IQ classification

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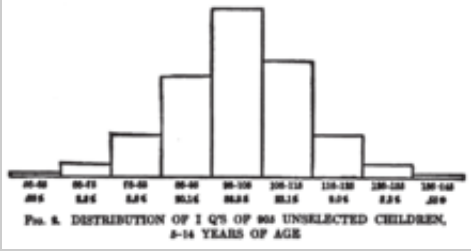
IQ classification is the practice by IQ test publishers of labeling IQ score ranges with category names such as "superior" or "average."[1][2][3] There are several publishers of IQ tests. No two publishers use exactly the same classification labels. IQ classification labels have changed from time to time since the beginning of IQ testing a century ago.

IQ scores have been derived by two different methods since the invention of IQ tests. The first method historically was the "quotient IQ," based on estimating a "mental age" of the test-taker (rounded to a specified number of years and months), which was then divided by the test-taker's "chronological age" (rounded to a specified number of years and months). For example, a mental age score of thirteen years and zero months for a test-taker with the chronological age ten years and zero months results in a quotient of 1.3 after doing the division. The division result was then multiplied by 100 so that scores could be reported without decimal points. Thus the score in the example would be reported as IQ 130. The current scoring method for all IQ tests is the "deviation IQ." In this method, an IQ score of 100 means that the test-taker's performance on the test is at the median level of performance in the sample of test-takers of about the same age used to norm the test. An IQ score of 115 means performance one standard deviation above the median, a score of 85 performance one standard deviation below the median, and so on.[4] Lewis Terman and other early developers of IQ tests noticed that most child IQ scores come out to approximately the same number by either procedure. Deviation IQs are now used for standard scoring of all IQ tests in large part because they allow a consistent definition of IQ for both children and adults. By the current "deviation IQ" definition of IQ test standard scores, about two-thirds of all test-takers obtain scores from 85 to 115, and about 5 percent of the population scores above 125.[5]



Score Distribution Chart for Sample of 905 Children Tested on 1916 Stanford-Binet Test

Historically, even before IQ tests were invented, there were attempts to classify people into intelligence categories by observing their behavior in daily life.[6][7] Those other forms of behavioral observation are still important for validating classifications based on IQ tests. Both intelligence classification by observation of behavior outside the testing room and classification by IQ testing depend on the definition of "intelligence" used in a particular case and on the reliability (http://en.wikipedia.org/wiki/Reliability_(psychometrics)) and error of estimation in the classification procedure.

All IQ tests show variation in scores even when the same person takes the same test over and over again.[8][9] IQ scores also differ for a test-taker taking tests from more than one publisher at the same age.[10] The various test publishers do not use uniform names or definitions for IQ score classifications. All these issues must be kept in mind when interpreting an individual's IQ scores, because they all can result in different IQ classifications for the same person at different times.

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Variance in individual IQ classification

IQ tests generally are reliable enough that most people ages ten and older have similar IQ scores throughout life.[12] Still, some individuals score very differently when taking the same test at different times or when taking more than one kind of IQ test at the same age.[13] For example, many children in the famous longitudinal Genetic Studies of Genius begun in 1921 by Lewis Terman showed declines in IQ as they grew up. Terman recruited school pupils based on referrals from teachers, and gave them his Stanford-Binet IQ test. Children with an IQ above 140 by that test were included in the study. There were 643 children in the main study group. When the students who could be contacted again (503 students) were retested at high school age, they were found to have dropped 9 IQ points on average in Stanford-Binet IQ. More than two dozen children dropped by 15 IQ points and six by 25 points or more. Yet parents of those children thought that the children were still as bright as ever, or even brighter.[14]

Because all IQ tests have error of measurement in the test-taker's IQ score, a test-giver should always inform the test-taker of the confidence interval around the score obtained on a given occasion of taking each test. IQ scores are ordinal scores and are not expressed in an interval measurement unit.[15][16][17][18] Besides the inherent error band around any IQ test score because tests are a "sample of learned behavior," IQ scores can also be misleading because test-givers fail to follow standardized administration and scoring procedures. In cases of test-giver mistakes, the usual result is that tests are scored too leniently, while some test-givers err by showing a "halo effect," with low-IQ individuals receiving IQ scores even lower than if standardized procedures were followed, while high-IQ individuals receive inflated IQ scores.[19]

IQ classifications for individuals also vary because category labels for IQ score ranges are specific to each brand of test. The test publishers do not have a uniform practice of labeling IQ score ranges, nor do they have a consistent practice of dividing up IQ score ranges into categories of the same size or with the same boundary scores.[20] Thus psychologists should specify which test was given when reporting a test-taker's IQ.[21] Psychologists and IQ test authors recommend that psychologists adopt the terminology of each test publisher when reporting IQ score ranges.[22][23]

IQ classifications from IQ testing are not the last word on how a test-taker will do in life, nor are they the only information to be considered for placement in school or job-training programs. There is still a dearth of information about how behavior differs between persons with differing IQ scores.[24] For placement in school programs, for medical diagnosis, and for career advising, factors other than IQ must also be part of an individual assessment.

> The lesson here is that classification systems are necessarily arbitrary and change at the whim of test authors, government bodies, or professional organizations. They are statistical concepts and do not correspond in any real sense to the specific capabilities of any particular person with a given IQ. The classification systems provide descriptive labels that may be useful for communication purposes in a case report or conference, and nothing more.[25]
>
> —Alan S. Kaufman and Elizabeth O. Lichtengerger, Assessing Adolescent and Adult Intelligence (2006)

IQ classification tables for current tests

There are a variety of individually administered IQ tests in use in the English-speaking world.[26][27] Not all report test results as "IQ," but most now report a standard score with a median score level of 100. When a test-taker scores higher or lower than the median score, the score is indicated as 15 standard score points higher or lower for each standard deviation difference higher or lower in the test-taker's performance on the test item content.

