psych

MDPI

Article

Do the Mega and Titan Tests Yield Accurate Results? An Investigation into Two Experimental Intelligence Tests

David Redvaldsen

Sociology and Social Work, University of Agder, 4604 Kristiansand, Norway; david.redvaldsen@uia.no

Received: 18 October 2019; Accepted: 28 April 2020; Published: 29 April 2020

Abstract: The Mega and Titan Tests were designed by Ronald K. Hoeflin to make fine distinctions in the intellectual stratosphere. The Mega Test purported to measure above-average adult IQ up to and including scores with a rarity of one in a million of the general population. The Titan Test was billed as being even more difficult than the Mega Test. In this article, these claims are subjected to scrutiny. Both tests are renormed using the normal curve of distribution. It is found that the Mega Test has a higher ceiling and a lower floor than the Titan Test. While the Mega Test may thus seem preferable as a psychometric instrument, it is somewhat marred by a number of easy items in its verbal section. Although official scores reported to test-takers are too high, it is likely that the Mega Test does stretch to the one in a million level. The Titan Test does not. Testees who had previously taken standard intelligence tests achieved average scores of 135–145 IQ on those. Since the *mean* of all scores on the Mega and Titan Tests was found to be IQ 137 and IQ 138, respectively, testees had considerable scope to find their true level without ceiling effects. Both are unusual and non-standard tests which require a great deal of effort to complete. Nevertheless, they deserve consideration as they represent an inventive experimental method of measuring the very highest levels of human intelligence and have been taken by enough subjects to allow norming.

Keywords: intelligence; Gaussian distribution; giftedness; psychometrics; genius

1. Introduction

Intelligence tests were invented by Alfred Binet and his student Théodore Simon in 1905 with the purpose of identifying pupils in need of remedial help in French public education. Within a few years, they had been translated into English and were to reach their apogee in the United States where Lewis M. Terman, a young professor of education at Stanford University, made his reputation as the foremost authority on all matters connected with intelligence. Terman's first book on the topic, *The Measurement of Intelligence,* featured examples of individuals within the various classifications [1]. By the time his *The Intelligence of School Children* was published three years later, it was clear that Terman's primary interest was in subjects scoring at the highest levels [2]. He had already begun a study of exceptional children, which became the basis for longitudinal research into the lives and careers of the gifted.

This study, published in five volumes as *Genetic Studies of Genius* between 1926 and 1959, required the construction of a special instrument to accommodate Terman's subjects as adults, called the Concept Mastery Test [3]. This marked the beginning of experimental research on adults in the intellectual stratosphere using psychological techniques. Due to the rarity of the individuals concerned, it was fraught with practical difficulties. One possible method was to give adolescents achievement tests designed for adults. That was the approach chosen by the Study of Mathematically Precocious Youth, which began in 1971 at Johns Hopkins University and which, despite its name, also considered verbal

ability. Students who scored at the highest levels on College admission tests at the age of 13 must, logically, be even brighter than the most able ordinary freshmen [4].

In contrast to this well-funded academic project, extending the scale of intelligence to the highest conceivable levels was an endeavor solely taken up by amateurs. Their method was to publish self-authored tests and to form societies for those who received the highest scores on them. In this way, more could be learned about intellects of the very highest order. *Omni* magazine, devoted to popular science and science fiction, published three such tests between 1979 and 1990. Because of *Omni*'s large readership, enough responses were received to allow official scoring of these tests with at least a semblance of being exact. The procedure of the designers was to compare the number of correct answers yielded by participants and their self-reported previous performance on standard educational or intellectual scales. The data were submitted by mail. It was, of course, an experimental method, because there could be no supervision of test-takers or control of whether the reported scores on the standard tests were accurate.

These three tests were the Langdon Adult Intelligence Test, the Mega Test and the Titan Test. They are the only credible tools for the measurement of intelligence at levels above the ceilings of the traditional instrument the Stanford–Binet, first developed by Terman, and the Wechsler Adult Intelligence Scale (WAIS). The Concept Mastery Test is purely verbal or educational, which means it cannot capture numerical or logical thinking, seen as essential components of intelligence in all modern studies [5–7].

2. Object

In this paper, we will investigate the Mega and Titan Tests, designed by Ronald K. Hoeflin and published in *Omni* magazine in April 1985 and April 1990 respectively [8,9]. We wish to discover whether their author's claims for them are well founded. The Mega Test was billed as discriminating up to the one in a million level of the general population as for intelligence, while the Titan Test was designed to be even more difficult. If this is verified, they could potentially help to identify the most gifted adults imaginable. This is a topic of some interest as the study of genius is one of the oldest concerns within psychology [10–12]. As the Mega and Titan Tests are relatively unknown tools serving a niche market, we additionally wish to consider whether they are suitable for wider use by psychologists. The Langdon Adult Intelligence Test would also have been considered if its norming data had been made public [13]. It is believed to have been taken by more than 20,000 individuals and was normed on the basis of recognized intelligence tests [14].

