

PRE-SCHOOL OPPORTUNITY AND SEX DIFFERENCES AS FACTORS AFFECTING EDUCATIONAL PROGRESS

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FOREWORD

The papers reproduced here were originally prepared as part of a series of six public lectures presented by the Faculty of Education early in 1973.

Once the series was completed it became apparent that the papers which follow were even more closely linked than was originally intended, in that they all attempted to focus attention on some educational base lines. The main purpose of each paper was to stress the fact that there is a vital need to look realistically at some of the assumptions made about the pupil in school to see whether what is provided for him is really in accordance with his needs, both present and future.

The chosen assumptions vary slightly from paper to paper but the conclusions reached by all three of the contributors may be summarised as follows:

The child in school is much more, and much less, than he appears to be. It is necessary to investigate the real pupil and his circumstances, past and present, in order to be able to make effective educational provision. Such investigation must be as rigorously empirical as possible so that broad principles as well as specific difficulties may be identified. But it will be necessary sometimes to take action even before all the evidence is in, if future educational and developmental problems are to be minimised.

It is hoped, then, that this publication, while pointing, perhaps rather diffidently, at some possible answers in limited, even specialised, fields, will encourage more people to look at the educational processes, both formal and informal, and at the validity of the assumptions on which they are based in the light of present and future empirical findings.

ELIZABETH HENDRIKZ

THE EARLY YEARS: THE VITAL YEARS OF CHILDHOOD

S. F. W. Orbell

In newly independent countries in Africa, the role of education is seen as being so vital for an early participation in the hoped-for riches of modern, scientific societies that some of these countries nearly bankrupt themselves in spending disproportionately large sums of money on education. "Education it is which is all that is lacking, and if we give more people more education, our major problems in this direction will be solved" seems to be a key to the thinking of many political leaders.

They then set about trying to make greatly increased material provision, with disappointing results in that there is little apparent progress following attempts to narrow the gap between the successful ones and the masses. It is interesting to note that, in Western nations, many research findings locate the bulk of the less successful children in the lower working classes, while from the U.S.A. comes strong evidence of negro groups having apparent mean I.Q.s some 15 points lower than those of Caucasian groups.

This is not the occasion critically to review either the research, or the appropriateness of the testing instruments. However, it is suggested that these observations cause understandable concern, particularly in the older educational systems where one sees so much change in educational practice that turns out to be ameliorative rather than curative. For instance, there has been fairly widespread abandonment of selection procedures such as the well-known 11+, as well as of streaming and banding. Then there has been the introduction of comprehensive secondary schools in some countries and, at the other end of the educational process, the mounting of extensive pre-school schemes. One has also read reports of commissions, such as that of the Coleman Commission (1966) which considered whether the quality of the individual school is the major culprit.

Alas, the solution seems to be ever elusive, and one is constrained to ask whether education has in fact only little to contribute to the big leap forward.

But, is this the right question to ask? Until very recently we have not seriously considered whether the major problem lies in the *living material* that the school has to build on. Quite mistakenly, the only real concern has been for *school* education, a concern one can appreciate, particularly in Africa where such pre-school education as there has been, was largely in a manner completely divergent from that which the school gives.

As Skeels (1970) observes with regard to British lower-working-class children (no longer limited to Caucasian stock), the majority of such children who do not succeed at school are probably "born with sound biological constitutions and potentialities for development within the normal range", and yet they may not become contributing members of society because the home has not prepared them for school. Wiseman

(1973) puts it even better: "The effect of environment begins at the moment of birth — and maybe earlier — so that by the time the child arrives at the gates of the school he may already be heavily handicapped."

So firmly held is this view among paediatricians and educational psychologists specialising in child development, that the editor of the *Times Educational Supplement* of 16 February, 1973, headlined an article "Parenthood — too serious to be left to novices". If the claim that the early years are crucial for subsequent development has any validity, one of the first tasks would be to encourage parents to appreciate the vital rôle they have to play in the cognitive development of their children. Novices they would still remain; but as well-informed novices their contribution could result in most significant gains.

Any country's educational policy is probably based on three-major aims, which might be summarised as: firstly, to give all unimpaired children a fair chance; secondly, to minimise drop-outs, and thirdly, and probably most importantly, to maximise intellectual growth over a wider spectrum. With such aims one can only agree, for they are laudable, practical and realisable, but the one common fault in efforts to implement these aims is that too late a start is generally made. It seems timely to examine some of the evidence, before suggesting what might be done.