Wechsler Intelligence Scales

Main article: Wechsler Adult Intelligence Scale

See also: Wechsler Intelligence Scale for Children

See also: Wechsler Preschool and Primary Scale of Intelligence

The Wechsler intelligence scales were originally developed from earlier intelligence scales by David Wechsler. The first Wechsler test published was the Wechsler-Bellevue Scale in 1939.[28] The Wechsler IQ tests for children and for adults are the most frequently used individual IQ tests in the English-speaking world[29] and in their translated versions are perhaps the most widely used IQ tests worldwide.[30] The Wechsler tests have long been regarded as the "gold standard" in IQ testing.[31] The Wechsler Adult Intelligence Scale—Fourth Edition (WAIS–IV) was published in 2008 by Psychological Corporation.[26] The Wechsler Intelligence Scale for Children—Fourth Edition (WISC–IV) was published in 2003 by Psychological Corporation, and the Wechsler Preschool and Primary Scale of Intelligence—Fourth Edition (WPPSI–IV) was published in 2012 by Psychological Corporation. Like all current IQ tests, the Wechsler tests report a "deviation IQ" as the standard score for the full-scale IQ, with the norming sample median raw score defined as IQ 100 and a score one standard deviation higher defined as IQ 115 (and one deviation lower defined as IQ 85).

Current Wechsler (WAIS–IV, WISC–IV, WPPSI–IV) IQ classification

IQ Range ("deviation IQ")	IQ Classification
130 and above	Very Superior
120–129	Superior
110–119	High Average
90–109	Average
80–89	Low Average
70–79	Borderline
69 and below	Extremely Low

Psychologists have proposed alternative language for Wechsler IQ classifications.[32][33] Note especially that the term "borderline," which implies being very close to being intellectually disabled, is replaced in the alternative system by a term that doesn't imply a medical diagnosis.

Alternate Wechsler IQ Classifications (after Groth-Marnat 2009)[34]

Corresponding IQ Range	Classifications	More value-neutral terms
130+	Very superior	Upper extreme
120–129	Superior	Well above average
110–119	High average	High average
90–109	Average	Average
80–89	Low average	Low average
70–79	Borderline	Well below average
69 and below	Extremely low	Lower extreme

Stanford-Binet Intelligence Scale Fifth Edition

Main article: Stanford-Binet Intelligence Scales

The current fifth edition of the Stanford-Binet scales (SB5) was developed by Gale H. Roid and published in 2003 by Riverside Publishing.[26] Unlike scoring on previous versions of the Stanford-Binet test, SB5 IQ scoring is deviation scoring in which each standard deviation up or down from the norming sample median score is 15 points from the median score, IQ 100, just like the standard scoring on the Wechsler tests.

Stanford-Binet Fifth Edition (SB5) classification[35]

IQ Range ("deviation IQ")	IQ Classification
145–160	Very gifted or highly advanced
130–144	Gifted or very advanced
120–129	Superior
110–119	High average
90–109	Average
80–89	Low average
70–79	Borderline impaired or delayed
55–69	Mildly impaired or delayed
40–54	Moderately impaired or delayed

Woodcock-Johnson Test of Cognitive Abilities

Main article: Woodcock–Johnson Tests of Cognitive Abilities

The Woodcock-Johnson III NU Tests of Cognitive Abilities (WJ III NU) was developed by Richard W. Woodcock, Kevin S. McGrew and Nancy Mather and published in 2007 by Riverside.[26] Note that the WJ III classification terms are not applied to the same score ranges as for the Wechsler or Stanford-Binet tests.

Woodcock-Johnson R

IQ Score	WJ III Classification[36]
131 and above	Very superior
121 to 130	Superior
111 to 120	High Average
90 to 110	Average
80 to 89	Low Average
70 to 79	Low
69 and below	Very Low

Kaufman Tests

The Kaufman Adolescent and Adult Intelligence Test was developed by Alan S. Kaufman and Nadeen L. Kaufman and published in 1993 by American Guidance Service.[26] Kaufman test scores "are classified in a symmetrical, nonevaluative fashion,"[37] in other words the score ranges for classification are just as wide above the median as below the median, and the classification labels do not purport to assess individuals.

KAIT 1993 IQ classification

130 and above	Upper Extreme
120–129	Well Above Average
110–119	Above average
90–109	Average
80–89	Below Average
70–79	Well Below Average
69 and below	Lower Extreme

Main article: Kaufman Assessment Battery for Children

The Kaufman Assessment Battery for Children, Second Edition was developed by Alan S. Kaufman and Nadeen L. Kaufman and published in 2004 by American Guidance Service.[26]

KABC-II 2004 Descriptive Categories[38][39]

Range of Standard Scores	Name of Category
131–160	Upper Extreme
116–130	Above Average
85–115	Average Range
70–84	Below Average
40–69	Lower Extreme

Cognitive Assessment System

Main article: Cognitive Assessment System

The Das-Naglieri Cognitive Assessment System test was developed by Jack Naglieri and J. P. Das and published in 1997 by Riverside.[26]

Cognitive Assessment System 1997 full scale score classification[40]

Standard Scores	Classification
130 and above	Very Superior
120–129	Superior
110–119	High Average
90–109	Average
80–89	Low Average
70–79	Below Average
69 and below	Well Below Average

Differential Ability Scales

Main article: Differential Ability Scales

The Differential Ability Scales Second Edition (DAS–II) was developed by Colin D. Elliott and published in 2007 by Psychological Corporation.[26] The DAS-II is a test battery given individually to children, normed for children from ages two years and six months through seventeen years and eleven months.[41] It was normed on 3,480 noninstitutionalized, English-speaking children in that age range.[42] The DAS-II yields a General Conceptual Ability (GCA) score scaled like an IQ score with the median standard score set at 100 and 15 standard score points for each standard deviation up or down from the median. The lowest possible GCA on the is DAS–II is 44, and the highest is 175.[43]

DAS-II 2007 GCA classification[44]

GCA	General Conceptual Ability Classification
≥ 130	Very high
120–129	High
110–119	Above average
90–109	Average
80–89	Below average
70–79	Low
≤ 69	Very low

Reynolds Intellectual Ability Scales

Reynolds Intellectual Ability Scales (RIAS) were developed by Cecil Reynolds and Randy Kamphaus. The RIAS was published in 2003 by Psychological Assessment Resources.[26]

