

What's really true about intelligence and IQ?

We empirically tested 40 claims

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You can access [the website version of this report here](#).

You've probably heard lots of claims made about IQ – for instance people saying that it's important and captures most of intelligence, or that it's meaningless or pseudoscientific. Lots of claims about IQ are also made in the academic literature, such as that it can predict a variety of life outcomes. But what's actually true about IQ? We set out to answer this by running a giant study aiming to check many claims about it to see if they hold up. This report contains our findings on 40 such questions, like:

- What's the relationship (if any) between IQ and income?
- Are people with higher IQs happier or less happy?
- Do psychopathic and narcissistic people have higher IQs or lower IQs?
- Are there any intelligence tasks that women do especially well on, and are there any that men do especially well on?
- Is there any relationship between personality and IQ, and if so, what is it?

Perhaps the most critical claim in the IQ literature is that IQ can be estimated from performance on just about any diverse set of intelligence tasks. For this study, we measured IQ using the following method:

- Each participant was randomly assigned to do intelligence tasks from a pool of 62 distinct intelligence tasks (each testing a different skill, such as spelling,

math, vocabulary, logic, and so on). On average participants completed between 6 and 7 tasks.

- Following a common practice, we converted each person's performance on each task to z-scores (meaning we subtracted and multiplied so as to make each task score have a mean of 0 and standard deviation of 1), and then conducted principal component analysis on these scores to find a "common factor" among the 62 intelligence tasks (after converting task scores to z-scores), and a weight was assigned to each task based on how strongly it correlated with this common factor. Each participant's IQ score was based on a weighted average of their z-scores on whichever of the 62 tasks they completed, where the weights were determined by the correlations with this common factor. IQ scores were also normalized (through simple subtraction and multiplication) aiming to make the average American's score be about 100, with a standard deviation among Americans of roughly 15.
- We estimate our IQ test's correlation with a hypothetical perfect measurement of the general intelligence factor (g) to be between 0.76 and 0.85. To determine the lower bound, we randomly split each participant's tasks into two independent task sets, generating two separate IQ scores (IQ_1 and IQ_2). The correlation between these scores was .58. Since both are equally representative of g (on average), their correlation to g is estimated to be $\sqrt{.58} \approx .76$. This serves as a (rough) lower bound because each score is based on only half of the available tasks, and so using all tasks to estimate IQ (as we did in this research) will produce a more accurate measurement of IQ. For the upper bound, we re-tested participants from the initial study several months later using a refined version of the test (that, on average, contained few items in common with the original version participants had taken). The correlation between their original and new IQ scores was .76. Assuming the new and old version were equally accurate and independent, this would yield an estimated correlation with g of $\sqrt{.76} \approx .87$. This likely represents an upper bound due to some minor task overlap between the two test administrations, and because the new (refined) version was likely at least somewhat more reliable than the original version that participants had taken. With this in mind, correlations in this report between measured IQ and different outcomes may be

approximately 20% smaller than they would be if our IQ measure was a perfect (noise free) measurement of g .

Our sample consisted of $n = 3691$ participants (61% male, 37% female). The mean age of our participants was 37.4 with a standard deviation of 13.

It's important to note that our participants came from two different sources. A total of 1853 participants came from [Positly, which is our platform for recruitment of participants for studies](#). The rest ($n = 1838$) of participants were recruited through social media posts (and posts on other sites, such as reddit) calling for participation in the study. Importantly, these two subsamples substantially differed in number of characteristics, the most prominent being age, gender and average IQ. The Positly sample was older than the social media sample (mean ages of 41.7 vs. 33.0) and more gender balanced (the ratio of male participants to female participants in the Positly sample was 0.84 male participants per 1 female participant, while in the social media sample it was 3.95 male per 1 female). Finally, non-Positly social media sample had on average substantially higher IQ estimates than Positly sample (IQ = 120.65 vs. IQ = 100.35).

It's also important to note that given our large sample size, even very low correlations are statistically significant by conventional criteria (i.e., achieving $p < 0.05$) as statistical significance depends on sample size. It does not mean, however, that such results are *practically* significant. Therefore, whenever the absolute value of correlation was lower than 0.10, we considered it a non-meaningful effect, even if the result was statistically significant. Additionally, the fact that our study showed or failed to show some effect, does not necessarily mean that the effect actually exists or does not exist. We can never completely trust a single study because, although the chances for it are low, the effect could just be a false positive (meaning that we detected the effect in our sample by chance even though it does not exist in a population), just as well as the lack of effect could be a false negative (meaning that we failed to detect the effect in our sample by chance, even though the effect exists in a population). It also could be the case that the effect we found was the result of the particular populations we conducted this research on. To help reduce the

chance of that being the explanation, we have controlled for age, gender and data source whenever the hypothesis being tested is not related to one of those variables.

Note that because of the large number of study participants used in this research, correlations reported here will typically be statistically significant any time that the correlation magnitude is at least $r=0.1$ (so long as it's an analysis that involved a sample size of at least 400 people). With a sample size of at least 400 people, even a correlation of only $r=0.15$ will have a low p-value of less than 0.003. Therefore we do not bother reporting p-values in this report.

Many of the correlations shown in this report are small or only modestly sized. When referring to the size of the correlations, we are relying on Cohen's (1988) criteria for small, medium and large effect sizes. Specifically, here is the nomenclature we are using depending on the size of correlation:

Correlation range	Interpretation
<0.1	Negligibly small correlation
$[0.10 - 0.20)$	Small correlation
$[0.20 - 0.30)$	Moderate correlation
$[0.30 - 0.40)$	Medium-sized correlation
$[0.40 - 0.50)$	Medium-large correlation
≥ 0.50	Large correlation

Not all of our analyses include the full sample of participants. Given that our full questionnaire would be intolerably long had we given all the questions to all participants, some of our tests and questionnaires were given to only a fraction of participants. So, for these variables, the analyses were conducted on a smaller sample of participants that received that particular test or questionnaire.

While we believe our IQ tasks did quite a good job of measuring IQ for most study participants, due to the nature of our study (with each study participant getting a

random sample of the 62 intelligence tasks) more accurate methods of doing IQ testing exist. The more noise there is in a measure of IQ, the lower the magnitude of correlations will be found with all other variables, on average. As such, our analyses are likely to slightly underestimate correlations with IQ compared to more accurate tests.

As a final note, remember that a correlation does not necessarily imply causation. The results below reflect correlations between IQ and many other different variables, but that does not necessarily mean that IQ causes changes in those variables. For instance, suppose we find a link between IQ and the personality trait of "openness to experience." This could be because:

- Higher IQs cause greater openness
- Higher openness causes higher IQs (e.g., maybe more open people learn more voraciously when young which causes higher IQs)
- Some third variable separately causes both higher IQ and higher openness (e.g., perhaps being raised by parents that strongly value education causes kids to both be more open and to have higher IQs)
- Higher IQ and greater openness both cause each other (e.g., maybe higher openness leads to more learning in childhood which leads to a higher IQ which leads to a more rewarding experience in school which leads to even more openness)

For more about how to interpret correlations, [see our article here](#). With these caveats covered, let's dive deeper into the results.

Summary table

Here is a brief summary of the findings in this report. Click on the corresponding research question to jump to that part of the report. Note that all of our analyses involved controlling for age, gender and data source (except for research questions

where that would be inappropriate, such as when looking at the relationship between age and IQ).

Research question	Main takeaway(s)
1. Is IQ normally distributed (i.e., is it really a "bell curve")?	In our sample, IQ was normally distributed, which agrees with prior studies.
2. If you are good at one intelligence task does it make you more likely to be good at most others (i.e., are intelligence tasks positively correlated to each other)?	There is a positive manifold of intelligence tasks, meaning that performance on nearly all intelligence tasks is positively correlated with performance on nearly all other ones.
3. Does IQ predict people using their time the way they'd ideally want to use it?	Higher IQ people are more successful in using their time as they would ideally like to than lower IQ people.
4. Does IQ predict outcomes only on the "left" side of the IQ distribution (i.e., for people of below average IQ)?	<p>To the extent IQ predicted variables that we tested, it did not predict them more strongly on the left side of the IQ distribution.</p> <p>The only notable exception to this was the "good employee self-report score" (an indication of how good people believe they are at their jobs). IQ was more correlated with this score for those with lower IQs than for those with higher IQs.</p>
5. Does IQ peak in the mid-to-late 20s and then decline and how does this look for "crystallized" vs. "fluid" intelligence?	Looking across ages for the population at a single point in time, fluid intelligence seems to rise throughout younger age, then remains stable in adulthood and steadily declines in older age (after 50). Crystallized intelligence also rises during early adulthood, but

	then plateaus.
6. Does the Dunning-Kruger effect exist (whereby lower IQ people tend to overestimate their IQ), and do higher IQ people tend to underestimate their IQ?	Our study data matched what is typically referred to as the Dunning-Kruger effect, though the interpretation of such data is complicated, and may not mean what it is generally believed to mean, as we discuss in our report here about the Dunning-Kruger effect.
7. Is IQ related to the Big Five personality trait "conscientiousness"?	There is little to no relationship between IQ and conscientiousness (other than, perhaps, some relationship with a small number of specific conscientiousness items).
8. Is IQ related to the Big Five personality trait "openness"?	IQ has a small positive correlation with the "intellect" facet of openness, but not with other measured facets.
9. Is IQ related to the Big Five personality trait "agreeableness"?	There is a small positive correlation between IQ and agreeableness, as well as between IQ and the "empathy" facet of agreeableness.
10. Is IQ related to the Big Five personality trait "extraversion"?	Higher intelligence people were generally less extraverted in our study with correlation sizes ranging from small to moderate.
11. Is IQ related to the Big Five personality trait "emotional stability" (i.e., a lack of neuroticism)?	IQ and emotional stability / neuroticism are not related, i.e. the correlations between IQ and emotional stability / neuroticism factor and facets were negligibly small.
12. Is personality a better predictor of important life outcomes than IQ?	The relative importance of IQ and personality depends on the outcome: for some outcomes, such as high-school and college GPA, they predict approximately equally well, while for

	<p>some outcomes personality is much stronger predictors (happiness and life satisfaction). Overall, when compared to all of the Big Five personality traits together, IQ was on average a weaker predictor than personality on the outcomes we tested. The effects of IQ and personality tend to be additive, so using both typically makes predictions more accurate than just using one.</p>
<p>13. Is IQ related to "dark triad" traits, like machiavellianism, narcissism, and sadism?</p>	<p>We found higher IQ people to be lower on two out of three dark triad traits, narcissism and sadism, but not on machiavellianism (with which there was no correlation). However, meta-analyses appear to find no relationship between IQ and these traits.</p>
<p>14. What is the relationship between IQ and education?</p>	<p>IQ is linked to higher levels of education obtained and to high-school GPA, but its relationship with college GPA is quite lower than with high-school GPA.</p>
<p>15. What is the relationship between IQ and job performance?</p>	<p>IQ predicts better self-reported job performance, but only in a subsample of participants with IQ that is lower than average. However, in that group of people, the link between IQ and self-reported job performance was quite large.</p>
<p>16. Is IQ positively related to income?</p>	<p>Higher IQ is linked to greater income but the correlation is small. Part of this effect may be that higher IQ people can get hired and perform better at some high paid jobs, but that is probably not the full explanation.</p>

<u>17. Is IQ related to happiness and life satisfaction?</u>	IQ likely has little to no correlation with either momentary happiness or life satisfaction.
<u>18. Is IQ related to different mental health challenges?</u>	IQ was not related to any of the 14 mental challenges we screened in our study, and more broadly there is a lack of consensus on the relationship between IQ and mental health.
<u>19. Does childhood poverty or low socioeconomic status in childhood predict lower IQ in adulthood?</u>	In our study childhood poverty and low childhood socioeconomic status were not related to IQ, although this contradicts findings from other studies that find a modest negative correlation between these factors and IQ.
<u>20. Is childhood nutrition related to IQ as an adult?</u>	We found that some aspects of childhood nutrition, specifically self-reports (as an adult) of having enough food in childhood and being breastfed as a baby, had a small positive correlation with later life IQ.
<u>21. Does IQ differ depending on the family structure in which one grew up?</u>	IQ differs depending on the family structure in which a person grew up, being highest in those from nuclear families compared to other family types (extended family or stepfamily).
<u>22. Is there a relationship between IQ and adverse childhood experiences (ACEs)?</u>	In our study, childhood adverse experiences had little to no association with adult IQ, but it must be noted that other studies found that these traumatic experiences are associated with detrimental effects.
<u>23. Is there a relationship between IQ and how much a person was read to as a child.</u>	People who say that they were read to more in childhood also score higher on IQ tests in adulthood, and this effect

	does not appear to be due to childhood wealth or childhood social class.
24. Is there a relationship between IQ and having been breast-fed?	People that report not having been breastfed in infancy seem to have slightly lower IQ than people that were breastfed.
25. Is there a correlation between self-estimated IQ and measured IQ?	Just like in other studies, in our study measured IQ was moderately related to the self-estimated IQ. Both higher IQ and lower IQ people may have a tendency to estimate themselves closer to the average than they really are.
26. What is the relationship between IQ and political views?	Those with higher IQs tend to have more socially progressive/liberal/left (i.e., less socially conservative/right) views.
27. Is IQ related to gun possession and/or gun support?	Higher IQ people would like to see stricter gun laws compared to people with lower IQs. The size of this effect was cut in half when we controlled for political ideology.
28. Is IQ positively related to political tolerance?	Higher IQ people are more likely to have tolerance for groups that they politically oppose with correlations between IQ and tolerance being small to moderate.
29. Is IQ related to actively open-minded thinking?	Higher IQ people are more prone to actively open-minded thinking with the medium-large correlation between the two ("the willingness to consider alternative opinions, sensitivity to evidence contradictory to current beliefs, the willingness to postpone closure, and reflective thought").
30. Is there a relationship between IQ	Grit ("passion and perseverance for

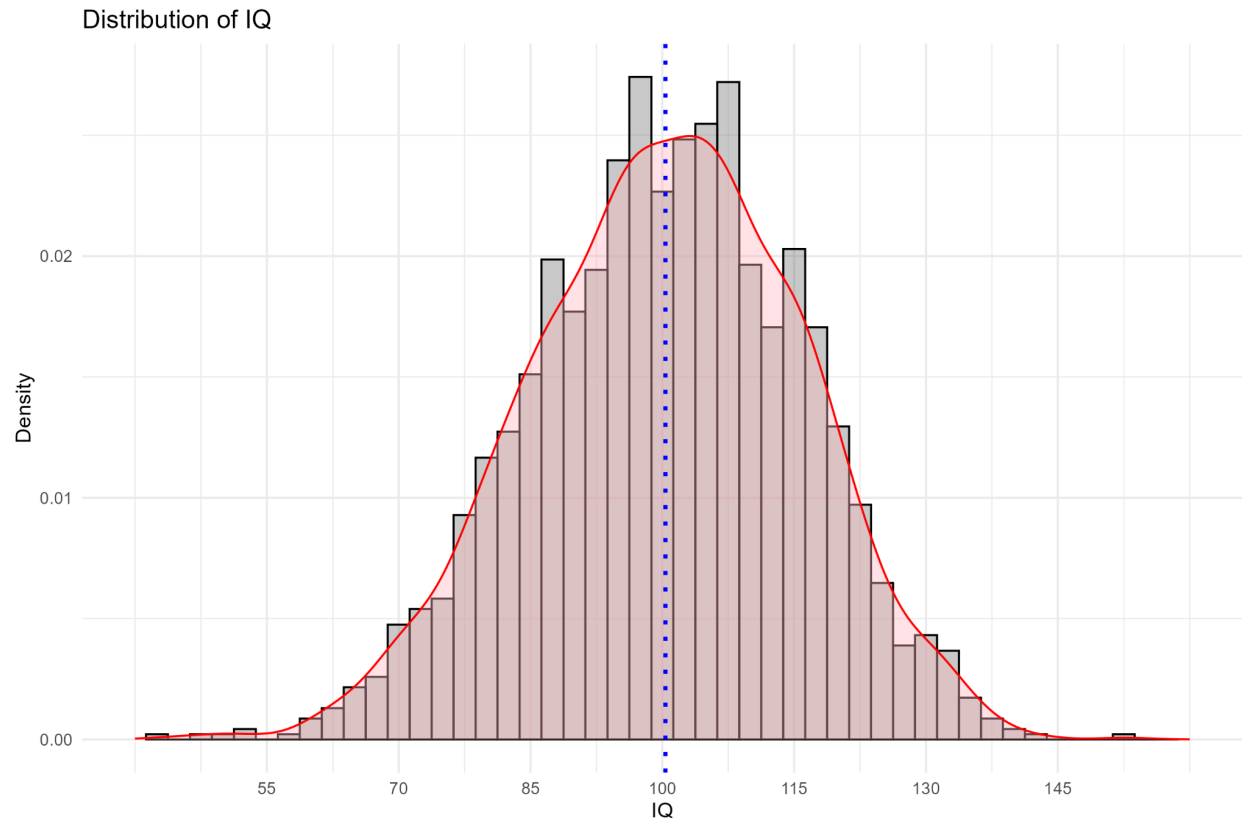
<u>and grit?</u>	long-term goals") and IQ have little to no correlation.
<u>31. Is there a positive correlation between IQ and a range of behaviors that some might think could be positively related to IQ?</u>	IQ is generally positively correlated to a variety of different self-reported behaviors that one might think could be associated with IQ, such as enjoying solving riddles/difficult puzzles, finding that math comes easy, and being interested in science, but there were a few surprising negative correlations as well, such as believing one could figure out solutions for society's big problems.
<u>32. Is there a negative correlation between IQ and the range of behaviors that some might think could be negatively related to IQ?</u>	People with lower IQ are more likely to report playing the lotto, watching more TV, keeping up with celebrity gossip, have difficulties filling out complicated forms, and getting bored with just sitting and thinking than people with higher IQ.
<u>33. Are there cognitive tasks that women are especially good at relative to men, and are their cognitive tasks that men are especially good at relative to women? For instance, are women better on processing speed and verbal tasks than men, and men perform better on numerical and spatial tasks?</u>	On average, women appear to perform slightly better than men at verbal tasks related to word production, while men appear to outperform women on spatial tasks. It's unclear, however, why these differences occur.
<u>34. Do people with higher IQ rate pseudo-profound made-up statements as less profound than people with lower IQs?</u>	Higher IQ people may be less susceptible to believing that B.S. "pseudo-profound" statements are profound.
<u>35. Is there a correlation between IQ and celebrity worship?</u>	Lower IQ is related to a higher obsession with celebrities and pathological attitudes toward celebrities. However, this is not true about more typical

	positive feelings towards celebrities (e.g., really enjoying watching, reading or listening to them), in which case there is no relationship to IQ.
<u>36. Is IQ related to the ability to identify facial expressions?</u>	Both verbal and numerical intelligence is positively correlated with the ability to accurately recognize emotions from facial expressions.
<u>37. Is IQ related to charitable behavior?</u>	In our study, IQ was not related to charitable behavior, though this contradicts typical findings by others on this subject.
<u>38. Is there a link between IQ and healthy lifestyle?</u>	IQ predicted only two of nine healthy behaviors that we measured. Higher IQ people were less likely to use drugs and to smoke than people with lower IQ. However, other studies have found broader positive links between IQ and healthy behavior that we did not find.
<u>39. How does being nervous or anxious before and while taking an IQ test affect performance?</u>	Participants who were feeling nervous or anxious both before and while taking IQ tests performed worse on those tests.
<u>40. Does temperature or air flow in the room impact performance on an IQ test?</u>	Room conditions such as temperature or freshness of the air had minimal effects on IQ (though we did not test extreme conditions, just the natural conditions people found themselves in).

