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Compensated Dys-perception

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'My confusion is continually before me.'
Psalm 44, 15

IN retrospect it may be possible to diagnose one's own past deficiencies, and difficulty with visual perception — rather than lack of intellectual ability — may explain poor school performance and other inadequacies. In most cases these inadequacies disappear with time, but in others they persist, perhaps in altered form, and it is possible to make adjustments and compensations.

Visual dys-perceptions and, to a lesser extent, auditory dys-perceptions (receptive aphasia) have received the most attention in the management of children with school difficulties. Much of the recent educational research on visual perception has come from Marianne Frostig of Chicago,[9] and she classifies perceptual difficulties into 5 categories which are currently used as diagnostic and therapeutic tools:

1. Eye-hand co-ordination.
2. Figure-ground perception.
3. Awareness of form constancy.
4. Perception of position in space.
5. Perception of spatial relations.

This is all very well for the tester, but the recipient experiences his defects in different fields:

Affected children make poor scholars, especially in the grades. By the age of 10 or 11 years pupils (usually boys) may be in serious difficulty. Spelling presents a particular stumbling block and affected persons may remain poor spellers and poor readers in adulthood. Misreading of words is common.

Objects lack uniqueness and, if not associated with a familiar background, may not be easily recognizable, and such objects include faces, houses and streets. Cars of the same size tend to look alike, and, unlike most boys, affected children cannot rapidly identify the makes of cars speeding along a street.

One gets easily disorientated and is easily lost. There is an altogether remarkable propensity for taking the wrong turning. Maps are as necessary as watches. A few twists and turns and it is no longer possible to tell north from west.

Visual imagery is poor. It is hard to remember incidents before the age of 6 years. It is difficult to conjure up a picture of an individual's appearance, or to visualize where one's car is parked, or to plan a mental route for visiting more than 6 homes, or to picture where the chessmen will stand more than 2 or 3 moves hence, or to fit together a jigsaw puzzle.

Affected children often have an irritating clumsiness. A marked tendency for small objects to drop from the hand may persist into adulthood. An impaired ability to judge the speed, direction and curvature of balls presents difficulty with school cricket and football and with bowls in later life. Such impairment also affects one's driving ability, resulting in recurrently scratched and dented fenders, because the speed and position of other objects are misjudged.

However, the difficulties are generally trivial and interfere but little with daily life.

Clinical Description

Dys-perception is the disorder of a hundred names. A publication[4] of the American Department of Public Health lists 38 names for this condition, or aspects thereof, including such old ones as dyslexia, specific reading disability and the clumsy-child syndrome, and newer terms like minimal brain damage, minimal cerebral dysfunction, cerebral dys-synchronization syndrome and perceptual cripple. Curiously, several established names, such as congenital word blindness, have been overlooked. Dys-perception is simply another label which draws attention to one aspect, perhaps the largest and most important aspect, of the chronic minimal brain syndromes.

It is a condition of infinite complexity[34] encompassing the most exquisite and subtle functioning of the brain, probably at a molecular level.[7 29] In its protean presentations it suggests maturational, neurological, psychological, ophthalmological and educational origins or aetiologies, and nomenclature varies accordingly. It manifests an astonishingly complex jumble of disabilities consequent on the myriad of possible combinations and permutations of cerebral function and malfunction.

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A principal difficulty in this disorder is inadequate or distorted appreciation of size, shape, slant, depth, contour, movement and position in space. It has long been taught that such are learnt faculties; infants must experience them and handle them before they can learn what they mean. 'These skills are not part of the child's equipment at birth; they must be learned.'[32] Educational psychologists like Piaget[30 31] and Kephart [17] have written in several books and papers that there is an orderly sequence in the attainment of babyhood sensorimotor abilities, with awareness of the outside world coming last. Frostig[9] has listed these abilities in sequence up to the age of 2 years:

1. Controlled movement of the body.
2. Manipulation of outside objects.
3. Development of body awareness.
4. Awareness of the surrounding world.

But this scheme is not entirely in accordance with the facts that even before they have the opportunity to handle and experience these things, infants can already appreciate much of what adults know more reliably.

Bower[3] has recently succeeded in examining perceptual abilities in infants but a few weeks old and he has shown that external awareness, i.e. visual perception, is innate, like breathing, and is added to by subsequent experience. Infants of 8-12 weeks can distinguish patterns, depth, distance, size, shape and slant. They have acute visual discriminatory abilities before they can physically experience things.

These innate perceptual facilities may be faulty, as they usually are in the mentally retarded. No matter how much physical and perceptual experience they subsequently have, intellectually defective children are commonly born with a defective perceptual apparatus as well, hence the immense difficulties in teaching skills to such children.