RIAS 2003 Scheme of Verbal Descriptors of Intelligence Test Performance[45]

Intelligence test score range	Verbal descriptor
≥ 130	Significantly above average
120–129	Moderately above average
110–119	Above average
90–109	Average
80–89	Below average
70–79	Moderately below average
≤ 69	Significantly below average

Historical IQ classification tables

Lewis Terman, developer of the Stanford-Binet Intelligence Scales, based his English-language Stanford-Binet IQ test on the French-language Binet-Simon test developed by Alfred Binet. Terman believed his test measured the "general intelligence" construct advocated by Charles Spearman (1904).[46] Terman differed

from Binet in reporting scores on his test in the form of intelligence quotient ("mental age" divided by chronological age) scores after the 1912 suggestion of German psychologist William Stern. Terman chose the category names for score levels on the Stanford-Binet test. When he first chose classification for score levels, he relied partly on the usage of earlier authors who wrote, before the existence of IQ tests, on topics such as individuals unable to care for themselves in independent adult life. Terman's first version of the Stanford-Binet was based on norming samples that included only white, American-born subjects, mostly from California, Nevada, and Oregon.[47]

Terman's Stanford-Binet original (1916) classification[48][49]

IQ Range ("ratio IQ")	IQ Classification
Above 140	"Near" genius or genius
120–140	Very superior intelligence
110–120	Superior intelligence
90–110	Normal, or average, intelligence
80–90	Dullness, rarely classifiable as feeble-mindedness
80–90	Border-line deficiency, sometimes classifiable as dullness, often as feeble-mindedness
Below 70	Definite feeble-mindedness

Rudolph Pintner proposed a set of classification terms in his 1923 book *Intelligence Testing: Methods and Results*.[3] Pintner commented that psychologists of his era, including Terman, went about "the measurement of an individual's general ability without waiting for an adequate psychological definition."[50] Pintner retained these terms in the 1931 second edition of his book.[51]

Pintner 1923 IQ classification[3]

IQ Range ("ratio IQ")	IQ Classification
130 and above	Very Superior
120–129	Very Bright
110–119	Bright
90–109	Normal
80–89	Backward
70–79	Borderline

Albert Julius Levine and Louis Marks proposed a broader set of categories in their 1928 book *Testing Intelligence and Achievement*.[52] Some of the terminology in the table came from contemporary terms for classifying individuals with intellectual disabilities.

Levine and Marks 1928 IQ classification[52]

IQ Range ("ratio IQ")	IQ Classification
175 of above	Precocious
150–174	Very superior
125–149	Superior
115–124	Very bright
105–114	Bright
95–104	Average
85–94	Dull
75–84	Borderline
50–74	Morons
25–49	Imbeciles
0–24	Idiots

The second revision (1937) of the Stanford-Binet test retained "quotient IQ" scoring, despite earlier criticism of that method of reporting IQ test standard scores.[53] The term "genius" was no longer used for any IQ score range.[54] The second revision was normed only on children and adolescents (no adults), and only "American-born white children."[55]

Terman's Stanford-Binet Second Revision (1937) classification[54]

IQ Range ("ratio IQ")	IQ Classification
140 and over	Very superior
120–139	Superior
110–119	High average
90–109	Normal or average
80–89	Low average
70–79	Borderline defective
Below 60	Mentally defective

A data table published later as part of the manual for the 1960 Third Revision (Form L-M) of the Stanford-Binet test reported score distributions from the 1937 second revision standardization group.

Score Distribution of Stanford-Binet 1937 Standardization Group[54]

IQ Range ("ratio IQ")	Percent of Group
160–169	0.03
150–159	0.2
140–149	1.1
130–139	3.1
120–129	8.2
110–119	18.1
100–109	23.5
90–99	23.0
80–89	14.5
70–79	5.6
60–69	2.0
50–59	0.4
40–49	0.2
30–39	0.03

David Wechsler, developer of the Wechsler-Bellevue Scale of 1939 (which was later developed into the Wechsler Adult Intelligence Scale) popularized the use of "deviation IQs" as standard scores of IQ tests rather than the "quotient IQs" ("mental age" divided by "chronological age") then used for the Stanford-Binet test.[56] He devoted a whole chapter in his book *The Measurement of Adult Intelligence* to the topic of IQ classification and proposed different category names from those used by Lewis Terman. Wechsler also criticized the practice of earlier authors who published IQ classification tables without specifying which IQ test was used to obtain the scores reported in the tables.[57]

Wechsler-Bellevue 1939 IQ classification

IQ Range ("deviation IQ")	IQ Classification	Percent Included
128 and over	Very Superior	2.2
120–127	Superior	6.7
111–119	Bright Normal	16.1
91–110	Average	50.0
80–90	Dull normal	16.1
66–89	Borderline	6.7
65 and below	Defective	2.2

In 1958, Wechsler published another edition of his book *Measurement and Appraisal of Adult Intelligence*. He revised his chapter on the topic of IQ classification and commented that "mental age" scores were not a more valid way to score intelligence tests than IQ scores.[58] He continued to use the same classification terms.

Wechsler Adult Intelligence Scales 1958 Classification[59]

IQ Range ("deviation IQ")	IQ Classification	Percent Included
128 and over	Very Superior	2.2
120–127	Superior	6.7
111–119	Bright Normal	16.1
91–110	Average	50.0
80–90	Dull normal	16.1
66–89	Borderline	6.7
65 and below	Defective	2.2

The third revision (Form L-M) in 1960 of the Stanford-Binet IQ test used the deviation scoring pioneered by David Wechsler. For rough comparability of scores between the second and third revision of the Stanford-Binet test, scoring table author Samuel Pinneau set 100 for the median standard score level and 16 standard score points for each standard deviation above or below that level. The highest score obtainable by direct look-up from the standard scoring tables (based on norms from the 1930s) was IQ 171 at various chronological ages from three years six months (with a test raw score "mental age" of six years and two months) up to age six years and three months (with a test raw score "mental age" of ten years and three months).[60] The classification for Stanford-Binet L-M scores does not include terms such as “exceptionally gifted” and “profoundly gifted” in the test manual itself.

