

Ref: Freeman, J. (2000) 'Families, the essential context for gifts and talents', (pp. 573-585) in K.A. Heller, F.J. Monks, R. Sternberg & R. Subotnik, *International Handbook of Research and Development of Giftedness and Talent*. Oxford: Pergamon Press.

FAMILIES: THE ESSENTIAL CONTEXT FOR GIFTS AND TALENTS

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KEY WORDS: Giftedness, Parenting, Families, Individual differences, Culture, Mediation, Educational provision, Development, Feedback, Advice.

There is no lack of evidence to show that children's development, outlooks and achievements are influenced by the life-style of the families in which they grow up, and that from the beginning, the urge to learn is tempered by opportunity. Simonton (1998), though, in his investigations of world-class achievers has shown that there is no ideal family for producing giftedness: his subjects came from very varied backgrounds.

Indeed, families vary greatly in composition - from isolated one-parent units in big cities, to large families which are well integrated within a local community; from African families where children are cared for by several 'mothers', to large polygamous families where the father is shared, as well as residential homes for children without parents. It is not an easy matter to separate the effects of interactions between children and their parents from those with the wider culture, because each family provides its own unique mini-culture, 'translated' and adapted from that of the greater society. This special context not only provides a guide for the children's development, but also largely defines the opportunities in which all the family members can exercise their abilities. As far as we know, human parenting is not driven by instincts; every individual mother and father decides what to do, based on their own culture, experience and hopes.

THE EARLY PROMOTION OF GIFTS

Children's aptitudes, in whatever area they show promise, can only develop into exceptionally high achievement in circumstances which are rich in the appropriate material and psychological learning opportunities. All long-term studies on the development of talent have shown the cumulative effects of family attitudes on high level achievement (e.g. Bloom, 1985; Freeman, 1991; Perleth & Heller, 1994). In general, as children get older, there is a widening gap in average intelligence scores between those from differently supportive homes (Mascie-Taylor, 1989).

Gifted achievement, though, cannot be predicted from early experiences alone, self-esteem; genetic, constitutional and social trajectories impose powerful limits. Using children's precocity as the prime identifying feature of giftedness is probably partly responsible for its later apparent loss, often called 'burn out', which is usually due to the others catching up. Giftedness may also take many different forms; it may appear in quite unexpected situations and at different points during a lifetime (Subotnik, Kassin, Summers, & Wasser, 1993). Trost (1993) calculated that less than half of "what makes excellence" can be accounted for by measurements and observations in childhood. The key to success, he said, lies in the individual's dedication, but given a high level of aptitude, intelligence and other cognitive factors are the most reliable indicators.

In fact, very high intelligence, as measured by IQ tests, is by far the most popular criterion for defining children as very able or gifted. Just one problem is that IQ testing is strongly influenced by belief systems, learned in the family, which include social and moral values. An example is in the Stanford-Binet Intelligence Scale in the question “What’s the thing to do if another boy/girl hits you without meaning to do it?” The correct response must involve forgiveness. Consequently, children who come from families who are part of that belief system are likely to be advantaged on these tests. The vocabulary aspect too is dependent on having heard those words.

A very close positive relationship was found when children's (Stanford-Binet) IQ scores were compared with their home backgrounds (Freeman, 1991). The higher the children's IQ scores, especially over IQ130, the better the quality of their educational support, measured in terms of reported verbal interactions and activities with parents, number of books and musical instruments in the home etc. In a detailed review of influences on the development of children’s IQ, Slater (1995) concluded that the best predictor of all is parents’ IQ, education and socioeconomic status.

The family culture

Due to its mediating role in a culture, the family ‘belief system’, or what is taken as ‘common sense’ in one home, may bear little relevance to what is taken equally for granted by a neighbour. In his studies of creative people, Perkins (1981) found that they were able to produce great works, not solely as a result of their talent, but as a function of their values and beliefs, which were demonstrated individually in terms of originality, knowing, and independence. After all, as Csikszentmihalyi (1998) wrote, genius cannot exist independently of the culture: one has to be a genius in something. Lubart and Sternberg (1998) showed that culture influences the definition and expression of creativity, channelling it into certain task domains and social groups. “The quantity of creative activity can be further affected by cultural factors such as the value placed on conformity” (p.59)

Cultural and family attitudes have a considerable effect on high-level achievement. For example, Berry (1990) found highly significant geographical and religious differences between Nobel prize-winners. In proportion to their numbers, Jews were heavily over-represented, in certain subject areas 50 times more. Zuckerman (1977) suggested that as 75% of Jewish Laureates came from lower socio-economic backgrounds, it could not have been social advantage which produced that excellence, but rather – in line with other research – the cultural influence of the family's drive for success. Indeed, in their late adulthood, the most successful of the Terman sample were neither distinguishable by IQ nor by earlier school achievement but by family background, notably the aim for success (Holahan & Sears, 1995). In many Pacific Rim countries, as well as Russia, measured intelligence is largely ignored and success is attributed to sheer effort, hence the growth of out-of-school crammers. Both Flynn (1991) and Stevenson (1998) have concluded that the culture of hard work is probably responsible for so many Asian youngsters’ greater school and work success than their higher IQ class-mates. In fact, Hess and Azuma’s (1991) in-depth research showed that American children needed much more help and praise than Japanese children in their motivation to learn.