Biesheuvel (1972), whose extensive writing on African problems has won world-wide acclaim, takes a very clear stand:

The evidence suggests that for various functions there are critical maturational periods during which physical well-being, mental stimulation (and) environmental inter-action have their optimum effect, and during which future deployment of potential can be permanently affected, either positively or negatively. Inability to take full advantage of later favourable opportunities (for example, in school) would be a consequence.

In short, he is unquestionably accepting the very strong evidence in favour of the critical periods hypothesis, and also implying that failure at school could well result from inadequate and inappropriate action during the early vital years.

There is some doubt about the timing of early critical periods in humans, though they have been generally well mapped for lower forms of animal life. It is probably fairly safe to extrapolate from many of the animal experiments and generalise to human babies. Indeed, as Moray (1959) declares:

They suggest that the more an animal relies on learning, the more important is a rich, varied environment full of stimuli in the very first weeks and months of life if the brain is to organise itself effectively.

He may be overstating the case for humans, though there is abundant evidence to support the contention that the brain does require stimulation if it is to develop. Suffice it to refer to the work of a brilliant interdisciplinary team made up of a biochemist, an anatomist and two psychologists from the University of California at Berkeley (Bennett, 1964). These four research workers focused their attention on the chemi-

cal and anatomical differences between the brains of rats that lived under conditions of sensory impoverishment and those that experienced sensory enrichment. The enriched ones were found to have:

heightened levels of a chemical activity that is intimately related to the production of acetylcholine (which is a prime conductor of nerve impulses within the brain). They also have thicker and heavier cortices, and, in general, what is commonly regarded as a better brain.

Turning to another aspect altogether, what is so compelling is the evidence that the patterning of the major stages of intellectual development is invariant across races and cultures, there being no counter claims of any substance. However, it is acknowledged that in different cultures there are considerable differences in the chronological ages at which these stages emerge, and at which they are stabilized.

One of the best reviews of such evidence is that of Werner (1972), who made comparisons of the findings of 50 cross-cultural studies of psychomotor development from birth to two years among contemporary groups of infants on five continents. She found that African infants showed greater motor acceleration than "westernised" urban infants in the first six to twelve months, and a greater decline, after weaning, in adaptive and language development in the second year.

It is almost as though nature provided a better start where the threat to the security of life is greater. Why, then, are those great advantages so noticeably dissipated well before the child first goes to school? The answers can only be sought in the homes. If one could convince parents that they have a vital rôle to play in the cognitive development of their own children, and if appropriate action were to be taken, it would be interesting to speculate on the extent of the gains that would accrue. Would one see a giant leap forward?

Very rarely has there been such close agreement by two contrasting political parties as is seen in the Conservative and the Labour parties in Britain on the issue of pre-school education, the provision of which is being made a major plank in the pre-election party platforms. With the emergence of play-groups and in the increasing emphasis on the importance of nursery school, a partial answer may be presenting itself. However, intervention and help through these approaches comes only from about age three or four, by which time the battle has, for all practical purposes, been largely won or lost.

It must be admitted that there is some value in both approaches, but both of them, nursery schools more than playgroups, presume that someone else must take on an important parental rôle — but how illogical one is in doing so for only part of the time! Partial answers cannot suffice. There is another illogicality in that, unlike the more sheltered middle-class children, the typical working-class children do not require the playgroup opportunities for the social experience of playing together. Nor are they deficient in most physical skills. When these facts are held constant and we look for common findings among the less successful children, it seems that the problems emerge in the very early stage of language acquisition, the onset of which is as early as eighteen

months of age. This acquisition of language by the child, "though dependent upon maturation of the organism, is essentially a learning process occurring within a matrix of reciprocal communication between adult and child" (Wyatt, 1969). That is to say, without adult mediation, development in this important medium is likely to be markedly poor, as is pointed out by Hawkins (1971) in a recent address to the British Medical Association. He stresses that:

the common factor in the background of those who are not acquiring confident use of language is lack of access to an adult for long, undisturbed periods before the age of four-and-a-half.