1. Is IQ normally distributed (i.e., is it really a 'bell curve')?

Yes, in our dataset IQ was approximately normally distributed. We decided to test this only on participants that came from [Positly](#) (our web platform for recruitment of study participants) because the rest of our sample that came from social media is highly non-representative. As we wrote previously, our social media sample is younger, mostly male and of above average IQ and therefore inappropriate for generalizing about the IQ distribution.

After we selected Positly participants ($n = 1853$), we plotted their IQs. Here is a histogram and density plot that shows the distribution of IQs in our Positly sample (blue vertical dots indicate the average IQ of the sample). Note that we have not transformed the shape of this distribution at all (i.e., we did not do any processing that would force it to be a bell curve). Since IQ is based on principle component analysis (i.e., taking the first principle component of the matrix of task z-scores scores for all participants, and then calculating the loading of each task on the principle component), IQ scores end up being a weighted average of task scores. Since weighted averages have a tendency to be normal distributed due to the central limit theorem when applied to statistically independent random variables, this raises a question of how much of the bell curve shape comes from the fact that it's a weighted average of different test results, and how much of it comes from the underlying nature of intelligence. One argument sometimes made in favor of IQ being inherently normally distributed is that if it is the result of many small, independent additive factors (e.g., in a person's life, or in our genes, or in the brain) then that would produce a bell curve naturally. To what extent this may or may not be true is beyond the scope of this report.



The distribution looks pretty bell-curved, i.e. normally distributed. However, to test this formally, we conducted the Kolmogorov-Smirnov test, which is a statistical test that tests whether the distribution statistically significantly deviates from normal. The test was non-significant ($D = 0.019$, $p = 0.53$), meaning that the difference between a normal distribution and the actual IQ distribution we measured in our sample is not statistically significant.

What do the other studies say?

Studies generally agree that IQ is normally distributed (e.g. [Godwin & Smith, 2012](#); [Kaplan et al., 2000](#)).

Takeaways

- In our sample, IQ was normally distributed, which agrees with prior studies.

2. If you are good at one intelligence task does it make you more likely to be good at most others (i.e., are intelligence tasks positively correlated to each other)?

Yes! The positive manifold refers to the empirical observation that all cognitive ability tests tend to be positively correlated with each other meaning that individuals who perform well on one type of cognitive test (e.g., verbal reasoning, or math, or pattern finding) are also likely to perform well on most other types of cognitive tests (e.g., spatial reasoning, memory, or processing speed). Since we administered 62 different cognitive tests to our participants, we were able to calculate correlations between each pair of those tests. Out of 1891 pairwise correlations, 1847 (98%) were positive, while only 44 (2%) were negative. Furthermore, the absolute average value of positive correlations was much higher than the absolute average value of negative correlations ($r = 0.42$ vs. $r = 0.07$). Based on these results, we can be fairly certain about the positive manifold theory. The average correlation between all pairs of tasks was $r=0.41$.

Note: The phrase "positive manifold" in the field of psychometrics [originally had a different meaning](#), but we're using the more commonly used modern meaning of the term.

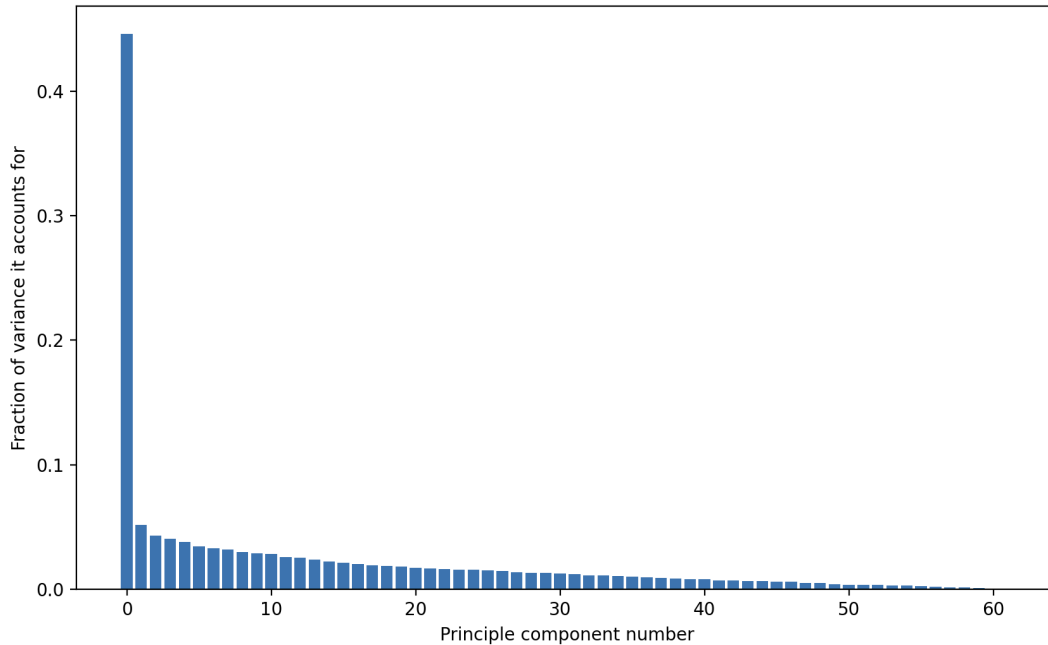
Below is a nice illustration of this pattern that we produced from our data. Blue color denotes positive correlation, and the darker it is, the greater the correlation. Red means that the correlation is negative. Note how few red rectangles there are. The tasks are ordered by g-loading, with the highest g-loaded tasks first and the lowest last.

[illegible]

Of course, while we tested a very wide range of intelligence tasks (62 distinct tasks), we did not test every conceivable intelligence task. So there could be some intelligence tasks that have no correlation with the bulk of intelligence tasks. But we didn't find any like that. The intelligence task we used in our study that turned out to have the lowest average correlation to the other tasks still had a meaningfully average positive correlation with the other tasks ($r=0.18$).

It's also interesting to note that if we conduct principal component analysis on this matrix of task correlations, we find that the first principle component accounts for 45% of the variance, with a very sharp drop after that, as can be seen in the chart below:

How much variance does each principle component account for? (i.e., the normalized eigenvalues of the matrix)



This suggests that there was primarily one hidden factor accounting for performance across the tasks – though it doesn't rule out the possibility of other, substantially weaker factors. Note that the shape of this normalized eigenvalues plot, above, may be partially effected by our study design, which involved each study participant getting a small random sample of intelligence tasks (chosen from a much larger set of 62 tasks). For participants we recruited from Positly, they completed 7.7 tasks on average (a median of 7 tasks) selected at random from our full set of 62 potential intelligence tasks, whereas our non-Positly sample completed 5.9 tasks on average (median of 6 tasks).

What do the other studies say?

Although not all researchers agree on the ultimate explanation for the positive correlations between different cognitive tasks (i.e., positive manifold), studies generally agree that the positive manifold of cognitive tasks exists (e.g., [Burgoyne et al., 2022](#); [Jensen, 1986](#); [Kovacs & Conway, 2016](#); [Pluck & Cerone, 2021](#); [van der Maas et al., 2016](#)).

In fact, it was this observation that almost all intelligence related tasks are positively correlated that makes the concept of measuring an IQ score potentially useful. If performance on different intelligence related tasks were all uncorrelated, it wouldn't make sense to assign a single score.

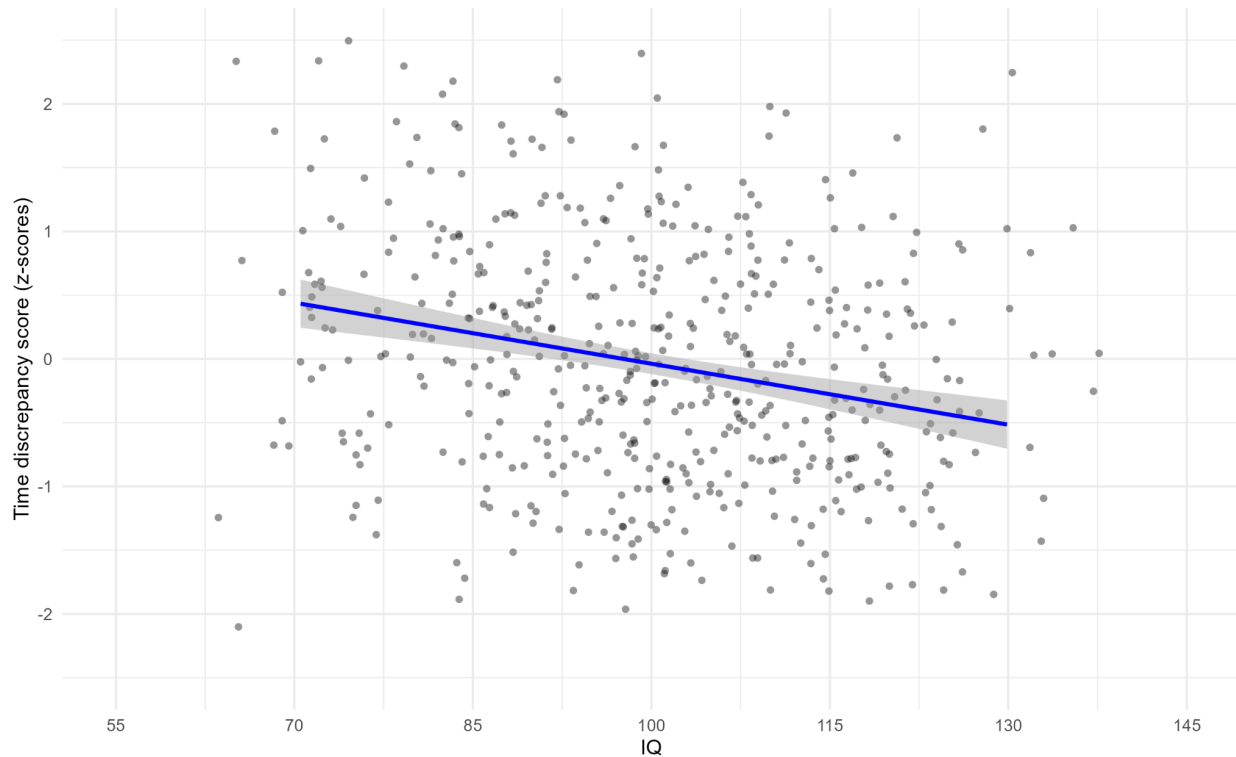
Takeaways

- There is a positive manifold of intelligence tasks, meaning that intelligence tasks are positively correlated to each other.

3. Does IQ predict people using their time the way they'd ideally want to use it?

Yes it does. The way we examined this was by asking people ($n = 516$) a) what is the ideal amount of time they would like to spend on various activities and b) what is the actual time they spend on those same activities. The activities we asked them about were spending time on the internet, exercising, planning for the future, reading, sleeping, spending time with a partner, spending time with family, spending time with friends, watching TV and working. For each of the activities we calculated the difference between the ideal and actual time and summed up the absolute values of those differences to obtain a total time discrepancy score. Therefore, the higher the total time discrepancy score, the more actual time spent on activities differs from people's reported ideal time. When we correlated this time discrepancy score with our IQ measure, the correlation was $r = -0.23$ meaning that higher IQ people spend more of their time as they would ideally like compared to lower IQ people. The link between using time the way you most desire does not seem to be explained by household income because even when controlling for household income we find that the correlation between time use discrepancy and IQ remains the same. Here is the scatterplot of this relationship.

Relationship between IQ and time discrepancy score (both variables controlled for age, gender, data source)



What do the other studies say?

We did not find studies or meta-analyses that investigated this same question that we did here, but under the assumption that good management of own time requires a good self control and is therefore an indicator of self control, we can look at what other studies say about the relationship between IQ and self control. Here, the results seem to indicate a positive relationship between IQ and self control, such as in [Duckworth et al. \(2012\)](#) study on $n = 1264$ students where students' IQ was correlated with parent and teacher reports of students' self control ($r = 0.25$ and $r = 0.33$ respectively). There is also a meta analysis by [Shamosh & Gray \(2008\)](#) on the relationship between IQ and delay discounting which is a form of self control that found the correlation between IQ and delay discounting to be $r = -0.23$ (this is expected as lower delay discounting implies higher self control). Thus, in this sense, our results are in line with previous literature. However, even if this time discrepancy is related to self-control, it likely involves other factors beyond self-control.

Takeaways

- Higher IQ people are more successful in using their time as they would ideally like to than lower IQ people.

4. Does IQ predict outcomes only on the "left" side of the IQ distribution (i.e., for people of below average IQ)?

No. Following some claims that circulated in the blogosphere (such as [this one](#) by Nassim Nicholas Taleb), we have set out to study this research question and, in general, found that whether IQ is more predictive on the left or on the right side of the distribution depends on the outcome. Statistically, we have tested this research question by dividing our sample in three separate groups: low IQ group ($IQ < 92$), average IQ group ($\geq 92 \ \& \ \leq 108$) and high IQ group ($IQ > 108$) and calculating the correlation between IQ and seven outcomes within each group independently. We chose these cut-off points because roughly a similar proportion of the population should fall into each group (approximately 30% of the population should fall into low and high IQ groups, while around 40% of the population should fall into the average IQ group). Note that a related claim that's been made in the academic literature is that there is a threshold beyond which IQ stops being useful (or becomes less useful) for some outcomes – known as the "threshold hypothesis."

The outcomes that we measured were a) level of education achieved, b) high-school GPA, c) personal income, d) life satisfaction, e) good employee self-report (a measure of how good people report being at their job that combines a number of different job relevant questions such as "I don't do every single thing that my boss asks me to do.", "I am often told by bosses that I do a great job at work." or "I always get my work done on time."), f) self-rated achievement of life goals, g) self-rated accomplishment in life, h) self-rated physical health, and i) the discrepancy between the ideal and the actual time use (participants estimated the ideal time they would like to spend on different activities, as well as the actual time they spend on it, and we summed the absolute differences between the two scores for each activity to make the total time use discrepancy score). In addition we have

plotted the smoothed line of best fit to visually represent the relationship between IQ and each outcome throughout IQ distribution.

As can be seen from the tables and figures below, out of the seven outcome that we've taken into account for this analysis, there were two for which IQ showed a higher predictiveness on the left side of the distribution (i.e., in the low IQ group, compared to the other two groups): the good employee self-report and the self-rated accomplishment in life, although its correlations with IQ did not differ across the IQ groups as much as did IQ-good-employee correlations. For some of the outcomes, the correlation was even slightly higher on the right side of the IQ distribution (e.g. high-school GPA, educational level, and personal income). An important note here, is that when restricting the range of a variable, as we do here by dividing into three different IQ groups, the magnitude of correlations will tend to drop through an effect known as "[range restriction](#)", so please keep that in mind when viewing the table below.

	Correlations of outcomes with IQ for different IQ groups		
	For Lower IQ participant s (IQs < 92)	For Middle IQ participant s (IQs from 92 to 108)	For Higher IQ participant s (IQs > 108)
Educational level	-0.029	0.089	0.114
High-school GPA	-0.018	0.121	0.202
Personal income	-0.040	0.005	0.084
Life satisfaction	-0.093	-0.046	0.01
Self-rated scale about how good an employee they are	0.458	0.052	0.042

Self-rated achievement of life goals	-0.118	-0.017	0.038
Self-rated accomplishment in life	-0.186	-0.067	0.047
Self-rated physical health	-0.037	-0.012	0.002
Time use discrepancy	-0.098	-0.023	0.008

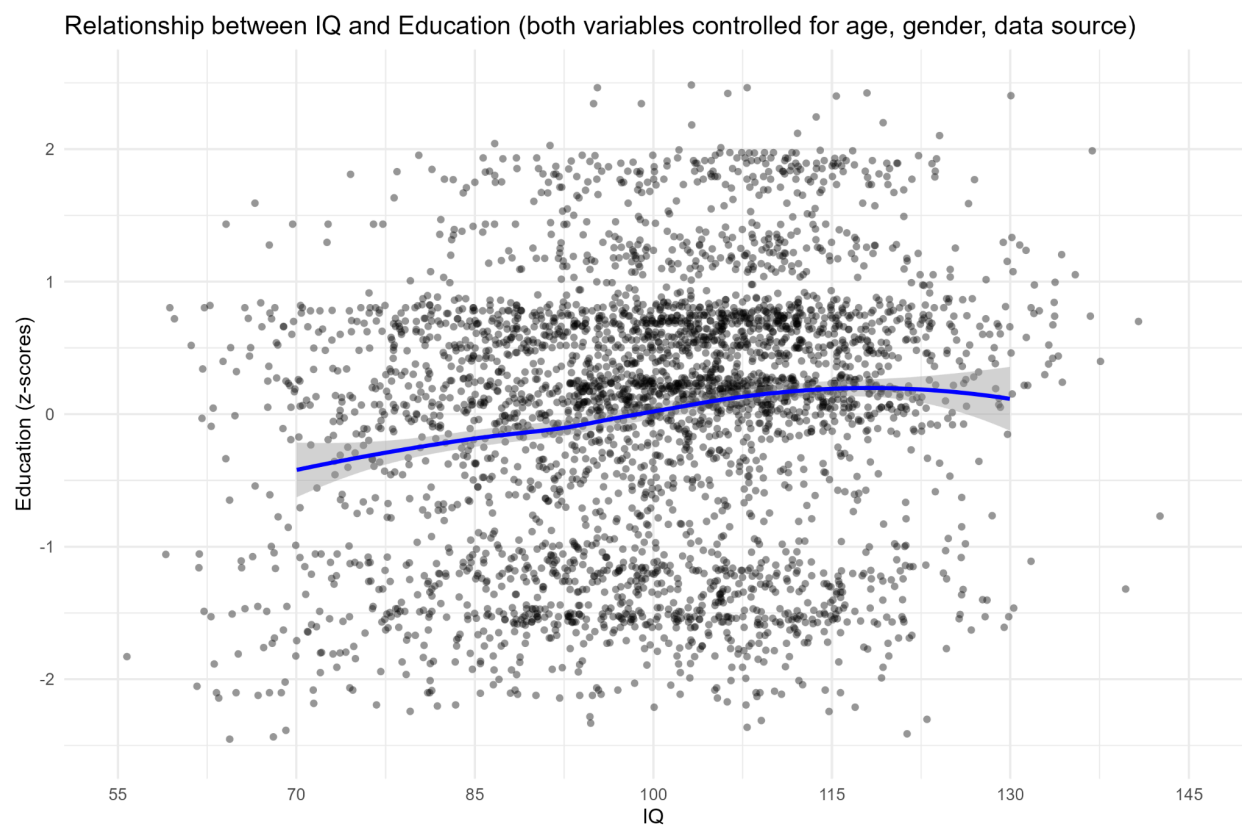
Note that self-rated achievement of life goals is measured on a 5 point likert scale from 0=not at all to 4=very much, using the question: "To what extent have you achieved your biggest goals in life that you've set out to achieve?"