Home outlook and style of upbringing provides a large part of the bridge between home and school. In Poland, Niebrzydowski (1997) compared mothers’ styles of upbringing. Mothers of high attaining kindergarten children showed a greater capacity to control the child. Being themselves more sensitive to the child’s concerns and competent with

educational problems allowed the child greater autonomy. When parents and teachers are in agreement, the path to the child's achievement is smoother, in ways which are not always obvious.

Positive cooperation may be seen, for example, in the amount and quality of homework that a child does, a well recognised factor in school success. In a comprehensive review of research on homework, Hallam and Cowan (1998) conclude that the family is essential for seeing that it is done by young children. American teachers, pupils and parents appear to be more negative than Europeans. For highly achieving Canadian inner-city children the combination of positive parental attitudes, parent-school links, and homework were the three key supports for high level achievement (Zeigler, Hardwick & McCreath, 1989). In an overview of international research on education of the gifted, it was quite clear that without family support, schools would not be able to help a potentially gifted child to achieve (Freeman, 1998).

Cultural values may inhibit the achievements of bright children. These too can be subtle, such as the effect of expectations: if children do not fit the cultural stereotypes they are less likely to be recognised as potentially highly able. Currently, the common Western stereotype of a gifted child is of a weedy lad: he (for he is usually male) is bespectacled, lonely, and much given to solitary reading. He is, in fact, a juvenile 'egg-head', at times referred to by his schoolmates and maybe his teachers as 'the little professor'.

Very able children who do not speak the language of the test-makers or who think in different ways are also less likely to be recognised as having high potential. In an overview of 20 research-based international papers on the gifted disadvantaged across five continents, Wallace and Adams (1993) concluded that it is not only culture which can cut such children out of recognition and special provision, but poverty. There is, they wrote starkly, "the equation, in reality, of wealth with giftedness, special educational provision and giftedness." (p. 446).

Parents who have been brought up in culturally impoverished circumstances may lack familiarity with easy verbal communication, which affects their children's intellectual growth. Cultural disadvantage usually brings psychological handicaps in the areas of perception and attention, verbal and intellectual abilities, and motivation. Those parents who, for example, give orders more frequently than explanations are less likely to discuss daily events with their children. Where the children's questions are ignored or rejected, and play-material and psychological 'permission' to play is scarce, their development will be accordingly narrowed, and bright children may have to develop complex strategies to get any verbal interaction from their parents. The intellectual poverty of children from unstimulating homes is noticeable by the age of five years. Perceptual deficiency in children who are not talked with is shown when they recognise fewer objects and situations, and their interests are limited by their inability to describe them.

The use of language

The single most effective help parents can give towards future giftedness is the early encouragement and enrichment of language. Vygotsky (in Wertsch, 1990) suggested that with specific provision and mediation (adult guidance, especially through language) children can learn at a far greater speed than otherwise.

Based on 20 years of experimental research, Fowler (1990) showed how enriched language enabled children to shoot ahead of others with equal measured ability. From the earliest days, the key for parents is to take turns with the baby at initiating and responding to communication. The parent is not teaching but enabling. Early fluency in using language involving stimulation and practice from adults, such as being read to and talked with from the time of birth, enables children to deal more effectively with later complexities. His follow-up of 14 children with enriched early language showed them to have become “outstanding students in school”, in all subject areas including the sciences and mathematics. 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, too, in his survey of exceptional early achievers, found that although some appeared to come from homes of low socio-economic status, these homes were all lively, stimulating, and usually highly verbal (Radford, 1990).

Advanced language is probably the first thing to look for in assessing a potentially high intellectual level, and the advantage usually lasts. Infants are able to manipulate language correctly, both in its comprehension and its production, earlier than had previously been thought. In intellectually gifted children, this is followed by the ability to reflect upon and control language using metalinguistic abilities - a reflective attitude to the comprehension and production of oral and written language - which is different from ordinary verbal communication (Gombert, 1992). But children who are advanced in verbal ability are not, on average, more advanced in motor skills (Robinson, 1996).

In poor countries, literacy is often the key to the promotion of giftedness. Having a literate family both improves a child's chances of going to school, and encourages familiarity with the written word. But it is unfortunate that education is so often identified with status, self-esteem, and empowerment, because not all members of the family are seen as having the same needs or rights. For example, where women's lives are restricted to the home, they may be denied literacy; all communication with the wider (male) society being filtered through to them by their male relatives. Literacy for women has proven value: in an area of high illiteracy, where one group of mothers were taught to read and a control group was not, it was found that those with even a little literacy produced healthier and cognitively brighter children (Hundeide, 1991).

Even within a strongly literate cultural tradition, one cannot make the assumption that parent-child relationships have a similar nature. Adult development is as important as child development. Some mothers are aged 16 and some are 45 - for this and other reasons, their mental and educational development may be quite different. The interaction between parents and children is not just between them as individuals, but also between their cognitive capacities and needs, which change with age. For example, physical contact is most important in the first year of life, conversation and responsiveness in the second, responsiveness to the child's talk in the third, and from then on, more variety of contacts with a range of other adults. From the age of five, maternal responsiveness is less important, but parental encouragement and the availability of a range of play materials and learning experiences remains salient. For example, a London study found that as children were learning to read, those who read out loud to their parents at home had markedly higher reading attainments than those who did not. This could not be explained by any factor other than their reading aloud (Tizard, 1985). Gottfried, Gottfried, Bathurst & Guerin (1994) found that “Ongoing reading to the child in the early years is consistently associated with gifted intelligence (130 IQ) at 8 years.” (p.161)

Can parents make a child gifted?