3. Method

The designer's method is the experimental measurement of the very highest levels of human intelligence. It is experimental in the sense of being based on unrecognized techniques which are put forward for consideration. It is also experimental in retaining some features of previous practice, while changing others in pursuit of a particular outcome. Dr Hoeflin saw intelligence as a composite of verbal, numerical and spatial skills. Standard item formats such as analogies, number series, logical progression and mental manipulation of three-dimensional objects were included. However, he dispensed with a time limit and permitted the use of reference materials and, in one case, pocket calculators. These novelties may be justified by seeking to privilege intellectual power over speed and the correct application of knowledge rather than merely possessing it. Our method, on the other hand, goes back to first principles in simply mapping the raw scores obtained on the tests onto the normal curve of distribution. An assumption behind the norming of tests of mental ability is that intelligence is a variable characteristic which is distributed normally. This also matches the empirical realities, according to a meta-study of ten mostly well-known surveys of intellect [15]. We are not primarily interested in the predictive validity of the tests since they are designed for adults, but whether they can be used to identify the presence of intellectual power beyond what the standard tests allow. If they

do, the entire range of human intellect would be available for study according to a common criterion (psychologically tested intelligence).

A critique of the Mega Test already exists which focused on the violation of psychological practices inherent in accepting testing without supervision and norming from self-reported data [16]. The reviewer felt that its accuracy would be increased if the test were taken under controlled conditions. As it stands, the library resources available to test-takers are a factor in the score generated. Even so, Dr Carlson recognized that the author made such a choice for practical reasons. Hoeflin did not have access to a large pool of individuals who could take the test under controlled conditions for norming purposes. It might be added here that allowing reference materials closed off a potential avenue to cheating and that efficiency in using dictionaries, thesauri and encyclopedias in any case probably correlate to intelligence. Therefore, instead of pursuing the available resources angle further, we will examine, using the available data, whether Hoeflin's tests truly identify giftedness beyond what the recognized tests do. If they do not, the rationale behind them disappears however the resources issue is settled.

4. Limitations

As we are probing an experimental attempt to extend the range of the scale of intelligence, we are aware that our research has several limitations. Chief among them is the problem of validity intrinsic to the Mega and Titan Tests. No data have been published which shows Titan Test correlations with other intelligence tests, while the Mega Test correlates only 0.374 with the Stanford–Binet and a mere 0.137 with the WAIS [16]. It is true that it correlates more highly with some other intelligence tests (0.565 with the Army General Classification Test and 0.562 with Cattell), but can we be sure that these tests measure what they purport to do? The lack of a time limit has the effect of rewarding persistence and intense interest in the subject matter over actual capacity in a real-world setting. In removing speed as a factor, the Mega and Titan Tests also define intelligence differently to the established understanding manifest in virtually all other tests, while simultaneously giving rise to scores on what is presented as the same scale. Most of the questions on these tests are very difficult and risk conflating puzzle-solving skills with general ability. Especially the Titan Test contains too many spatial items to be representative of *g*, the general factor underlying thinking, see [17]. Neither it nor the Mega Test can be used on the general population, and consequently the lowest raw scores are uncertain. The tests are, however, reliable, as they would be scored identically by any marker since there is a single correct answer to each question.

A present limitation for us is that we are relying on a non-standard source (a web page) for scores on the Titan Test, as *Omni* magazine did not continue coverage of the topic after 1990. We have no direct method of norming the Mega Test other than by the self-reported previous test scores of *Omni* participants (also from the web page) and the Titan Test, in turn, is normed from self-reported scores on the Mega Test. Although the tests are examined here in case they are, or may be adapted to be, useful to psychologists and researchers, there is no guarantee that the highest scorers on them are representative of the statistical group to which they belong. They are a self-selected sample, possibly with excess time on their hands.

5. The Mega Test

The Mega Test consists of 48 items, of which 24 are verbal analogies, 12 spatial problems, 6 number series and 6 other numerical problems. Two of the questions are multiple choice, but there is no penalty for wrong answers on these or other questions. There is no time limit, though it is suggested the subject spend no more than one month. Reference materials and pocket calculators are permitted. Given that thesauri can be used, a number of questions in the verbal section become relatively easy. A facsimile of the original is available to the reader [18].

The January 1986 issue of *Omni* carried a score report for the magazine's readership who had taken the Mega Test as printed in the April 1985 issue [19]. It was stated that about 3200 readers had submitted answers to Dr Hoeflin, and that the median score was 15. An accompanying graph allowed

information to be read off about the frequency of each raw score. Because this was given in tens, it required some concentration on our part to arrive at an exact number of readers who had achieved a particular raw score. We are convinced that our reading is accurate, which was confirmed by our grand total of 3258 testees.

The data used for the subsequent calculations are given in Table 1 below.

Table 1. The frequency of raw scores on the Mega Test among *Omni* readers.