Self-rated accomplishment is measured on a scale of 0 to 100 using this question:

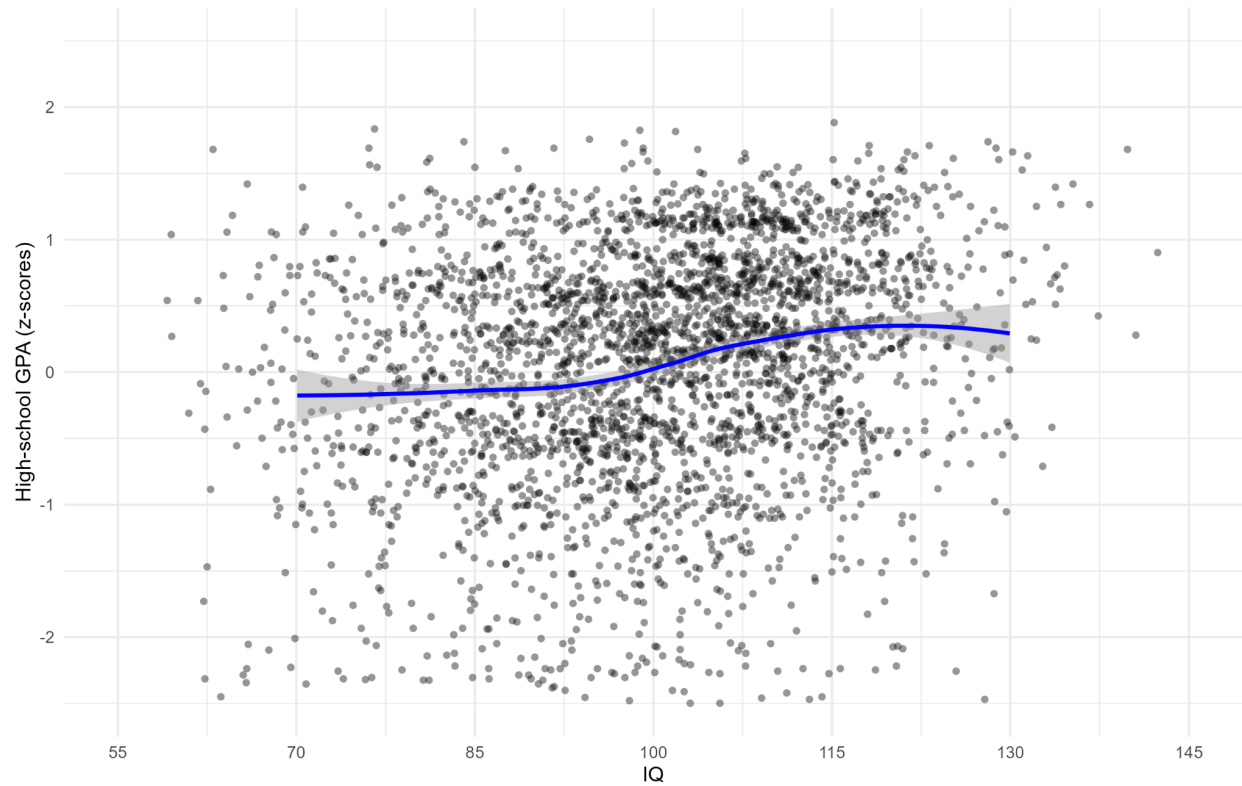
"Suppose that 0 refers to having accomplished nothing at all that people in your country value, and 100 refers to having accomplished as much as the most accomplished people in the world (such as a Nobel Prize winning scientists, billionaire CEO, world famous musician, or beloved president of a country). On this scale from 0 to 100, where would what you have accomplished thus far in your life fall (according to the standards of the people in your country)?"

Time use discrepancy is measured by subtracting actual self-reported use of time from the ideal time that participants reported they spent on different activities such as exercising, sleeping, reading, spending time with friends and family etc. The absolute values of these discrepancies for each specific activity were then summed to obtain the total time use discrepancy score. Higher score indicates higher mismatch between ideal and actual time use, i.e., more time spent in unwanted ways.

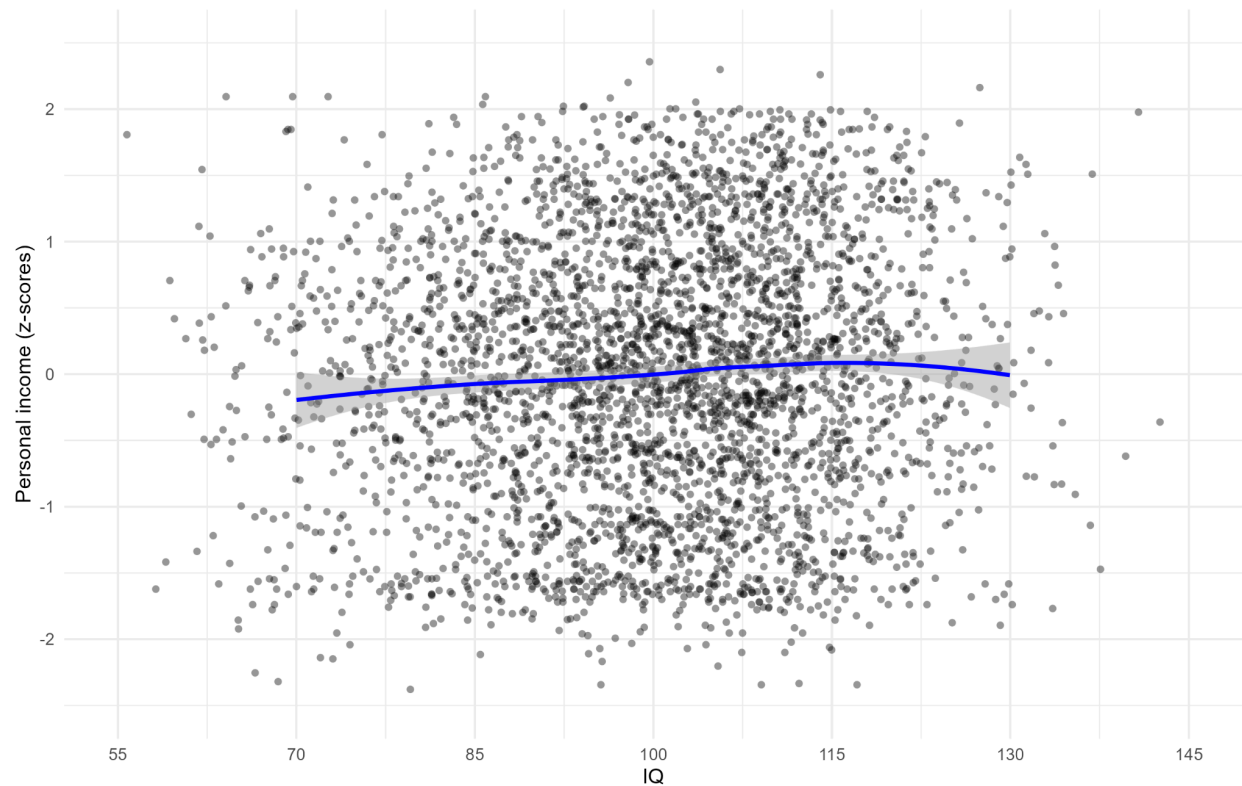
Note: In the plots below, we fitted a blue line that illustrates the relationship between IQ and other variables using the LOESS method (specifically quadratic local regression with tricube weight function) which is a non-parametric regression method that fits a smooth curve to data without assuming a specific model (such as linear or quadratic).



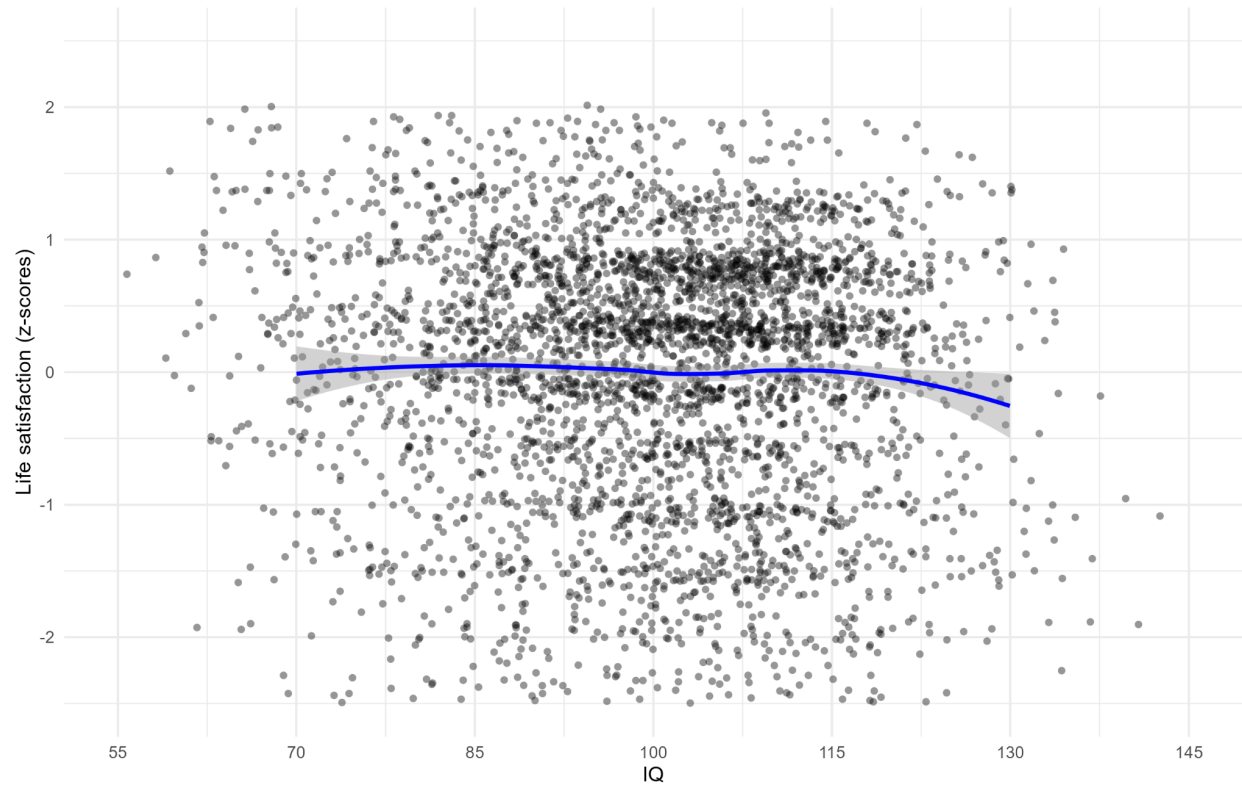
Relationship between IQ and high-school GPA (both variables controlled for age, gender, data source)



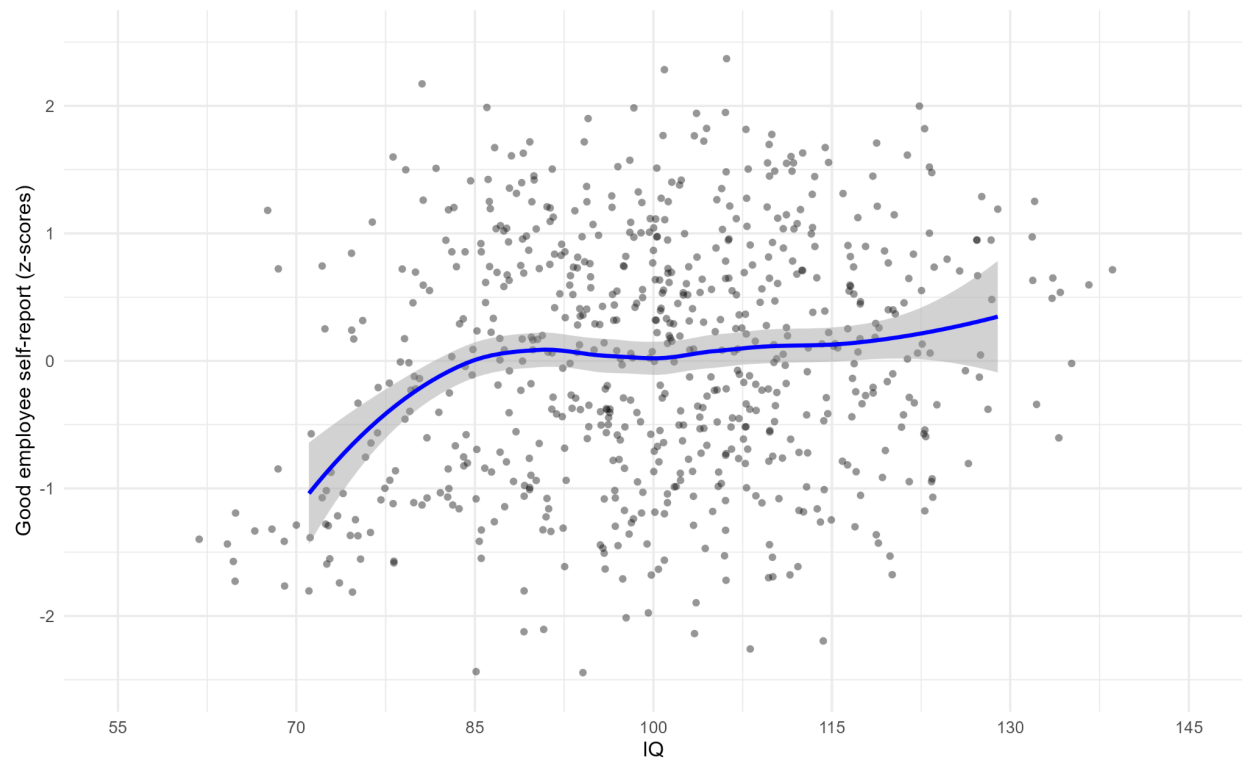
Relationship between IQ and personal income (both variables controlled for age, gender, data source)



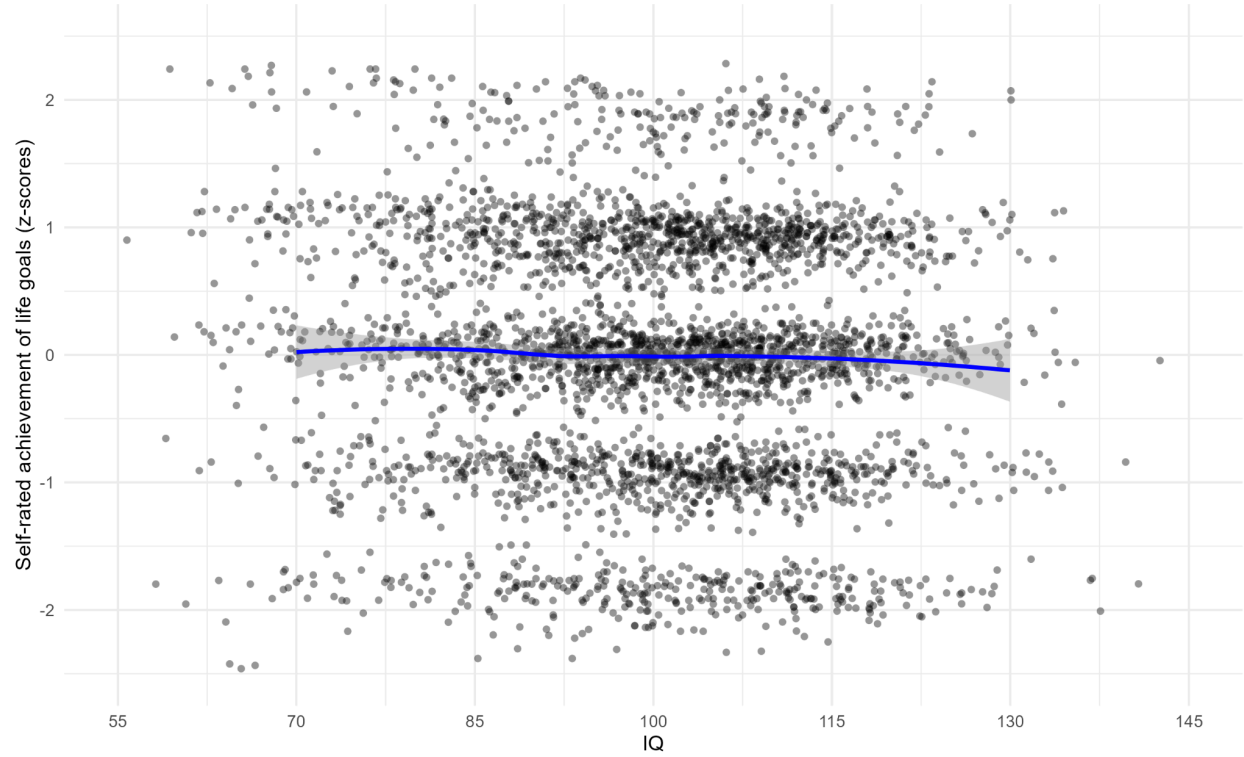
Relationship between IQ and life satisfaction (both variables controlled for age, gender, data source)



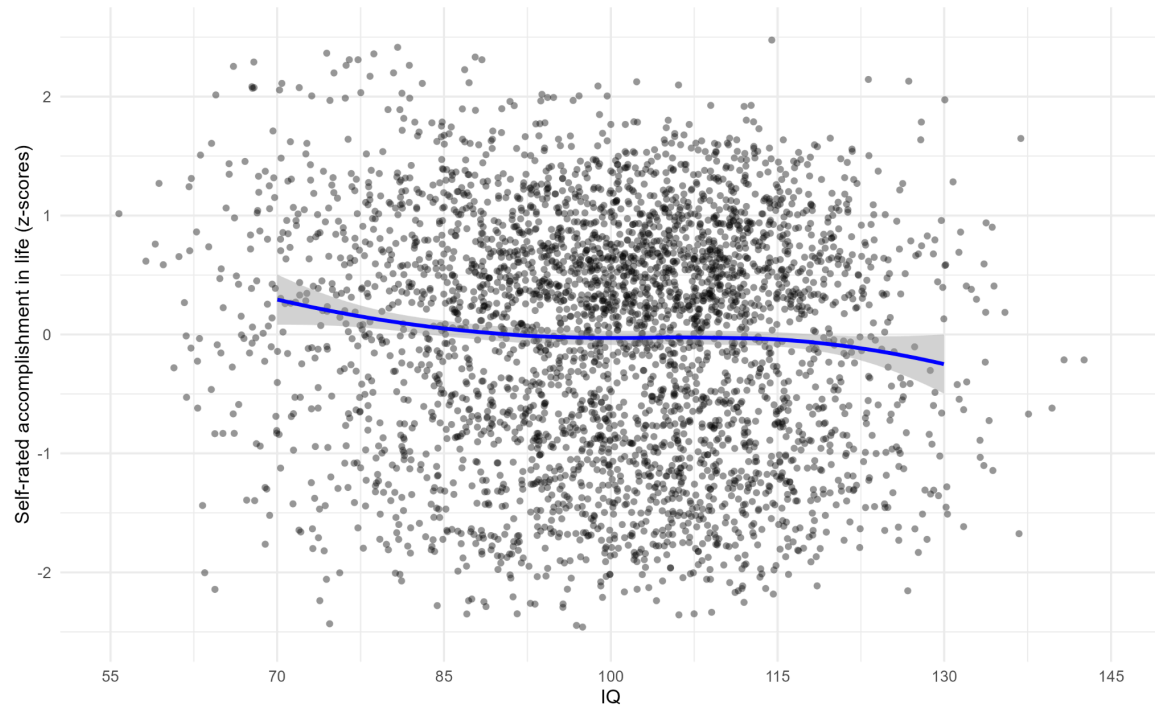
Relationship between IQ and Good employee self-report (both variables controlled for age, gender, data source)