Terman's Stanford-Binet Third Revision (Form L-M) classification[35]

IQ Range ("deviation IQ")	IQ Classification
140 and over	Very superior
120–139	Superior
110–119	High average
90–109	Normal or average
80–89	Low average
70–79	Borderline defective
Below 60	Mentally defective

The first edition of the Woodcock-Johnson Tests of Cognitive Abilities was published by Riverside in 1977. The classifications used by the WJ-R Cog were "modern in that they describe levels of performance as opposed to offering a diagnosis."[36]

Woodcock-Johnson R

IQ Score	WJ-R Cog 1977 Classification[36]
131 and above	Very superior
121 to 130	Superior
111 to 120	High Average
90 to 110	Average
80 to 89	Low Average
70 to 79	Low
69 and below	Very Low

The fourth revision of the Stanford-Binet scales (S-B IV) was developed by Thorndike, Hagen, and Sattler and published by Riverside Publishing in 1986. It retained the deviation scoring of the third revision with each standard deviation from the median being defined as a 16 IQ point difference. The S-B IV adopted new classification terminology. After this test was published, psychologist Nathan Brody lamented that IQ tests had still not caught up with advances in research on human intelligence during the twentieth century.[61]

Stanford-Binet Intelligence Scale, Fourth Edition (S-B IV) 1986 classification[62][63]

IQ Range ("deviation IQ")	IQ Classification
132 and above	Very superior
121–131	Superior
111–120	High average
89–110	Average
79–88	Low average
68–78	Slow learner
67 or below	Mentally retarded

The third edition of the Wechsler Adult Intelligence Scale (WAIS-III) used different classification terminology from the earliest versions of Wechsler tests.

Wechsler (WAIS–III) 1997 IQ test classification

IQ Range ("deviation IQ")	IQ Classification
130 and above	Very superior
120–129	Superior
110–119	High average
90–109	Average
80–89	Low average
70–79	Borderline
69 and below	Extremely low

Classification of low-IQ individuals

Main article: Intellectual disability

See also: Mental retardation

See also: Borderline intellectual functioning

Mental retardation	
Classification and external resources	
ICD-10	F70 (http://apps.who.int/classifications/icd10/browse/2010/en#/F70)-F79 (http://apps.who.int/classifications/icd10/browse/2010/en#/F79)
ICD-9	317 (http://www.icd9data.com/getICD9Code.ashx?icd9=317)-319 (http://www.icd9data.com/getICD9Code.ashx?icd9=319)
DiseasesDB	4509 (http://www.diseasesdatabase.com/ddb4509.htm)
MedlinePlus	001523 (http://www.nlm.nih.gov/medlineplus/ency/article/001523.htm)
eMedicine	med/3095 (http://www.emedicine.com/med/topic3095.htm) neuro/605 (http://www.emedicine.com/neuro/topic605.htm#)
MeSH	D008607 (http://www.nlm.nih.gov/cgi/mesh/2013/MB_cgi?field=uid&term=D008607)

The earliest terms for classifying individuals of low intelligence were medical or legal terms that preceded the development of IQ testing.[6][7] The legal system recognized a concept of some individuals being so cognitively impaired that they were not responsible for criminal behavior. Medical doctors sometimes encountered adult patients who could not live independently, being unable to take care of their own daily living needs. Various terms were used to attempt to classify individuals with varying degrees of intellectual disability. Many of the earliest terms are now considered very offensive.

In current medical diagnosis, IQ scores alone are not conclusive for a finding of intellectual disability. Recently adopted diagnostic standards place the major emphasis on adaptive behavior of each individual, with IQ score just being one factor in diagnosis in addition to adaptive behavior scales, and no category of intellectual disability being defined primarily by IQ scores.[64] Psychologists point out that evidence from IQ testing should always be used with other assessment evidence in mind: "*In the end, any and all interpretations of test performance gain diagnostic meaning when they are corroborated by other data sources and when they are empirically or logically related to the area or areas of difficulty specified in the referral.*"[65]

In the United States, a holding by the Supreme Court in the case *Atkins v. Virginia,* 536 U.S. 304 (2002) bars states from imposing capital punishment on persons with mental retardation, defined in subsequent cases as persons with IQ scores below 70. This legal standard continues to be actively litigated in capital cases.[66]

Classification of high-IQ individuals

IQ classification and genius

Main article: Genius

Francis Galton (1822–1911) was a pioneer in investigating both eminent human achievement and mental testing. In his book *Hereditary Genius,* writing before the development of IQ testing, he proposed that hereditary influences on eminent achievement are strong, and that eminence is rare in the general population. Lewis Terman chose "'near' genius or genius" as the classification label for the highest classification on his 1916 version of the Stanford-Binet test.[48] By 1926, Terman began publishing about a longitudinal study of California schoolchildren who were referred for IQ testing by their schoolteachers, called Genetic Studies of Genius, which he conducted for the rest of his life. Catherine M. Cox, a colleague of Terman's, wrote a whole book, *The Early Mental Traits of 300 Geniuses,* published as volume 2 of The Genetic Studies of Genius book series, in which she analyzed biographical data about historic geniuses. Although her estimates of childhood IQ scores of historical figures who never took IQ tests have been criticized on methodological grounds,[67][68][69] Cox's study was thorough in finding out what else matters besides IQ in becoming a genius.[70] By the 1937 second revision of the Stanford-Binet test, Terman no longer used the term "genius" as an IQ classification, nor has any subsequent IQ test.[54][71] In 1939, Wechsler specifically commented that "we are rather hesitant about calling a person a genius on the basis of a single intelligence test score."[72]

The Terman longitudinal study in California eventually provided historical evidence on how genius is related to IQ scores.[73] Many California pupils were recommended for the study by schoolteachers. Two pupils who were tested but rejected for inclusion in the study because of IQ scores too low for the study grew up to be Nobel Prize winners in physics, William Shockley,[74][75] and Luis Walter Alvarez.[76][77] Based on the historical findings of the Terman study and on biographical examples such as Richard Feynman, who had an IQ of 125 and went on to win the Nobel Prize in physics and become widely known as a genius,[78][79] the current view of psychologists and other scholars of genius is that a minimum level of IQ, no higher than about IQ 125, is strictly necessary for genius, but that level of IQ is also sufficient for development of genius only when combined with the other influences on individual development of genius identified by Cox's biographical study, namely opportunity for talent development and personality characteristics of drive and persistence.[80][81][82]