Studies of successful people brought Howe (1990) to the conclusion that "in the right circumstances almost anyone can" ... acquire exceptional skills (p.62). He argues that self direction, self confidence, a sense of commitment and persistence, can effectively produce gifted performance. But Freeman (1998) has responded that in all history "no one has ever taken a number of children at random and obliged them to practice to a world-class level of talent in any area." (p. 415)

In fact, attempts to analyse and teach the specific skills of expertise to adults have been carried out in laboratory studies for some years (Ericsson & Lehman, 1996). But even though motivation and practice made a vast difference to results in those strictly controlled conditions, the trainees differed in the level of expertise they could reach. The researchers concluded that the most important variable in gaining expertise is sufficient ability to gain a foothold in the learning process, and then to put in thousands of hours of learning and practice. Although Ericsson (1998) concluded that "expert performance can be attained without unique and innate capacities (talent)", he states that the mystery lies in the motivation for anyone to practice sufficiently to get there.

Children's interests may provide a clue. These offer parents a lead in selecting provision (Renzulli, 1995; Hany, 1996; Gottfried, Gottfried, Bathurst & Guerin, 1994). Able youngsters' interests and leisure activities have been found to be a reliable predictor of future high achievement in that area. Although such choice is largely self-directed, showing task commitment, intellectual abilities, persistence and other personal attributes, it also depends on provision and culture. Eighteen years after secondary school, 48 of the original 159 subjects of a high school in Tel Aviv, Israel, were surveyed for their occupational accomplishments and outstanding career achievements. A third of the sample had continued to work seriously in their childhood leisure areas with relatively higher attainment than their school-fellows whose careers were unrelated to their interests (Milgram & Hong, 1997) It was concluded that serious adolescent leisure activities were highly indicative of future successful careers and that this form of self-identification should be encouraged and provided for.

PARENTS AND CHILDREN TOGETHER

Things that parents do together with their children have a far-reaching effect on the child's understanding: games, chatter, stories, even arguments can be a stimulating means of fostering the child's intellectual growth. The cognitive functions most closely linked to family social relationships are the executive regulators - the way we plan, monitor, and check the outcome of problem-solving. The system works because adults have learned it and share the same cultural assumptions. But close friends of children, who spend more time with them than other children do, are also cognitive mediators, in that they help each other to understand the world.

The problem for research is how to establish what results in what. A highly verbal and demanding child, for example, can affect parents' behaviour by stimulating them to have more conversation and read more stories aloud. On the other hand, parents who talk to children a lot are themselves verbal people.

By adaptation from the study of animals (e.g. by Konrad Lorenz, 1965), it has been proposed that there are specific times in development when a child is sensitive to certain

influences. Danger points in physical development were revealed at the time of the thalidomide tragedy - if the mother took the drug at a specific stage in the development of the foetus, the baby could be born with deficiencies related to that time. But the general existence of critical periods for cognitive development in human beings is less sure, although foreign language learning does seem to be affected in this way. Since attempts to acquire another tongue after 15 years of age are very much less successful than earlier learning, it is important to start language teaching as early as possible. In general, however, the benefits of good learning experiences in the early years can be lost if subsequent experiences are bad, and conversely, there can be substantial recovery if early bad experiences are followed by good ones in middle childhood.

Maria Montessori designed a system of early childhood education using the similar idea of 'prime developmental times' (Montessori, 1964). She wrote that should those special times be used well, then good learning will happen, but if not, the moment may pass and the child may not have the chance again. Intellectual progress is 'at risk' between 7 and 36 months, because that is a period which is particularly sensitive to lack of good stimuli. White (1985) concluded that probably not more than one in ten children get sufficient educational input at that time for the fulfilment of their potential. Shavinina (1997), suggested that prodigiousness is itself a consequence of accelerated development during sensitive periods, expressed in exceptional perceptions of the world.

Imitation

The ability to imitate is extremely important in learning, and without it, the gifted would not reach their full potential. So fundamental and universal is this human ability that its absence in newborns is a sign of retardation. Imitation is not only a means of learning; it is also an emotional bonding process which begins from the first day of life, with the two-way imitative 'conversations', which mothers and babies enjoy. Mothers introduce their babies into their culture, such as one would do for a verbally helpless foreigner, by establishing a 'dialogue'. To do this, she is sensitive to what her baby initiates, as well as suggesting and demanding certain behaviours from him. She encourages the activities of which she approves and discourages those she considers inappropriate, trying to extend the baby's grasp of what is appropriate by being sensitive to signs, which she can reinforce, that he is understanding what is wanted of him. It is not just physical behaviour that she is moulding, but a conceptual learning system. From the earliest days, "Sensitive parents may not only be maintaining infant interest in the events during social interaction, but also maintaining infant state at an optimal level for processing information" (Messer, 1994, p. 27).

Babies initiate as well as imitate, making their own mark on their world. For example, those babies who are demanding may receive special family attention and resources, and if these demands 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 specifically active role for the baby, but one which positively involves the parents too. It is open to question, though, whether demanding babies are always those with the potential for high ability, and whether parents should stimulate passive babies into demanding more, on the grounds that this will encourage intellectual development.

