

Cognitive Reaction and Faster Learning of Science Students Intelligent Quotient

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Article History	Abstract
Original Research Article	<i>This study was conducted to test Science Students Intelligent Quotient (IQ). Thirty-four Science Students from different classes were tested using an IQ test. Their mental ages were calculated having known their chronological age. It was found out that as a child grows from age one so his IQ increases. Parents are therefore encouraged to assist their Science Students with the author's recommendation tips to boost their Science Students IQ also to make play a priority. Play is like a supper food. It supports development across all 7-abilities. As long as your child is engaged and having fun, that's all that matters.</i>
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INTRODUCTION

The concept of intelligence remains one of the most widely discussed yet complex subjects in psychology, largely because scholars have not reached a universally accepted definition of the term. Some researchers view intelligence as a single, general mental ability that influences overall cognitive performance, whereas others argue that it consists of multiple abilities, skills, and talents operating in different dimensions of human functioning (Kendra Cherry, 2019) <https://www.verywellmind.com>. Intelligence has therefore been described from diverse perspectives, including the capacity for logical reasoning, comprehension, self-awareness, learning, emotional understanding, planning, creativity, critical thinking, and problem-solving abilities (Wikipedia, 2019) <https://study.com>academy>stem>. Similarly, Robert Sternberg's triarchic theory of intelligence identifies three major forms of intelligence possessed by individuals: analytical intelligence, creative intelligence, and practical intelligence, each reflecting different ways people process information and adapt to their environments. <https://en.m.wikipedia.org>

Questions about Intelligence Cognitive Reaction

The history of intelligence is an important subject of study and knowledge of the scientific research that has been conducted and the conclusions that have emerged is vital in order to obtain a deeper understanding of intelligence and the tests that have been established in an attempt to measure this notion.

The History of IQ Cognitive Reaction

Although there has been scholarly interest in intelligence for several centuries, the scientific measurement of intelligence itself can be traced back to pioneering work by Alfred Binet. The first ever IQ test was developed by Binet who was asked to create a means of identifying students needing special educational assistance. The IQ test is flawed and has spawned many less-scientific imitations over the years, yet it remains one of the most widely used tools in the world for measuring and comparing intelligence across individuals.

History

During the early 1900s, the French government commissioned a test by Alfred Binet to find students who were at risk for failing in school. It was an initiative that

became pertinent following the advent of compulsory education laws in France forcing all children to attend school. As a result, the demands increased in finding an efficient way to identify students that warranted more educational assistance and targeted instruction.

With collaborator Theodore Simon, Binet created a test consisting of questions that emphasized cognitive skills that were not actually taught in school. There are a lot of variables, such as attention span, memory retention, reasoning ability and problem-solving capacity. Axiomatic testing⁵ : Binet and Simon isolated the kinds of questions that best predicted students' success in school; ⁶

Their findings also identified striking variations in cognitive development at identical chronological ages within children. Younger students were capable of answering some questions normally associated with older children, while conversely, even some of the older students had difficulty performing tasks that are appropriate for younger ages. We then present data and, based on it, Binet hereafter defines the mental age: a measure of intellectual functioning calculated by comparing an individual's level of ability with the average cognitive performance for children in a given age group (age category).

First IQ Test

The first testing, formally an assessment of intelligence later known as the Binet–Simon Scale evolved into what we currently consider one of many tests for modern psychological assessment related to intelligence. Binet did not believe intelligence was innate, static, or measureable as a permanent trait with one score from a psychometric test even though the test itself became widespread by this time.

That is, Binet stressed that intelligence is a complex and multidimensional thing which we cannot condense into one single number. He contended that intellectual ability is influenced by many environmental, social and educational factors, and can change over time. In addition, he argued that comparisons of intelligence were only meaningful between students from similar social and educational backgrounds because context was so important to the expansion of cognitive ability.

Stanford-Binet Intelligence Test

The Binet–Simon Scale was brought to the United States, it generated a great deal of interest among psychologists and educational researchers. The original test was then adapted and normed on a sample of the US population by Lewis Terman from Stanford University. The new edition, created in 1916, was recognized as the Stanford-Binet Intelligence Scale and rapidly became one of the most coveted techniques for assessing intelligence in the nation.

The Stanford–Binet test featured a single number called the Intelligence Quotient or IQ meant to be an indication of how well someone does at the particular thought tests that comprise the test. It became a standard way given to relate IQ score as a descriptor of comparing aptitude between individuals compared within close age bands.

The IQ score was calculated by dividing the test taker's mental age by his or her chronological age and then multiplying this number by 100.