IQ classification and giftedness

Main article: Intellectual giftedness

A major point of consensus among all scholars of intellectual giftedness is that there is no generally agreed definition of giftedness.[83] Although there is no scholarly agreement about identifying gifted learners, there is a de-facto reliance on IQ scores for identifying participants in school gifted education programs. In practice, many school districts in the United States use an IQ score of 130, including about the upper 2 or 3 percent of the national population, as a cut-off score for inclusion in school gifted programs.[84]

As long ago as 1937, Lewis Terman pointed out that error of estimation in IQ scoring increases as IQ score increases, so that there is less and less certainty about assigning a test-taker to one band of scores or another as one looks at higher bands.[85] Current IQ tests also have large error bands for high IQ scores.[86] As an underlying reality, such distinctions as those between “exceptionally gifted” and “profoundly gifted” have never been well established. All longitudinal studies of IQ have shown that test-takers can bounce up and down in score, and thus switch up and down in rank order as compared to one another, over the course of childhood. Some test-givers claim that IQ classification categories such as "profoundly gifted" are meaningful, but those are based on the obsolete Stanford-Binet Third Revision (Form L-M) test.[87] Moreover there has never, ever been any validation of the Stanford-Binet L-M on adult populations, and there is no trace of such

terminology in the writings of Lewis Terman. Although two current tests attempt to provide "extended norms" that allow for classification of different levels of giftedness, those norms are not based on well validated data.[88]

References

1. ^ Wechsler 1958, Chapter 3: The Classification of Intelligence
2. ^ Matarazzo 1972, Chapter 5: The Classification of Intelligence
3. ^ *a b c* Kamphaus 2005, pp. 518–20 section "Score Classification Schemes"
4. ^ Gottfredson 2009, pp. 31–32
5. ^ Hunt 2011, p. 5 "As mental testing expanded to the evaluation of adolescents and adults, however, there was a need for a measure of intelligence that did not depend upon mental age. Accordingly the intelligence quotient (IQ) was developed. . . . The narrow definition of IQ is a score on an intelligence test . . . where "average" intelligence, that is the median level of performance on an intelligence test, receives a score of 100, and other scores are assigned so that the scores are distributed normally about 100, with a standard deviation of 15. Some of the implications are that: 1. Approximately two-thirds of all scores lie between 85 and 115. 2. Five percent (1/20) of all scores are above 125, and one percent (1/100) are above 135. Similarly, five percent are below 75 and one percent below 65."
6. ^ *a b* Terman 1916, p. 79 (http://books.google.com/books?id=26l9AAAAMAAJ&pg=PA79) "What do the above IQ's imply in such terms as feeble-mindedness, border-line intelligence, dullness, normality, superior intelligence, genius, etc.? When we use these terms two facts must be born in mind: (1) That the boundary lines between such groups are absolutely arbitrary, a matter of definition only; and (2) that the individuals comprising one of the groups do not make up a homogeneous type."
7. ^ *a b* Wechsler 1939, p. 37 "The earliest classifications of intelligence were very rough ones. To a large extent they were practical attempts to define various patterns of behavior in medical-legal terms."
8. ^ Aiken 1979, p. 139
9. ^ Anastasi & Urbina 1997, p. 326 "Correlation studies of test scores provide actuarial data, applicable to group predictions. . . . Studies of individuals, on the other hand, may reveal large upward or downward shifts in test scores."
10. ^ Kaufman 2009, pp. 151–153 "Thus, even for tests that measure similiar CHC constructs and that represent the most sophisticated, high-quality IQ tests ever available at any point in time, IQs differ."
11. ^ Kaufman 2009, Figure 5.1 IQs earned by preadolescents (ages 12–13) who were given three different IQ tests in the early 2000s
12. ^ Mackintosh 2011, p. 169 "First, after the age of 8–10, IQ scores remain relatively stable: the correlation between IQ scores from age 8 to 18 and IQ at age 40 is over 0.70. The correlations are not perfect, which means that significant changes in IQ can and do occur, but these data are evidence of considerable long-term stability, and thus consistent with expectations of a measure of intelligence. Second, however, the correlations of less than 0.50 between IQ scores taken before the age of five and later, adult IQ are distinctly less impressive. . . . IQ tests given before the age of 5 are clearly only imperfect predictors of later IQ."
13. ^ Uzieblo et al. Magez, p. 34 "It is important to understand that, despite some degree of exchangeability between several IQ measures (Floyd, Clark, & Shadish, 2008), they are not parallel forms of each other, but often represent fundamentally different latent intelligence factors. This is illustrated by the discrepancies in IQ total and index scores found between IQ instruments (e.g., Canivez, Neitzel, & Martin, 2005; Floyd et al., 2008; Morgan, Sullivan, Darden, & Gregg, 1997; Robinson, 1999; Thompson, Browne, Schmidt, & Boer, 1997). Despite the increasing disparity between total test scores across intelligence batteries—as the expanding factor structures cover an increasing amount of cognitive abilities (Flanagan, et al., 2010)—Floyd et al. (2008) noted that still 25% of assessed individuals will obtain a 10-point IQ score difference with another IQ battery. Even though not all studies indicate significant discrepancies between intelligence batteries at the group level (e.g., Thompson et al, 1997), the absence of differences at the individual level cannot be automatically assume. Thompson et al. (1997) reported, for instance, the staggering difference of 50–63 points between the K-BIT and the Wechsler Intelligence Scale for Children–Third Edition (WISC-III; Wechsler, 1991) in two participants in their sample of juvenile offenders."