Score	Frequency	Product
0	3	0
1	20	20
2	30	60
3	43	129
4	77	308
5	103	515
6	138	828
7	140	980
8	125	1000
9	160	1440
10	140	1400
11	160	1440
12	145	1740
13	142	1846
14	128	1792
15	140	2100
16	138	2208
17	126	2142
18	104	1872
19	120	2280
20	100	2000
21	108	2268
22	90	1980
23	80	1840
24	77	1848
25	60	1500
26	70	1820
27	40	1080
28	49	1372
29	43	1247
30	22	660
31	38	1178
32	40	1280
33	28	924
34	11	374
35	17	595
36	18	648
37	10	370
38	8	304
39	8	312
40	3	120
41	4	164
42	7	294
43	3	129
44	3	132
45	1	45
TOTALS	3258	48,899

The mean was thus 48,899/3258 = 15. The standard deviation was calculated as shown in Table 2 below.

Table 2. Deviation of scores from the mean on the Mega Test.

Score	Frequency	Deviation	Deviation^2	Product
0	3	−15	225	675
1	20	−14	196	3920
2	30	−13	169	5070
3	43	−12	144	6192
4	77	−11	121	9317
5	103	−10	100	10,300
6	138	−9	81	11,178
7	140	−8	64	8960
8	125	−7	49	6125
9	160	−6	36	5760
10	140	−5	25	3500
11	160	−4	16	2560
12	145	−3	9	1305
13	142	−2	4	568
14	128	−1	1	128
15	140	0	0	0
16	138	1	1	138
17	126	2	4	504
18	104	3	9	936
19	120	4	16	1920
20	100	5	25	2500
21	108	6	36	3888
22	90	7	49	4410
23	80	8	64	5120
24	77	9	81	6237
25	60	10	100	6000
26	70	11	121	8470
27	40	12	144	5760
28	49	13	169	8281
29	43	14	196	8428
30	22	15	225	4950
31	38	16	256	9728
32	40	17	289	11,560
33	28	18	324	9072
34	11	19	361	3971
35	17	20	400	6800
36	18	21	441	7938
37	10	22	484	4840
38	8	23	529	4232
39	8	24	576	4608
40	3	25	625	1875
41	4	26	676	2704
42	7	27	729	5103
43	3	28	784	2352
44	3	29	841	2523
45	1	30	900	900
TOTALS	3258			221,306

The variance can accordingly be calculated as 221,306/3258 = 67.93. The standard deviation is therefore √67.93 or 8.24.

As established, we have a mean of 15 and a standard deviation of 8.24. It was also reported in the January 1986 issue of *Omni* that the mean IQ for its readers on the Mega Test had been 141 (on the scale used by the Stanford–Binet, which traditionally had a standard deviation of 16). Dr. Hoeflin arrived at this value by collating previous scores on intelligence and achievement tests reported by participants. We have chosen to calculate the mean IQ on the basis of four intelligence tests alone: the Cattell, the California Test of Mental Maturity (CTMM), the WAIS and the Stanford–Binet (see Table 3 below). Scores were reported on other tests too [20], but since the standard deviations for those are not as clear as for our chosen instruments, they were not taken into consideration by us. This is particularly true for the Army General Classification Test.

Table 3. Previous scores on other tests and raw scores on the Mega Test.

Test and Its Standard Deviation	Previous IQs	Mega Test Raw Scores	Sum Previous IQs	Sum Mega Test Raw Scores	Number of Observations	Mean Previous IQ	Mean Mega Test Raw Score
Cattell (S.D. 24)	178, 155, 178, 157, 156, 163, 177, 157, 175, 158, 161, 143, 154, 140, 135, 157, 152, 172, 154, 161, 162, 155, 159, 157, 159, 150, 151, 155, 159, 151, 139, 148, 148, 151, 160, 147, 147, 139, 135, 150, 137, 146, 142, 130, 152, 155, 142, 151, 134, 140.	44, 39, 34, 33, 33, 29, 28, 27, 27, 26, 25, 24, 24, 23, 23, 21, 21, 21, 20, 19, 18, 16, 15, 15, 15, 15, 14, 13, 13, 13, 12, 12, 11, 10, 10, 10, 9, 9, 8, 7, 7, 6, 5, 5, 5, 5, 4, 3, 3, 3.	7634	832	50	152.68	16.64
CTMM (S.D. 16)	174, 148, 137, 139, 153, 143, 135, 132, 130, 130, 136, 128, 142, 138, 136, 144, 105, 156, 139, 148, 135, 145, 153, 138, 135, 148, 142, 140, 144, 143, 142, 145, 121, 143, 123, 135, 148, 135, 136, 140, 132, 147, 139, 135, 135, 134.	43, 33, 29, 27, 26, 25, 24, 24, 24, 24, 24, 23, 21, 21, 20, 20, 19, 18, 17, 16, 16, 16, 15, 15, 15, 15, 15, 14, 13, 13, 13, 12, 11, 11, 11, 11, 10, 9, 7, 7, 7, 6, 5, 5, 5, 5.	6406	760	46	139.26	16.52
WAIS (S.D. 15)	133, 149, 149, 140, 140, 133, 134, 150, 130, 137, 139, 138, 144, 140, 130, 130, 164, 125, 115, 133, 130, 152, 134, 140, 138.	33, 32, 32, 30, 29, 28, 28, 26, 25, 24, 22, 21, 20, 17, 16, 16, 15, 13, 10, 9, 8, 8, 7, 7, 5.	3447	481	25	137.88	19.24
Stanford–Binet (S.D. 16)	137, 124, 166, 149, 143, 145, 167, 148, 127, 145, 149, 156, 169, 149, 149, 127, 138, 155, 150, 126, 135, 150, 158, 157, 122, 138, 151, 149, 134, 143, 160, 139, 130, 148, 139, 148, 138, 137.	40, 34, 32, 28, 27, 26, 26, 24, 24, 24, 24, 22, 22, 21, 20, 20, 19, 19, 19, 19, 17, 17, 16, 15, 15, 14, 13, 13, 11, 11, 11, 9, 8, 8, 7, 7, 4, 3.	5495	689	38	144.61	18.13

