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## WHERE TALENT BEGINS

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### Abstract

The beginnings of talent, the abilities and attitudes for learning, are ready to be developed at birth. New research, using both naturalistic observation and laboratory investigations has shown that, in particular, the cognitive attributes of mastery motivation, attention, memory, and overall developmental advancement are excellent indications of future talent- all overlapping and affected by emotional development. Vital social influences centre on the development of language and hence cognition. Babies, like older individuals, need tutoring, material provision, and encouragement to practice specific skills, provided along with love without 'strings'. But the spark of originality that produces great works and ideas is as yet impossible to predict.

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Every baby's situation is different - in genetic make-up, the effect of experiences, and the mediating role of those who look after them., so that discovering exactly how these different kinds of influences are received by each baby is impossible. What is more, there is sufficient evidence to show that the unborn baby is subject to environmental influences (Rosenblith, 1992): for example, it could not be assumed that an hour-old baby who is slow-moving has a genetic tendency to act in that way, because this behaviour may be the effects of drugs, disease, or simply exhaustion. But the effects of drugs on new-born responses are confused because each drug acts differently at different times, and on mothers and babies respectively. Strong analgesic drugs can interfere with both the mother's and the baby's responses, and so may have longer-term consequences on their emotional bonding, but tranquillisers have been found to have a beneficial effect on mother-baby bonding, through reduction of anxiety (Rosenblith, 1992).

There are also different kinds of 'social' birth experiences. It has been claimed that kinder styles of birthing, such as that of Leboyer (1975) in France, with low lights and gentle handling, result in livelier babies who develop faster. However, no study has been made of the outcomes of these methods using adequate control groups; the mothers and fathers who chose the method were self-selected, with all the bias that this implies. Moreover, the children most likely to succeed and score most highly on intelligence tests, first-borns, have much more difficult births than later-borns - their mother's labours last about half as long again, with greater likelihood of birth complications, and the babies birth-weights are lower.

Once the baby is in the world, every sense modality becomes operative. Newborns can distinguish tastes, smells, and tactile experiences, and discriminate pitch and loudness, and locate sounds. Their eye movements are partly organised, they can track a moving object, and distinguish colours, often seek out visual stimuli, and particularly favour sharp contrasts. Refinement of these early efforts is swift, so that by five months, the brightest can even distinguish between strangers in photographs. There are distinct practical outcomes

from this very early responsiveness. Many learning processes - conditioning, extinction, shaping, modelling - are used to some degree even by the second month of life (Rosenblith, 1992). There has been speculation about the inheritance of such new-born capacities, such as Jung's Collective Unconsciousness, an inherited memory over generations (Jung, 1916), or Chomsky's (1968) hypothesis that babies inherit a grammatical capacity.

The idea of critical periods, or prime developmental times, has been promoted by many, such as Maria Montessori (Montessori, 1964). They certainly exist for pre-birth physical development, as was clear from the thalidomide tragedy: the type of disfigurement identified the point of development at which the drug was taken. But are such precise stages likely to happen in cognitive and emotional growth? Tinbergen showed that among ducks an infant's attachment to its mother had to be made at a critical time or it might be too late to promote bonding, as indeed did Harlow with his baby monkeys (Harlow & Harlow, 1966). Freud maintained that the ability to love had to be formed in infancy (quoted in Clark, 1980). But research into their possible existence in humans can only be done with deprived babies, such as those in old-style orphanages, and it is difficult to separate the effects of long-term deprivation from those of adverse experiences at precise times. Obviously, one cannot ask parents to deprive their children of possible learning experiences, so that it is necessary to use large population studies. A large British study of a cohort of children (National Child Development Study, Butler & Golding, 1986) born between 3-9 March 1958 showed that at 5 years-old, those from socially disadvantaged backgrounds differed, not only in being physically smaller and having more medical problems, but also in having more difficult behaviour, lower intelligence, and poor educational attainment. It is known that, within certain limits, there can be recovery from mental deprivation when the conditions for intellectual growth improve, but millions of economically and culturally impoverished children must carry their very early educational disadvantages as handicaps for the rest of their lives (see Freeman, 1992).

The rate of all growth in infancy is more rapid than at any time during the rest of life. In contradiction to previously held beliefs, new evidence shows that within the second half of the second year, the following range of mental skills are developed enough to be seen in action. None are discrete; each affects the growth of the others (White, 1985; Rosenblith, 1992).