One or more of these innate perceptual abilities may be deficient in the intellectually normal, and, depending upon the nature and severity of the constellation of innate deficiencies, the resultant dys-perception and its manifestations vary accordingly.

Deficient perceptual skills may right themselves in time (a maturational lag, and probably the largest single group within the dys-perceptions) or, if not, compensatory mechanisms may be evolved to counter the handicap. There also exists acquired damage to perceptual facilities, temporary or permanent, and these damaging noxa presumably act prenatally as well as postnatally.

If there is evidence that the disorder is transient and self-curing with the passage of time, there is also evidence that the handicap may be enduring, particularly if there be manifestations of overt brain damage. Children crippled by neurological diseases have a much higher incidence of concomitant psychiatric disturbances than do children crippled by orthopaedic diseases,[12] and psychiatrically disturbed dys-perceptive children tend to retain both their dys-perception and their psychiatric disorder. In a 25-year follow-up study it was found that some even became frankly psychotic.[26]

Windle [36] has published disturbing findings concerning the permanence of neurological damage in monkeys. Newborn monkeys, partially asphyxiated, were followed-up for several years, and even where there was ostensible clinical recovery, subsequent histological sections of their brains showed that damaged neurons had been replaced by glial elements. Damaged neurons never recover.

Eu-perceptive Difficulties

There is a tendency of late to evaluate scholastically handicapped children in terms of dys-perception and specifically in terms of the 5 categories of Frostig.[9 10] Such evaluations are far from complete. The brain is more than an estimator of percepts, however important these latter may be in cerebration.

Consider the average normal 5-year-old child. He can readily be taught to recognize the letters *d o g* and to sound them *deh oh geh*. He can perceive the shape, direction and sequence of the letters and has no difficulty with the auditory perception of the 3 syllables, yet, when asked to read them as one word, will read it as *deh-oh-geh*. The blending of sounds is deficient at 5 years, and is not due to a perceptual deficiency. It takes another 6 months to learn how to blend *deh-oh-geh* to *dog*.

Illustrative case. An attractive, well-developed girl of 12 years, in Standard IV and reading fluently, can even manage a medical text without too much difficulty. She has a good memory for faces, houses and the direction of streets. Her writing is reasonable and she can reproduce the rather complicated Bender Gestalt figures. She clearly has no difficulty with perception, but she is to be excused further attendance at school, where she has been promoted every year on the basis of age and reading fluency, because she is intellectually retarded, and grossly so.

She has no comprehension of what she is reading and lacks any degree of reasoning power. When shown a drawing of 2 children carrying schoolbooks and walking across a street she cannot infer that they are walking to or from school. Her reasoning ability is less than that of a child of 6 years and she should not have been promoted out of Grade I. Her arithmetical ability is, of course, non-existent.

Here only one faculty, reasoning ability, is deficient, while perception of size, shape, direction, letter constancy and sequence is unimpaired. Similar observations have been made by Machanik.[24]

In differentiating perceptual from other intellectual faculties, one underlines the fact that the latter are not necessarily dependent on the former. 'When care is taken to control the variable intelligence levels, systematic study shows no important relationship between right-left discrimination and reading ability.'[2] In other words, right-left confusion, finger agnosia and visual perceptual disturbances are all consequences of a deeper disorder, associations of, rather than causes of, dyslexia and dysgraphia.

Illustrative case. A boy of 11 years has, as far as I am aware, a heretofore undescribed disorder. He presented in an ordinary enough fashion, with dyscalculia, i.e. difficulty in doing arithmetic, mental as well as graphic. For the rest there was little of note: his IQ was in the region of 110 (Ammons test) and he has a 13-year-old first cousin who has trouble with reading and writing.

He is right-handed and reads and writes fluently. What is unusual, however, is that he also reads and writes backwards, and fluently. With amazing facility he can begin a line of text at the right end of a page and rattle off the resultant gibberish as though he was reading Hebrew. He reads and writes with equal facility in either direction.

What makes matters triply incredible is that he can also speak backwards, and with the greatest of ease. He could be instructed to speak this very sentence backwards and immediately he would begin the gibberisho *sdrawkcab ecnetnes yrev* . . . . His mental image of sounds and letters is so uniquely clear that their sequence from left to right or right to left is immaterial to him.

The ability to read, write and speak forwards and backwards (and he is ambilexic, ambigraphic and ambilalic) forms the triad of signs of what might be termed palindromism.

