslexia properly speaking" or of „severe dyslexia". In this classification of the general diagnoses obtained, we do not take into consideration the cases in which these syndromes combine with one another thus giving rise to clinical entities of more difficult interpretation. Consequently, the assigned findings must be interpreted as corresponding to the predominant syndromes in each case. For that same reason we shall confine ourselves solely to point out that the incidence of impairment of hearing of intermediate degree in the schools corresponds to 4.3 per cent (2.3 per cent are children without problems and 2 per cent are children with syndromes of dysphasia-dyslexia-immaturity). Regarding sex, all authors agree that specific difficulties in reading and writing are much greater in boys than in girls (from 3 to 4 times greater) (3, 17), which Cohen and Ortiz (8) suppose is due to tardier maturation of boys with regard to girls. Our statistics are not so categorical in this sense. In fact, although we have been able to check the exactitude of that statement in other developmental conditions (as stuttering, 30), the same does not occur regarding children with dysphasia, in the broad sense which we give to this term.

**Some symptoms of neurological importance**

**Inheritance:** In 29 per cent of the children with difficulties in reading and writing no computable factors were recorded. Inheritance, therefore, is an important factor in determining this entity. **Pregnancy and delivery:** When the developmental condition allows the child to enter a primary school, pregnancy or delivery do not seem to be important factors. Nevertheless, labour difficulties are found in the history of 10 per cent of the children without these problems, whereas they affect 21 per cent of the school-age children with dysphasia. **Fever and convulsions:** A greater occurence of high fever is observed among children with this type of condition than among those who do not display it; 39.1 per cent as against 24.6 per cent display axillary fevers above 39 ° C. in their history. Even more important is the difference in regard to convulsions, in which 17.2 per cent of children with problems of this type record this symptom, whereas only 3.6 per cent of children without problems of this type record it as well. **Toilet control and walking:** No appreciable differences in toilet control are observed between the data obtained from children without this type of problems and those from dysphasic children, and the same may be said about walking (school-age dysphasic children

begin to walk at an average of 14 months and the children without these problems at an average of 12 months). It is well known that these latter data are very important in cases of severe cerebral damages (and in hospital dysphasia) but not in this other type of condition in school children, which, when it is organic (and not specific), reveals itself by slight symptoms. **Motor ability:** It is greater in children without these problems (53.5 per cent), diminishing in the dysphasia-dyslexia syndrome (27.8 per cent) and in mental retardation (26 per cent). Motor difficulty has been pointed out by different authors together with spoken language troubles, visomotor and perceptive realizations and the immaturity of body image (14). It is very clear from the computed data that the neurological or psycho-neurological causality, held by modern authors as originating these syndromes, is acceptable (12, 27, 10). In like manner we must accept the coexistence or presence of the school-age dysphasia-dyslexia syndrome in different minimal cerebral damages or in psycho-motor syndromes. From these same data it is also evident that it is sometimes practically impossible to determine any history or neurological sign that may justify a presumed encephalic damage or maturity trouble. It is in these cases that we are obliged to accept the syndromes of specific developmental dysphasia-dyslexia and to orientate ourselves towards a genetic cause (in the case of dyslexia and presumably of dysphasia) or environmental — psychological — in the case of the so-called simple delay in the acquisition of reading and writing. Of course the prognosis of this latter case will be much better than that of specific developmental dyslexia. Consequently, when there are damage records, we are going to find a greater percentage of children with school-age dysphasic syndromes than children without this type of problems.

**Symptoms of psychic and perceptual importance**

The investigation of the characteristics of the environment that surrounds these children led us to verify that 21 per cent of the children, that enter the first grade, present problems of this nature. Nevertheless, and contrary to what some authors suppose (5, 23), it would be wrong to consider this origin as a fundamental eliciting cause of dysphasic syndromes in school children since our statistics are categorical in this sense: both among the children with this type of problems and among those without it; the resulting averages comprised 20 per cent of children in whom emotional life might affect the conditions of learning. Consequently, this factor is not the cause of developmental dysphasia-dyslexia, and in this sense we agree with other authors (11, 1, 12).

**Auditory symptomatology**

After this brief review about the infantile dysphasia (and some chief symptoms of this condition) we must consider the rapports between dysphasia and hearing. It is well known that in severe infantile dysphasia a perceptive deafness frequently appears, the cause of which is not yet very clear: the French school (2) speaks of a „U curve" shown by phonetic audiometry, but its meaning is under discussion. We ourselves have described in 1957 the modification of the pure tone audiometric curves in different successive

