

## A3 COGNITIVE DEVELOPMENT DEVELOPMENT OF MEASURED INTELLIGENCE

### Definition of intelligence

There are many different definitions of intelligence. There is general agreement that intelligence refers to how effectively we can do certain things:

- Acquire information
- Effectively think and reason
- Effectively deal with and adapt to our environment

Binet developed a test of **general mental ability** in the early 1900's, which he gave to many children. The tasks in the test gradually become more difficult, and Binet was able to gather the average age at which children would be able to complete each task in the test.

### IQ and intelligence tests

IQ stands for '**intelligence quotient**'. IQ tests enable us to calculate a child's **mental age**. For example, if a child passes tasks in the general mental ability test that average 8 year olds pass, but can't pass tasks that an average 9 year old can pass, then the child has a mental age of 8.

If we divide the mental age by the child's chronological age, then multiply it by 100, the child's IQ can be found. Therefore IQ can be plotted on a **normal distribution**, with the score of 100 being the mean average IQ.

In order for an IQ test to be effective, it has to demonstrate **reliability** and **validity**. If a test is reliable, it will **consistently** provide the same results. A problem with checking the reliability of IQ tests is that **practice effects** can occur. If you do a test once, the chances are that you will perform better on a similar test conducted at a later date because you will have 'learned' how to do it. If a test is valid, then it measures what it claims to measure. The way to check if an IQ test is valid, is to compare the results with an independent measure, such as school grades. This has already been done, and it shows that IQ tests are not always particularly valid ways of testing intelligence.

### What factors can affect performance on intelligence tests?

Factors affecting performance could be:

- Genetic – some believe intelligence is inherited, and is fixed from conception
- Environmental and culture – this might be life experiences such as educational background and peer groups affecting growth of intelligence
- Test factors – does the test reflect life experiences, is the child motivated to complete the test, etc.?
- Race – how do ethnic groups differ in intelligence?

### Genetic research - Twin studies/kinship studies

There is a long-standing debate over the role that genetic factors have to play in the development of intelligence, as opposed to environmental factors. This is known as the 'nature nurture' debate. There are supporting arguments and criticisms levelled at both these theories, and most people agree that the real issue is **how much** of a role each of these things have to play in a child's developing intellect.

One of the first studies into genetic factors was conducted by **Shields** in the 1960's. Using advertising, he was able to gather together, and study the IQ of 44 pairs of monozygotic twins. He claimed the twins, although identical genetically, were all reared apart. Shields found a high positive correlation in IQ test results between the twins, much the same as in twins who had been reared together. This would suggest there was strong evidence for the 'nature' argument. However, the study comes under fire for several reasons. It later emerged that the MZ twins had grown up in very **similar environments**, and actually spent a lot of time with each other. Many of them lived within close proximity to each other. Also,

Shields only gathered *correlational* data, which doesn't prove any *causative* relationship. That is, it doesn't show that genes affect IQ in any way.

In support of Shields, other later twin studies give much the same results as his did; high positive correlations between the IQ results of twins.

**Bouchard** and **McGue** analysed data from many kinship studies, which included twin studies. They wrote an article, which concluded that genetic factors do have a role to play in the development of intelligence, but that environmental factors also have a considerable effect. The current opinion is that around *half* of the factors which contribute to our intelligence are hereditary.

#### Genetic research - Adoption studies

Effective adoption studies give researchers the chance to compare IQ scores between adopted children, adoptive parents, and biological parents. If genetic factors were of the greatest influence, then you would expect children to have IQ scores which closely correlate to the scores of their biological parents. If environmental factors are of the greatest influence, the scores ought to match those of the adoptive parents more closely.

A study which investigated these factors was the **Texas Adoption Project**, which was conducted in the early 80's. The researcher used records of IQ test results from a large private adoption agency to gather correlational data. The IQ scores were taken from unmarried mothers of 469 children (who were later adopted), the children themselves, and their adoptive mothers. The results show a slightly higher correlation between the children and their biological mother than between their adoptive mothers, but this still leaves about 80% of the scores to be accounted for in terms of environmental influence.

A *transracial* adoption study conducted in the USA by **Scarr** investigated black children from lower class backgrounds, adopted by white middle/upper class parents. Scarr found that the average IQ of the black children brought up by the adoptive parents was 106, but genetically similar children who were not brought up in a middle class environment only had an IQ score of 90. This is convincing evidence towards the importance of environmental factors.

#### Environmental and cultural factors

***Members of the culture in which a child is brought up, such as parents, teachers, and friends, all directly influence development of intelligence in the child.***

***Home background, parental involvement, and enrichment programmes*** are all things that have been studied in relation to intelligence.