And why was he having difficulty with arithmetic? Because of his ambilexigraphism, because, in terms of the idiom, he didn't know whether he was coming or going. When sums are written, or pictured mentally, the individual numbers proceed from left to right, viz.:

→ 694 +
→ 132

826 ←

but when it comes to the process of addition (or subtraction) the direction is reversed and numbers have to be written from right to left. In the case reported this led to hopeless confusion. He was helped by means of a piece of cardboard with a longitudinal slot through which only one set of figures, e.g. 4
2

6 could be seen at one time.

Children with dyscalculia commonly also have dys-perception, so that numbers are frequently written reversed, duplicated, out of the horizontal and are generally very untidy. Clearly, in such instances, both the dyscalculia and the dys-perception stem from a more basic cerebral disorder or dys-cerebrism. But there need not be any concomitant dys-perception in dyscalculia; the failure may simply be an isolated difficulty in handling concepts of quantity.[5] In the case reported there is clearly a different mechanism at play.

The cerebrophysiological bases for these disorders are very obscure but it is in their elucidation that hope lies for the scholastically handicapped, perceptually and otherwise. In gross (and, no doubt, inaccurate) terms, one tends to think that the trouble with dys-perceptives is that there is some delay, block, obstruction or lack of myelinization along cerebral fibres and cells. Perhaps the reverse is the case. One wonders whether transmission, myelinization and spread are too good, too extensive and too indiscriminate.

Familial Incidence

Dys-perception is much more common in males and is often associated with left-handedness or ambidexterity (more often ambi-non-dexterity) and with a familial incidence. Critchley[6] emphasizes the hereditary nature of the disorder.

It is common to elicit a history of familial difficulties with reading and writing, and if one questions the parents closely it is not unusual to get a history somewhat as follows:

Illustrative case. A 7-year-old girl has been promoted into Grade II. She is bright enough, but her writing is untidy and her spelling disgraceful, with many interpolated letters. Her brother, aged 5 years, has no idea which shoe goes on which foot and will probably have learning problems in the grades.

The mother, aged 30 years, is a pleasant, happy person and did not realize that she had a handicap until I brought it to her notice; she and her husband thought her failings to be a curious idiosyncrasy.

Although she now enjoys reading, she had immense difficulties with reading during her early school career. Her writing remains an untidy scrawl. She has difficulty in recognizing faces out of their familiar environment. She easily gets lost and her mystified husband repeatedly complains, 'But we have driven along this road before; why can't you recognize it?'

She is ambidextrous and cannot easily tell left from right. She is immediately thrown into confusion, and cannot respond accurately to the command, 'Now quickly, place your left hand on my right ear'. It takes her several seconds to comply, and even then her response is wrong.

Diagnosis

For the most part it is easy to recognize children with dys-perception. They are usually discovered at school. In Grade I they already experience difficulty with reading. If they are very intelligent they can manage Grades I and II reading books purely on memory and intelligent guesswork, but they will be found out in Standard I.

In nursery school, potentially dys-perceptive children can often be differentiated from late maturers because they are unusually clumsy and experience marked difficulty in handling scissors or a crayon. In 1956 I drew attention to another characteristic of prognostic value:[19] nearly all children can put their shoes on the correct feet by the age of 4-4½ years, but children with dys-perception cannot manage this even by 5 years and one sometimes sees boys of 6 years struggling to fit a left shoe or slipper on the right foot, and this long before the teacher realizes that the boys are not learning to read.

In other instances the diagnosis may be difficult because the handicap is mild and is passed off as an individual quirk. It could be such, of course; an inability to recognize faces, streets, homes, may be an isolated individual quirk (is such a quirk a single dys-perception?) but closer inquiries, including family histories, may reveal further disabilities within the spectrum of dys-perception. Here is the sort of clinical picture, common enough, which can easily be missed or ignored:

Illustrative case. At the age of 4 years B.R. remains a disruptive influence at home and at nursery school. During the first 6 months and more of his life he terrorized his parents, crying excessively, eating poorly and not responding to affection. To the inevitable maternal diagnostic refrain of 'colic, wind; wind, colic' I responded: 'This is a neurological, not an intestinal, disturbance; there is no gale in his gut but a storm in his nut'. He continued to be a difficult child, restless, hard to please, spurning affection, eating poorly and sleeping badly. But he is very bright and speaks well. He does not fit in with the nursery-school playmates, preferring to amuse himself, or to complain on the periphery. He cannot handle a crayon, paintbrush or scissors. At home he cannot do simple jigsaw puzzles, cannot put blocks together, cannot catch a ball, cannot do up buttons, has no idea which shoe is for which foot and is unable to comprehend that it will be easier to eat from a plate if he first shifts the plate nearer to him. The mother's chief anxiety, however, concerned his ungainliness; he walks badly, and his mother really only wanted to know whether an orthopaedic surgeon should build up his shoes. In addition, he also had unusually brisk knee-jerks, while the upper left abdominal reflex was appreciably less marked than the one on the right. He is certain to have scholastic difficulty in the grades.