Converting to the Stanford–Binet equivalent scale used by Hoeflin, we arrive at a mean of IQ 135.12 for those who had previously taken the Cattell, IQ 139.26 for previous CTMM-takers, IQ 140.40 for those who reported scores on the WAIS and IQ 144.61 for former Stanford–Binet testees. The mean for each group on the Mega Test was higher than for the *Omni* respondents in general. The previous scores on the Stanford–Binet were particularly high, with many above the available ceiling for adults. This leads us to believe that a significant proportion of these were yielded in childhood. Since such scores are not applicable to the norming of an adult intelligence test, we decided to discard the Stanford–Binet data. Using the results from the other tests, we calculated an average of 137.8 IQ at a raw score of 17.13. If a raw score of 17 thus represents an IQ of 138 in round numbers, the mean of

15 on the Mega Test likely represents an IQ of 137, given the rate of growth on this part of the scale (this will be confirmed below). We therefore base our norming on the mean of 15 being equivalent to an IQ of 137.

The major advantage in introducing the deviation IQ was that it should conform to the normal curve of distribution. The number of scores above the mean do show a generally declining tendency. We therefore decided to map raw scores above the mean onto the normal curve. The shape of the normal curve means that scores taper off sharply above 140 IQ. Any score above the mean or below the mean are less common occurrences, but on this test, raw scores below the mean *increase* in frequency. Therefore, a different method will be used to calculate raw scores below the mean. We divided scores at and above the 137 IQ-level into intervals of 3 IQ points. To substantiate just how rare the very highest scores are supposed to be, we include a column showing the distribution of scores at or above 137 IQ (see Table 4 below). Statistical tables in books seldom give percentiles for scores more than 3 standard deviations above the mean. Since the previous scores of Mega Test participants were taken from Darryl Miyaguchi's website "Uncommonly Difficult IQ Tests" [20] we additionally decided to use the percentiles calculated by him. This led to the following:

Table 4. Relative frequency of particular IQ levels according to the normal curve of distribution.

IQ Interval	Percentile Interval	Percentile Increment	Percentage of Total Scores ≥ IQ 137
137–139	99.0–99.3	0.3	40.98
140–142	99.4–99.57	0.17	23.22
143–145	99.64–99.75	0.11	15.02
146–148	99.8–99.87	0.07	9.56
149–151	99.89–99.93	0.04	5.46
152–154	99.94–99.96	0.02	2.73
155–157	99.97–99.982	0.012	1.64
158–160	99.986–99.991	0.005	0.68
161–163	99.993–99.996	0.003	0.41
164–166	99.997–99.9981	0.0011	0.15
167–169	99.9986–99.9992	0.0006	0.082
170–172	99.9994–99.99966	0.00026	0.036
173–175	99.99975–99.99986	0.00011	0.015
176–178	99.9999–99.99995	0.00005	0.007
179–181	99.99996–99.99998	0.00002	0.0027
182–184	99.999985–99.999992	0.000007	0.0016
TOTALS		0.732147	99.9943

There were 1566 testees who scored 15 or higher on the Mega Test among the *Omni* readership. We place these scores into the various intervals of the grid constructed from the normal curve of distribution, as can be seen in Table 5.

The highest scorer on the Mega Test among the *Omni* readership solved 45 correctly. This represents an IQ of 170 or slightly above. There were three subjects who solved 44 correctly and their associated IQs would be 165–170. We decided to assign them to the 167–169 category, as this allows good approximations of 43 and 42 as raw scores in the 164–166 and 161–163 categories respectively. No reader scored above 45 and we simply do not have the data to tell us what IQ levels these raw scores represent. Because we originally believed the Titan Test to be harder for all raw scores, our aim was to extrapolate from that test to Mega raw scores above 45. It will be shown below, however, that the Mega Test is more difficult near the ceiling.

Table 5. Distribution of testees in the intervals and associated scores on the Mega Test.