This aspect is graphically illustrated by Luria and Yudovich (1959) who treated a pair of identical young twins that were very retarded in speech, though otherwise normal. Special training in speech was given to the less able twin who, after ten months, excelled in all areas when compared with the originally more able twin who had not received this specialised help. From this and from other experimental work, the Russian psychologists point to the importance of unimpaired speech for adequate mental development. They even go as far as to suggest that the teacher and the specialist can intervene to improve the spoken language and thereby improve the intellectual life of the child.

Another widely supported school of thought emphasising the rôle of language comes from Bernstein (1958) and many workers who have followed his lead. Their view is that there are two culturally-determined kinds of language, termed Restricted and Elaborated Codes, the former being typical of "working class" people. A close link is said to exist between a child's social class background and his success at school, the obvious factor being that of language. Bernstein (1971) explains that "one of the effects of the class system is to limit access to elaborated codes", implying that this richer code might have marked advantage for a child's development.

No defence is needed for this stress on the rôle of language in a child's cognitive development, for it is difficult to imagine the growth of a child's mind to the higher strategies of thinking without the acquisition of this skill. The majority of American theorists are categorical in emphasising that mediation and language are at the heart of reasoning, and though the Geneva school of thought, under the tremendous influence of Piaget might question this, Piaget (1963) himself concedes the point that "it is hard to conceive how (advanced level thinking) would develop, or, rather, how (it) would reach an advanced stage of development without the use of language." His chief co-worker, Inhelder, (1965) goes even further in saying "Language (is) without doubt the vehicle of choice for thought."

Important as language is, there are other vital factors. Very recently Pollak (1972) published the results of her study of three-year olds in London. She worked with children of chiefly lower-working-class parents from three major groups:— English-born, West Indian and "other immigrant groups". There were no differences in birth weights, or in the social class or in income. As she puts it, "These groups lived in the same streets, shopped at the same shops and shared the same pubs."

She found that 87 per cent. of the West Indian children had no toys, 80 per cent. received no birthday presents, and 95 per cent. had no holidays and few outings or treats. Their experience of everyday life was restricted, and their father played little part in their upbringing "but not so the English and other immigrant groups." While motor development at this age was similar in all ways for all three groups, she reports that language development was markedly different, with mean group scores on the tests being:

English-born	12,04
Other immigrant groups	10,77
West Indian	3,85

Furthermore, in measuring adaptability to situations, objects and problem-solving, the mean group score for the English group was 10,32 vs. 3,48 for the West Indian Group. She concludes:

My study in Brixton emphasises the importance of the home in the child's early development and suggests that plans for pre-school education must go hand in hand with making parents a significant part of it. Some parents will need to be taught how to play their rôle of providers of tender loving care and a stimulating environment.

With this viewpoint there would be very little to quarrel about, and though it was made rather graphically 30 years ago by people such as Buhler (1936), one sees depressingly little evidence of the message going home. In this vein, an interesting comment, some 25 years later, comes from Pringle and Bossio (1960) of Birmingham University. Of the eight to 14-year-old maladjusted children whom they studied, nine out of eleven had been separated from their mothers during the first year of life. This is not an attempt to argue that any novice would do provided she is the natural mother, a point which the authors well appreciated in saying:

Susceptibility to maladjustment and resilience to the shock of separation and deprivation appear to be determined by the quality of human relationships available to the child during critical periods of growth.

This appears to bring one full circle to the opening comments, and it would therefore be timely to draw the threads together. It has been argued that there is ample evidence to support the claim that the pre-school period between ages one-and-a-half and four years is the time when a child is best prepared maximally from the later comprehensive provision which society provides, chiefly through the education system. Writes Beadle (1972):

The emphasis on correcting failure should shift to the other end of the age scale, with provision for the acquisition of intellectual skills at a time when children can best use the opportunity — that is between the ages of two and six.

Apart from the language skills, it has also been argued that the regular availability of tender loving care during this period is another vital provision, always accepting, of course, that there is neither neurological nor other physiological impairment. Hawkins (*op. cit.*) suggests

so succinctly "the key is in the kitchen" referring clearly to the vital rôle of the mother who is so often unprepared, alone and unaided. To try to meet the worst of the problems attendant upon this, York University has undertaken an interesting experiment which, in part, aims at providing an effective language enrichment programme, chiefly for immigrant children. It is based on the obvious conclusion that there must be the provision of a dialogue with an adult. This is because the adult language, so vital for growth towards the final goal of abstract thinking, cannot be acquired except from an adult. From their work with these immigrant children it is reasonable to expect that there may well result much that will benefit a broader cross-section of children.