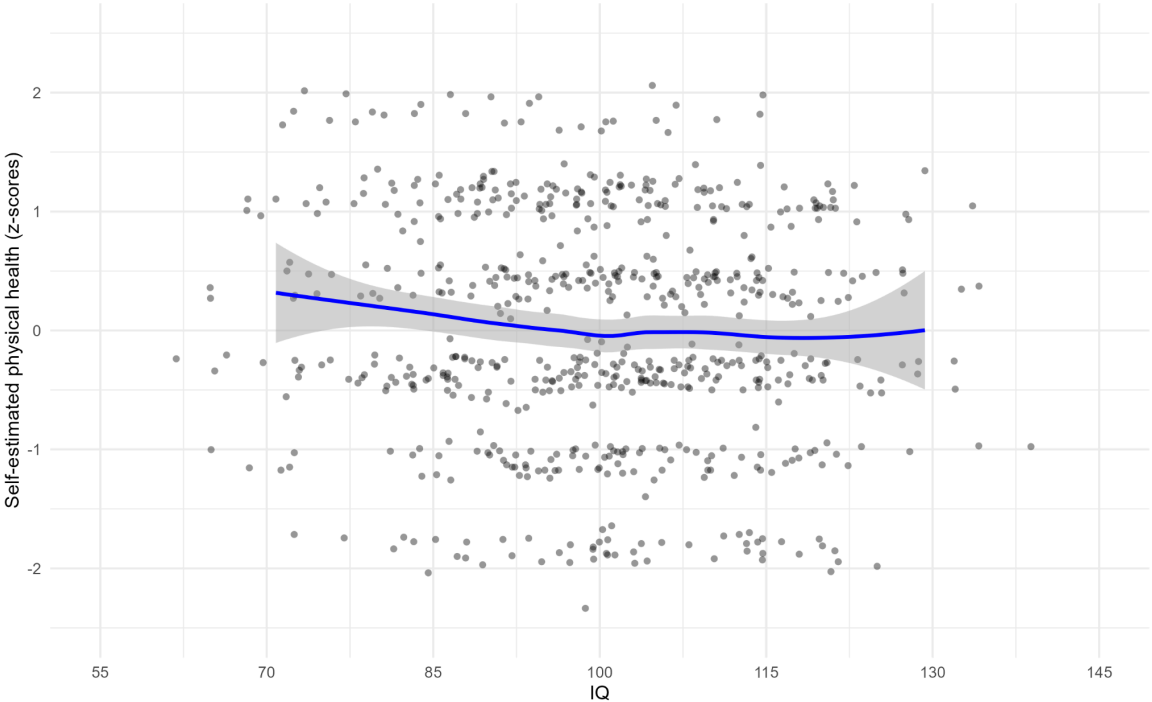
Relationship between IQ and self-rated achievement of life goals (both variables controlled for age, gender, data source)



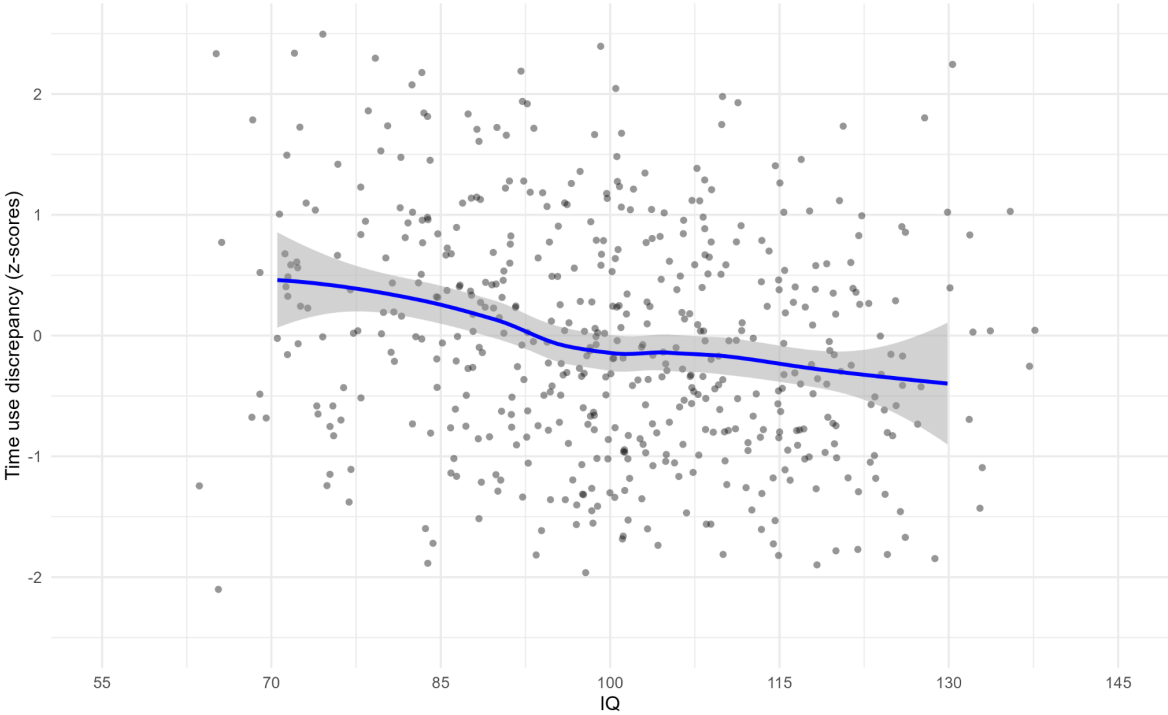
Relationship between IQ and self-rated accomplishment in life (both variables controlled for age, gender, data source)



Relationship between IQ and Self-estimated physical health (both variables controlled for age, gender, data source)



Relationship between IQ and Time use discrepancy (both variables controlled for age, gender, data source)

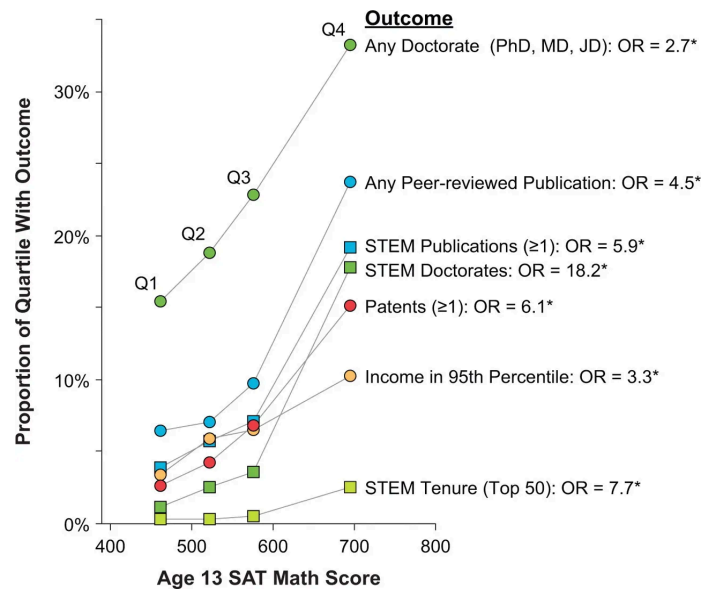


Note: Time use discrepancy is measured by subtracting actual from the ideal time that participants reported they spent on different activities such as exercising, sleeping, reading, spending time with friends and family etc. The absolute values of these discrepancies for each specific activity were then summed to obtain the total time use discrepancy score. Higher score indicates higher mismatch between ideal and actual time use, i.e., more time spent in ways other than ideal.

What do the other studies say?

One of the largest studies ([Brown et al., 2021](#)) that investigated whether the effects of IQ on various outcomes are linear (meaning similar irrespective of the IQ level) or curvilinear (meaning stronger at some and weaker at different levels of IQ) conducted on a large sample of US and UK citizens (n = 48,558) concluded that, whenever there was an effect of IQ on an outcome, it was almost exclusively linear, with all nonlinear effects being practically insignificant in magnitude. Although we found some differences in correlations across the three groups (i.e., the low, average and high IQ groups), these differences were quite small and practically negligible, with the exception of our good employee score. In this sense, despite some popular voices against the linearity hypothesis, our data are mostly in line with the latest findings in the literature.

As additional notes, [Jauk et al., 2013](#) found no threshold effect for creative achievement, whereas they do find thresholds for ideational originality (IQ=100) and ideational fluency (IQ=85) beyond which further IQ seemed to have little effect. [Robertson et al., 2010](#), on the other hand pushed the idea to its limits testing whether there was a link between cognitive ability and outcomes for those in the top 1% of cognitive ability. They found that even in this very elite group "individual differences in general cognitive ability level...lead to differences in educational, occupational, and creative outcomes decades later." This is the graph they provide of outcomes versus age 13 SAT math scores:



[source](#)

Takeaways

- To the extent IQ predicted variables that we tested, the effects were similar across the whole range of IQ scores (i.e. not particularly stronger on the left side of the distribution)
- The only notable exception to this was the good employee self-report score for which IQ was indeed more predictive on the left side of the distribution, meaning in lower IQ group

5. Does IQ peak in the mid-to-late 20s and then decline and how does this look for "crystallized" vs. "fluid" intelligence?

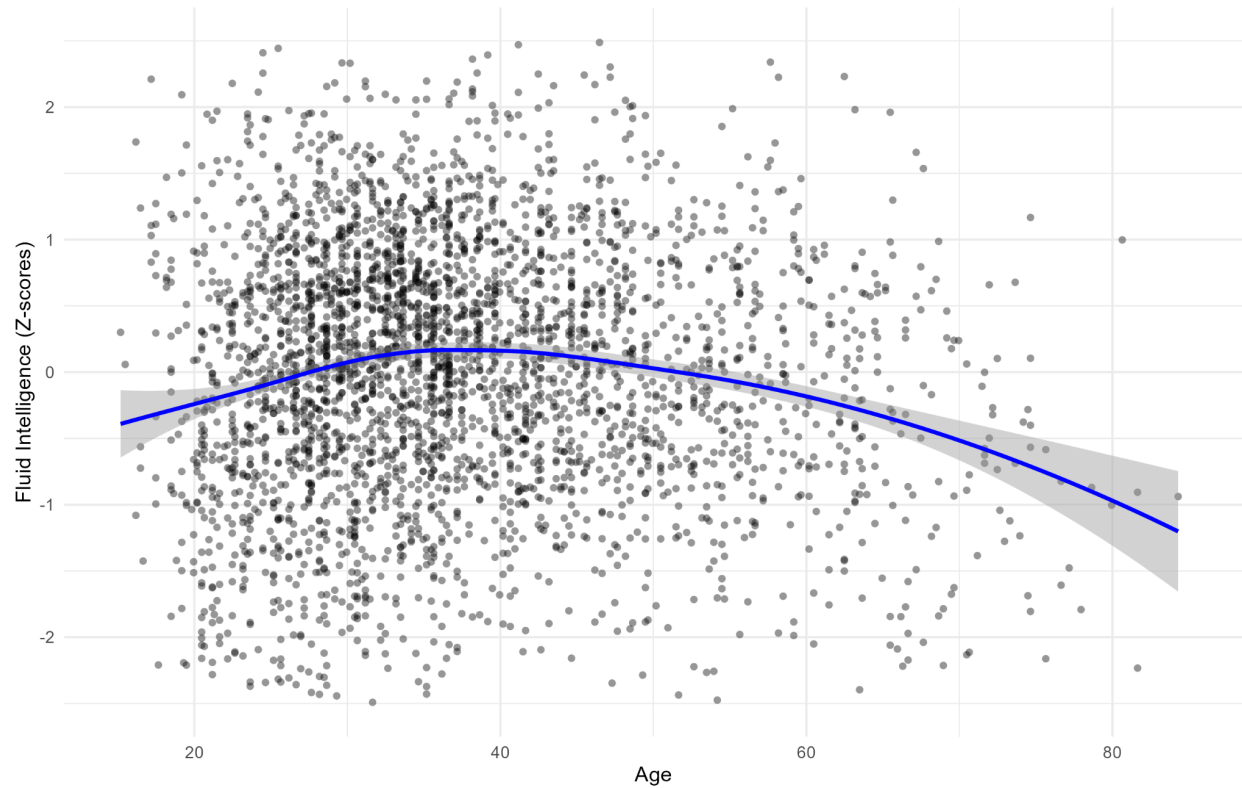
It seems that fluid intelligence rises with age during people's twenties, then holds roughly constant in one's thirties and forties and starts to drop after 50. On the other hand, crystallized intelligence does not seem to drop with age, but it also shows the

highest correlation with age during the twenties. The way we tested this was by dividing our sample into three categories: younger (age < 30), middle aged (age >= 30 & <=50) and older (age > 50). We then calculated scores for fluid and crystallized intelligence for each of our participants and correlated those scores with age. We show these correlations in the table below. In addition, we have plotted a smoothed line of best fit depicting the relationship between IQ and age throughout life span (from twenties to seventies, as this was the age range of our participants).

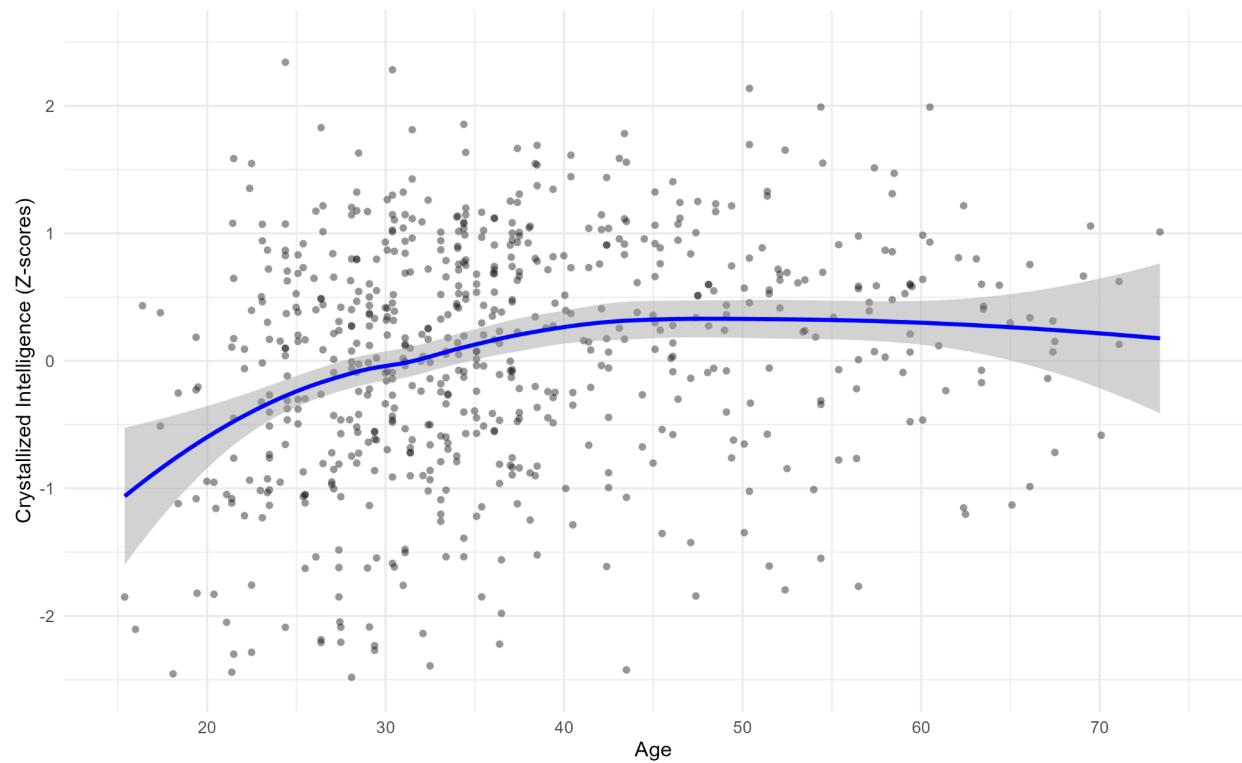
		Correlation (r)
Correlation between fluid intelligence and age	Younger (<30)	0.14
	Middle aged (30 to 50)	0.01
	Older (>50)	-0.22
Correlation between crystallized intelligence and age	Younger (<30)	0.24
	Middle aged (30 to 50)	0.06
	Older (>50)	0.01

This is how it looks graphically:

Relationship between Fluid intelligence and age (both variables controlled for gender and data source)



Relationship between Crystallized intelligence and age (both variables controlled for gender and data source)



What do the other studies say?

Research on fluid and crystallized intelligence reveals distinct age-related patterns. Fluid intelligence seems to develop earlier, peak in early adulthood, and then decline thereafter, with accelerated decline after age 55 ([Kaufman & Horn, 1996](#); [Li et al., 2004](#)). Crystallized intelligence increases through the 20s, plateaus until around age 60, and then declines ([Kaufman & Horn, 1996](#); [Horn, 1980](#)). Our results are quite similar to these general trends found in the literature.

Takeaways

- Fluid intelligence seems to be rising throughout younger age, then remains stable in the adulthood and steadily declines in older age (after 50)
- Crystallized intelligence also rises during early adulthood, but then plateaus.

6. Does the Dunning-Kruger effect exist (whereby lower IQ people tend to overestimate their IQ), and do higher IQ people tend to underestimate their IQ?