The mother's emotions influence the interactions, which can significantly affect the intellectual growth of the baby. Even infants of ten weeks can recognise the difference

between happiness, sadness, or anger in the mother. Her happiness encourages them to explore, joy in one producing joy in the other, whereas her distress causes them to withdraw, her sadness producing sadness or anger. The implications are profound. A negative emotional atmosphere inhibits good learning, but positive emotions have an encouraging effect. 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 a series of anxiety-arousing experiences, the effect is cumulative. Sensitive parents are aware of times when the baby's attention begins to diminish, and change their behaviour to keep its interest, such as a change of voice or holding the toy in a different light. Infants cared for in this way are more likely to persist with their own explorations later on, especially as the tasks become more complex.

The promotion of motivation

Children's feelings about what they are able to achieve start early. Young children do not understand ability in the same way as they will at about age 11. They start by expecting effort to lead to results (Heyman & Dweck, 1996). Differences in motivation to learn in young children may also be more connected to their ideas of goodness and badness than to specific ideas of intellectual competence. Increasing motivation to learn, then, implies taking the blame away from personal deficiencies, such as perceived low ability over which children have no control, and putting it on lack of effort or appropriate learning strategies over which they do have control.

Lehwald (1990) concluded that the major base of future problem-solving behaviour at a gifted level is an infant's curiosity coupled with confidence to explore the environment, which each one acquires as the result of favourable social processes. There is evidence that four year-olds who have high self-concepts are not only more intelligent and socially responsible, but better able to plan ahead, which is a vital part of creative thinking (Mischel, Shoda, Flavell & Rodriguez, 1989). However, these studies involve difficulties in measurement, for example in accounting for the effects of influences such as gender, education, and socio-economic-status. For example, Power et al. (1998) in Britain, investigated young men who had been identified while at school as 'academically able', and found that their perceptions of a masculine identity could either foster or jeopardise their academic achievement.

Empowering children by giving them a feeling of competence and a goal to aim for (even examinations) generally increases both their motivation to study and the accompanying rise in level of work (Freeman, 1992). On the other hand, too much adult control implies constant dependence on someone else's decisions, removing their 'locus of control' - the place from which power comes (Rotter, 1966). If children see control of their learning as outside themselves, resting with the teacher or some other authority figure, then they will tend to be less involved and motivated to work. The urge to learn may also be improved when poorly motivated youngsters are empowered to help others, as when unsuccessful adolescents take on the role of tutors to younger children.

Improving motivation through feedback

Knowing how well one is doing allows aims to be set at an appropriate level, avoiding both certain failure and too-easy success. Both success and failure tend to perpetuate themselves. A parent or teacher can modify feedback to give a child the feeling of success by raising the standard of the task so that when the child succeeds, her outlook on learning is encouraged to be one of success and optimism. Motivational factors are as important to high-

level human accomplishment as intellectual ones. The existing body of research on intrinsic (deep and meaningful) motivation, as distinct from superficially trying to please, is particularly relevant for high levels of performance. Deci and Ryan (1985) analyzed over 200 studies on motivation, from which they formulated a theory of human motivation, which included personality factors. They found that when children feel competent, it motivates them to exercise and elaborate their abilities.

Yet the situation is not entirely controllable by parents or other adults. Children can interpret feedback in different ways, depending both on the psychological context and on the child's personality. Telling one child he is doing badly may be interpreted as an excuse to stop work because it does not seem worth the effort, while for another, the response may be an increase in motivation to prove 'them' wrong. Paradoxically, too much praise, particularly in a system of close supervision, may tell a child that he is doing the bidding of the teacher, rather than developing his own competence. It then becomes psychologically impossible for the child to feel in control of his own progress in learning.

All children, whatever their ability, want to feel effective and engaged by challenge, which must include a risk of failure. The gifted need challenge at least as much as any others. If children are given a superficial reward, such as money or sweets, they are far more likely to choose the easiest ways of succeeding, whereas if they are enjoying the activity for itself, they choose harder tasks, usually just above the level of previous success. When children are interested in what they are doing, they seem to have a natural tendency to take on challenges that exercise and expand their limits of competence.

Positive feedback, particularly a positive attitude on the part of adults, can be very effective. There is always something specific to praise, some form of recognisable success, and the possibility of offering a reward. Sloboda, (1993) found that the best music students had received more praise than the others, and their parents had made them feel 'special'. Negative feedback, such as sarcasm, punishment, or detention, are much less effective: for emotional reasons the child may have been seeking extra attention, and such punishment may simply fulfil what was wanted.

Social cognition

Social cognition is the way an individual perceives other people and comes to understand their thoughts, emotions, intentions, and viewpoints, first described by Flavell (1977). Parents are cognitive mediators with a special relationship. Children's experiences in the family are used to develop a system of inferences which they use to make predictions about others, especially in relation to themselves, and consequently how they think and behave. Although social cognition is related to intelligence, actual social behaviour comes from children's involvement in a variety of social situations, and benefits from adult guidance. Socially positive attitudes, such as being sensitive to the feelings of other people, are more often shown by confident young children, especially if they are highly intelligent. They are also better at making use of adults as resources and tend to play more imaginatively.

To explore their awareness of other people's feelings, 3-6 year-old children were asked to predict what someone else would like as a birthday present, rather than what they themselves would like to receive (Flavell, Botkin, Fry, Wright, & Jarvis, 1968). Each child was presented with an array of objects, and asked to select a birthday present for each of his or her parents, siblings, and teachers. Choices were judged as role-appropriate on the basis of age and gender. The 3 year-olds disregarded both the age and gender of the intended

recipient, while 4 and 5 year-olds' choices represented a type of transitional level, and all the 6 year-olds made appropriate role responses. Age seemed to improve social cognition, which was more advanced for the highest IQ children in each age-group. However, the available research does not reveal a recognisable relationship between social cognition and actual behaviour towards others, whether intellectual or emotional. Nor does this seem to be the case for moral reasoning.