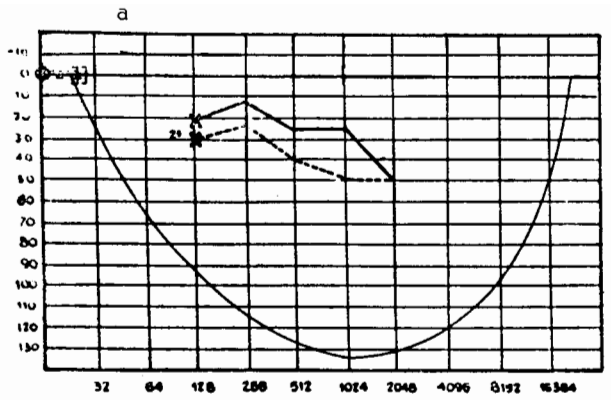
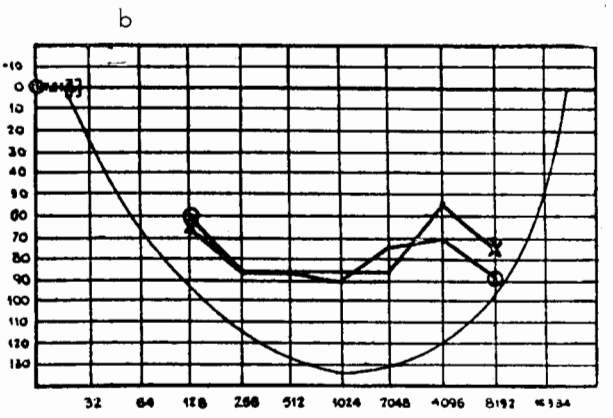


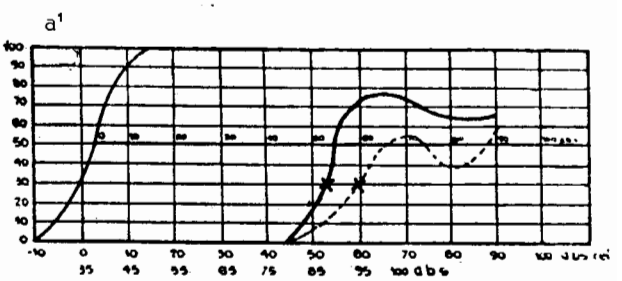

*FIGURE 1*

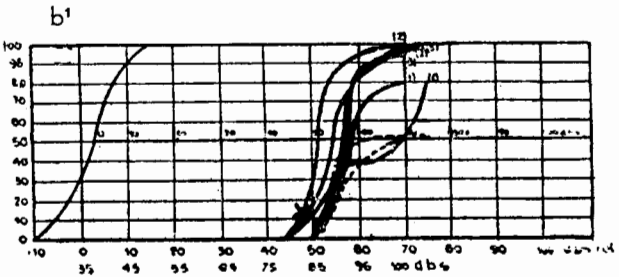
*(a): In school-age dysphasic childern it is possible to observe the modification of the pure tone audiometric curves in different successive tests.*




*(a—a¹, b—b¹):*

*If to the receptive lesion a factor of developmental dysphasia is associated, a V-type curve is noted, that is a dissociation between the modified curve and the curve of simple articulation.*



tests Figure 1. The curve thresholds, however, were similar for the different items of the same test. We interpreted the results as being due to the decline of central perceptiveness and fatigue conditions. We have already pointed out that 2 per cent of the children that enroll in the first grade of primary school manifest impairment of hearing concomitantly with problems of the dysphasia-dyslexia-immaturity type, that is to say, that 9.2 per cent of the children that show this syndrome are hard of hearing. One observes the importance of this figure if it is compared to the percentages which children without problems give: of the totality of children that enter, 2.3 per cent are hard of hearing children without school-age dysphasia problems, and of the totality of the latter, 3.3 per cent are hard of hearing. In this paper, it was not our object to see the incidence of school-age dysphasia among receptive deaf children but we are not ignorant of the fact that it is evident that this peripheral disturbance seems to facilitate perceptual disturbances, made very evident with the sensibilized audiometric tests: perhaps, as Morley (24) supposes, because of a deficiency or lack of proper stimulation.

In the paper which we wrote about „Dyslexia as a symptom and as a syndrome" based upon the study made in 1958 on 478 children, we emphasized: „Of the totality of dyslexic children studied, 57.69 per cent showed auditory losses, mostly bilateral losses oscillating between 15 and 30 decibels, principally towards the grave zones (46.26 per cent of the dyslexic children studied)". In the present paper it is advisable to make it clear that the cases indicated in this present study do not refer to the totality of impairments of hearing cases, for the problems of conductive deafness (tubal obstruction, wax clog, etc.) were omitted as they do not affect learning in school, logically. Nevertheless, of the rest of receptive deafness cases that remain, the percentage still continues to be higher among the children studied in 1958 than among the children of the present study. The explanation of this difference (2 per cent) must be sought in the fact that **some children with the syndrome of school-age dysphasia reveal the existence of a false impairment of hearing in the pure tone audiometric tests.** The reason for this result lies perhaps in the conditions of deficient attention and rapid fatigability, very frequent in this type of children. These factors were not borne in mind in the audiometries of our former work, but they suggest to us the necessity of the verification of the thresholds obtained in the presence of any doubt. The responses of the children to the single speech audiometry and to some sensibilized tests were likewise investigated in this study. It must be pointed out that the responses to the single speech audiometry were fairly similar in children with normal hearing. With regard to the modified test (repetition of series of words 3 by 3), the school-age dysphasic children gave curves of the bell type, comparable only to the speech-audiometry curves in children without dysphasic problems but with end organ damage.