For example a youngster with a mental age of 12 and a chronological age of 10 would have an IQ of 120 (12/10 times 100).

Since its debut, the Stanford-Binet has been revised numerous times and continues to be a prominent assessment instrument today.

Pros and Cons of IQ Cognitive Reaction

When World War I began, US Army officials needed to evaluate a massive number of military recruits quickly. In response, Robert Yerkes devised in 1917 (the Army Alpha and Army Beta tests), serving as chairman of the Committee on the Psychological Examination of Recruits. The Army Alpha test consisted of written tasks designed to be taken by recruits who were literate in English, whereas the Army Beta test mostly used pictorial and nonverbal tasks to assess recruits who could not read or did not speak English. Over two million soldiers were evaluated with these tools to help the military place candidates in positions and assign leadership responsibilities where they are best suited.

Afterward, some intelligence tests continued to be used in various civilian situations with people across ages, cultures and nations. One of the best known uses was screening immigrants coming into America at Ellis Island. But there was a tendency to generalize these test results across broad categories of population. As a result, this data was used by certain supporters of intelligence testing to argue for restrictive immigration legislation and demonstrate how early assessments of intelligence were manipulated to support social and political agendas.

Wechsler Intelligence Scales

Based on the work, American psychologist David Wechsler developed an alternative measure of human intelligence. Like Alfred Binet, Wechsler argued that intelligence is not a single unitary ability but amalgamation of many different cognitive and mental capacities. Wechsler, who was unimpressed with aspects of the Stanford-Binet test, released in 1955 the Wechsler Adult Intelligence Scale; this eventually became one of the most frequently used instruments for measuring intelligence.

Wechsler also developed two different tests specifically for use with Science Students: the Wechsler Intelligence Scale for Science Students (WISC) and the Wechsler Preschool and Primary Scale of Intelligence (WPPSI). The adult version of the test has been revised since its original publication and is now known as the WAIS-IV.

WAIS-IV

The WAIS contains 10 core subtests plus five supplemental ones to assess various aspects of intellectual functioning. Takeaway: The test generates scores in four main domains of intelligence: Verbal Comprehension, Perceptual Reasoning, Working Memory, and Processing Speed. The test also generates two general measures of cognitive functioning: the Full-Scale IQ, which summarizes performance across all four index areas and the General Ability Index, which is composed of six specific subtests. <https://www.verywellmind.com>

Published data from the WAIS-IV are especially useful in diagnosing learning disabilities and exact cognitive deficiencies. If someone shows very high performance in specific cognitive domains while having a much lower score on others then these profiles might indicate the presence of some type of processing or learning impairment. <https://www.apa.org>

While the original Stanford-Binet Intelligence Scale based scores on comparisons between chronological age and mental age, this tension was resolved in the WAIS-IV by using a norm referenced scoring system. Here an individual is compared with other individuals of the same age group. Normal scores for the test usually fall between 85 and 115; it has a standardized mean of 100. This standard score system is a common practice in most modern IQ tests and in the present-day versions of the Stanford-Binet test. <https://www.verywellmind.com>

LIMITATION OF Cognitive Reaction

Although IQ tests can help identify students who may need special educational resources or are gifted, they are not foolproof. A variety of factors may influence a child when taking a test, such as cultural background, language differences, motivation level during testing time, emotional condition, and the environment in which they are assessed. IQ scores change over time, influenced by development and the nature of standardized testing instruments according to the American Psychological Association (2019). As a result, the group recommends that IQ tests should be read by qualified and certified professionals who understand that these exams are only one piece of a child's larger intellectual and developmental puzzle.

Likewise, Alfred Binet downgraded the value of intelligence tests and insisted such one-dimensional factors

cannot adequately reflect intelligence which is complex and diverse. He argued that there are many influences on intellectual functioning, including language, education, and environmental conditions, all of which may vary with time. Binet also believed that it was only proper to compare students of similar social and cultural background with regard to intelligence, in other words he recognized the role context plays on cognitive performance.

Here's an age-by-age guide for identifying kids with high IQ:

1. Newborn: Having a bigger-than-average head!

Mums, if your kid was born with a fairly large head then celebrate! Research in the Journal of Molecular Psychiatry found the bigger the baby's head at birth, the more likely they are to have a high IQ.

Analysis of the research data also showed that "babies born with larger heads are significantly more likely to get a degree, as well as score higher on verbal-numerical reasoning tests."

Tips to boost your child's overall development at this age:

- a. Regular massage for fostering physical and motor skills.
- b. Responding to your baby's babbling and also speaking to your baby will help develop your baby's brain.
- c. Holding and cuddling your baby helps in making him or her feel emotionally secure and stable.