#### Mental Skills Appearing at Age 18-24 Months

- \* Representation in language and thought
- \* A mature level of object permanence
- \* Ability to solve problems through mental combinations
- \* Ability to categorise two classes at the same time
- \* Between 2/3 to 3/4 of all the language ever used in ordinary conversation, including a receptive vocabulary of about a thousand words and all the primary grammatical elements.
- \* Many lifelong attitudes towards learning
- \* A full array of social skills
- \* A basic awareness of the self - for good or ill.

#### **Research methods**

The early, naturalistic way of investigating babies' intellectual abilities was by observation, as used by Piaget in the 1930s watching his own three children, and using simple experiments. However, observers do not always recognise their own biases, or agree as to

what happened - ie. exactly what the infants have responded to, which makes it difficult to qualify results. But as techniques have improved, many previously unseen changes, such as heart-rate reactions, began to be measured, and by the 1950s, slow-motion film and video was beginning to identify many fine-motor responses. The detailed experimental work which followed brought its own research problems, because it meant that babies were often measured in a regulated environment, which was different from that at home. Such work is always valuable for the measurement of reflexes or focal distances, but generalisation from there to overall cognitive development is not always useful. On the other hand, it is clearly impossible to expect a balanced and large enough sample of parents to alter their every-day care of their baby for scientific purposes. Current methods are attempting to combine both home observations and laboratory situations, eg. filming the interaction of mothers and babies at home and in the laboratory. This wider view, together with much more sophisticated measurement technology, has provided a considerable volume of information about very early development. It has shown that the previously defined limits of babies' abilities were too restricted.

Three major techniques are used -

*Preference* - in which more than one stimulus is presented together, to see which ones the baby prefers (turns to) under different conditions.

*Habituation* - a measure of how long a baby attends to a stimulus, which tests the ability to discriminate. For example, when the baby is looking at one kind of stimulus and another is presented, if it cannot perceive the difference between the two, it will not switch its attention to the second one.

*Discrimination learning* - a form of operant conditioning in which babies are trained to respond or not respond to different stimuli; the objective is to see how much they can generalise from their learning.

### **Very early cognitive development**

Potential talent is already present in newborns, and for those with supportive homes it will continue to grow. Colombo (1993), who has contributed to and surveyed research in the prediction of childhood intellectual processing from infant measurement, concludes: "The fact that individual differences in some aspect(s) of information processing survive the tumultuous period of early infancy (during which there are constant reorganisations in affective, social, and motoric domains) suggests the existence of a robust, independent, and perseverative core of cognitive ability that is present quite early in the human life span". "This thread of mental function can be assessed from the first year of life through school age" (p.126). Such continuity appears to be attributable to two fundamental constructs - processing and memory. However, the double-edge to this powerful predictive sword is, that such early labelling, especially of deficit, can affect others' attitudes and so bias caregiving. Also ... "The utility of these measures in identifying the "gifted" end of the intellectual spectrum is yet to be empirically evaluated".

Unfortunately, current *general* intelligence tests for infants do not give reliably stable scores from the time of birth to early childhood. There are several probable reasons.

- The tests themselves may not be sufficiently sophisticated for the task.
- The cognitive system - the capacity to process information - is not fully developed at birth, and so environmental influences will change it during those first few months of life.
- Perhaps reliability is lost because the wrong things are being measured and confused. The two major tests, the Bayley and the Gesell, are dominated by sensori-motor rather

than cognitive measures, and are possibly too heavily influenced by the baby's social responsiveness..

- There are statistical problems. Two major life-events can significantly lower the intelligence scores of infants, and so affect the reliability of tests. The first is some specific stress on the infant, such as the absence or loss of a care-giver, but individual strength of reaction to specific stress varies: those of particularly high intelligence seem to be better at withstanding such shocks (Arnold, 1990). The second is well known - continual deprivation: without the stimulation and means to learn, early infant promise will not be developed (Lewis & Louis, 1991).