With regard to home background, the **Rochester Longitudinal study** observed children from birth to adolescence and found there were 10 factors which could be detrimental to the child's IQ. That is, the more factors present in the child's life, the lower the child's IQ would be. Some of these factors include the mother having a history of mental illness, the mother not going to high school, there being four or more children in the family, and the main earner in the family having a semi-skilled job. The data gathered here is only correlational, and a criticism of the study is that ***low parental IQ could account for some of the 10 factors***. For example, "the mother didn't go to high school" – this may be due to the fact that the mother herself has a low IQ, and therefore the child has inherited his IQ from her. This works against the researcher's original conclusion that environmental factors are of greater influence to intelligence! Research into home environment has shown that children who do well in IQ tests are usually from families who are:

- emotionally responsive and involved with the child,
- provide play materials and opportunities to explore and learn,
- who expect their child to learn and achieve.

HOME scoring stands for Home Observation for Measurement of the Environment. ***HOME scoring measures the quality of home life a child has.*** Yeates conducted a longitudinal study with children aged

2,3, and 4. Yeates measured the mothers and childrens IQ, and found that the best predictor of the child's IQ at 2 was the mother's IQ, because at this age genetic factors play the bigger role in intelligence development. By the age of 4, HOME scores were the biggest predictor of IQ, because by this age, home environment has become very important to intelligence.

The nature nurture debate takes on more momentum when considering how enrichment programmes affect intelligence. Enrichment programmes such as **Headstart** (in the USA) are designed to give children from disadvantaged backgrounds the best possible start, by giving them **intensive preschool education** along with **social support** and involvement of the children's families in their care and education. By the time the children who took part in Headstart started school, they had more advanced cognitive and social skills than the children who were not in the programme, and although these positive results seemed to tail off during the following few years, they re-emerged later in life. When the children were older, they had better language skills and felt more confident and in control of their lives, and were more likely to go into further education.

What about differences in social class? Research seems to consistently find that children from lower class backgrounds score lower in IQ tests than those from middle class homes. Why is this?

**A study into diet and intelligence was conducted Benton and Cook.** They used a **double blind** study to discover if giving 6 year olds a vitamin and mineral supplement would affect their IQ. After six weeks, the average IQ for the children taking the supplements increased by 7.6 points. It seems that **children from poor backgrounds are more likely to be undernourished**, so this could account, in part, for their lower IQ scores. However, diet and nutrition is very unlikely to be the only factor which contributes to IQ. Parents who have little money and who are too busy worrying about how to make ends meet, are unable to provide the **responsive** and **stimulating** environment that their child needs. **Scores on the HOME inventory are often lower in lower class families.** It has also been suggested that a vicious circle of deprivation can occur in these families – if parents are unintelligent, badly educated and unmotivated, they are likely to pass these problems and negative behaviours on to their children. Parents who are 'bright', and motivated themselves, are far more likely to encourage and motivate their children to learn more.

### Race factors

On average, African American children have an IQ score which is 15 points below their European American counterparts.

**Psychologists such as Jensen and Eysenck have suggested that genetic differences between black and white children account for differences in IQ.** These arguments are unfounded, and have caused much controversy and debate. Suggestions such as those made by Jensen and Eysenck have had some very adverse social effects. Extreme right wing groups such as the national front have used the information to justify their arguments that certain racial groups are inferior.

**Other Psychologists, such as Gould, suggest that a combination of environmental factors and test bias account for differences in IQ scores between black and white children.**

How can we be sure that Jensen and colleagues are incorrect in their assumptions? Firstly, there is no proof of genetic differences between people of different races, which count towards intelligence.

Ironically, the genetic variation **within** a racial group is greater than it is **between** groups.

If we look at Scarr's study (above) into black children adopted by white middle class families, we can clearly see that the environment in which the children were raised had a direct effect on their IQ, and that race had no part to play.

**Moore** closely studied black children who had been adopted by both white and black '**middle class**' families. She noted that the children who had been placed in the white homes had an IQ 13 points higher than those adopted by the black families. She monitored how all the families interacted with the children during a testing situation, and made the observation that there were important **social differences**, even though all the families were of the same class. The white parents were more **responsive** to the children

during difficult tasks, and they created an atmosphere that was *relaxed* and *enjoyable* for the child. The black parents were found to be *mildly critical*, and the children seemed more *tense* and *unhappy*.

### Test factors

What factors of an IQ test might cause some children to score less than others?

- **Culture bias.** IQ tests such as the Stanford-Binet are designed to test intelligence in Western cultures. They are culture specific. Some psychologists have attempted to put together culture fair tests, such as the Raven Progression Matrices Test. These tests don't involve any use of language or other culturally specific factors.
- **Oversimplification.** Using IQ as a single measure of intelligence is problematic. The results of IQ tests have been criticised as misleading because they only really test *academic* abilities (i.e. things the child learns at school), rather than *real life* abilities. For example, people who are dyslexic perform better on some types of tests than others. This shows that some forms of IQ testing don't take *individual differences* into account.
- **Familiarity.** Some children are familiar with IQ tests, and because of practice effects, will score better than others that haven't had a chance to practice.
- **Motivation.** The better a child is expected to do, the better he is likely to do. Rosenthal conducted a study where he demonstrated how children who were expected to do well by their teachers, showed large IQ gains over a year. This is known as the self-fulfilling prophecy. The teachers beliefs that the child would do well were realised because of those beliefs.