It is true in our data that those with lower measured IQ tended to overestimate their measured IQ, and those with higher measured IQ tended to underestimate it. However, whether or not this should be interpreted as a genuine Dunning-Kruger effect is up for debate. [See our in-depth discussion of this question in our Dunning-Kruger analysis report here.](#)

Here is what we did to investigate this question. First, after each set of intelligence related tasks participants took, we asked them to estimate in what percentile they think they scored on each such task. Thus, for each person we were able to calculate the mean of their actual, objective performance on the set of intelligence tasks (the

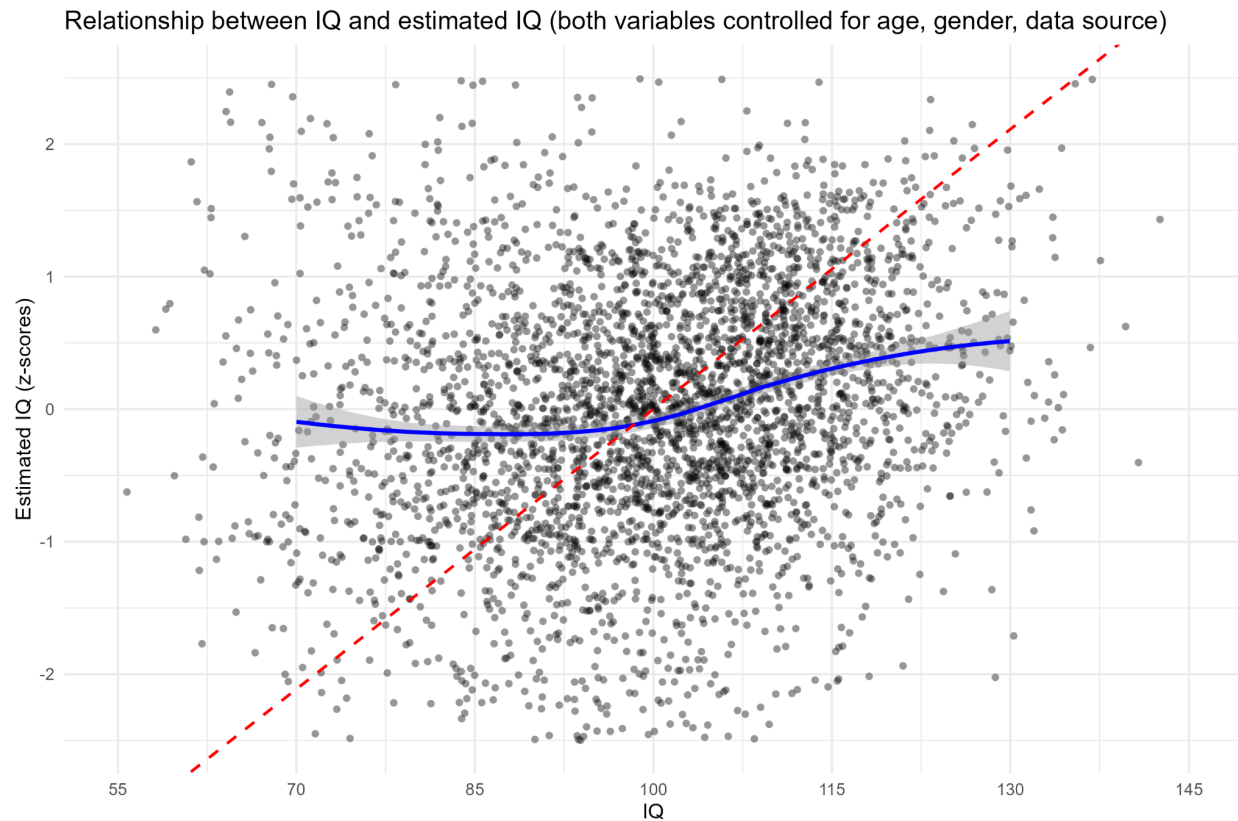
mean score) and the mean of their subjective, self-estimated performance on those same tasks (the estimated score). That means that, for each participant, we took the mean of self-estimated performance on the tasks that specific person took, as well as the mean of the objective performance on the tasks that specific person took. We next converted all of these scores to so-called z-scores to have them all on the same scale (with mean 0 and standard deviation 1 across people). Finally, we fitted the line of best fit describing the relationship between actual objective scores and self-estimated subjective scores, together with the line that shows what the perfect relationship between these two scores would look like (i.e. if everybody was perfect at estimating their average scores).

Here is the graph that shows these two lines. The curved line represents the actual relationship between objective and subjective scores while the straight dashed diagonal line represents what perfect self-estimations would look like. What can be seen on it is that, on the left side of the graph among lower levels of objective scores, the curved line is above the diagonal line and is flat. This means that in general people with lower scores tended to overestimate their performance.

On the contrary, on the right side of the graph among higher levels of objective scores, the curved line is below the diagonal line, meaning that people with higher IQ tended to underestimate themselves. However, this time the line is going upward which means that, although in general they underestimated their performance, higher scoring people estimated their performance to be somewhat better (meaning that the higher their objective score was, the higher their subjective estimation was too).

One thing to note is that recently the Dunning-Kruger effect was questioned and presumed to be mostly a statistical artefact, i.e., to appear because wrong kinds of statistical analyses were used (e.g. [Gignac & Zajenkowski, 2020](#)). We will not go into details about this here, but two valid statistical approaches were suggested for testing the Dunning-Kruger effect: Glejser heteroskedasticity test and the test of quadratic effects. We analyzed our data using these two approaches too and the results confirmed the existence of the effect. On the other hand, there are some

doubts about the interpretation of all of the results and their connection to a "real" Dunning-Kruger effect. [As mentioned, you can find more details in our Dunning-Kruger analysis report here.](#)



What do the other studies say?

Recent research challenges the generality of the Dunning-Kruger effect in intelligence self-assessment. While some studies found limited support for the effect ([Hofer et al., 2021](#); [Dunkel et al., 2023](#)), others argue it's primarily a statistical artifact ([Gignac & Zajenkowski, 2020](#)). In conclusion, recent literature suggests that the effect's magnitude may be minimal, affecting only a small portion of the population with very low IQ scores ([Gignac, 2024](#)).

Takeaways

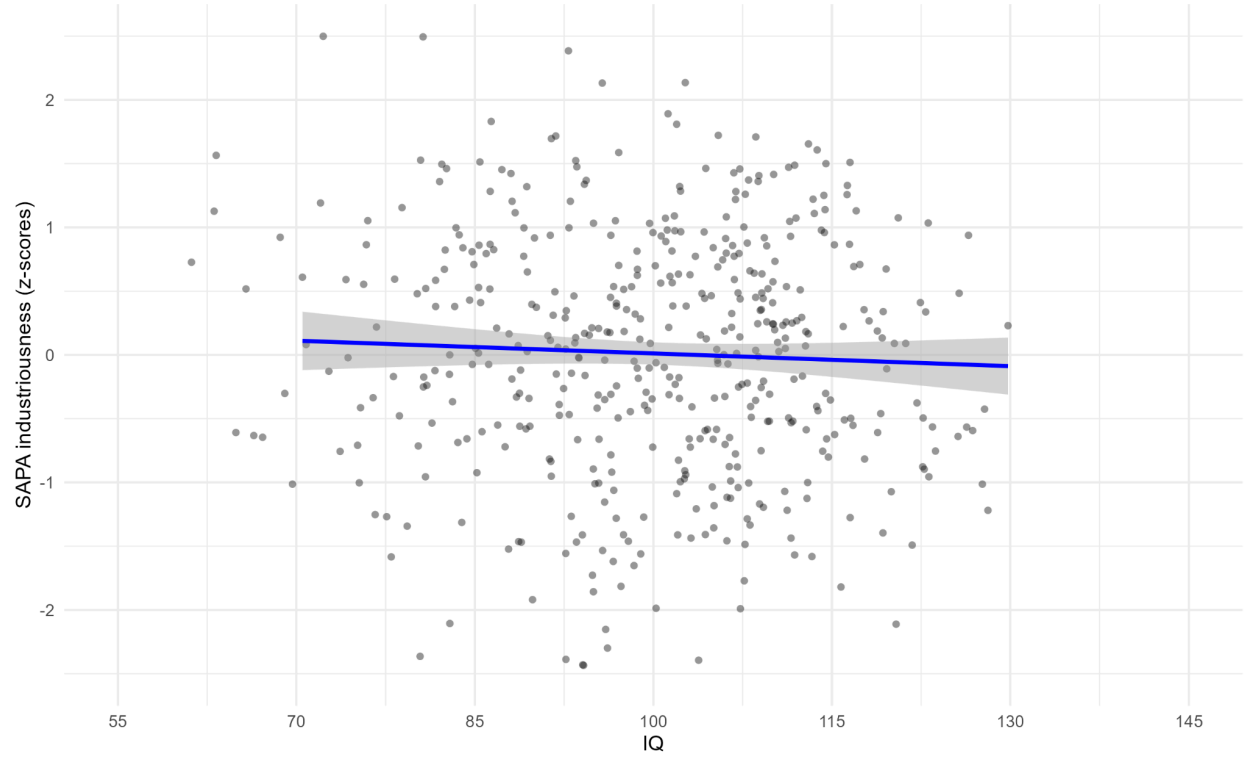
- Our study found evidence for the existence of the Dunning-Kruger effect, though the interpretation of such an effect is complicated, and may not mean what it is generally believed to mean, as we discuss in our [report here](#).

7. Is IQ related to the Big Five personality trait "conscientiousness"?

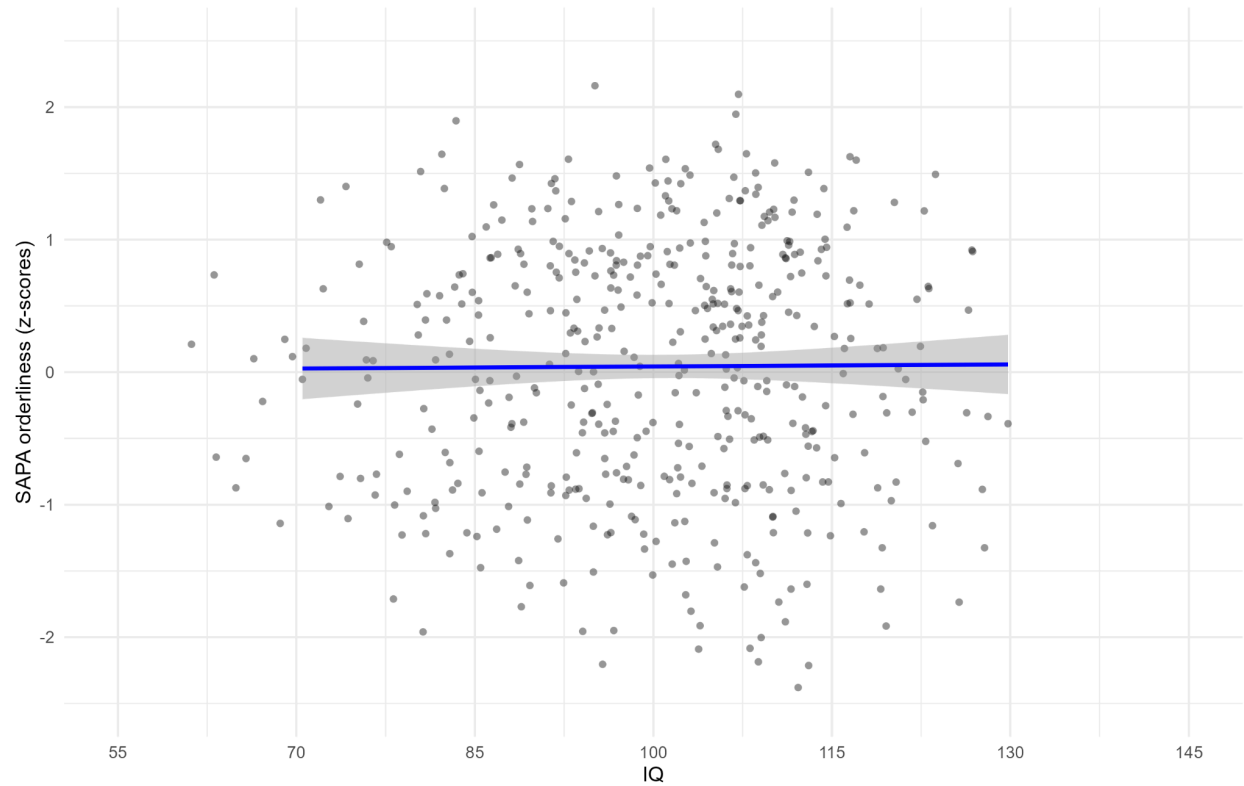
No – the correlations are so small that they are practically meaningless. In addition to conscientiousness as a whole, we measured three facets of conscientiousness: industriousness, orderliness and perfectionism. We measured these facets/traits by asking our participants (subsample of $n = 477$) to rate statements from the [SAPA](#) personality inventory that measured the three facets of conscientiousness, the industriousness facet (e.g., "I begin tasks right away.", "I find it hard to get down to work." – reverse scored), the orderliness facet (e.g., "I like it when things are in order.", "I keep things organized.") and the perfectionism facet (e.g., "I don't stop until everything is perfect."). In this way we were able to get the facet-level results, as well as a total conscientiousness result.

All correlations had an absolute value below $r = 0.10$. Specifically, the correlations between IQ and SAPA scores were $r = -0.06$ for industriousness, $r = 0.02$ for orderliness, $r = -0.07$ for perfectionism and $r = -0.04$ for conscientiousness as a whole. The scatterplots of these correlations are shown below. The strongest correlation between IQ and any item from these three facets is $r = -0.18$

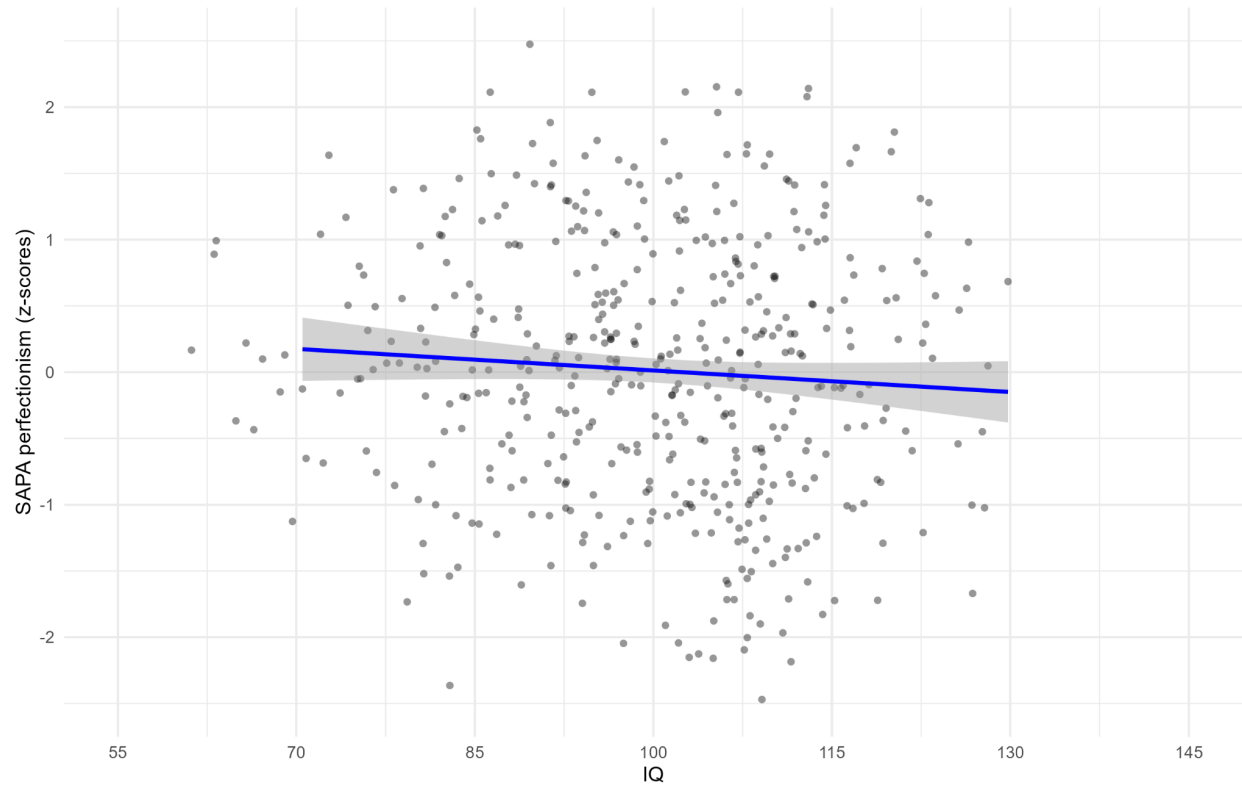
Relationship between IQ and SAPA industriousness (both variables controlled for age, gender, data source)



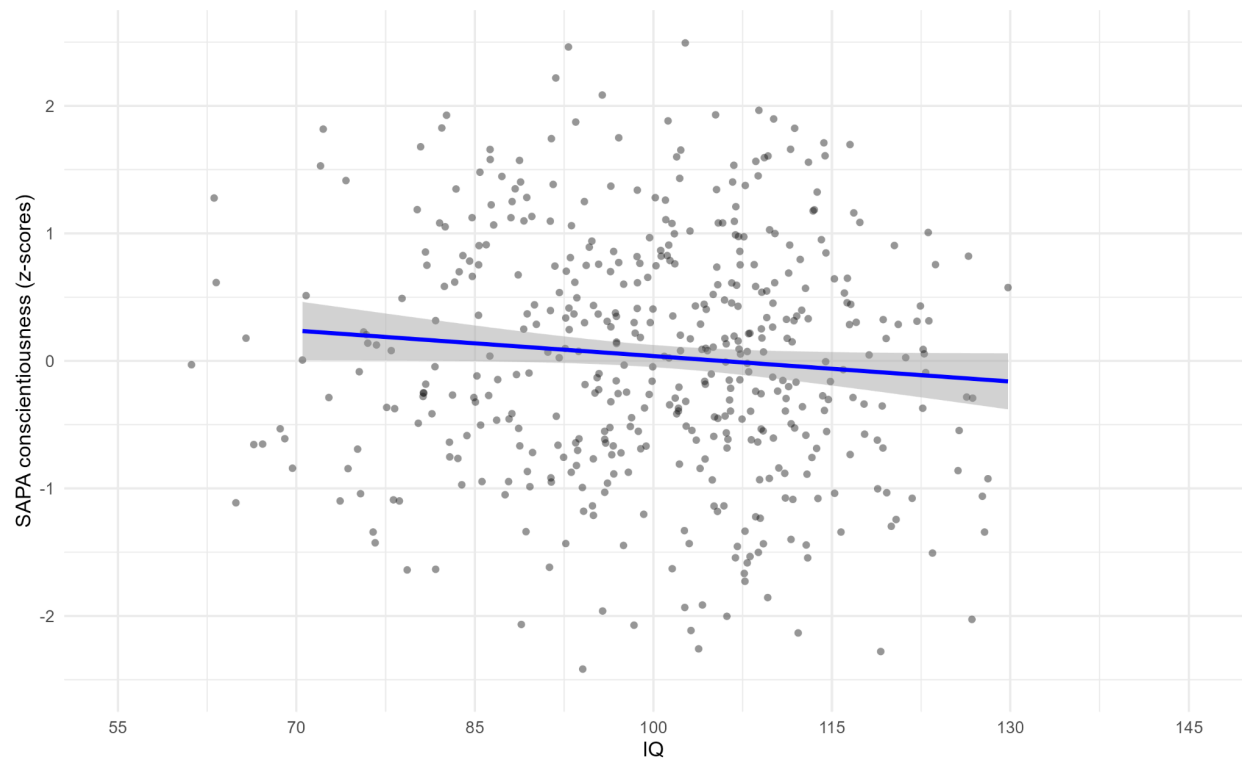
Relationship between IQ and SAPA orderliness (both variables controlled for age, gender, data source)



Relationship between IQ and SAPA perfectionism (both variables controlled for age, gender, data source)



Relationship between IQ and SAPA conscientiousness (both variables controlled for age, gender, data source)



What do the other studies say?