IQ Interval	Theoretical Frequency	Associated Scores
137–139	641.7	15–19
140–142	363.6	20–23
143–145	235.3	24–27
146–148	149.7	28–31
149–151	85.6	32–33
152–154	42.8	34–36
155–157	25.7	37–39
158–160	10.7	40–41
161–163	6.4	42
164–166	2.4	43
167–169	1.3	44
170–172	0.6	45
173–175	0.2	
176–178	0.1	
179–181	0.04	
182–184	0.01	
TOTAL	1566.15	

On the basis of the present norming, we believe that the Mega Test is indeed able to yield IQs at the one in a million level, a threshold which is attained at a raw score of either 46, 47 or 48. As for the scores below the mean, we calculate them from one standard deviation equaling 16 IQ points. In this way, each question solved correctly up to the mean adds 16/8.24 or 1.94 IQ points to one's score (see Table 6). This gives us:

Table 6. New norming of the Mega Test 2019.

Raw Score	IQ	Raw Score	IQ	Raw Score	IQ
1	110	17	138	33	151
2	112	18	139	34	152
3	114	19	139	35	153
4	116	20	140	36	154
5	118	21	140	37	155
6	120	22	141	38	156
7	121	23	142	39	157
8	123	24	143	40	158
9	125	25	143	41	160
10	127	26	144	42	163
11	129	27	145	43	165
12	131	28	146	44	167
13	133	29	146	45	170
14	135	30	147	46	170+
15	137	31	148	47	170+
16	138	32	149	48	170+

6. The Titan Test

The Titan Test consists of 48 items, of which 24 are verbal analogies, 6 are number series, 17 are spatial problems and 1 is a complicated calculation. It was designed to be more difficult than the Mega Test. Hardly any questions are intuitive and almost all require a substantial amount of effort. There is no multiple choice nor penalty for incorrect answers. Test-taking time is unlimited and could require more than a month, reference materials are allowed but not calculators or computers. A facsimile of the published test is available to the reader [21].

The Titan Test was attempted by 391 *Omni* readers. This was only a fraction of the number of responses received for the Mega Test, but is nevertheless high for a test of this nature. The scores of the *Omni* participants were reported to Mr Miyaguchi and appear on his website [20]. They were as may be seen in Table 7.

Table 7. Scores on the Titan Test by *Omni* readers.

Raw Score	Frequency of Score	Product
0	21	0
1	33	33
2	27	54
3	25	75
4	16	64
5	25	125
6	20	120
7	16	112
8	13	104
9	15	135
10	13	130
11	11	121
12	10	120
13	8	104
14	10	140
15	8	120
16	8	128
17	9	153
18	10	180
19	11	209
20	2	40
21	8	168
22	6	132
23	9	207
24	7	168
25	3	75
26	7	182
27	2	54
28	4	112

Table 7. *Cont.*

Raw Score	Frequency of Score	Product
29	3	87
30	4	120
31	4	124
32	3	96
33	1	33
34	2	68
35	2	70
36	3	108
37	0	0
38	1	38
39	6	234
40	2	80
41	1	41
42	0	0
43	0	0
44	1	44
45	0	0
46	0	0
47	0	0
48	1	48
Totals	391	4556

We begin by calculating the mean, which is 4556/391 = 11.65. Once we also have the standard deviation for the test, we are in a position to begin norming it. This is computed in Table 8.

Table 8. Finding the variance and standard deviation of the Titan Test.

Raw Score	Frequency	Dev. from Mean	Deviation^2	Product
0	21	−11.65	135.72	2850.12
1	33	−10.65	113.42	3742.86
2	27	−9.65	93.12	2514.24
3	25	−8.65	74.82	1870.5
4	16	−7.65	58.52	936.32
5	25	−6.65	44.22	1105.5
6	20	−5.65	31.92	638.4
7	16	−4.65	21.62	345.92
8	13	−3.65	13.32	173.16
9	15	−2.65	7.02	105.3
10	13	−1.65	2.72	35.36
11	11	−0.65	0.42	4.62
12	10	0.35	0.12	1.2

Table 8. *Cont.*

Raw Score	Frequency	Dev. from Mean	Deviation^2	Product
13	8	1.35	1.82	14.56
14	10	2.35	5.52	55.2
15	8	3.35	11.22	89.76
16	8	4.35	18.92	151.36
17	9	5.35	28.62	257.58
18	10	6.35	40.32	403.2
19	11	7.35	54.02	594.22
20	2	8.35	69.72	139.44
21	8	9.35	87.42	699.36
22	6	10.35	107.12	642.72
23	9	11.35	128.82	1159.38
24	7	12.35	152.52	1067.64
25	3	13.35	178.22	534.66
26	7	14.35	205.92	1441.44
27	2	15.35	235.62	471.24
28	4	16.35	267.32	1069.28
29	3	17.35	301.02	903.06
30	4	18.35	336.72	1346.88
31	4	19.35	374.42	1497.68
32	3	20.35	414.12	1242.36
33	1	21.35	455.82	455.82
34	2	22.35	499.52	999.04
35	2	23.35	545.22	1090.44
36	3	24.35	592.92	1778.76
38	1	26.35	694.32	694.32
39	6	27.35	748.02	4488.12
40	2	28.35	803.72	1607.44
41	1	29.35	861.42	861.42
44	1	32.35	1046.52	1046.52
48	1	36.45	1328.60	1328.60
Totals	391			42,455

The variance is therefore 42,455/391 = 108.58. So the standard deviation is $\sqrt{108.58} = 10.42$. What IQ level does the mean of 11.65 represent? Unlike for the Mega Test, previous test scores of *Omni* participants are not available. The only usable data we have for norming is a table of paired scores for testees who attempted both the Mega and the Titan Tests from early 1999, several years after the latter was published in *Omni* [20]. It is reproduced below as Table 9.