At this point it needs to be acknowledged that most of the research evidence cited has been gathered either from lower-working-class situations or from African and Negro studies. This is not a serious danger however and, in this context, the following quotation from Cole and his co-workers (1971) seems apposite.

In particular, we want to emphasise our major conclusion that cultural differences in cognition reside more in the situations to which particular cognitive processes are applied than in the existence of a process in one cultural group and its absence in another.

There seem to be two major needs. One is the need to mount a vast propaganda campaign, something which the press might undertake as a useful public service. The other, following on from the first, is the need for a large number of suitable volunteer adolescents with regular, sustained access to children on a one-to-one basis. It is submitted that this latter could be most suitable in the local African context. With their marked affection for children, the African people might well find it possible to operate such a scheme with tremendous benefit to both giver and receiver. When all is said and done, there are currently in Africa many youth movements along the lines of Young Pioneers, and similar organisations. How much better to try to win the battle for future men's minds, not in the physical or the political sense but in the cognitive sense. No better investment in the future comes readily to mind.

REFERENCES

- BEADLE, M. (1972). *A Child's Mind: How children learn during the critical years from birth to age five years*. London, Methuen.
- BENNETT, E. L., DIAMOND, M. C., KRECH, D. and ROSENZWEIG, M. R. (1964). "Chemical and anatomical plasticity of the brain." *Science*, 146, 610-619.
- BERNSTEIN, B. (1958). "Some sociological determinants of perception." *Brit. J. Sociol.*, 9, 159-174.
- BERNSTEIN, B. (1971). *Class, Codes and Control. Vol. 1*. London, Routledge & Kegan Paul.
- BIESHEUVEL, S. (1972). "An examination of Jensen's theory concerning educability, heritability and population differences." *Psychol. Africana*, 14, 87-94.
- BUHLER, C. (1936). *From Birth to Maturity*. London, Kegan Paul.
- COLE, M., GAY, J., GLICK, J. A. and SHARP, D. W. (1971). *The Cultural Context of Learning and Thinking*. London, Methuen.

- COLEMAN, J. S. (1966). *Equality of Educational Opportunity*. Washington, D.C., National Center for Ed. Stats., U.S. Govt. Printing Office.
- HAWKINS, E. (1971). "Communication and language." *Contact*. (Summary of address to the B.M.A.).
- INHENDER, B. (1965). "Operational thought and operational imagery." *Monograph of the Society for Research in Child Development*. Serial No. 100: 2; No. 2, Berkeley, Univ. of California.
- LURIA, A. R. and YUDOVICH, F.Ia. (1959). *Speech and the Development of Mental Processes in the Child*. Harmondsworth, Penguin.
- MORAY, N. P. (1959). "Attention in dichotic listening: affective cues and the influence of instructions." *Q. J. Exp. Psychol.*, 11, 56-60.
- PIAGET, J. (1963). Le langage et les opérations intellectuelles. In *Problèmes de psycholinguistiques: Symposium de l'association de psychologie scientifique de langue française*, trans. by G. H. FURTH. Paris, Presses Universitaires de France.
- POLLAK, M. (1972). *A study of 3-year-olds in London*, as reported in *Times Ed. Sup.*, 16 Feb. 1973, 3012, 4.
- PRINGLE, K. and BOSSIO, V. (1960). "Early prolonged separation and emotional maladjustment." *J. Child Psychol. Psychiat.*, 1, 37-48.
- SKEELS, H. M. (1970). Adult status of children with contrasting early life experiences. In H. CLARIZIO (ed.), *Contemporary Issues in Education*, Boston, Allyn, 92-93.
- WERNER, E. E. (1972). "Infants around the world: cross-cultural studies of psychomotor development from birth to two years." *J. Cross-Cult. Psychol.*, 3, 111-134.
- WISEMAN, S. (1973). "The educational obstacle race: factors that hinder pupil progress." *Educ. Res.*, 15, 87-93.
- WYATT, G. L. (1969). *Language, Learning and Communication Disorders in Children*. London, Collier-MacMillan.



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