Our study is generally in line with what meta-analyses have found regarding the relationship between IQ and conscientiousness, namely that the correlations are negligibly low. For example, the [Poropat \(2009\)](#) meta-analysis found the IQ-conscientiousness correlation to be $r = -0.03$, while [Corbeanu \(2023\)](#) found it to be between $r = -0.06$ and $r = 0.02$, depending on the IQ measure used. Similarly, in [Anglim et al. \(2022\)](#) meta-analysis, the IQ-conscientiousness correlation was $r = -0.02$ and neither of the IQ-facets correlations exceeded $r = 0.05$.

Takeaways

- There is basically no relationship between IQ and conscientiousness.

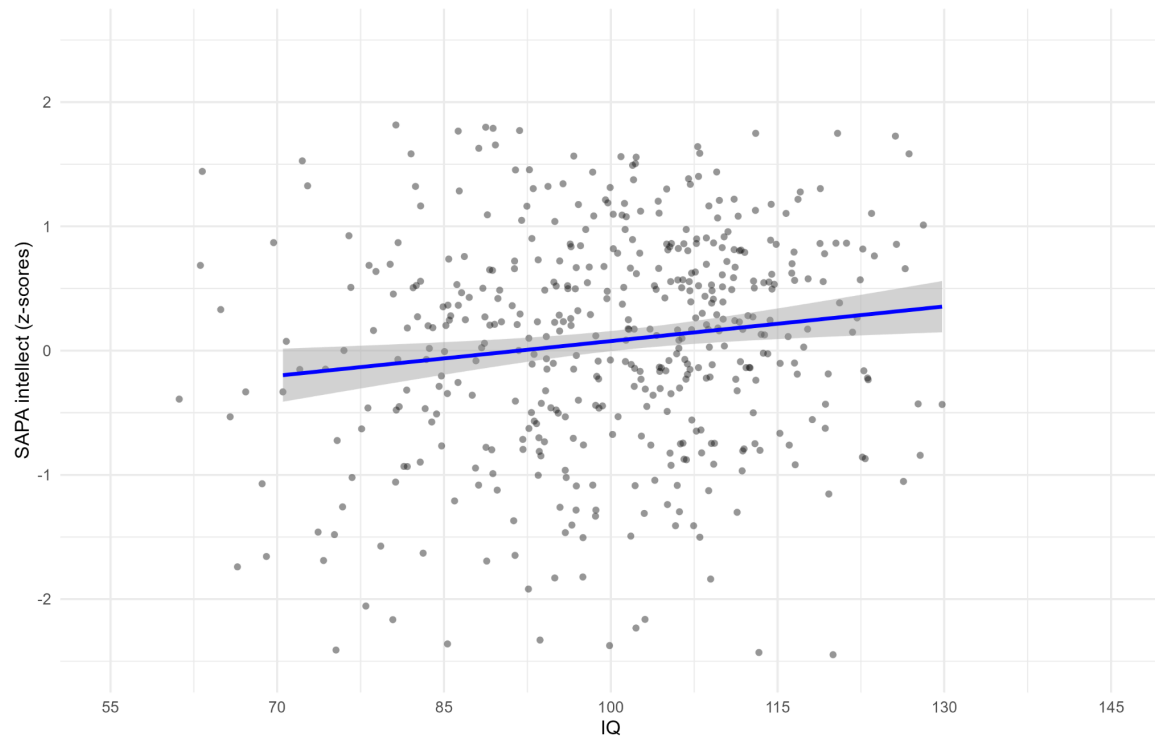
8. Is IQ related to the Big Five personality trait "openness"?

No, but there is a positive, albeit weak, correlation between IQ and the "intellect" facet of openness. As with conscientiousness, we measured openness using SAPA statements. Specifically, we measured three facets of openness, intellect (e.g., "I can take in and process lots of information." or "I quickly understand things."), creativity (e.g., "I love to think up new ways to do things." or "I have a creative and powerful imagination.") and introspection (e.g., "I like to get lost in contemplation." or "I make an effort to understand myself deeply."). Therefore, we had four SAPA openness scores: the three facets and the total score for broad openness.

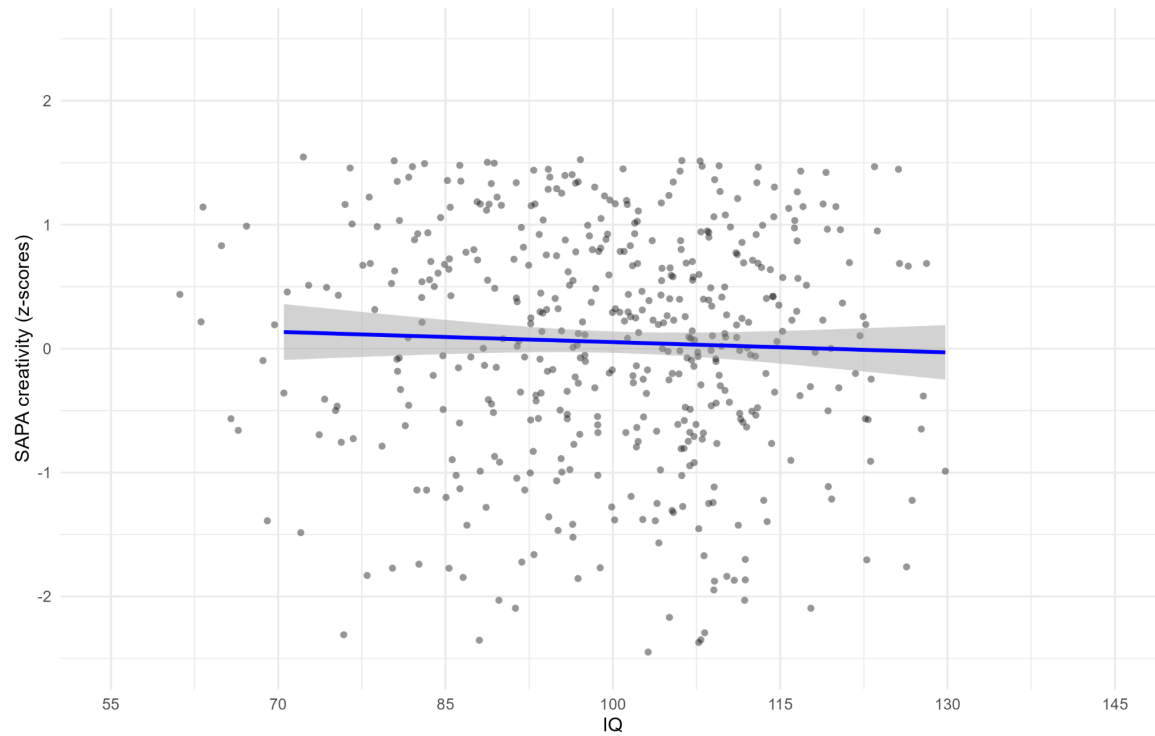
Correlational analysis on sample size of $n = 477$ uncovered mostly low correlations. The only significant correlation was between IQ and the intellect facet ($r = 0.11$). Although significant, this correlation is low. All the other correlations between IQ and openness facets/scores were non-significant: for SAPA creativity score ($r = -0.07$), for

SAPA introspection score ($r = -0.02$) and for SAPA broad openness trait score ($r = 0.01$). Here are the scatterplots of our correlations:

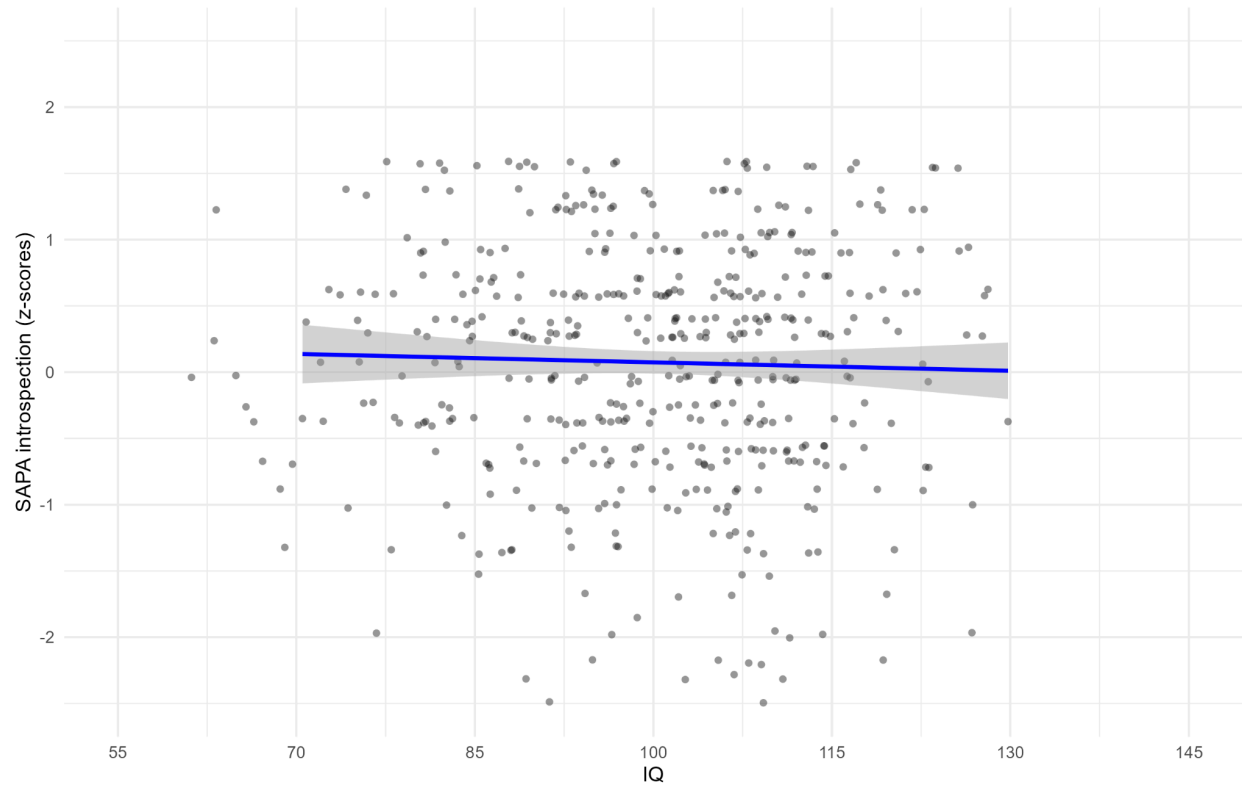
Relationship between IQ and SAPA intellect (both variables controlled for age, gender, data source)



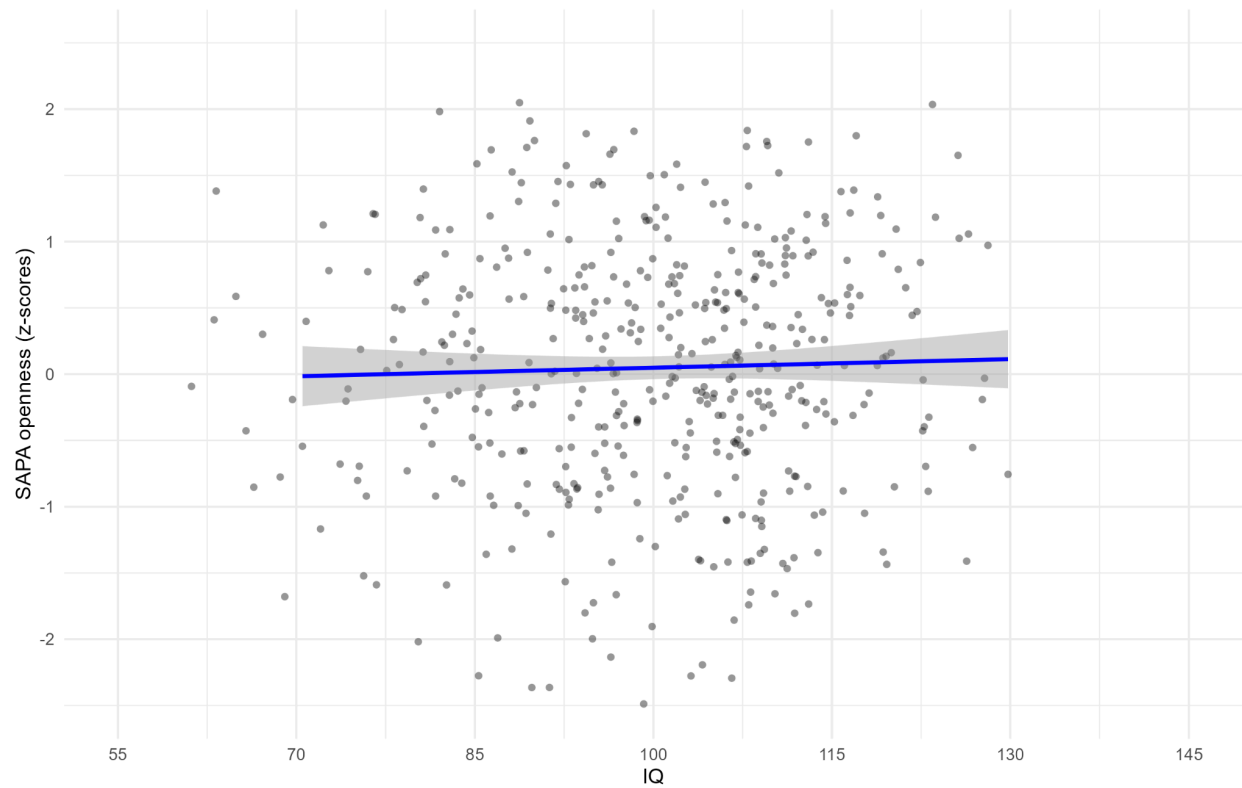
Relationship between IQ and SAPA creativity (both variables controlled for age, gender, data source)



Relationship between IQ and SAPA introspection (both variables controlled for age, gender, data source)



Relationship between IQ and SAPA openness (both variables controlled for age, gender, data source)



What do the other studies say?

Other studies with large sample size or meta analyses that examined the IQ-openness relationship generally find moderate correlation between IQ and intellect facet of openness (or related facets, such as "ideas"), with the correlation between IQ and other openness facets being substantially smaller (e.g., [Ackerman & Heggestad, 1997](#) meta analysis; [Anglim et al., 2022](#) meta analysis; [Furnham, 2023](#) on $N > 14000$; [Kaufman, 2013](#)). In Anglim et al.'s meta-analysis, the highest correlation between IQ and any openness facet is with "ideas" ($r = 0.25$). Correlations between IQ and all other facets are lower (between 0.06 and 0.16). There is a similar result in Furnham's study, where IQ- vs. "ideas" correlation is $r = 0.15$ and all the other correlations are below 0.10.

Thus, our findings are generally in line with previous, albeit with somewhat lower effect sizes.

Takeaways

- IQ has a small positive correlation with the "intellect" facet of openness, but not with other measured facets.

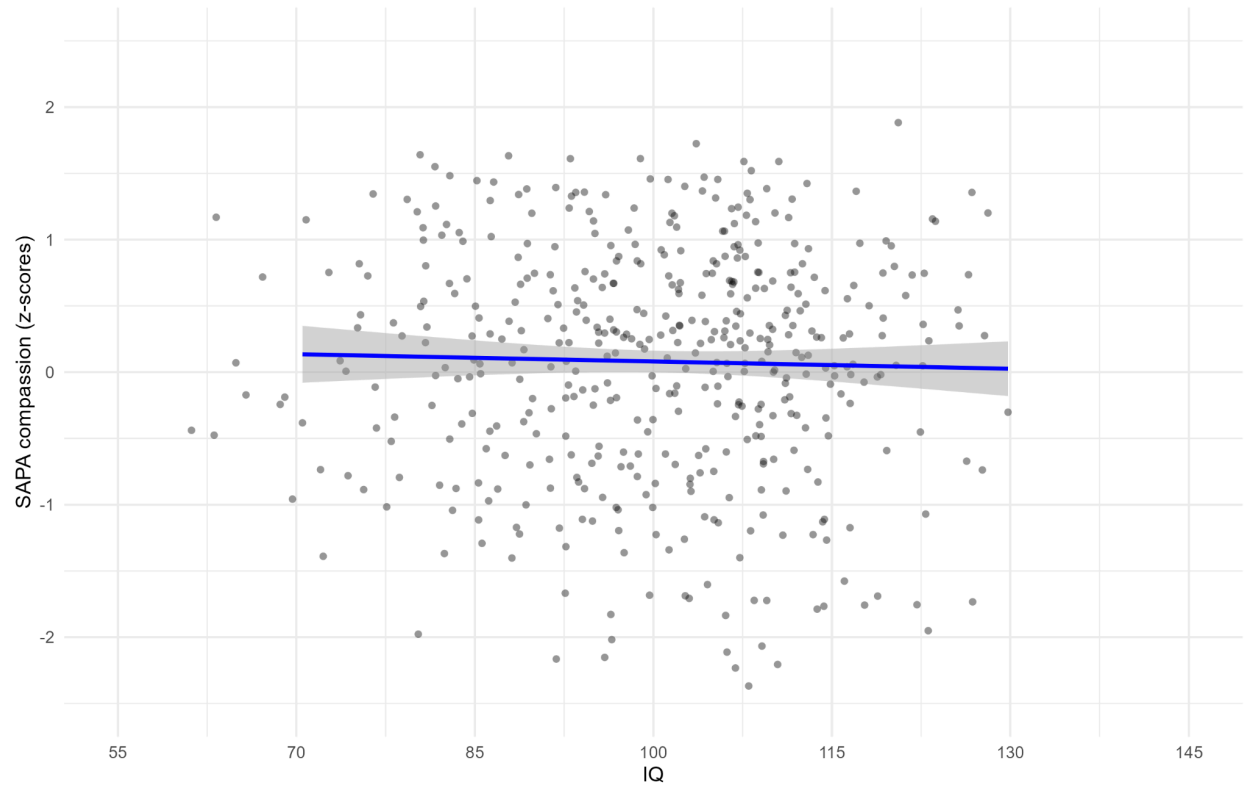
9. Is IQ related to the Big Five personality trait "agreeableness"?