Table 9. Reported scores on the Mega Test by Titan Test-takers.

Titan Test Score	Mega Test Score
48	44
46	43
45	42
41	37
41	35
40	28
39	40
39	39
39	30
39	21
38	41
38	36
37	33
37	30
36	44
36	35
36	33
35	40
35	36
34	29
32	38
32	35
32	25
31	36
31	32
31	25
30	33
30	31
29	27
28	28
27	26
26	27
26	21
26	21
25	34
25	31
25	19
24	23
24	22
23	33
23	29
23	24
23	22
23	14
22	23
22	20

Table 9. *Cont.*

Titan Test Score	Mega Test Score
20	24
20	22
19	33
19	23
18	30
18	28
18	20
17	29
17	21
15	18
15	15
14	11
13	18
12	25
12	23
12	19
11	15
11	14
11	11
10	15
9	14
9	12
8	20
8	15
7	16
7	9
6	13
6	12
5	12
5	11
5	9
4	24
4	13
4	8
3	12
3	9
3	4
TOTAL 1870	TOTAL 2042

This indicates that the mean score on the Titan Test was lower than on the Mega Test for participants who took both. Of the 83 participants, 52 achieved a lower raw score on the Titan Test than on the Mega Test. Their mean score was 22.5 on the Titan Test versus 24.6 on the Mega Test. This is considerably higher than the mean of 11.65 on the Titan Test for all *Omni* participants and not particularly helpful for determining the IQ at the mean. We decided to find the Mega Test scores of Titan Test-takers who were close to the mean of 11.65 by considering scores at 10 to 13 on the latter. Their Mega Test scores were 18, 25, 23, 19, 15, 14, 11 and 15 compared to their Titan Test scores of 13, 12, 12, 12, 11, 11, 11 and

10 respectively. Their mean Mega Test score was therefore 17.5 and their mean on the Titan Test was 11.5. Now 17.5 on the Mega Test is equivalent to an IQ of 138.5, so if we estimate a raw score of 11 on the Titan Test as being equivalent to an IQ of 138, we have a base for our norming. It is also the same value as Hoeflin calculated in the official norming and he had access to the test-takers' previous IQ scores [20].

As before, we create a grid taking account of the normal curve of distribution's shape for scores of 11 or above. This is reproduced as Table 10.

Table 10. Relative frequency of particular IQ levels according to the normal curve of distribution.

IQ Interval	Percentile Interval	Percentile Increment	Percentage of Total Scores ≥ 138 IQ
138–140	99.1–99.4	0.3	44.98
141–143	99.5–99.64	0.14	20.99
144–146	99.7–99.8	0.1	14.99
147–149	99.83–99.89	0.06	9.0
150–152	99.91–99.94	0.03	4.5
153–155	99.95–99.97	0.02	3.0
156–158	99.977–99.986	0.009	1.35
159–161	99.989–99.993	0.004	0.6
162–164	99.995–99.997	0.002	0.3
165–167	99.9976–99.9986	0.001	0.15
168–170	99.9989–99.9994	0.0005	0.075
171–173	99.9995–99.99975	0.00025	0.037
174–176	99.99981–99.9999	0.00009	0.013
177–179	99.99993–99–99996	0.00003	0.0045
180–182	99.99997–99.999985	0.000015	0.0022
183–185	99.999989–99.999995	0.000006	0.0009
TOTALS		0.666891	99.9926

There were 167 test-takers who scored 11 or above and thus qualified to be inserted into our grid. We sort the test-takers into categories on the basis of their raw scores, as can be seen in Table 11.

Table 11. Distribution of testees in the intervals and associated scores on the Titan Test.

IQ Interval	Theoretical Frequency	Associated Scores
138–140	75.12	11–18
141–143	35.06	19–23
144–146	25.04	24–28
147–149	15.02	29–33
150–152	7.5	34–38
153–155	5	39
156–158	2.25	40
159–161	1	41–43
162–164	0.5	44
165–167	0.25	45–47
168–170	0.125	48
171–173	0.063	
174–176	0.023	
177–179	0.0075	
180–182	0.0038	
183–185	0.0015	
TOTAL	166.9638	

The clustering at the bottom is probably a result of there not being enough test-takers to get more precise results. Getting seven more questions right should raise IQ by much more than two points. It is a problem that we have fewer than 400 test-takers, as the mean IQ is based on the Mega Test to which there were more than 3200 responses. The Titan Test appears to be able to discriminate up to the one in a hundred thousand level, but more extravagant claims do not seem well founded. As for the scores which were below the mean, we use the mean and the standard deviation to estimate them, in preference to the normal curve to which this array of scores does not conform. As before, we assign 16 IQ points to one standard deviation of 10.42, counting from IQ 138, which we placed at raw score 11 (see Table 12). Each question answered correctly up to the mean therefore yields 16/10.42 IQ points, or an increment of 1.54 IQ. Hence, we obtain the following norming for the test:

Table 12. New norming of the Titan Test 2019.