Diagnostic Tests

The usual neurological impairments are not found and an EEG is not of much help. More subtle evidence must be sought and these are nowadays often called 'soft neurological signs'.

Clumsiness and ungainliness are readily detectable.[14 35] These are due to difficulties in maintaining balance and are manifest in various physical ways. Affected children walk oddly. They are often unable to hop or to stand on one foot. They may be unusually fidgety.

They have defective gross and fine motor co-ordination.[14 35] They lack finesse in throwing or catching a ball, in tying shoelaces, cutting with scissors, colouring within an outline, doing up buttons, threading beads and picking up a pin. They have difficulty reproducing circles, squares and triangles. Pencil control is poor. They may be prone to dropping things.

Sometimes auditory perception is defective.[19] The normal child can remember and reproduce in sequence one number or nonsense syllable per year of age. Children with dys-perception may be lost after 3 or 4 items. They also cannot imitate tapped rhythms. Their auditory imperception may give them a garbled speech.

There are several tests available for exploring visual perceptual impairments, such as directionality, figure constancy and foreground-background differentiation, and the best collection of tests is that of Frostig.[10]

Management

If it is the disorder of 100 names, dys-perception is also the disorder of 100 remedies. Almost all teachers and all interested schools have their panaceas. It seems, however, that no particular teaching method or technique is distinctly superior.[16 21 22 25 37]

One is often struck by the long periods required to effect substantial improvement, even in those who are simply late to mature (the teacher's estimation of progress tends to be more optimistic than that of the mother). Certainly some children do make appreciable progress after 3 or 4 months of special tuition, and one sometimes hears of spectacular progress, but, in general, children who experience real difficulty at school need 2 or more years of supportive education consisting of extra lessons every week in order to make substantial progress. There are no miracles in this field; progress tends to be painfully slow. Indeed, one wonders how justified the word 'remedial' is in this context. The implication is overoptimistic; it promises more than it delivers. Terms like reme-

dial and therapeutic in relation to education appear to be leftovers from 19th century hopes on the radical cure of mentally retarded children.[15] 'Supportive education' is a more accurate and more honest term.

The real therapeutic difficulty, of course, is the lack of knowledge of what is basically disordered in these children, and the representatives of many disciplines hopefully contribute their quotas of knowledge or ignorance: : grade teachers, research educationists, paediatricians, neurologists, schools medical officers,[13] speech therapists, occupational therapists, physiotherapists, soon-to-come perceptuotherapists, psychologists, ophthalmologists and optometrists, with those providing perceptual training coming increasingly to the fore.

Perceptual Training

Despite the lack of basic aetiological knowledge, however, the problem interests large numbers of people, professional and lay,and things are stirring in the field of supportive education. Undoubtedly there is much stir and motion, though it is problematical just how much real movement there is. What appears to be movement, however, is the supposed advance in education based upon the accelerated development of perception by means of orderly training rather than the haphazard explorations of children left to their own devices during random play.

It is certain that the training of children in the appreciation of shape, size, texture, direction, colour, figure-ground, body image, right-left orientation and spatial relationships improves their perception of these factors, even if they be mentally retarded.[20]

But does it increase their ability to read and write? It is tempting to answer yes, but evidence for a positive answer is lacking. Kephart [17] and Frostig [10] lend solid support to perceptional training both at play and on paper and their opinions are worthy of the utmost respect. Based on their work, especially that of Frostig,[10] special education institutions for dyslexic children are now found providing novel exercises with pencil and paper, or with a suspended swinging ball which the child must watch and touch at its nadir in flight; or exercises in which he must move in and out and under and above or along objects, or in which following Delacato's teachings, with one arm and leg temporarily splinted, he perhaps creeps and crawls over the floor for several hours.

Psychologists and teachers tend to the view that perceptual techniques *per se* are valuable, while medical men, with double-blinded doubts, demand some rigorous proofs instead of anecdotal and subjective assurances. In the preface to his book, Money[28] writes: 'There are no chapters on the current fashions in perceptual training and visuomotor co-ordination because these methods have not yet been proved to have any direct effect on the learning of reading'.

Lubkin[23] writes: 'The fact that throughout the country thousands of children are being given training in visual perception, largely by optometric facilities, does not yet authenticate its use, to my mind'.