But later IQ scores can be predicted to a large extent by *focused* tests of attention, memory, and mastery motivation (the effort the baby makes to succeed at the task) (Lewis & Brooks-Gunn, 1981). Lewis and his colleagues (Lewis & Louis, 1991) have moved from attempting to produce measures of general infant intelligence to predicting this from babies' skills in specific areas: early motor development, for example, may predict subsequent physical aptitude. They have found distinct but related paths of development which are stable over the first three years of life. The strongest path, which can be traced from three months, is verbal, but there are also spatial and non-verbal paths. They find the greatest overall stability of development at the extremes of both gifted and low-IQ children, and suggest that intellectual development for the gifted is somewhat different from the average. Each growing attribute is associated with more efficient information-processing, and is indeed part of the same cognitive process. The basis of meta-cognition begins here, with the inter-relatedness of these very early attributes which Lehwald (1990) terms the "quest for knowledge" - curiosity, preference, attention, and motivation - the roots of future high ability. It begins, he says, with the emergence of the mental processes that control the way knowledge is used, and this seems to be very early indeed. But it is only when little children are able to plan ahead in a controlled way - to defer gratification - that they can acquire much more knowledge and use it in a highly able way.

Communication can be regarded as the cradle of intelligence, and clear evidence of a built-in ability to interact with others at birth has been demonstrated many times. Butterworth (1984) showed how newborns can turn towards a sound; from two months, a baby can follow a pointing finger, then soon after that look to where someone else is looking. This apparently insignificant information provides considerable counter-evidence to the Piagetian acceptance of the baby's total egocentricity, since even tiny babies *can* alter their own viewpoint to that of someone else. Children under three years-old, who were assessed as having a high quality of both verbal and non-verbal communication with their mothers from birth, showed more advanced intellectual progress than children who had not been given that amount and quality of input (Tulkin, 1977). They played with toys for longer times, were less distractible, more easily soothed, had better perceptual discrimination and - eventually - higher IQ scores. From the beginning, imitation serves as a bonding procedure as well as a learning base, usually from the first day. The reciprocal, non-verbal, imitative communication which mothers and babies enjoy begins then and continues throughout infancy, even though babies may only begin to produce words at the age of about a year. Such a conversation can be started by either one. For example, mother looks at baby and baby catches her eye; then she leans forward and says "Who's a lovely baby then?". He purses his lips and coos. She copies. He does it again. And so on, until interest wanes. By this means, the style of the mother-baby relationship may well have been initiated and set within the first two weeks.

### *Cognitive attributes*

*Mastery motivation.* Working on mastery motivation in infants, Messer (1993) writes that "motivation and cognition are inextricably bound together" (p.8). Whether motivation it is present at birth or internalised later, having been affected by environmental experiences, it is likely to change over the short-term due to successes and failures, and over the longer-term as these become internalised to some extent as self-concept. Mastery motivation is more than the capacity to persevere, as was once thought, but is the result of a variety of processes: "attentional, social, contingent, cognitive, and so on", all of which affect later competence and talent. Work in England with babies under a year-old found that it is not so much the baby's actual results on a task which may provide the guide to future ability, but the enthusiasm with which an infant approaches the task (Messer, 1993). It seems that infants who are attracted by novelty are likely to acquire and process more information, which will further assist their intellectual development.

*Attention.* Babies of three to 14 weeks were allowed to choose how much attention they paid to a visual stimulus - ie. the experimenter did not decide when the baby had had enough - the babies decided by crying and fussing less (Slater *et al*, 1989). They also looked for much longer times at the stimulus than the researchers had originally believed possible, times over two minutes being common. Indeed, Kagan *et al* (1979) followed-up four-month-old infants for 10 years, finding that their very early measures of attentiveness were related to later IQ and reading ability. However, they also found them to be more closely related with parental occupation, and concluded that social influences had a predominant effect on eventual IQ scores. By the age of 3-4 months, measures of how long the baby's attention stays on the stimulus (habituation) already account for about a quarter of the variance in later IQ scores. The different kinds of input, though, such as visual or auditory, do produce somewhat different results (Bornstein & Sigman, 1986; Rose, *et al*, 1986).

*Memory.* Newborns are capable of holding events in their memory for a few minutes. They can move their heads in response to stimuli which they have experienced before, and must therefore be remembering them - the start of a recognisable knowledge base. Newborns are thus able to retrieve information reviewed via their sense receptors, and are thus laying the foundations for more complicated processing. By 2-4 months, they can remember new learning for days or even weeks, and this measurable time is an indication of cognitive development (Lewis & Michalson, 1985). All babies have to organise their mental experiences in memory, in order to cope with them, but it may be that brighter more attentive infants have to manage an exceptional amount of incoming information. They would then need an appropriately more complex or advanced system of mental organisation than their baby age-peers, in order to reach the highest levels of thought and performance of which they are capable. Scarr and McCartney (1983) suggest that this depends on the maturation of the central nervous system, suggesting that as it develops, previously irrelevant aspects of the environment become relevant, so that learning occurs and cognition develops further. A swifter than average neural maturation would then be expected to produce precocity in learning.