Raw Score	IQ	Raw Score	IQ	Raw Score	IQ
1	123	17	140	33	149
2	124	18	140	34	150
3	126	19	141	35	150
4	127	20	141	36	151
5	129	21	142	37	151
6	130	22	142	38	152
7	132	23	143	39	154
8	133	24	144	40	157
9	135	25	144	41	159
10	136	26	145	42	160
11	138	27	145	43	161
12	138	28	146	44	163
13	138	29	147	45	165
14	139	30	147	46	166
15	139	31	148	47	167
16	139	32	148	48	168+

This norming is surprisingly low in context, as virtually all the questions on the Titan Test are difficult, unlike the Mega Test which also includes relatively easy items.

As shown above, the mean of the Mega Test is 15 and the standard deviation is 8.24. For the Titan Test, we found a mean of 11.65 and a standard deviation of 10.42. Each test has 48 items of equal weighting. Let us ascertain theoretically which test is the more difficult at the highest raw score possible.

The z-score for the Mega Test would be 48−15/8.24 = 4.004

The z-score for the Titan Test would be 48−11.65/10.42 = 3.4884

Empirical evidence also lends credence to the result that the Mega Test is harder at the highest levels. Out of the 3258 test-takers, there were 21 who scored 40 or higher on the Mega Test, which equals a proportion of 0.64%. For the 391 Titan Test subjects, there were 5 who scored 40 or higher, a proportion of 1.28%. For the paired scores, we notice that the highest scorers on the Titan Test normally achieved a lower raw score on the Mega Test. A perfect score of 48 on the Titan Test, achieved by one subject, equals about 44 on the Mega Test. The second highest score on the Titan Test, when considering only *Omni* participants, was 44, which equals about 42 on the Mega Test.

7. Conclusions

The renorming of these tests has indicated that the official scores reported to participants are too generous in almost all instances see [20] for a comparison. According to our results, the designer's most recent norming of the Mega Test is too high by six IQ points at a raw score of 10, five IQ points at a raw score of 20, ten IQ points at a raw score of 30 and eleven IQ points at a raw score of 40. The Titan Test has only been normed once. That norming, we believe, is too high by three IQ points at a raw score of 15, by five IQ points at a raw score of 20, ten IQ points at a raw score of 30 and thirteen IQ points at a raw score of 40. Scores on the Mega Test are boosted because its verbal section contains a number of items which can be solved without much effort (see Appendix A). The verbal section of the Titan Test is more abstruse, requiring greater knowledge, more elaborate fact-finding and more thought as to what is being asked for. Therefore, our norming is almost identical to Dr Hoeflin's up to a raw score of 11.

It is a surprise that the ceiling of the Mega Test seems to be higher than that of the Titan Test. Even a cursory glance at the two tests gives the impression that the Titan Test is harder, and it was designed to be so. There are two possible explanations. The first is that it attracted a more select group of testees. Only 391 *Omni* readers took the Titan Test, as opposed to more than 3200 for the Mega Test. It is possible that with a larger pool of subjects, the mean would have dropped significantly, which would have pushed the highest scores up. IQs yielded on both the tests relate greatly to the scores of other participants. The second explanation would be that taking the Titan Test involves answering questions which are rather similar. For instance, there are five variations on a single theme in the "probabilities" section (see Appendix B). Solving one of these problems correctly might have made it significantly easier to solve others in the same section. The combination of generally difficult questions with clustering occurring inside sections, may then have led to greater dispersal. The concomitant higher standard deviation would, in that case, have pushed the ceiling down. Mega Test questions tend to be more unlike one another. If we discount the defect associated with its verbal section, we believe it does measure mental ability up to the one in a million mark. (Even if the mean on the test represents an IQ of 131, six points lower than assumed, a raw score of 45 would generate an IQ of at least 167. A raw score of 48, not yet achieved by a test taker, would then probably still hit the one in a million level, which is an IQ of 176.) The Titan Test measures up to the one in a hundred thousand mark and, as discussed above, has no defect in its verbal section.