2. Kid with high IQ Age One and Two Years: Exposure to a number of languages:

Mums, do you speak other languages? If so, promote bilingualism in your toddler by communicating with them in more than one language. Research has shown that talking to your one or two year old in several languages boosts brain growth and could even get your Science Students in with the high IQ kids.

Science Students born to parents speaking more than one language performed better in IQ tests as studies reveal. In a related study, Peal and Lambert concluded that: "Intellectually [the bilingual child's] experience with two language systems seems to have left him with a mental flexibility, a superiority in concept formation, a more diversified set of mental abilities."

Tips to boost your child's overall development at this age:

- a. You can help improving your child's cognitive skills by encouraging imitation.
- b. Playing games like hide-and-seek, peek-a-boo will also foster cognitive skills at this age.

- c. Give your toddler choices: "Would you like apple juice or orange juice?" This gives your child autonomy, while you still maintain some control!

3. Age Three Years: Growing taller than the usual benchmark:

The findings from the study indicate that childhood height is associated with cognitive ability in later life. A recent National Bureau of Economic Research study found that, when compared with the general population, shorter children do worse on cognitive tests while they're younger than average. The researchers explain that this correlation is evident as early as the age of three, prior to formal schooling making a meaningful impact on intellectual development. Already predictable: The taller kids And the study found that children who were tallest at ages 4 and 5 also regularly had better cognitive skills throughout childhood. The researchers also went on to say that height in childhood is especially strongly predictive of adult height, with similarity between the two being around a correlation of 0.7 and just about the same for both male and female.

The research also believed that those with average heights were more likely to seek professions linked to higher pay and dependent on verbal, numerical and analytical skills. The pattern may relate to the heightened cognitive abilities we see at school age, which makes sense when taking into account potential lifetime associations between physical performance and intellectual as well as occupational outcomes.

Tips to boost your child's overall development at this age:

- a. Give your child ample playtime as their motor skills are developing. At this age, most kids are able to learn walking or running without tripping. You can also encourage the use of a bicycle or tricycle.
- b. Encourage your three-year-old to draw with crayons or turn the pages to encourage fine motor skill development.
- c. You can also start asking simpler questions like their name and age. Their linguistic skills will get stimulated by this activity.

4. Kids with High IQ, Age Four Years: Capacity to paint a person

Some researchers in early childhood and developmental psychology find that artistic skill may be related to intelligence later in life. In another study by King College London, four-year-old kids that are capable of making realistic drawings of human figures scored higher on intelligence tests. The children were placed into the "Draw-a-Child" test in which they had to draw a human body, and the human figure was analyzed based on physical features,

including whether eyes and noses are included. By examining around 15,000 four-year-old children's drawings, the researchers found that those who completed more detailed and representatively art tended to score higher in IQ tests. In addition, children who scored high on the drawing test were also found to be more intelligent at four years of age and later at fourteen. Although the Draw-a-Child test was first developed as a measure of children's intelligence in the 1920s, its association with IQ years later was among the most unexpected findings, according to Rosalind Arden, PhD, lead author.

Tips to boost your child's overall development at this age:

- a. Playing bounce ball with your child to help develop their motor skills
- b. You can also ask them to identify names of colours, animals and other objects to facilitate their cognitive development.
- c. Encourage them to draw as during this age they will begin to master the art of holding a pencil properly, which in turn will assist with writing.

5. Age Five Years: Ability to lie

Think developmental psychologists, who argue that a young child's ability to lie might demonstrate skill development rather than bad behaviour. Inventing a fictitious account is in itself an exercise that asks for creativity, knowledge about norms and incentives as well as information management: All of these are relatively advanced mental tasks for a child of the same age. A Canadian study in 1,200 children between 2-17 years found that children who lied at an early age were more likely to have a better cognitive and intelligence performance later on. Director of the Institute of Child Study Kang Lee said parents shouldn't rush to be alarmed when toddlers tell lies on occasion, as this behaviour can indicate a key developmental step. He also pointed out that the majority of children will lie at any point during their development, and those who are able to skilfully formulate falsehoods and keep their stories intact — usually due to advanced cognitive skills through greater mental processing and reasoning ability.

Tips to boost your child's overall development at this age:

- a. You can take your child to a park and encourage him or her to swing and climb. At this age, a child is looking forward to developing these physical skills.
- b. Allow your kids to co-narrate stories with you. They can complete the stories at this age. Letting them take the lead in storytelling from time to time will help in developing cognitive skills like memory and imagination. You can also allow your child to wear their clothes on their own. Around this time, kids learn to dress independently.