*Advancement.* Even in infants, advanced cognitive development can be thought of in terms of their level of problem-solving skills; their expertise depends both on the knowledge they have acquired and on the sophistication of the way they have organised it to find what they need quickly and easily. But most of all, it is the quality of their mental representations of the problem which help them (Chi, 1981). Later, as children, the talented will develop a wider view of problem-solving, in which they can use the principles of connecting the specific to

the general, and in Elshout's terms (1995), go through the developmental curve from novice to expert more rapidly. In fact, the parents of the exceptionally able children in the writer's follow-up study, compared with those of average-ability children, reported very early signs of exceptional concentration, memory, and talking (Freeman, 1991a). Advanced language is probably the first thing to look for in assessing potentially high ability; it has an enduring quality and underpins many other later competencies, including mathematics. In a summary of research on very early verbal ability and its outcomes, Fowler (1990) concluded that an advanced level of language is very dependent on adult stimulation and practice, such as being read to and talked with from birth. Looking at the early lives of recognised gifted adults, he found that they had enjoyed an enormous amount of verbal stimulation, both spoken and written. Radford (1990), too, in his survey of exceptional early achievers, found that although some appeared to come from homes of low socio-economic status, further investigation showed that they all came from lively, stimulating ones.

### *Social influences on cognition*

For several decades it was thought that structural demographic factors, such as social class, income level, and parents education, were responsible for the differences in children's achievements. For example, during the British National Child Development Study, no less than 29 variables emerged as having an effect on IQ, varying from maternal smoking to financial status (Mascie-Taylor, 1989). Although there is much contention about whether vitamin supplements really do increase overall IQ in non-deprived communities, there is some indication that they might increase the non-verbal intelligence of children with deficient diets (Benton, 1991). But the focus is now on processes, such as expectations, example, values and the general educational awareness. Support for this has come from a British longitudinal study on children tested at 7, 11, and 15 years, which concluded that educational disadvantage was "cumulative, and most strongly influenced by early home environment, notably of literacy knowledge and interest, but also by home stability in the school years (Cox, 1990).

Cognitive development can be seen as taking two possible directions, outwards and inwards. Piaget, for example, saw it as moving outwards from the infant, who used its experience of acting on the physical world to reach conclusions and thought processes. Only afterwards were these discoveries public and sharable. But for others, such as Vygotsky, with his 'socio-historical' approach to cognitive development, it was the other way round: the infant takes 'ready made' tools of thought inwards from the public domain. These were described by his student, A.R. Luria: "Children develop language - a ready-made product of sociohistorical development - and use it to analyze, generalise, and encode experience. They name things, denoting them with expressions established earlier in human history, and thus assign them to certain categories and acquire knowledge. Language mediates human perception, resulting in extremely complex operations: the analysis and synthesis of incoming information, the perceptual ordering of the world, and the encoding of impressions into systems ... and thus serves as a basis for highly complex creative processes." (Quoted by Pickering & Skinner, 1990, p.184). Words are symbols which stand for an accepted meaning; they are what every human baby learns as part of its cultural birthright. Wertsch of Clark University (1991), calls it "ventriloquating" through the voices of others. This 'grabbing' from one's culture to symbolise growing awareness is the pivotal event in the evolution of human consciousness - the transition from sentience (awareness) to symbols (Pickering & Skinner, 1991).

The distinction between the inwards and outwards points of view was seen in practice when Bryant's pioneering experimental work in Oxford in the early 1970s recognised little

children as social beings. By working with them in normal surroundings, he altered the then generally accepted Piagetian stages, as well as many psychologists' perception of the development of infant cognition. He showed, for example, how young children judge by codes, using relative positions, shapes, and sizes in a context. He concluded that it was not immature perception which made them give the wrong answers, but failure to understand the experimenter's words. Thus, rather than perceptual reasoning, as Piaget had assumed, it was rather the child's symbolic - ie. language - knowledge that was being tested (Bryant, 1974). In fact, much supporting evidence has accumulated since then to show that infants' awareness is indeed greater than they are able to express in words (Gombert, 1992). By two months, the effects of communication with other language users - language experience - already affects a baby's ability to discriminate language-like sounds, implying that they have learned something of the structure of language (Atkinson & Braddick, 1989; Harris, 1989). In a Canadian study, the language of two-year-old boys was found to be the best measure of their cognitive ability at nine (Lytton *et al*, 1990).