14. ^ Shurkin 1992, pp. 89–90 (citing Burks, Jensen & Terman, *The Promise of Youth: Follow-up Studies of a Thousand Gifted Children* 1930) "Twelve even dropped below the minimum for the Terman study, and one girl fell below 104, barely above average for the general population. . . . Interestingly, while his tests measured decreases in test scores, the parents of the children noted no changes at all. Of all the parents who filled out the home questionnaire, 45 percent perceived no change in their children; 54 percent thought their children were getting brighter, including the children whose scores actually dropped."
15. ^ Matarazzo 1972, p. 121 "The psychologist's effort at classifying intelligence utilizes, at present, an *ordinal* scale, and is akin to what a layman does when he tries to distinguish colors of the rainbow." (emphasis in original)
16. ^ Gottfredson 2009, pp. 32–33 "We cannot be sure that IQ tests provide interval-level measurement rather than just ordinal-level (i.e., rank-order) measurement. . . . we really do not know whether a 10-point difference measures the same intellectual difference at all ranges of IQ."
17. ^ Mackintosh 2011, pp. 33–34 "Although many psychometricians have argued otherwise (e.g., Jensen 1980), it is not immediately obvious that IQ is even an interval scale, that is, one where, say, the ten-point difference between IQ scores of 110 and 100 is the same as the ten-point difference between IQs of 160 and 150. The most conservative view would be that IQ is simply an ordinal scale: to say that someone has an IQ of 130 is simply to say that their test score lies within the top 2.5% of a representative sample of people the same age."
18. ^ Flynn 2012, p. 160 (quoting Jensen (2011). The Theory of Intelligence and Its Measurement. *Intelligence*. **39:**171–177.) "The problem with IQ tests and virtually all other scales of mental ability in popular use is that the scores they yield are only ordinal (i.e., rank-order) scales; they lack properties of true ratio scales, which are essential to the interpretation of the obtained measures."
19. ^ Kaufman & Lichtenberger 2006, pp. 198–202 (section "Scoring Errors") "Bias errors were in the direction of leniency for all subtests, with Comprehension producing the strongest halo effect."
20. ^ Reynolds & Horton 2012, Table 4.1 Descriptions for Standard Score Performances Across Selected Pediatric Neuropsychology Tests
21. ^ Aiken 1979, p. 158
22. ^ Sattler 1988, p. 736
23. ^ Sattler 2001, p. 698 "Tests usually provide some system by which to classify scores. Follow the specified classification system strictly, labeling scores according to what is recommended in the test manual. If you believe that a classification does not accurately reflect the examinee's status, state your concern in the report when you discuss the reliability and validity of the findings."
24. ^ Gottfredson 2009, p. 32 "One searches in vain, for instance, for a good accounting of the capabilities that 10-year-olds, 15-year-olds, or adults of 110 usually possess but similarly aged individuals of IQ 90 do not . . . . IQ tests are not intended to isolate and measure highly specific skills and knowledge. This is the job of suitably designed achievement tests."
25. ^ Kaufman & Lichtenberger 2006, p. 89
26. ^ ***a b c d e f g h i*** Urbina 2011, Table 2.1 Major Examples of Current Intelligence Tests
27. ^ Flanagan & Harrison 2012, chapters 8-13, 15-16 (discussing Wechsler, Stanford-Binet, Kaufman, Woodcock-Johnson, DAS, CAS, and RIAS tests)
28. ^ Mackintosh & 2011 page 32 "The most widely used individual IQ tests today are the Wechsler tests, first published in 1939 as the Wechsler-Bellevue Scale."
29. ^ Saklofske et al. 2003, p. 3 "To this day, the Wechsler tests remain the most often used individually administered, standardized measures for assessing intelligence in children and adults" (citing Camara, Nathan & Puente, 2000; Prifitera, Weiss & Saklofske, 1998)
30. ^ Georgas et al. 2003, p. xxv "The Wechsler tests are perhaps the most widely used intelligence tests in the world"
31. ^ Meyer & Weaver 2005, p. 219 Campbell 2006, p. 66 Strauss 2006, p. 283 Foote 2007, p. 468 Kaufman & Lichtenberger 2006, p. 7 Hunt 2011, p. 12
32. ^ Kamphaus 2005, p. 519 "Although the Wechsler classification system for intelligence test scores is by far the most popular, it may not be the most appropriate (Reynolds & Kaufman 1990). "
33. ^ Groth-Marnat 2009, p. 136
34. ^ Groth-Marnat 2009, Table 5.5
35. ^ ***a b*** Kaufman 2009, p. 112
36. ^ ***a b c*** Kamphaus 2005, p. 337
37. ^ Kamphaus 2005, pp. 367–68