It is strange that highly intelligent children are often thought of as having poor social cognition and therefore few friends. In fact, as research has shown (Freeman, 1997), they tend to have sympathy, adaptability and compassion in abundance, and do not usually choose to be without friends. Using one-to-one interviews in Germany, Rost and Czeschlik (1995), compared the responses of 50 high-IQ with 50 average-IQ primary school children, and concluded that the former were the better adjusted. Later, working with mixed-ability primary school children, they found that those with high-IQs were the most popular (Czeschlik & Rost, 1995).

FOLLOW-UPS

Detailed studies of gifted children as they grow up at home are rare. In America, Feldman (with Goldsmith 1986) spent ten years following-up just 6 young boys, described as prodigies; he used a term from biology, 'trace elements', to describe unrecognised events which are vital for gifted development. In a historical case-study of outstanding individuals such as Darwin and Piaget, Howard Gruber (1981) saw a similar combination, and referred to such creative achievers as people in "networks of enterprise", ie. they have many things going on at the same time. In a four-year research project, Benjamin Bloom and his team (1985) looked back at the lives of 120 young men and women who had reached world-class levels of accomplishment. The subjects told them that no matter what their initial gifts, those high levels of achievement were due to a long and intensive process of encouragement and teaching, usually combined with long hours of practice under parents who drove them hard. Although several crucial factors which appeared to help the potentially gifted to achieve highly have emerged from such studies, we do not know what the effect of similar parenting behaviour would have been on other children, as there were neither comparison groups of families, nor any more intimate view of their lives - in fact, most of the Bloom interviews seem to have been done by telephone.

In a review of 14 American and German follow-up studies of varying design and loss of subjects over time, Arnold and Subotnik (1994) suggested an "inextricable link" between the identification of potential and timing due to age-related stages of development: accuracy in predicting achievement increases with the age of the sample studied. Accordingly, for the greatest reliability, information should be collected at different points in an individual's life, most reliably within specific subject areas in which the child shows promise and interest.

Reports from a 15-year Chinese study of 115 extremely high -IQ children (Zha, 1995), showed the strong influence of family provision, both in achievement and emotional development. The children were first identified by parents (two boys to every girl) and then validated as gifted by a psychologist. Every year parents were given a questionnaire and interviewed several times. The parents-to-be had taken their future responsibilities very seriously by studying parenthood. As the toddlers were learning to speak, the parents often taught them to read, and some children even mastered writing at the same time. By the age of three many children could recognise 2000 Chinese characters, and at four many could not only read well, but also wrote compositions and poems. However, these 'hothoused' children

were found to be lacking in easy social relationships, and the parents had to be given some more lessons in how to help their children to some social life.

Measurements of certain aspects of learning in the first three years of life provide reliable indicators of life-long attributes, such as advanced physical control, which can predict gymnastic talent (Lewis & Louis, 1991). The strongest early indicator, which can be traced from the age of three months, is verbal ability, but spatial and non-verbal signs are also valuable indications for future talents. These researchers found that the greatest overall intellectual stability was at the extremes of the IQ range - both gifted and low - and suggest that this intellectual development is qualitatively different from that of individuals with more average scores. Indeed, the parents of the exceptionally high IQ children in the follow-up study by Freeman (1991), compared with those of more average IQ children, reported very early signs of exceptional concentration, memory, and talking. Clearly, early infancy is the time when family sensitivities and influences are the most vital means of developing potential giftedness.

A unique study in California began with 130 one-year-olds of unknown potential, the only criterion being that they were healthy (Gottfried, Gottfried, Bathurst & Guerin, 1994). Various measures of intellectual, physical and social development were made regularly until they were 9 years old. Those with an IQ of 130 or more on the Wechsler Intelligence test were designated gifted and compared with the others. The researchers concluded that giftedness is a developmental phenomenon, which can rise – and fall – over time: late bloomers' do exist and can be missed in a single testing. In a detailed examination of the family environments, they found a rich continuous educational environment to be essential in developing intrinsic motivation for curiosity and love of learning. Children from higher SES families tended to have higher IQs. According to the researchers, this was neither due to the parents' occupations or intelligence, nor to the amount of parent-child contact, but rather to the parents' educational accomplishments. "The families of gifted children provided more stimulating activities than did the families of non-gifted children. Moreover, the parents were more involved and apparently more invested in providing their children with a cognitively advantageous home environment" (p. 156). These differences, which were clear at three years-old and remained throughout the early elementary years, were notably of an academic and cultural nature, such as use of library or musical instruments. The gifted IQ children also influenced their environments, demanding more learning activities compared with the non-gifted children.

INDIVIDUAL DIFFERENCES WITHIN FAMILIES

Most studies of the effects of the social environment on children's development examine factors that are supposedly similar for all the siblings in the family, such as social class, marital conflict, or pressure to perform. But a child is neither a passive nor an unbiased recipient. There are indications that the most influential environmental factors may be those which are different for siblings in the same family (Dunn, 1984). Thus, there may be social and biological mechanisms which increase the differences between experiences which siblings have in the same family. These are termed non-shared environmental effects, and might, for example, include variations in how each child is treated by the same parent, peer relationships, school interactions, and when they are older, differences in their marital and occupational experiences. Discovering exactly how different kinds of influences are received by different kinds of children is extremely difficult. Parental divorce, for example, might either cause a temporary halt to a child's development or have life-long effects.