## SIGNES DE DYSPHASIE CHEZ LES ENFANTS D'AGE SCOLAIRE, COMME MANIFESTATION DE LA SURDITE CENTRALE

La recherche ici presentée a été faite sur 1278 enfants scolaires, à partir de 1958. L'évolution de ces enfants a été controlée périodiquement. Ce tra-

vail tout d'abord résume les notions d'aphasie de l'enfant et de dysphasie scolaire, après nous renseigne sur le dépistage de la dysphasie (suivi dans trois écoles) et enfin nous donne les conclusions statistiques obtenues sur quelques symptômes neurologiques et audiologiques. On désigne sous le nom **d'aphasie de l'enfant** un syndrome caractérisé par le retard dans l'acquisition de la parole ou le langage alors qu'aucune anormalité peut-être démontré en ce qui concerne l'appareil articulatoire, l'audition, les fonctions psychiques ou l'intelligence.

Ce syndrome peut se donner avec une forme sévère ou bien avec une forme légère. Dans le premier cas les parents de l'enfant aphasique se présentent spontanément, avec celui-ci, à la consultation médicale. Le médecin est obligé à faire, avec une équipe auxiliaire, le dépistage et le diagnostic différentiel entre l'aphasie de l'enfant et des autres syndromes tels comme la surdité, les troubles psychiques (autisme, perturbation émotionnelle) ou le retard mental. Ces syndromes troublent, eux-aussi, profondement l'acquisition du langage. Les enfants avec une aphasie légère peuvent présenter quelques troubles articulatoires, mais l'acquisition du langage courant peut s'effectuer, malgré quelques difficultés de la parole. Quelquefois la prononciation de ces enfants peut-être apparemment similaire à celle des enfants normaux. Ces enfants arrivent à l'école et bientôt manifestent des difficultées remarquables d'apprentissage, notamment en rapport avec la lecture et l'écriture. La dysphasie dite scolaire présente des défauts d'organisation; elle peut manifester inestabilité psychomotrice, hyperkinésie, perturbatión de la structuration temporo-spatiale, ınorganisation de la lateralité, trouble de l'image corporelle, dyslalies ou dysarthries; difficultés d'acquisition de la lecture-écriture (ou d'autres systèmes de symbolisation), difficultés de synthése, déficits d'attention — de mémoire abstraite — de motricité. Ces troubles peuvent se présenter plus ou moins isolés ou mélangés dans un syndrome appelé „aphasie scolaire" où se trouve toujours quelque degré de défaut „linguistique" (dans le plus large sens du mot).

Les principales conclusions obtenues dans cette recherche sont les suivantes:

1) L'hérédité paraît-être un facteur etio-pathogénique de premier ordre (beaucoup plus que les influences du milieu social).
2) Le nombre d'enfants scolaires dysphasiques, avec des antécedents de lésions à niveau encéphalique est plus grand que le nombre d'enfants scolaires normaux avec les mêmes antécedents. Cependant il y a des enfants dysphasiques sans antécedents de ce type (cause génétique?).
3) De la totalité des enfants qui entrent à l'école primaire, 69 pour cent ne présentent pas des problèmes maturatifs, neurologiques, et/ou psychiques qui puissent difficulter l'apprentissage scolaire, et 6,33 pour cent correspond à des enfants aillant débilité mentale.
4) De la totalité des enfants qui entrent à l'école primaire, 18,66 pour cent manifestent des troubles dans l'acquisition de la lecture et de l'écriture. Ce pourcentage diminue au fur et à mesure que les enfants avancent dans leur apprentissage.
5) De la totalité des enfants qui entrent à l'école primaire, 4,3 pour cent

présentent surdité réceptive et presque la moitié de ces enfants (2 pour cent de la totalité) présentent en même temps hypoacousie et symptômes de dysphasie scolaire.

6) Quelques enfants aillant le syndrome de dysphasie scolaire manifestent une surdité (**fausse**) aux épreuves d'audiométrie tonale, probablement dûe aux déficits d'attention et aux conditions de fatigabilité.
7) En ce qui concerne l'audiométrie vocale les résultats chez les enfants scolaires avec des symptômes dysphasiques fûrent assez similaires aux résultats obtenus chez les enfants normaux.
8) Avec quelques épreuves audiometriques modifiées, les enfants scolaires avec dysphasie donnent courbes-cloche, semblables aux courbes des enfants sans dysphasie mais avec cortipathie.

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