6. Kids with High IQ, Age Six Years: Playing a musical instrument

According to a study from the University of Vermont College of Medicine, Science Students who played a musical instrument were better at managing anxiety and better at emotional skills than those who did not.

They looked at brain scans of 232 healthy children with an average age of 12 years. At this age playing musical instruments aids in enhancing a child's emotional intelligence.

Tips to help your child's healthy development at this age:

- a. Allow your child to be more independent as this is an age when kids like to do things on their own.
- b. Encourage them to dance as around this age kids usually learn to move to music and beat.
- c. Apart from that, allow them time for lots of physical activity for their little bodies to develop.

7. Age Seven Years: Being voracious readers

Is your child reading anything and anything that they get hold of? Besides enhancing vocabulary, reading is also a sign of high IQ.

The University of Edinburgh and King's College, London, worked together on a study in 2014. They found that Science Students who read a lot of books at age seven were more intelligent in later life. They also scored quite well on IQ exams.

Tips to boost your child's overall development at this age: At this stage the personality of the child is forming hence it is needed to give positive feedback for building self-esteem. Patience and empathy are also vital when your youngster is irritated or anxious about a task. Give age-appropriate chores to promote responsibility.

8. Age Eight Years: Staying up until late

Mums, if you're struggling to get your eight-year-old to bed on time, they'll likely grow up to be youngsters with high IQ. Research from the London School of Economics suggests that bright adults are more inclined to stay up late and guess what? They picked up the habit in their youth.

Researchers observed: "More intelligent Science Students are more likely to grow up to be nocturnal adults who go to bed late and wake up late on both weekdays and weekends."

Tips to boost your child's overall development at this age:

- a. At this age, your child may feel a strong need to belong. So this can be a good age to talk about peer pressure. Parents must also recognize a child's need for privacy at this age.
- b. Teach your child about managing basic finances by giving them an appropriate amount of pocket money.

9. Age Nine Years: Eating a healthy breakfast:

High IQ science students like to have a healthy breakfast. Research by the University of Cardiff, including 5,000 science students aged between 9 and 11, indicated those who ate a balanced breakfast scored better in their tests.

Tips to boost your child's overall development at this age:

- a. Kids in this age are also curious about relationships between boys and girls. So you can talk to them more openly about what they think. You may allow kids of this age to make their own decisions. Around this time, Science Students would appreciate that type of freedom from parents. Encourage them to be organized in their day-to-day life as well as make plans, by keeping a journal or a daily planner.

10. Kids with High IQ, Age Ten Years: Ability to engage in a good chat

Some of the important symptoms of intelligence at the age of ten years can include a like for speaking, inventing alternative rules for board games and being bored with other Science Students.

Tips to boost your child's overall development at this age:

- a. You can encourage your kids to join group activities or spend time with friends to improve their social skills. You can also allow them to do complex tasks on their own like asking them to help in household activities. Continue to foster your child's love of reading by getting them a library membership. In sum, Science Students with high IQ display a wide range of characteristics like good memory and observation skills. They also have good concentration. Even at a young age, they may show exceptional ability in one area of growth and development, however not in others. They may have some special interests that they explore deeply.
- b. Their thought process can be abstract even at a young age. They have a variety of ideas that they produce in their mind and understand well. Their inquiring minds are always on the lookout to uncover new streams of knowledge or learn new skills. They not only understand concepts quickly but also show that they have understood them by explaining in easy language or with examples.

Statement of the problem

The researcher observed that most parents are ignorant of the IQ scale and its measurement. Also most classroom teachers do not know either how to calculate a child IQ. The study therefore is an eye opener to parents and teacher to know the exact way to calculate and to improve Science Students IQ under their cares.

Objectives of the Study

This study sought to calculate the Intelligent Quotient (IQ) of Science Students and to help stake holders to achieve the following:

1. To be aware the need to calculate a child IQ.
2. To know the right approach to carry out the task of calculating IQ.
3. To suggest ways to improve a child IQ.