38. ^ Kaufman et al. 2005, Table 3.1 Descriptive Category System
39. ^ Gallagher & Sullivan 2011, p. 347
40. ^ Naglieri 1999, Table 4.1 Descriptive Categories of PASS and Full Scale Standard Scores
41. ^ Dumont, Willis & Elliot 2009, p. 11
42. ^ Dumont, Willis & Elliot 2009, p. 20
43. ^ Dumont & Willis 2013, "Range of DAS Subtest Scaled Scores (http://alpha.fdu.edu/psychology/range_of_scores.htm)" (Web resource) "The range of DAS GCA is 44 to 175. This range is not available at some ages. For example, the highest possible GCA that adolescents who are aged 17 years 11 months can get is 156; the lowest possible GCA that children who are 2 years 6 month old can get is 53."
44. ^ Dumont, Willis & Elliot 2009, Table Rapid Reference 5.1 DAS-II Classification Schema
45. ^ Reynolds & Kamphaus n.d., p. 30 (Table 3.2 RIAS Scheme of Verbal Descriptors of Intelligence Test Performance)
46. ^ Wasserman 2012, pp. 19–20 "The scale does not pretend to measure the entire mentality of the subject, but only *general intelligence*. (citing Terman, 1916, p. 48; emphasis in original)
47. ^ Wasserman 2012, p. 19 "No foreign-born or minority children were included. . . . The overall sample was predominantly white, urban, and middle-class"
48. ^ ***a*** ***b*** Terman 1916, p. 79 (http://books.google.com/books?id=26l9AAAAMAAJ&pg=PA79)
49. ^ Kaufman 2009, p. 110
50. ^ Naglieri 1999, p. 7 "The concept of general intelligence was assumed to exist, and psychologists went about "the measurement of an individual's general ability without waiting for an adequate psychological definition." (Pintner, 1923, p. 52)."
51. ^ Pintner 1931, p. 117
52. ^ ***a*** ***b*** Kamphaus et al. 2012, pp. 57–58 (citing Levine and Marks, page 131)
53. ^ Wasserman 2012, p. 35 "Inexplicably, Terman and Merrill made the mistake of retaining a ratio IQ (i.e., mental age/chronological age) on the 1937 Stanford-Binet, even though the method had long been recognized as producing distorted IQ estimates for adolescents and adults (e.g., Otis, 1917). Terman and Merrill (1937, pp. 27–28) justified their decision on the dubious ground that it would have been too difficult to reeducate teachers and other test users familiar with ratio IQ."
54. ^ ***a*** ***b*** ***c*** ***d*** Terman & Merrill 1960, p. 18
55. ^ Terman & Merrill 1937, p. 20
56. ^ Wasserman 2012, p. 35 "The 1939 test battery (and all subsequent Wechsler intelligence scales) also offered a deviation IQ, the index of intelligence based on statistical difference from the normative mean in standardized units, as Arthur Otis (1917) had proposed. Wechsler deserves credit for popularizing the deviation IQ, although the Otis Self-Administering Tests and the Otis Group Intelligence Scale had already used similar deviation-based composite scores in the 1920s."
57. ^ Wechsler 1939, pp. 39–40 "We have seen equivalent Binet I.Q. ratings reported for nearly every intelligence test now in use. In most cases the reporters proceeded to interpret the I.Q.'s obtained as if the tests measured the same thing as the Binet, and the indices calculated were equivalent to those obtained on the Stanford-Binet. . . . The examiners were seemingly unaware of the fact that identical I.Q.'s on the different tests might well represent very different orders of intelligence."
58. ^ Wechsler 1958, pp. 42–43 "In the case of the mental age scores, even psychologists are often under the impression that we are dealing with some absolute quantity, and the impression is even more common among psychiatrists. There is a rather widespread view that in definining intelligence in terms of mental age we are doing so in terms of some basic unit of amount. That, as we have seen, is a mistake. A mental age is just a test score and differs from other arithmetical summaries only by the fact that it happens to be in year-month notation. . . . In brief, mental age is no more an absolute measure of intelligence than any other test score."
59. ^ Wechsler 1958, p. 42 Table 3 Intelligence classification of WAIS IQ's
60. ^ Terman & Merrill 1960, pp. 276–296 (scoring tables for 1960 Stanford-Binet)
61. ^ Naglieri 1999, p. 7 (http://books.google.com/books?id=sOB14V6096MC&pg=PA7) "In fact, the stagnation of intelligence tests is apparent in Brody's (1992) statement: 'I do not believe that our intellectual progress has had a major impact on the development of tests of intelligence' (p. 355 (http://books.google.com/books?id=Au2KHXQs2JUC&pg=PA355))."
62. ^ Sattler 1988, Table BC-2 Classification Ratings on Stanford-Binet: Fourth Edition, Wechsler Scales, and

McCarthy Scales

63. ^ Kaufman 2009, p. 122
64. ^ American Psychiatric Association 2013, pp. 33–37 Intellectual Disability (Intellectual Development Disorder): Specifiers "The various levels of severity are defined on the basis of adaptive functioning, and not IQ scores, because it is adaptive functioning that determines the level of supports required. Moreover, IQ measures are less valid in the lower end of the IQ range."
65. ^ Flanagan & Kaufman 2009, p. 134 (empasis in original)
66. ^ Flynn 2012, Chapter 4: Death, Memory, and Politics
67. ^ Pintner 1931, pp. 356–357 "From a study of these boyhood records, estimates of the probable I.Q.s of these men in childhood have been made. . . . It is of course obvious that much error may creep into an experiment of this sort, and the I.Q. assigned to any one individual is merely a rough estimate, depending to some extent upon how much information about his boyhood years has come down to us."
68. ^ Shurkin 1992, pp. 70–71 "She, of course, was not measuring IQ; she was measuring the length of biographies in a book. Generally, the more information, the higher the IQ. Subjects were dragged down if there was little information about their early lives."
69. ^ Eysenck 1998, p. 126 "Cox found that the more was known about a person's youthful accomplishments, that is, what he had done *before* he was engaged in doing the things that made him known as a genius, the higher was his IQ. . . . So she proceeded to make a statistical correction in each case for lack of knowledge; this bumped up the figure considerably for the geniuses about whom little was in fact known. . . . I am rather doubtful about the justification for making the correction. To do so assumes that the geniuses about whom least is known were precocious but their previous activities were not recorded. This may be true, but it is also possible to argue that perhaps there was nothing much to record! I feel uneasy about making such assumptions; doing so may be very misleading."
70. ^ Cox 1926, pp. 215–219, 218 (Chapter XIII: Conclusions) "3. That all equally intelligent children do not as adults achieve equal eminence is in part accounted for by our last conclusion: *youths who achieve eminence are characterized not only by high intellectual traits, but also by persistence of motive and effort, confidence in their abilities, and great strength or force of character*." (emphasis in original)
71. ^ Kaufman 2009, p. 117 "Terman (1916), as I indicated, used *near genius or genius* for IQs above 140, but mostly *very superior* has been the label of choice" (emphasis in original)
72. ^ Wechsler 1939, p. 45
73. ^ Eysenck 1998, pp. 127–128 "Terman, who originated those "Genetics Studies of Genius," as he called them, selected . . . children on the basis of their high IQs; the mean was 151 for both sexes. Seventy-seven who were tested with the newly translated and standardized Binet test had IQs of 170 or higher—well at or above the level of Cox's geniuses. What happened to these potential geniuses—did they revolutionize society? . . . The answer in brief is that they did very well in terms of achievement, but none reached the Nobel Prize level, let alone that of genius. . . . It seems clear that these data powerfully confirm the suspicion that intelligence is not a sufficient trait for truly creative achievement of the highest grade."
74. ^ Simonton 1999, p. 4 (http://books.google.com/books?id=LcB2kOXT-68C&pg=PA4) "When Terman first used the IQ test to select a sample of child geniuses, he unknowingly excluded a special child whose IQ did not make the grade. Yet a few decades later that talent received the Nobel Prize in physics: William Shockley, the cocreator of the transistor. Ironically, not one of the more than 1,500 children who qualified according to his IQ criterion received so high an honor as adults."
75. ^ Shurkin 2006, p. 13 (http://books.google.com/books?id=cRb_qzEwWWAC&pg=PA13) (See also "The Truth About the 'Termites' (http://www.psychologytoday.com/blog/beautiful-minds/200909/the-truth-about-the-termites)" (Kaufman, S. B. 2009)
76. ^ Leslie 2000, "We also know that two children who were tested but *didn't* make the cut -- William Shockley and Luis Alvarez -- went on to win the Nobel Prize in Physics. According to Hastorf, none of the Terman kids ever won a Nobel or Pulitzer. (http://alumni.stanford.edu/get/page/magazine/article/?article_id=40678)"
77. ^ Park, Lubinski & Benbow 2010, "There were two young boys, Luis Alvarez and William Shockley, who were among the many who took Terman's tests but missed the cutoff score. Despite their exclusion from a study of young 'geniuses,' both went on to study physics, earn PhDs, and win the Nobel prize. (http://www.scientificamerican.com/article.cfm?id=recognizing-spatial-intel)"
78. ^ Gleick 2011, p. 32 (http://books.google.com/books?id=j42RD66g72oC&pg=PT32) "Still, his score on the school IQ test was a merely respectable 125."