### *Emotional influences*

Babies' emotions play a vital role in both their personal and interpersonal development from birth. Where once emotions were seen as merely disruptive, they are now recognised as part of the processes of individual adaptation in building cognitive responses from experience (Williams *et al*, 1988). In an overview of research in this area, Collins & Gunnar (1990) concluded that by seven to nine months, all the basic emotions can be detected, and that individual differences in the expression of anger and fear continue to be remarkably stable, at least through childhood.

Probably the major emotional influence on the development of high potential is self-esteem, though there is also the danger that some insecure bright children can take far too much of their self-esteem from the success itself (Freeman, 1991a). But good feelings about oneself bring the ability to control one's own behaviour and expectations. The ability to control the need for instant reward was investigated by Mischel *et al* (1989) with four year-olds. They found that although the ability to delay gratification increased with age, as might be expected, it also correlated positively with intelligence and greater social responsibility, a delay vital in the production of high level achievement.

In many if not most cultures, mothers provide the baby's introduction to her culture by mediating experiences of the outside world. It is this mediating facility which Stein has recognised and applied with success, not only to children with learning problems, but to the gifted (Feuerstein & Tannenbaum, 1993). Even newborns respond selectively to social stimuli, and babies are highly sensitive to the kind of care they receive. By two weeks-old, a baby will respond to the mother's characteristics, such as voice and smell, and by six weeks, will become distressed if the social contacts between them are even slightly disturbed. Between 3 and 6 months, a baby starts to discriminate between the emotional expressions on people's faces, and from three to nine months, will search for clues from other faces.

The mother's emotions play a role in this mediation, which can significantly affect the intellectual growth of the baby. Even infants of ten weeks can discriminate her state of happiness, sadness, or anger. Her happiness encourages them to explore, joy giving joy; whereas her distress causes them to withdraw, sadness producing sadness or anger. The implications are profound: if an infant is unresponsive, this may be a sign of autism, often mistaken for deafness, or it may be a more subtle warning of poor cognitive learning. A negative emotional atmosphere inhibits cognitive development, but positive emotions have a

facilitating effect, not least in pro-social learning, such as helping, sharing, empathising and showing physical affection for the benefit of others (Abroms, 1985; Williams *et al*, 1988; Harris, 1989).

In Britain, about 10% of mothers suffer from non-psychotic post-natal depression. A depressed mother is relatively unresponsive to her baby's attempts to elicit attention, and consequently, the baby also loses interest and becomes discontented. Such mothers are found to be less helpful in their children's play, and their children more negative towards their mothers. Recent follow-up studies have found that the children's emotional and cognitive development were often adversely affected in later childhood by their mother's depression at birth, even when this remitted within a few months (Cogill *et al* 1986). However, social support can substantially improve the impact of such stressful experiences on mothers, and this is associated with more secure attachment to children. Mothers with small children in the upper floors of tower blocks are more likely to be depressed: they should not be there. In cultures which do not permit women to develop their intellects, to the extent of forbidding reading, the development of the children's intellects must also be affected. Research in areas of high illiteracy, where one group of mothers were taught to read and a control group was not, found that women with even a little education produced healthier and cognitively brighter children (Hundeide, 1991).

Any condition that causes stress to infants increases their need for their mothers, and decreases their urge to explore. What is more, when toddlers experience successive anxiety-arousing experiences, the effect is cumulative. On the other hand, fortunate three and a half years-olds, who had been classified in infancy as securely attached were found to initiate and participate more in nursery activities, and were sought out by other children. Their teachers rated them as more curious, eager to learn, self-directed, and forceful (Waters, et al, 1979). A firm early attachment relationship is probably a positive force in the development of high-level creative thought, although there is not yet enough evidence to draw long-term conclusions about this.

More sensitive parents seem to structure social interaction, to keep babies at an optimal level for taking-in and processing information. From the beginning, they are more aware when the baby's attention begins to drop, and change their behaviour to keep its interest, such as a change of voice or holding the toy in a different light. Thus, the lucky babies are not only given sensitive and appropriate input, but are encouraged to an optimal mental state to deal with it. Infants cared for in this way are more likely to persist with their own explorations, especially as the tasks become more complex, indeed, tutoring families to foster feelings of mastery has been found to improve performance on learning tasks (Messer, 1993).