In order to study family interaction effects on different siblings in a family, it would be necessary to define the individual difference between the siblings (in families of at least two siblings) and the relationship of these differences to simple family structural variables. Only then would it be possible to distinguish the environmental variables which are likely to be important developmental differences. These could be relationships with the parents, as in the study which showed considerable consistency in parent's differential treatment of their children (Abramovitch, Pepler & Corter, 1982). There are also the differences in the way siblings see themselves as being treated by the family, and peer group relationships can also be different for children in the same family.

To some extent, these differences are attributable to recognised variables such as birth order, age spacing, and gender. Gottfried, Gottfried, Bathurst & Guerin (1994) found, as have many others, that birth order was important. Firstborns and only children do better. They strive harder to please their parents because they identify more strongly with them, and in addition to having higher IQ scores, they usually achieve more than their siblings throughout life. Even their leisure-time pursuits often have an educational aspect. First-born and only children are more likely to be more concerned with the effect they have on adults, and to be more responsible; the second-born is more easy-going and has more friends; the third-born is often more difficult to live with; while the fourth is often babied and so learns to be more dependent.

Speed of reaction may also be an innate ability which shows itself in many facets of behaviour that can affect relationships, etc., and which are regarded as important if not vital aspects of intelligence (Eysenck, 1998). There has also been considerable evidence of even young children's ability to shape interactions with their families; indeed Scarr and McCartney (1983) have suggested that to some extent, children make their own environments. Long-term research (eg. Reiss, Plomin, Hetherington, 1991.) has shown that children may identify with one parent and strive to follow the path of that example, differentiating themselves from the other siblings, and so accentuating different parent-child relationships.

Studies in various parts of the world have concluded that better nutrition leads to an improvement in children's IQ scores, correlated with increases in their head size and height (Lynn, 1989). Clearly, the better-nourished child will function more effectively at a biological level, and this can be expected to support a higher level of mental functioning; it could make the difference as to whether or not giftedness will develop in bad circumstances. This effect is recognised for instance in Brazil and some areas of the USA, where feeding very poor children is an important part of school life; indeed, it is some children's reason for coming to school.

Gifted girls and boys

Many studies have shown that in most cultures, families encourage boys more than girls to be independent, self-reliant, and able to assume responsibility, and that this alters their approach to both school and work. In Germany, Rost and Hanses (1994) found "dramatic gender effects" in the toys gifted children were given. There is a strangely stable ratio of 2 boys to every girl when parents identifying their children as gifted. This was the proportion in an American study by Johnson and Lewman (1990) of parent's selection of four to six year-olds as gifted. In China, in a 15 year follow up study, in which parents made the first judgement of giftedness, which was then confirmed by the teachers, 69.5% were boys and 30.5% were girls (Zha, 1995). Given the supposed differences in the Chinese attitudes, in which girls are seen as inferior, remarkably similar proportions appeared in Freeman's UK

study (1991) where parents made the first recommendation – 64.3% boys and 35.7% girls. The reason appeared to be that the boys had more behaviour problems as well as being more demanding in general. This also fitted better with the stereotyped image parents often had of the gifted child.

The effects of being a boy or girl are different for the gifted than for those of more average ability (Freeman, 1996). Many studies have shown gender to be the strongest single influence on high level achievement. Intellectually gifted girls appear to be cognitively more like gifted boys than girls of average ability (Stapf, 1990). Emotionally, though, in America they have been found to be more depressed than equally able boys, often underestimating their abilities because of conflicts between success and 'femininity' (Luthar, Zigler, & Goldstein, 1992). Golombok and Fivush (1994) wrote that: "Careful statistical analyses across hundreds of studies have demonstrated that gender differences in ability in math and language are so small as to be virtually non-existent for all practical purposes" (p. 177). They concluded that the measurable sex differences in aptitude are due to "a complex interaction between small biological differences and larger gender differences in socialisation experiences" (p. 176).

However, schoolgirls in Britain are currently achieving higher national examination grades than boys in all subjects at 16 and in everything except physics at 18 (Arnot, Gray, James, Rudduck with Duveen, 1998). Several other countries are moving in this direction, notably Australia. Investigating mathematically precocious American youth, Benbow and Lubinski (1993) although recognising the effects of cultural influences, concluded that there is a genetic mathematical bias in favour of boys. The British results, though, refute this. Taking a long-term look at giftedness in mathematics in the USA, Jacobs and Weisz (1994) found that parents held somewhat fixed and conventional gender expectations. This influenced the girls' self-esteem more than their actual performances, and inhibited their ambitions. Power et al. (1998) in Britain, investigated young men who had been identified at school as 'academically able', and found that their perceptions of a masculine identity could either foster or jeopardise their academic achievement.