Barely, but there is a slight positive correlation between IQ and some facets of agreeableness. Using SAPA statements, we measured the following three agreeableness facets on a sample of $n = 493$: (a) Trust with statements such as "I believe that people are basically good." and "I trust that others have good intentions."; b) Compassion with statements such as "I would feel very sorry for an animal caught in a trap." and "I am sensitive to other people's needs."; c) Empathy with statements such as "I feel the emotions of others." and "I feel sympathy for those

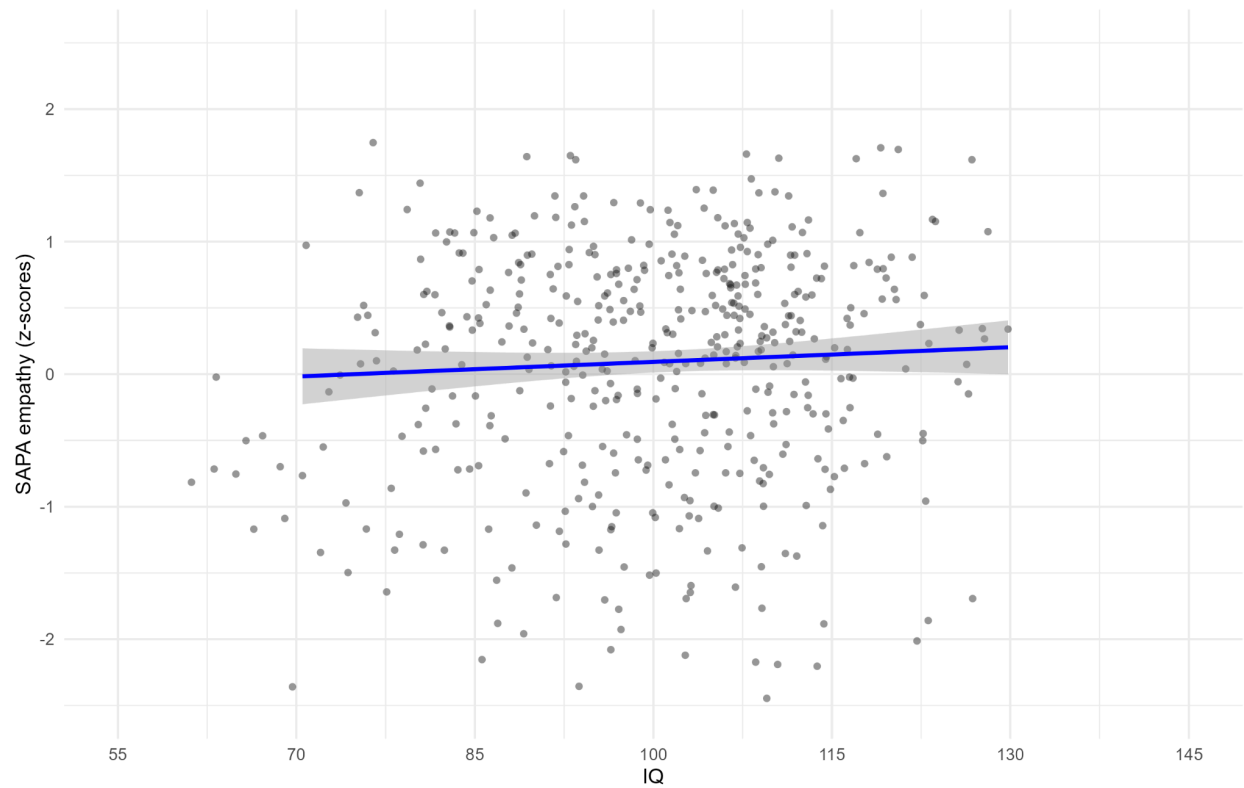
who are worse off than me.”). We were also able to calculate the total SAPA agreeableness score by combining the facet scores. All the correlations were very low, practically negligible, with the highest one being between IQ and total SAPA agreeableness score ($r = 0.122$), followed by the one between IQ and SAPA empathy score ($r = 0.117$). The other two correlations were all smaller than $r = 0.10$. Here are the scatterplots of all the correlations:



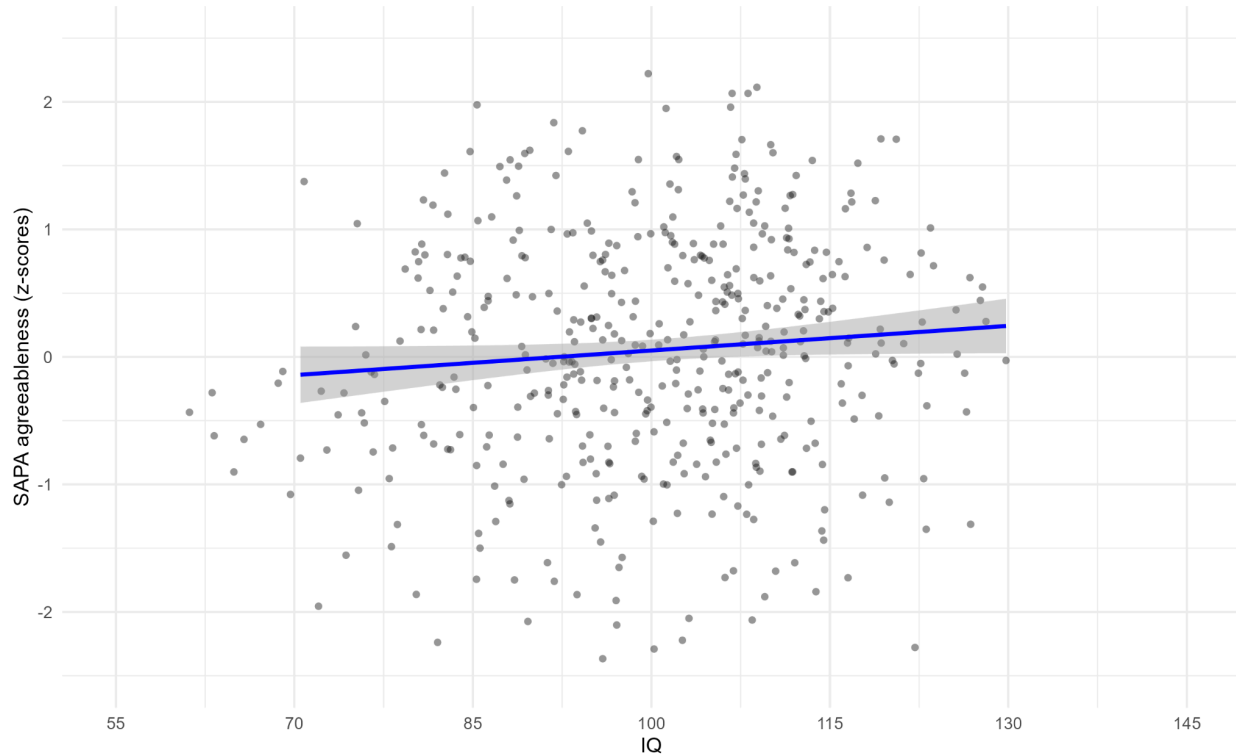
Relationship between IQ and SAPA compassion (both variables controlled for age, gender, data source)



Relationship between IQ and SAPA empathy (both variables controlled for age, gender, data source)



Relationship between IQ and SAPA agreeableness (both variables controlled for age, gender, data source)



What do the other studies say?

Other studies, similarly as ours, generally find very low or non-existing correlations between IQ and agreeableness (e.g., [Anglim et al., 2022](#) meta-analysis, [Kaufman, 2014](#), [Poropat, 2009](#) meta-analysis).

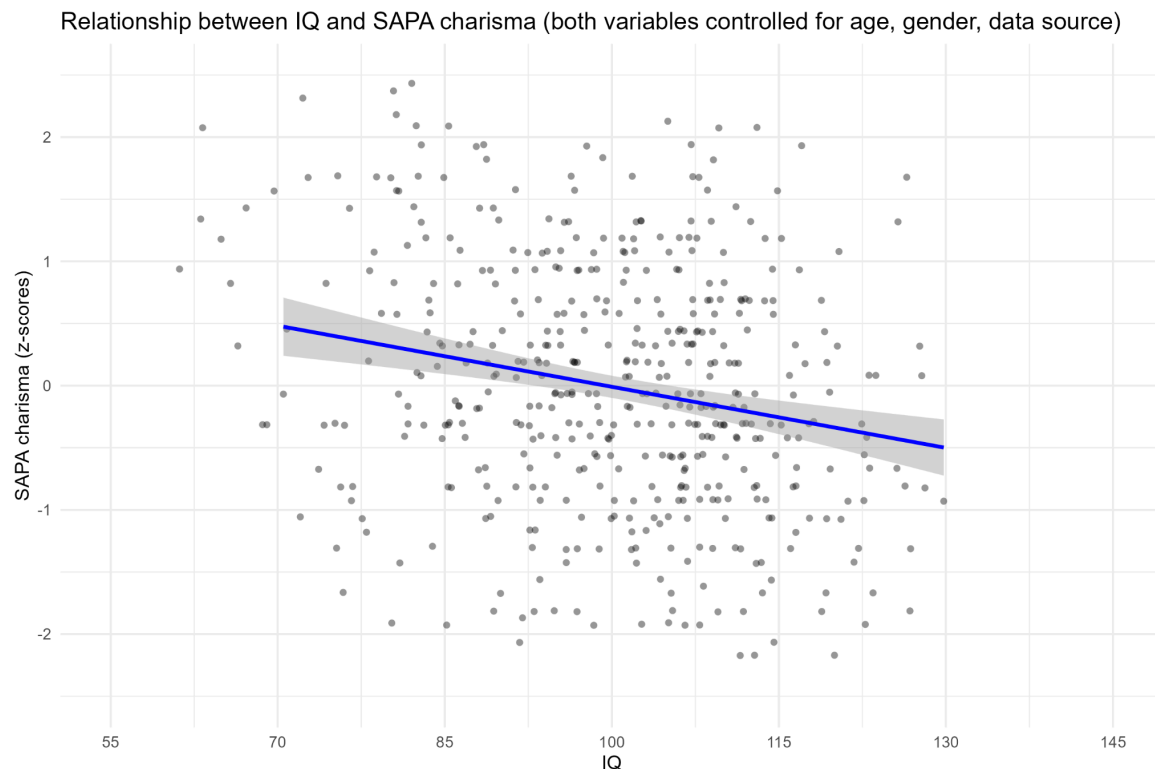
Takeaways

- There is very low, almost negligible, positive correlation between IQ and agreeableness, as well as between IQ and the "empathy" facet of agreeableness

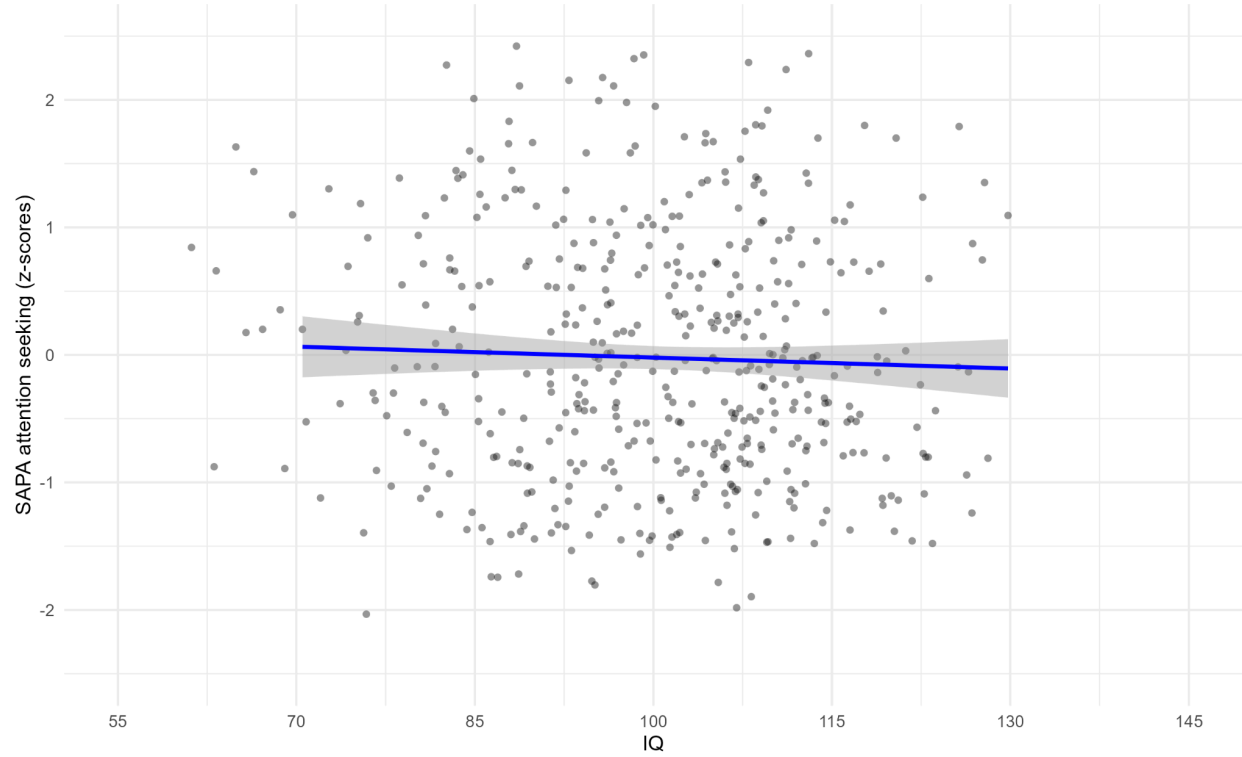
10. Is IQ related to the Big Five personality trait “extraversion”?

IQ is negatively correlated with extraversion, but mostly the correlations are low. We measured four facets of extraversion using the SAPA statements, namely charisma (e.g., “I am very charismatic.” and “I perfectly control social situations.”), attention seekingness (e.g., “I talk more often than I listen.” and “I hate being the focus of attention.”), sociability (e.g., “I generally like to spend my free time with people.” and “I enjoy going out a lot.”) and emotional expressiveness (e.g., “I bottle up my feelings.” and “I express my feelings easily.”). Of course, we also combined the facet scores into an overall SAPA extraversion score.

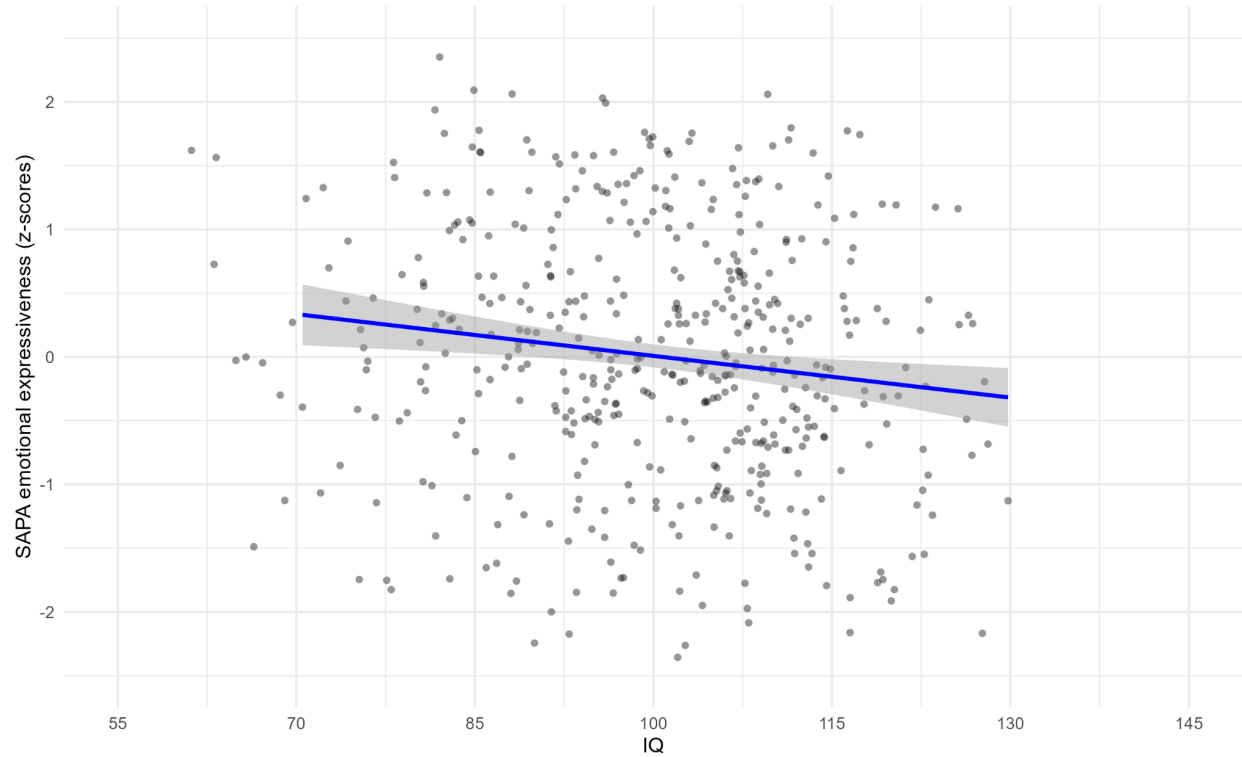
In our sample of $n = 492$ participants, the correlations between IQ and all the extraversion scores we calculated (including facet scores) were negative, with the strongest negative correlation being between IQ and charisma facet ($r = -0.25$), followed by IQ and total SAPA extraversion score ($r = -0.16$). All the other correlations were lower, between $r = -0.15$ and $r = -0.10$. Here are the scatterplots of all the correlations.