Mark[25] writes: 'All programs which place heavy emphasis on psychiatrically oriented approaches or on increasing various "sensorimotor skills" (including eye and head movements) should be suspect'. Merry,[27] also a physician, expresses similar doubts.

If reading disability, like clumsiness, is not a direct or even partial consequence of audio-visuo-motor dys-perception but, as seems more likely, an association of it, both being due to a deeper dys-cerebrism, then it is hard to see how perceptual techniques *per se* should accelerate skill in reading, a faculty which is, after all, of immense neurological complexity and perhaps the most highly organized function of the brain.[25]

Where testable, special techniques are found to be of dubious value. The Doman-Delacato school, in Philadelphia ('The Institute for the Achievement of Human Potential'), stress the importance of laterality, but on testing with proper controls in normal children it has been found that their hypothesis has no merit: emphasis on laterality does not accelerate reading skill.[8 33]

Perceptual hypotheses have an internal consistency. Within their framework diagnosis and treatment make sense, but what if the hypothesis is faulty, or non-testable against controls? It then becomes like a religion, to be taken on trust, faith and the undeniable positive educational results.

Teachers

Emphasis on perceptual training tends to submerge a more important facet of teaching, namely, the centrality of the teacher. Notwithstanding formidably worded machines and techniques ('audio-visual teaching') there is still no substitute for a teacher, especially a good one.

Neither electrical gadgets activated by buttons or pencil pressure, nor perceptual trainers or psychologists can replace the woman with a successful history of teaching in the grades. 'One of the prerequisites for becoming a good remedial reading teacher is successful classroom teaching of reading. It is a mistake to assume that a teacher who cannot effectively teach normal children to read in a classroom situation could have enough knowledge of the nature of reading and enough understanding of the learner to enable her to successfully work with the non-achieving child . . . The first requirement would be that the applicant be a successful elementary or secondary classroom teacher.'[18]

Unhappily, grade teachers are often lost when presented with dys-perceptive children. They feel keenly their lack of training in this field and look for guidance from other professionals, only to discover that others are equally ignorant. Should they take a special course in remedial reading, they appreciate even more keenly the lack of basic knowledge on the subject.

Successful teachers, like successful clinicians, develop a knack of handling children with learning problems and adapt their skills to each individual challenge. Every successful teacher has her own favourite techniques and, as in the case of doctors, her own following of grateful and loyal parents. Where there is much ignorance there is much faith, and inevitably one or other teacher is credited with the true faith, the really effective scheme for educational salvation. In fact, techniques do not make all that much difference and in the hands of competent teachers it does not matter which method is employed.[16 21 22 25 37] 'The method is the teacher', to quote the words of a devoted and enthusiastic teacher at a local school for handicapped readers.

The very fact that there are women who accept the challenge of the retarded reader stamps them as unusual persons. The question 'tuition or tutor, technique or teacher?' must be answered in favour of the teacher. A talented teacher will find a technique suited to each particular problem pupil. Fortunately there is a marked tendency for spontaneous improvement anyhow.

One should also remember the immense benefit a child derives from individual tuition, or from being in a class of 6 or 8 children instead of among the 30 or more pupils being hurried forward at a pace prescribed by the school syllabus.

If one must choose a technique, perhaps the one with the most promise is the teaching of reading by means of colour, as propagated by Gattegno and Hinman [11] and by Bannatyne.[1] Colours appear to be a useful crutch for giving letters more distinct and enduring shape. Preliminary experience among severely retarded children has suggested to me that red and yellow are vivid and enduring colours, more so than black and white — colours which, incidentally, are seldom seen by babies and young children indoors and out. One question to be settled among retarded readers is whether they would not read better with coloured letters on coloured paper. Reading books are almost invariably printed with black on white paper; would it be better to print red on white paper, or perhaps yellow on red?

While experimentation with different educational technique holds out some promise for dysperceptive children, it seems that the real problem is neurophysiological and that significant advances in diagnosis and management will only come with a much better understanding of neurophysiology and probably the use of medicaments to correct abnormalities of cerebral physiology and biochemistry.

Summary

Visual dysperception is an association rather than a cause of reading and writing disabilities. A marked tendency towards spontaneous improvement exists while compensatory adjustments also minimize the handicap. Management is generally difficult. Techniques are not nearly as important as the services of a keen and dedicated teacher with a lengthy classroom experience of teaching normal children. Colour may be a useful crutch in teaching, but the most useful of all is still unavailable: a better understanding of normal and abnormal neurophysiology.

I have learnt much from prolonged contact with the mentally handicapped pupils and the staff, in particular Mesdames I. Lipman, L. Rubinand J. Gillibrand, at The Hamlet School for Retarded Children.

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