In fact, demanding infants probably trigger special family attention and resources, and if these are of an appropriate nature, they can stimulate the infant's intellectual development. But this option is not open to all babies. Interaction is the key. It is only in families where the parents are good communicators that the baby's demands are likely to be beneficially effective. This implies a decidedly active role for the baby, but one which positively involves the parents too (Maziade *et al*, 1987). It is open to question whether demanding babies are those with the potential for high ability, and whether parents should stimulate passive babies into demanding more for their intellectual health.

Pro-social skills are more often shown by gifted pre-schoolers than by average children (Abroms, 1985). Such children are also much better able to make use of adults as resources,

and to play more imaginatively (White, 1985). This fits very well with Bandura's (1989) views on the effects of self-efficacy, although he has not applied them specifically to infants. He says that those who have a sense of effectiveness, aim higher, persist at the task, and actually reach higher achievements. If the infant believes, through experience, that it has some control over its life, then the route is open to future giftedness. It seems that motivation, persistence, and task orientation count towards achievement as much in early development as they do throughout the life-span.

## Conclusions

Focusing on very early development implies a strong concern with prediction, which usually works best when it is based on present performance, so that the clearest sign of future talent in an infant is advanced behaviour. It is easier to be a gifted child than a gifted adult, when advancement no longer counts. But the most advanced children can become 'merely' competent successful adults, as happened with most of Terman's 'genii', and also with many of the children in the writer's own long-term follow-up study (Freeman, 1991a). It is not so much 'burn-out' as the others catching up.

But information does exist about the kinds of early preparation which helps high level potential to flower, notably a stimulating home environment with lively-minded, concerned mentors, parents, and teachers. These influences are particularly important for infants of high potential who are able to extract relatively more benefit from their surroundings (Freeman, 1983). The evidence presented here shows that the experiences which occur in the brief period of infancy are vital for the development of talent. Yet children's development is continuously affected by on-going events and circumstances operating on an active individual, which makes it virtually impossible to isolate the effectiveness of each dimension of influence. There are babies who show great promise in reaching for objects, imitating with precision, and getting the idea of the permanence of objects. But still one cannot say with reliability how their intellects will develop, nor can one calculate the extent to which social-interaction contributes to an infant's cognitive development. Yet, although we cannot identify with certainty babies who will grow up to give consistently superior performances on any measure, or in any field of endeavour, enough is already known to significantly increase the proportion of talented children in the world. If this were to be done on a large enough scale, it might even change the shape of the normal curve of intelligence, by extending the height of the curve at the high ability end. It is clear how vital the first two years are, and there is no lack of evidence that the style parents use in bringing up their children is highly effective in the child's eventual intellectual development and outlook.

Attitudes to learning start in infancy, coming from the association of learning with pleasure, and from good feelings about oneself while doing it: early curiosity and enthusiasm are associated with later gifts. No child can make progress in any sphere of development without the means to do so, yet inadequate physical and mental provision are not only the result of physical poverty: it includes ignorance of what to do. High-level performance unquestionably requires great amounts of practice. Infants need plenty of practice to get their verbalising and sensori-motor skills running smoothly, so that the best infant toys are those which provide, eg. visual, auditory, and tactile stimulation; they should provide physical characteristics to be explored, problems to be solved, and the possibility of classifying aspects or objects. The classic form-board, in which rods have to be fitted into holes, is an excellent example. Much of a child's intellectual future can be enhanced by stimulation and interaction with language - not just in passing, but systematically. Taken as part of wider cognitive development, this interaction should include encouragement to see how to get to the

goal (the means-end routes) and the acquisition of knowledge. It should start from birth, and continue well beyond the child's mastery of the basics. Children who emerge from infancy with exceptional verbal skills, reading well by the ages of three to five, are fitted for exploring broader horizons on their own. Early verbal mastery is not only the precursor of eventual excellence, but is associated with the necessary curiosity and drive for the child to reach the heights.

However, the following qualifications need to be recognised:

- \* Stimulation must be of the right kind to encourage learning. If it is not meaningful to the baby, it can be merely confusing. Loud clashing noises and screaming can actually be detrimental to smooth development, but soft, continuous background music seems to be without effect.
- \* A variety of activities and experiences is important, particularly through parents who are responsive to their child in play and conversation. Children's verbal abilities are clearly related to family verbal interaction.
- \* Learning materials should be generously provided.
- \* Example is more effective than expectation.
- \* Love is to be given without 'strings'.