79. ^ Robinson 2011, p. 47 (http://books.google.com/books?id=UFoAiCR58YcC&pg=PA47) "After all, the American physicist Richard Feynman is generally considered an almost archetypal late 20th-century genius, not just in the United States but wherever physics is studied. Yet, Feynman's school-measured IQ, reported by him as 125, was not especially high"
80. ^ Jensen 1998, p. 577 "*Creativity* and *genius* are unrelated to *g* except that a person's level of *g* acts as a threshold variable below which socially significant forms of creativity are highly improbable. This *g* threshold is probably at least one standard deviation above the mean level of *g* in the general population. Besides the traits that Galton thought necessary for "eminence" (viz., high ability, zeal, and persistence), *genius* implies outstanding creativity as well. Though such exceptional creativity is conspicuously lacking in the vast majority of people who have a high IQ, it is probably impossible to find any creative geniuses with low IQs. In other words, high ability is a necessary but not sufficient condition for the emergence of socially significant creativity. Genius itself should not be confused with merely high IQ, which is what we generally mean by the term 'gifted'" (emphasis in original)
81. ^ Eysenck 1998, p. 127 "What is obvious is that geniuses have a high degree of intelligence, but not outrageously high—there are many accounts of people in the population with IQs as high who have not achieved anything like the status of genius. Indeed, they may have achieved very little; there are large numbers of Mensa members who are elected on the basis of an IQ test, but whose creative achievements are nil. High achievement seems to be a *necessary* qualification for high creativity, but it does not seem to be a *sufficient* one." (emphasis in original)
82. ^ Cf. Pickover 1998, p. 224 (http://books.google.com/books?id=P0CSxB2aHMcC&pg=PT243) (quoting Syed Jan Abas) "High IQ is not genius. A person with a high IQ may or may not be a genius. A genius may or may not have a high IQ."
83. ^ Sternberg, Jarvin & Grigorenko 2010, Chapter 2: Theories of Giftedness
84. ^ Template:Harnb
85. ^ Terman & Merrill 1937, p. 44 "The reader should not lose sight of the fact that a test with even a high reliability yields scores which have an appreciable probable error. The probable error in terms of mental age is of course larger with older than with young children because of the increasing spread of mental age as we go from younger to older groups. For this reason it has been customary to express the P.E. [probable error] of a Binet score in terms of I.Q., since the spread of Binet I.Q.'s is fairly constant from age to age. However, when our correlation arrays [between Form L and Form M] were plotted for separate age groups they were all discovered to be distinctly fan-shaped. Figure 3 is typical of the arrays at every age level. From Figure 3 it becomes clear that the probable error of an I.Q. score is not a constant amount, but a variable which increases as I.Q. increases. It has frequently been noted in the literature that gifted subjects show greater I.Q. fluctuation than do clinical cases with low I.Q.'s . . . . we now see that this trend is inherent in the I.Q. technique itself, and might have been predicted on logical grounds."
86. ^ Lohman & Foley Nicpon 2012, Section "Conditional SEMs" "The concerns associated with SEMs [standard errors of measurement] are actually substantially worse for scores at the extremes of the distribution, especially when scores approach the maximum possible on a test . . . when students answer most of the items correctly. In these cases, errors of measurement for scale scores will increase substantially at the extremes of the distribution. Commonly the SEM is from two to four times larger for very high scores than for scores near the mean (Lord, 1980)."
87. ^ Lohman & Foley Nicpon 2012, Section "Scaling Issues" "The spreading out of scores for young children at the extremes of the ratio IQ scale is viewed as a positive attribute of the SB-LM by clinicians who want to distinguish among the highly and profoundly gifted (Silverman, 2009). Although spreading out the test scores in this way may be helpful, the corresponding normative scores (i.e., IQs) cannot be trusted both because they are based on out-of-date norms and because the spread of IQ scores is a necessary consequence of the way ratio IQs are constructed, not a fact of nature."
88. ^ Lohman & Foley Nicpon 2012, Section "Scaling Issues" "Modern tests do not produce such high scores, in spite of heroic efforts to provide extended norms for both the Stanford Binet, Fifth Edition (SB-5) and the WISC-IV (Roid, 2003; Zhu, Clayton, Weiss, & Gabel, 2008)."

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External links

- FAQ/Finding Information About Psychological Tests (American Psychological Association)

(http://www.apa.org/science/programs/testing/find-tests.aspx)
- Classics in the History of Psychology (http://psychclassics.yorku.ca/)
- Beyond the Flynn Effect (http://www.psychometrics.cam.ac.uk/page/109/beyond-the-flynn-effect.htm)

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