An international review of research on gender differences in the highly able in mathematics and natural sciences, failed to find any reliable evidence that girls are inherently less able than boys in these subjects (Heller & Zeigler, 1996/7). So, because they have similar abilities, girls and boys can act as experimental controls for each other to gauge the power of social effects, probably best seen in career outcomes. Heller pointed out that, for example, that even on present tests of spatial abilities at which boys do better, we could expect only twice as many male engineering graduates as females, whereas there are 30 times as many. This effect was found to be more pronounced among the gifted. Clearly, girls are being more influenced by social pressures than boys, e.g. by the 'unfemininity' of subjects such as physics, as well as much less practice and fewer role-models. Most importantly, the often-noted 'learned helplessness' of girls (a feeling that events and outcomes are beyond their control) was considered to be the result of 'wrong' attributions, so that girls often think their success is due to luck rather than their own ability. Thus, Heller states, believing that they are not good at maths, simply lucky to have done well that time, girls adjust their behaviour to fit their belief (attribution), and 'confirm' it by doing less well as time goes by.

Biological differences

There is a limit to the extent that family influences can affect children's achievements because of biological differences. The IQ scores from studies of more than 400 sets of

identical and non-identical twins separated at birth were investigated in later life (Plomin, 1998). This work discovered about 70% genetic influence on IQ, the strongest correlation found for any psychological characteristic. In isolating the genetic input, such studies have highlighted environmental influences, notably that the younger the child, the more potent the environment. But no specific gene for giftedness has yet been discovered.

Lykken (1998) points out that identical twins are affected by uterine environmental influences, causing differences e.g.; in size and handedness, in quite enough ways for parents to tell them apart. It is the configural or 'emergenic' aspects of inheritance, he writes, which mark the truly gifted from the merely assiduous. He demolishes the idea that it is only practice which makes perfect, pointing out that perfect pitch or the aptitude to become a Olympic gold medallist are not the birthright of every child.

The perceptual responses of even tiny babies to shapes and noises can be related to the type of care they receive, which in turn reflects the care which their parents themselves experienced. Harlow's (1958) observations of monkeys were the basis for work which showed how both animal and human behaviour patterns are learned and transmitted over generations. But of course, the baby's individual responses are important. For example, girl babies seem to have more sensitive skins than boy babies, responding more positively to stroking, which reinforces the parent's pleasure in doing this, so that baby girls may receive more soothing attention of this kind; similarly, heavy babies often respond less quickly than thin ones, which must affect parental responses to them, and they seem to continue in this way as children.

Freeman (1983) concluded that genetic and environmental influences on IQ are unlikely to be in the same proportion for all children. She found that when their environmental support was poor, children, who scored in the top 1% on the (relatively culture-free) Raven's Matrices test of intelligence, sometimes scored at a much lower level on the Stanford-Binet test (contaminated by learning). However, the brightest appear to be relatively more able to extract benefit from whatever environment they are in.

Emotional influences

Although gifted children are possibly more sensitive than others to emotional nuances in the family, there is no evidence that they are emotionally less stable than other children - even though it is sometimes argued that they are. On the contrary, an American meta-analysis pointed to low intelligence and attention problems as being associated with delinquency (Maguin & Loeber, 1996). Investigators who describe the gifted as having emotional problems have usually taken their data from clinical settings and case-studies, where the population is self-selecting and no comparisons are made with other equally able children (e.g., Silverman, 1993; Gross, 1993). In fact, the gifted appear to be emotionally stronger than other children, with lower levels of anxiety, higher productivity, and higher motivation. Perhaps those who are to be high achievers need to be stronger than most because their exceptionality makes them more likely to come up against some special problems.

Research, unique in its in-depth approach, was carried out in Britain over 14 years (Freeman, 1991). A target group of 70 children, identified (but untested) by their parents as gifted, were compared with a second group of 70 who were unlabelled - but of equal measured ability - and a third group of 70 randomly selected children. 82% of the target group parents either reported emotional problems or were expecting them. Typically, the child showed over-activity, clumsiness, tantrums, excessive demands, poor sleep and had few

friends of any age. However, the comparison children in the study - of identical high ability - who did not exhibit problem behaviour, were much less likely to be seen as stereotypically gifted, simply outstanding at what they did. Freeman also found that about 10% of the children presented by parents as gifted were only of average ability on IQ tests, and had achieved accordingly at school. This perceived 'failure' was then sometimes blamed by parents on the school, or as teacher discrimination against the child. Ten years later, the parent identified youngsters had often remained the least happy (as measured by rating scales), for which their gifts were sometimes blamed. Labelling appeared to have the effect of putting pressure on children to live up to it in high achievements, notably those who had been wrongly labelled and could not fulfil their parents' ambitions. Whatever problems already exist in the family, these can be intensified when there is an unusual child present.

Emotions help or hamper learning at all levels. German research on gifted young children has found that fear can inhibit the development of curiosity, an important motivator in learning, thinking and creative endeavour (Lehwald, 1990). Boekaerts' (1991) overview of international research on the learning of gifted young children found that those who achieve most highly are not only very curious but have a hunger to learn, often along with a strong urge to control. Canadian research with young children has also found an extra quality of playfulness in the learning of highly able little children (Kanevsky, 1994). Investigating the current work of creative scientists in California and later that of living "classical" composers, although some of this work was retrospective, Simonton (1994) could demonstrate that above a certain high level, personal characteristics such as independence contributed more than intellect to reaching the highest levels because of the great demands of effort and time needed. Perhaps for that reason, a four-year follow-up investigation of talented American teenagers, Csikszentmihalyi et al. (1993) found that in learning to tackle difficult tasks, the stronger the social support the more developed the youngster's skills, though schools were found to be much less effective in this than parents.