It seems as though the future talented adult is to be found in the infant who pays attention, is attracted by novelty, enjoys a challenge, makes a concerted effort to succeed at a task, and is advanced in delaying gratification. It will have the best chance if born to a happy, lively family of secure socio-economic status, enjoying good emotional and psychological nourishment with plenty of play opportunities and verbal interaction. Such infants have good feelings about themselves, and so are happy babies with the courage to investigate. Certainly, that describes the earliest lives of most children who are *identified* as talented. But where does the spark of originality come from, the emotional strength that produces great works and ideas? Less definable signs might be the absolute faith parents place in their children. In a statement about himself, which can certainly be extended to others, Freud said: "if a man has been his mother's undisputed darling, he retains throughout life the triumphant feeling, the confidence in success, which not seldom brings actual success along with it." (quoted by Clark, 1980).

## REFERENCES

- Abroms, K. (1985). 'Social giftedness and its relationship with intellectual giftedness' in J. Freeman, (ed.) *The Psychology of Gifted Children*. Chichester: John Wiley.
- Arnold, L.E. (1990). *Childhood Stress*. Chichester: Wiley.
- Atkinson, J. & Braddick, O. (1989), 'Development of basic visual functions', in A. & G. Bremner (Eds.) *Infant Development*, (7-42). Hillsdale: Erlbaum.
- Bandura, A. (1989), 'Perceived self-efficacy in the exercise of personal agency', *The Psychologist*, 2, 411-424.
- Benton, D. (1991). 'Vitamins and IQ', *British Medical Journal*, 302, 1020-1021.
- Bornstein, M.H. & Sigman, M.D. (1986) 'Continuity in mental development from infancy', *Child. Dev.*, 57, 251-274.
- Bryant, P. (1974). *Perception and Understanding in Young Children*, London: Methuen.
- Butler, N.R. & Golding, J. (1986). *From Birth to Five: A Study of the Health and Behaviour of Britain's Five Year Olds*. Oxford; Pergamon Press.
- Butterworth, G. (1984). Referred to in Nicholson, J. & Lucas, M. (Eds) *All in the Mind*. London: Thames Methuen.
- Ceci, S.J. (1990) *On Intelligence ... More or Less*. New Jersey: Prentice Hall.
- Chi, M. T. H. (1981), 'Knowledge development and memory performance', in J.P. Das & N. O'Conner (Eds.) *Intelligence and Learning*. New York: Plenum Press.
- Chomsky, N. (1968). *Language and Mind*. New York: Harcourt Brace Jovanovich.
- Clark, R.W. (1980). *Freud; the Man and the Cause*. London: Jonathan Cape and Weidenfeld & Nicolson.
- Cogill, S., Caplan, H., Alexandra, H., Robson, K., & Kumar, R., 'Impact of post-natal depression on cognitive development in young children', *British Medical Journal*, 292, 1165-7.
- Collins, W.A. & Gunnar, M.R. (1990), 'Social and personality development', *Annual Review of Psychology*, 41, 387-419.
- Colombo, J. (1993). *Infant Cognition: Predicting Later Intellectual Functioning*. London: Sage.
- Cox, T. (1990). 'Educational disadvantage: the bearing of the early home background on children's academic attainment and school progress', in A.S. Honig (Ed.) *Early Parenting and Later Child Development*. New York: Gordon and Breach.
- Elshout, J. (1995) 'Talent: the ability to become an expert', in J. Freeman, P. Span, & H. Wagner (Eds.) *Actualising Talent: a Lifelong Challenge*. London: Cassell.
- Feuerstein, R. & Tannenbaum, A.J. (1993), 'Mediating the learning experiences of gifted underachievers', in B. Wallace and H. B. Adams (Eds.) *Worldwide Perspectives on the Gifted Disadvantaged*. Bicester: ABA Academic Publishers.
- Fowler, W. (1990), *Talking from Infancy: How to Nurture and Cultivate Early Language Development*, Cambridge, M.A.: Brookline Books.
- Freeman, J. (1983). 'Environment and high IQ - a consideration of fluid and crystallised intelligence', *Personality and Individual Differences*, 4, 307-313.
- Freeman, J. (1991a). *Gifted Children Growing up*. London: Cassell.
- Freeman, J. (1991b). *Bright as a Button*. London: Optima.
- Gombert, J.E. (1992). *Metalinguistic Development*. Hemel Hempstead: Harvester Wheatsheaf.
- Harlow, H.F. & Harlow, M.K. (1966), 'Learning to love', *American Scientist*, 54, 1-29.
- Harris, P.L. (1989). *Children and Emotion: The Development of Psychological Understanding*. Oxford: Blackwell.
- Howe, M.J.A. (1990). *The Origins of Exceptional Abilities*. Oxford: Blackwell.