METHODS

34 pupils of ages ranging from 3 to 5 years were selected for this study. The instrument for generating score was Science Students IQ question for age between 3 and 6. The question

was applied to the Science Students and their scores were obtained for analysis using IQ formula. Given below

To calculate Science Students IQ, IQ formula was used which is:

$$IQ = (\text{Mental Age}/\text{Chronological Age}) \times 100$$

IS = Intelligent Score

Mental Age (MA) = Age due to mental ability

Chronological Age (CA) = Biological Age

$$\text{Mental Age} = (IS \times A)/100$$

analysis

Thirty-four (34) Science Students were used for this study and there Intelligence Score, Mental Age, Chronological Age And Intelligence Quotient Are Given in Table 1, Below:

Table 1: showing intelligence score, chronological Age, mental Age and Intelligent Quotient

S/NO.	INTELLIGENCE SCORE, IS (%)	CHRONOLOGICAL AGE IN YEARS	MENTAL AGE = (IS x CA)/100	INTELLIGENT QUOTIENT IQ = (MA/CA) X 100
1	100	5	5	100
2	100	4	4	100
3	93	4	3.72	93
4	93	5	4.65	93
5	87	3	2.61	87
6	80	4	3.2	80
7	100	4	4	100
8	100	4	4	100
9	100	4	4	100
10	87	5	4.35	87
11	93	4	3.72	93
12	93	4	3.72	93
13	100	4	4	100
14	100	4	4	100
15	100	4	4	100
16	100	5	5	100
17	100	5	5	100
18	100	5	5	100
19	100	5	5	100
20	100	5	5	100
21	100	5	5	100
22	100	5	5	100
23	100	5	5	100
24	100	5	5	100
25	100	5	5	100
26	100	5	5	100
27	100	5	5	100
28	100	5	5	100
29	100	5	5	100
30	100	5	5	100
31	100	5	5	100
32	100	5	5	100
33	100	5	5	100
34	100	5	5	100

DISCUSSION

Table 1 shows intelligence as typically developing in circle relative to age and development from early childhood. The data suggest that while most three- and four-year-olds scored below 100 IQ points, a majority of five-year olds scored closer to the 100 marks. In the field of intelligence assessment, when a child has a mental age of precisely the same as his or her chronological age then they would possess an Intelligence Quotient (IQ) which is standardized at 100. IQ scores in childhood and adolescence might also change widely, it is further inferred to mean, because cognitive growth still takes place across this period (it is much continued through the early twenties usually). While the components of fluid intelligence normally beginning declining slowly after a person has reached his or her twenties (or thirties), standardized IQ scores are normalized for age so that the average IQ is kept at 100 regardless of the age group when measured. Therefore, although unadjusted raw cognitive performance declines as we age, the average standardised IQ score remains relatively stable because of statistical adjustments (Wikipedia, 2019). <https://en.m.wikipedia.org>

CLASSIFICATION OF IQ

Table 2: IQ Classification

IQ Range	Classification	Remark
120 – 129	very high	very bright
110 – 119	high average	bright
90 – 109	average	normal or average
80 – 89	low average	backward
70 – 79	feeble mind	borderline
50 – 74		moron
25 – 49		imbecile
0 – 24		idiot

TIPS TO BOOST Science Students IQ

1. Talk to your child about anything and everything all the times. This will build her language skills. Science Students raised in high-language households have IQs scores that are 38-points higher than kids brought up in low language homes.
2. Read concept books. Science Students tested for kindergarten are expected to know colours, shapes, seasons, fruit, farm animals – all the basic information kids are exposed to through picture books, pre-school, and life itself. If your child knows everything covered in these books, she will be ready.
3. Challenge your child memory. After you read your child a book, ask him to tell you the story back in his own words. Make patterns using fruit loops or coloured pads, cover them up, and see if he can

recreate them. These activities will build your child's verbal and visual memory.

4. Build maths concepts into your conversations. Dinner will be ready in five minutes. Do you want a whole cookie or a half cookie? Look how cute toes are. Let's count them. You have three M&Ms. I will give you two more. Now you'll have five. You can even bring up math when reading picture books. Look at that funny octopus. How many legs does he have?
5. Give your child blocks, puzzles, etc to play with. These will strengthen his spatial skills. You can also look spatial challenges in Highlights magazine, which always features hidden pictures inside other pictures, or read a where is waldo book and let your child find waldo.
6. Let your child solve problems. When the ball rolls behind the console, ask him to come up with ways to retrieve it. When he can't get dressed in time for school, let him think of ideas to get ready faster. Give him a voice in making simple choices so he will become a decision-maker. Science Students who are allowed to think for themselves at home develop strong cognitive skills.
7. Keep craft supplies handy and let your child create on rainy days. Coloured paper, crayons, scissors, glue, glitter, paint, markers, brushes, q-tips, play-Doh – working with these materials strengthens fine-motor skill, which are simply your child's ability to control her hands and fingers.
8. Make play a priority. Play is like a super food. It supports development across all 7-abilities. As long as your child is engaged and having fun, that's all that matters (<https://www.google.com/tipsonlifeandlove.com>)

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