Vygotsky's (in Wertsch, 1990) Dynamic Theory of Giftedness suggests that either giftedness or defectiveness are possible outcomes when a child is faced with emotional barriers to development. Failure to overcome such barriers can lead to a child hiding behind the weakness, which then becomes reinforced. In a six-year experimental study in Moscow (Babaeva, 1999) investigated how to overcome such barriers in 31 children aged 6-7, identified as non-gifted by teachers and conventional tests. Following a specially devised therapeutic educational programme of 6 years, measures of the experimental group's abilities were equal to those of the identified gifted children, and considerably surpassed those of the non-gifted control children.

Even often-referenced studies may have tiny samples which are possibly unrepresentative. In Australia, Gross (1993) used the contentious IQ of 200 to select just three "profoundly gifted" young children. They were described as exhibiting the 'typical' gifted symptoms of emotional disturbance, such as school-refusal and friendlessness, because for them, Gross wrote, being with normal children was the same as interacting "solely with children who are profoundly intellectually handicapped" (p. 475). But are the described heavy emotional problems a result of subtle messages from home that the child is 'too clever' and thus too sensitive to fit in socially? No comparisons with other children were made.

In fact, some studies of the gifted have found them to be emotionally stronger than others, with higher productivity, higher motivation and drive, and lower levels of anxiety. An Israeli study (Kener, 1993), found that gifted junior-school boys and girls showed significantly

higher self-esteem when compared with those of average ability from similar backgrounds. In Italy, a sample of 300 high school pupils were given tests and open-ended questionnaires, although the follow-up only managed to trace 63 of them 8 years later (Boncori, 1996). There were three sub-samples, 'highly gifted' (the top 10% of the general population), 'less gifted' and 'average'. The 'highly gifted' not only had far greater academic success than the other two groups, but also right through university enjoyed better social integration, wider interests, less materialism – and more satisfaction.

High achieving learners and labelled 'gifted' children are sometimes susceptible to extra pressure from parents to be continually successful, possibly at the expense of more challenging intellectual, artistic and emotionally satisfying activities (Freeman, 1997). What is more, no individual can perform at a high level all the time, not least because these children's abilities may develop at different and extreme rates, which can bring difficulties of coordination (Terassier, 1985; Silverman, 1993). Additionally, the highly able may suffer from false stereotyping and its expectations – along a spectrum which varies from expecting them to be emotionally handicapped to perfect in every respect. Fear of failure and feelings of failure and of disappointing others' expectations are likely to develop, with possibly negative emotional consequences for life.

The particular pressures which the very able may experience, usually stem from others' reactions and expectations of them. For example, although the gifted may be expected to be too clever to enjoy normal relationships with ordinary people, in most findings, higher IQ youngsters have better all-round social relationships (e.g., van Leishout, 1995; Boncori, 1996). Other researchers have pointed to the tendency to perfectionism in the gifted (Stednitz, 1995; Robinson, 1996). But we cannot be sure about the causes, or whether this kind of obsessionality is found more among the gifted than other children. Certainly the gifted can suffer from adults who mistake the abilities for the child.

CONCLUSIONS

All babies are born with potential, but it is clear that only some develop this to its full, and fewer still to a recognisable level of excellence. What is it that makes the crucial difference in later behaviour between people who start out in life with much the same potential ability? That vital provision starts in the family. Parents have to be both willing and able to make the effort if their children are to take advantage of the opportunities that exist around them. But there is no single type of parent-child interaction which is critical to the development of high level abilities in children. The process is complex because parents and children each have their respective intellectual capacities as well as their own personalities, but genuine and regular interaction between parents and children is decidedly effective.

Good parenting for nurturing and enhancing children's gifts involves the following:

- Interaction between parent and children from birth, which is positive and supportive, providing a structure in which a child can grow with security.
- Meaningful stimulation, which provides opportunities for children's learning, including other people outside the family, especially as the child develops interests which may need specialist help.
- A variety of experiences, which can be followed up by the child if wished.
- Provision of both materials and tuition with which to reach advanced heights of learning and creative production. This includes good relations with the child's school.
- Gifted children need the emotional freedom and materials to play and experiment, both for their mental health and for creative thinking. Would-be artists need far more than a

few scraps of paper and a pencil stub, a mathematician needs a teacher, a linguist has to hear the language, and a budding violinist needs a violin.

- Teaching skills are needed by parents to develop general and specific areas of their children's potentials. This starts with the basic teaching of language, and through it the family culture.
- Sensitivity of parents to their children's potential talents from a very early age is different from attempting to mould them into the image that the adults may prefer. Knowing when to take action and when not to is a matter of sensitivity. Parents also have to be aware of their own feelings, notably to avoid labels and categories such as gender, in bringing up children who can demonstrate their gifts.
- Children need to be taught specific skills and be given the opportunities to practise them.
- Real emotional support is not quite the same as love: parenting in the name of love can be directive and so inhibit the growth of children's gifts where they are not acceptable. Pride and pleasure in children's accomplishments (or efforts), along with suggestions and encouragement to practice, provide excellent feedback for improving performance.

Like other children, the potentially gifted with emotional problems generally achieve less well than those of the same ability who enjoy peace of mind. The best results in human terms are found when children are treated with respect, allowing them enough responsibility to make many of their own discoveries and decisions. There are some, though, especially in the arts, who seem to have an inbuilt impetus - a spark which can light up the world, bringing them great inspiration and success.

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