- Hundeide, K. (1991). *Helping Disadvantaged Children*. London: Jessica Kingsley; Norway: Sigma Forlag.
- Jung, C.G. (1916). *Analytical Psychology*. New York: Moffat.
- Kagan, J., Lapidus, D.R. & Moore, M. (1979), 'Infant antecedents of cognitive functioning: a longitudinal study', in Chess, S. & Thomas, A. (Eds.), *Annual Progress in Child Psychiatry and Child Development*. New York: Bruner Mazel.
- Leboyer, F. (1975). *Birth Without Violence*. New York: Knopf.
- Lehwald, G. (1990). 'Curiosity and exploratory behaviour in ability development', *European Journal for High Ability*, 1, 20-210.
- Lewis, M. & Michalson, L. (1985). 'The gifted infant', in Joan Freeman (ed) *The Psychology of Gifted Children*. Chichester: Wiley.
- Lewis, M. & Brooks-Gunn, J. (1981), 'Visual attention at three months as a predictor of cognitive functioning at two years of age', *Intelligence*, 5 (2), 131-140.
- Lewis, M. & Louis, B. (1991), 'Young gifted children', in Colangelo, G.A. & Davis, G.A. (Eds.), *Handbook of Gifted Education*, Boston: Allyn and Bacon.
- Lytton, H., Watts, D. & Dunn, B. (1990). 'Early mother-son relations and son's cognitive and social functioning at age 9: a twin longitudinal study', in A.S. Honig (Ed.) *Early Parenting and Later Child Development*. New York: Gordon and Breach.
- Mascie-Taylor, G.C.N. (1989). 'Biosocial correlates of IQ', in C.J. Turner & H.B. Miles (Eds.), *The Biology of Human Intelligence*. Driffield: Nafferton Books.
- Mazisfr, M., Cote, R., Boutin, P., Bernier, H. & Theivierge, J. ((1987), 'Temperamental and intellectual development: a longitudinal study from infancy to four years', *American Journal of Psychiatry*, 144:2, 144-150.
- Messer, D.J. (1993), 'Mastery motivation; an introduction to theories and issues', in Messer, D.J. *Mastery Motivation in Early Childhood*. London: Routledge.
- Mischel, W., Shoda, Y. & Rodriguez, M. (1989), 'Delay of gratification in children', *Science*, 244, 933-938.
- Montessori, M. (1964). *The Montessori Method*. New York: Schocken.
- Pickering, J. & Skinner, M. (1991). *From Sentience to Symbols; Readings on Consciousness*. London: Harvester Wheatsheaf.
- Radford, J. (1990). *Child Prodigies and Exceptional Early Achievers*. London: Harvester Wheatsheaf.
- Rose, D.H., Slater, A.M. & Perry, H. (1986), 'Predictions of childhood intelligence from habituation in early infancy', *Intelligence*, 10, 251-263.
- Rosenblith, J.F (1992). *In the Beginning: Development from Conception to age Two*. London: Sage Publications.
- Scarr, S., & McCartney, K. (1983). 'How people make their own environments: a theory of genotype ---> environment effects', *Child Development*, 54, 424-435.
- Slater, A.M., Cooper, R., Rose, D. & Morison, V., (1989), 'Prediction of cognitive performance from infancy to early childhood', *Human Development*, 32, 137-47.
- Tulkin, S.R. (1977). 'Social class differences in maternal and infant behaviour' in *Culture and Infancy*, P.H. Leiderman, S.R. Tulkin, and A. Rosenfield (eds), New York: Academic Press.
- Waters, E., Wippman, J., & Stroufe, L.A. (1979), 'Attachment, positive effect and competence in the peer group: Two studies in construct validation', *Child Development*, 50, 821-829.
- Wertsch, J. V. (1991). *Voices of the Mind*. London: Harvester Wheatsheaf.
- White, B. (1985). 'Competence and giftedness', in Joan Freeman (ed) *The Psychology of Gifted Children*. Chichester: Wiley.

Williams, J.M., Watts, F.N., Macleod, C., Mathews, A. (1988). *Cognitive Psychology and Emotional Disorders*. Chichester: Wiley.