The decisive issue is whether these tests can be useful to psychologists. Our norming does indicate that the tests go above the ceilings of established tests. Subjects who achieve a raw score above 40 are of such exceptional ability that standard tests are unable to measure them adequately. Scores above 5 or so on the Titan Test and scores above 11 or so on the Mega Test also betoken giftedness in the subject. For detecting this, the experimental tests are alternatives to the many accepted tests which operate with a ceiling of only 2 to 2.5 standard deviations above the mean. If the experimental tests were to be adopted by a researcher with the resources necessary to combine them in such a way that the easy verbal and any other faulty items were eliminated, they might serve as a useful complement to other high-range instruments such as the Concept Mastery Test or the Miller Analogies Test [22]. This is especially true because the experimental tests offer many non-verbal questions. New norms would of course have to established for the improved test or tests. Short forms of the tests could also be created which select the best items. Item Response Theory would be useful here. The object would be to choose the items which act as the greatest indicators for the levels of ability which surpass the norms on the standard tests available. The Mega and Titan Tests, however, cannot be used on their own and in their current form by psychologists, owing to the lack of supervision associated with them and the extremely lengthy test procedure.

Funding: This research received no external funding.

Acknowledgments: The author is grateful for the input of the three referees for this journal any remaining deficiencies are entirely his own.

Conflicts of Interest: The author declares no conflict of interest.

Appendix A. Examples of Items from the Verbal Section of the Mega Test

1. NIGHT is to DAY as NOCTURNAL is to?
2. HEEL is to ACHILLES as BOX is to?
3. SHOE is to COBBLER as BARREL is to?
5. $\frac{1}{2}$ is to SEMI as 1 $\frac{1}{2}$ is to?
6. BILLION is to BILLIONTH as GIGA- is to?
11. WATER is to AQUEOUS as SNOW is to?
12. SEA is to LITTORAL as RIVER is to?

Appendix B. Items from the "Probabilities" Section of the Titan Test

For the following five problems, imagine that there is an ant at each vertex and that the ants all simultaneously crawl along an edge to the next vertex, each ant choosing its path randomly. What is the probability that no ant will encounter each other, either en route or at the next vertex, for each of the following regular polyhedrons?

38. A tetrahedron
39. A cube
40. An octahedron
41. A dodecahedron
42. An icosahedron

References

1. Terman, L.M. *The Measurement of Intelligence: An Explanation of and a Complete Guide for the Use of the Stanford Revision and Extension of the Binet-Simon Intelligence Scale*; Houghton Mifflin: Boston, MA, USA, 1916.
2. Terman, L.M. *The Intelligence of School Children. How Children Differ in Ability, the Use of Mental Tests in School Grading and the Proper Education of Exceptional Children*; Houghton Mifflin: Boston, MA, USA, 1919.
3. Terman, L.M. *The Gifted Child Grows Up. Twenty-Five Years' Follow-Up of a Superior Group*; Genetic Studies of Genius; Stanford University Press: Stanford, CA, USA, 1947; Volume 4.
4. Lubinski, D.; Benbow, C.P. Study of mathematically precocious youth after 35 years. Uncovering antecedents for the development of math-science expertise. *Perspect. Psychol. Sci.* **2006**, *1*, 316–345. [CrossRef] [PubMed]
5. Sternberg, R.J. *A Triarchic Mind: A New Theory of Human Intelligence*; Viking: New York, NY, USA, 1988.
6. Kline, P. *Intelligence. The Psychometric View*; Routledge: London, UK, 1990.
7. Jensen, A.R. *The g Factor: The Science of Mental Ability*; Praeger: Westport, CT, USA, 1998.
8. Morris, S. The world's hardest IQ test. *Omni* **1985**, *7*, 128–129, 132.
9. Morris, S. Games. *Omni* **1990**, *12*, 90–91.
10. Galton, F. *Hereditary Genius: An Enquiry into Its Laws and Consequences*; Macmillan: London, UK, 1869.
11. Lombroso, C. *The Man of Genius*; Scott: London, UK, 1891.
12. Ellis, H. *A Study of British Genius*; Hurst & Blackett: London, UK, 1904.
13. Langdon, K. Hardest IQ Test. *Omni* **1979**, *1*, 116–120.
14. Morris, S. Brainbuster: Omni's new IQ test. *Omni* **1981**, *3*, 96–98.
15. Warne, R.T.; Godwin, L.R.; Smith, K.S. Are there more gifted people than would be expected in a normal distribution? An investigation of the overabundance hypothesis. *J. Adv. Acad.* **2013**, *24*, 224–241. [CrossRef]
16. Carlson, R.D. The Mega Test. In *Test Critiques*; Keyser, D.J., Sweetland, R., Eds.; Pro-Ed: Austin, TX, USA, 1991; Volume 8.
17. Spearman, C. General intelligence objectively determined and measured. *Am. J. Psychol.* **1904**, *15*, 201–293. [CrossRef]
18. Available online: http://www.williamflew.com/omni79d.html (accessed on 25 October 2019).
19. Morris, S. Games. *Omni* **1986**, *8*, 112–114.
20. Miyaguchi, D. Uncommonly Difficult IQ Tests. Available online: www.miyaguchi.4sigma.org (accessed on 25 October 2019).

21. Available online: http://www.williamflew.com/omni139e.html (accessed on 25 October 2019).
22. Zahler, K.A. *McGraw-Hill's MAT. Miller Analogies Test*; McGraw-Hill: New York, NY, USA, 2006.