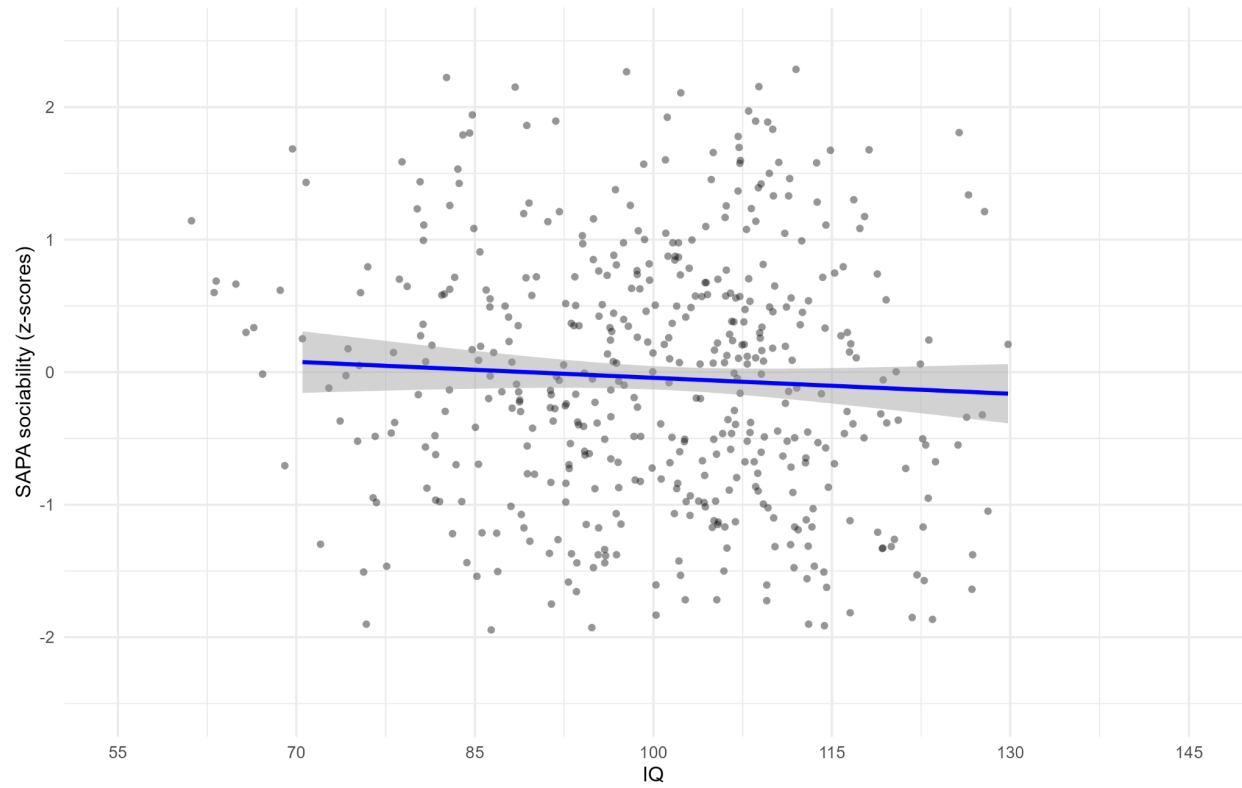
Relationship between IQ and SAPA attention seeking (both variables controlled for age, gender, data source)



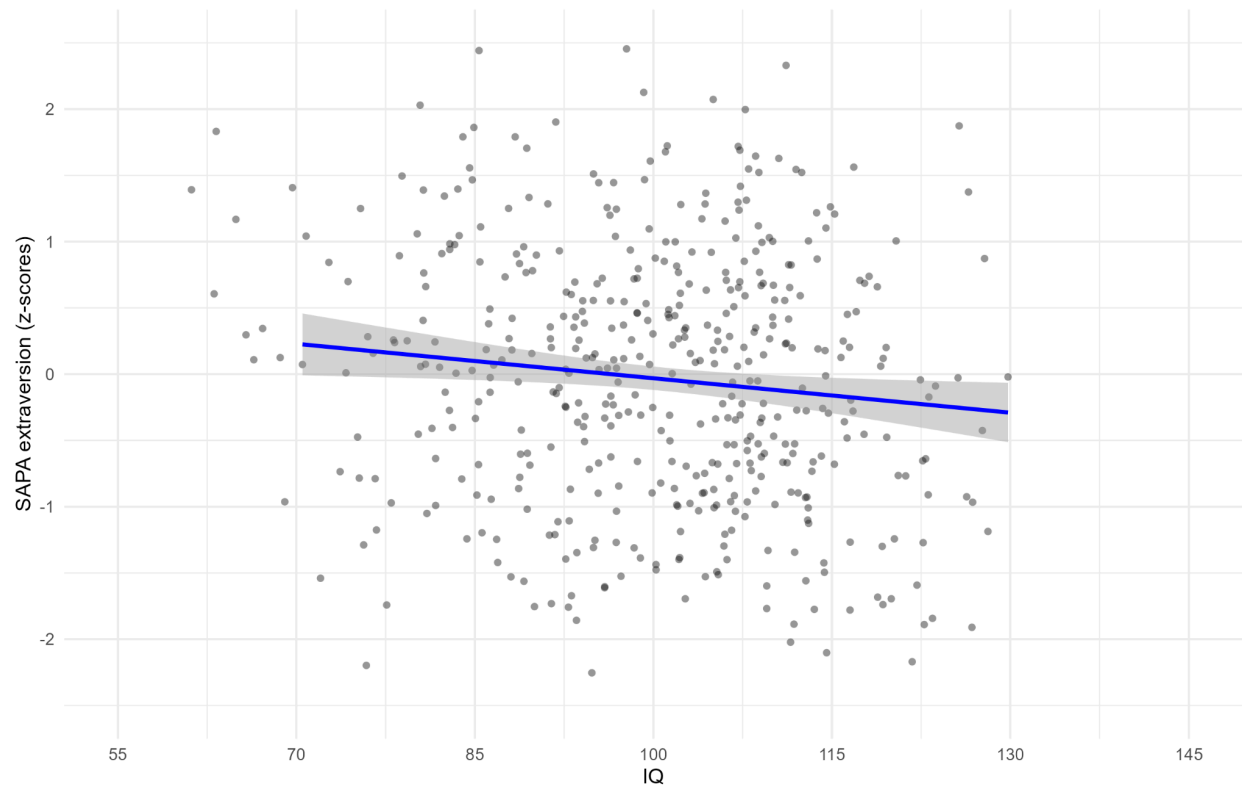
Relationship between IQ and SAPA emotional expressiveness (both variables controlled for age, gender, data source)



Relationship between IQ and SAPA sociability (both variables controlled for age, gender, data source)



Relationship between IQ and SAPA extraversion (both variables controlled for age, gender, data source)



What do the other studies say?

The correlations obtained in our study are slightly higher than the ones found meta analytically (e.g., [Anglim et al., 2022](#) meta-analysis or [Poropat, 2009](#) meta-analysis) where the correlations between IQ and extraversion (including its facets) were mostly negligible.

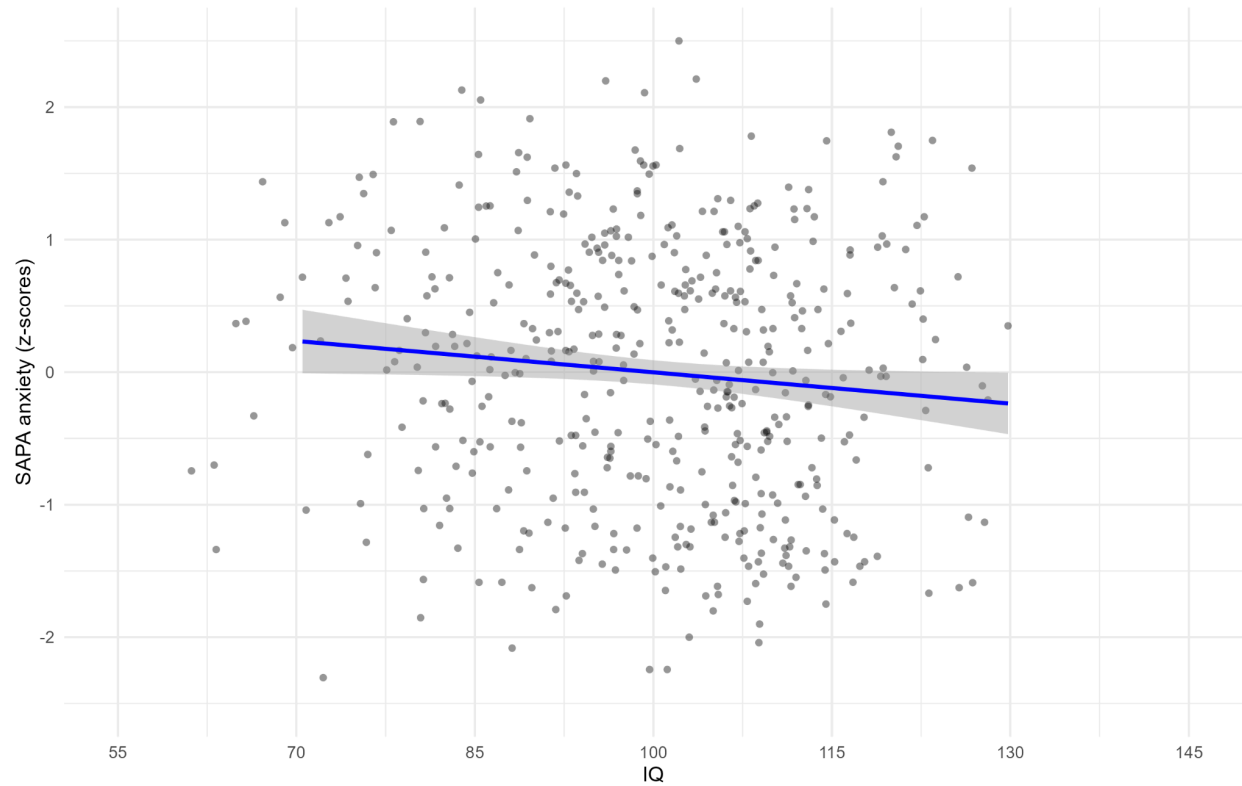
Takeaways

- Higher IQ people were generally less extraverted in our study, although the effect is quite weak.

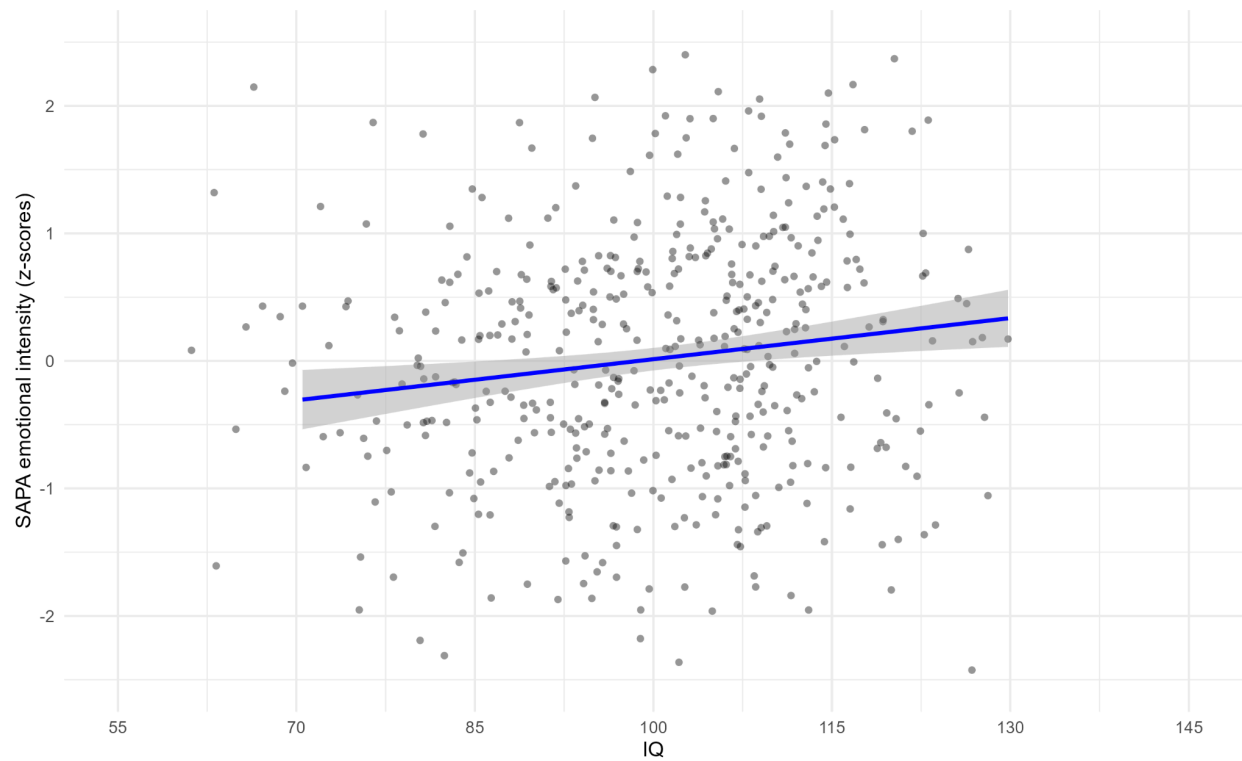
11. Is IQ related to the Big Five personality trait “emotional stability” (i.e., a lack of neuroticism)?

No. We measured four facets of emotional stability with SAPA statements: anxiety (e.g., “I typically fear for the worst.” or “I spend a lot of time worrying.”), emotional intensity (e.g., “I don’t think that my moods change more than most people’s do.” or “I rarely get excited or upset about anything.”), irritability (e.g., “I get angry less often than other people do.” or “I rarely get annoyed.”) and well-being (e.g., “I have feelings of worthlessness or hopelessness.” or “I don’t like myself.”). The statements were always coded so that a higher score means higher emotional stability (i.e., lower neuroticism, which entails lower anxiety, lower emotional intensity, lower irritability and higher well-being). In addition to this, we also measured the total emotional stability score by combining the facet scores. All the correlations between IQ and emotional stability facets or global trait scores were negligible and only one of the correlations was higher than 0.10 ($r = 0.11$ between IQ and SAPA facet of emotional intensity). The sample size was $n = 492$. Here are the scatterplots of all the correlations.

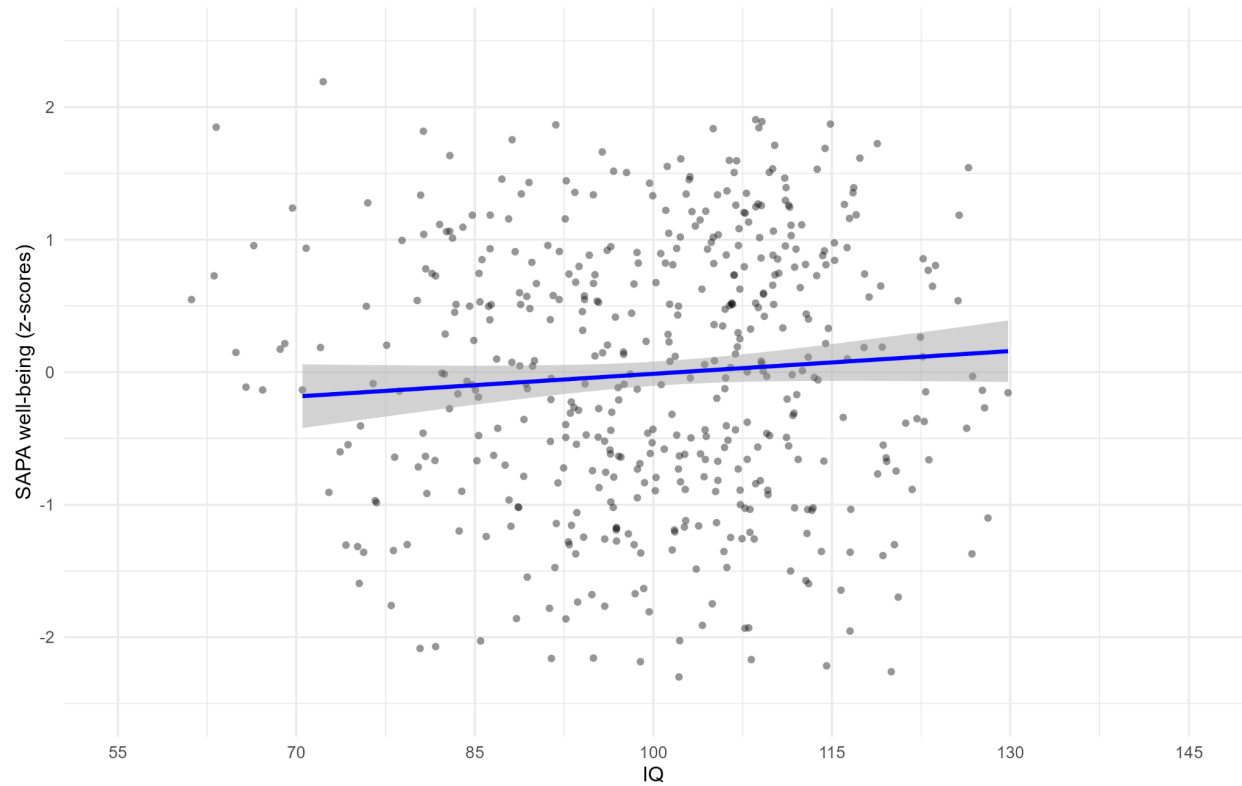
Relationship between IQ and SAPA anxiety (both variables controlled for age, gender, data source)



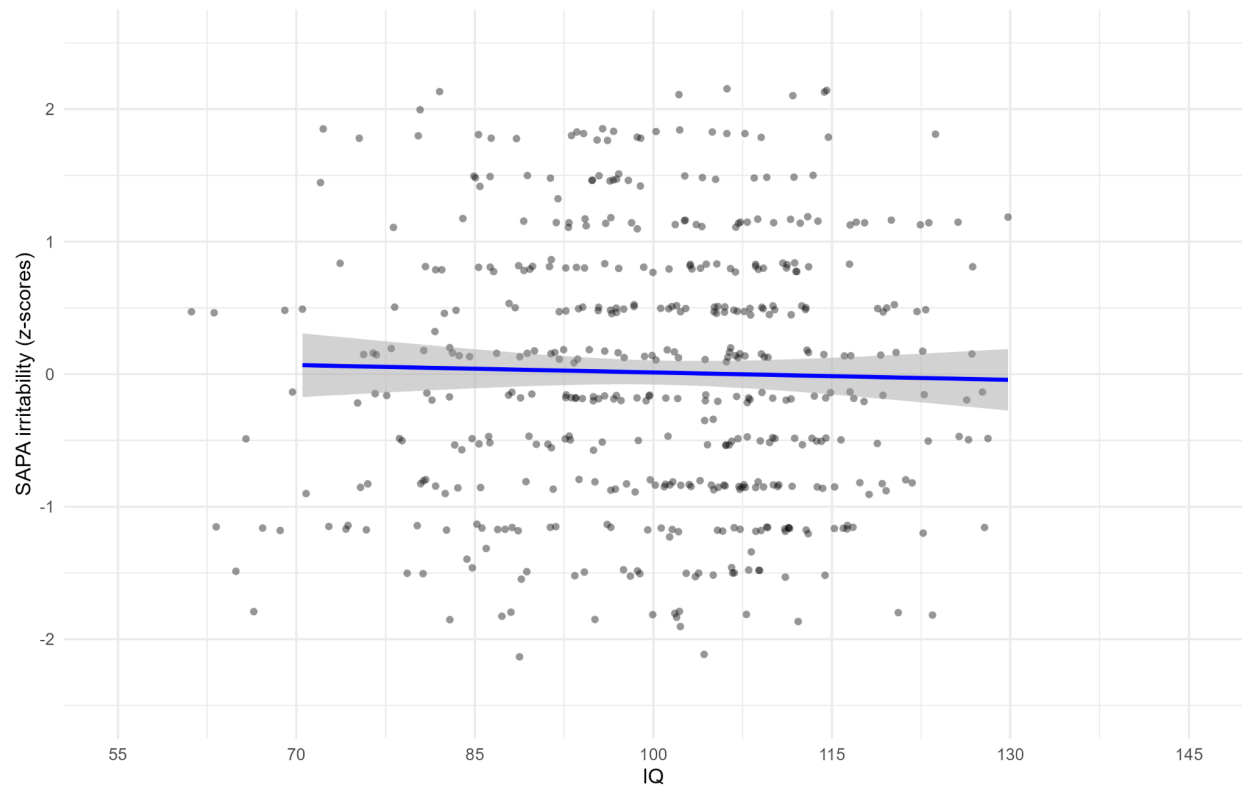
Relationship between IQ and SAPA emotional intensity (both variables controlled for age, gender, data source)



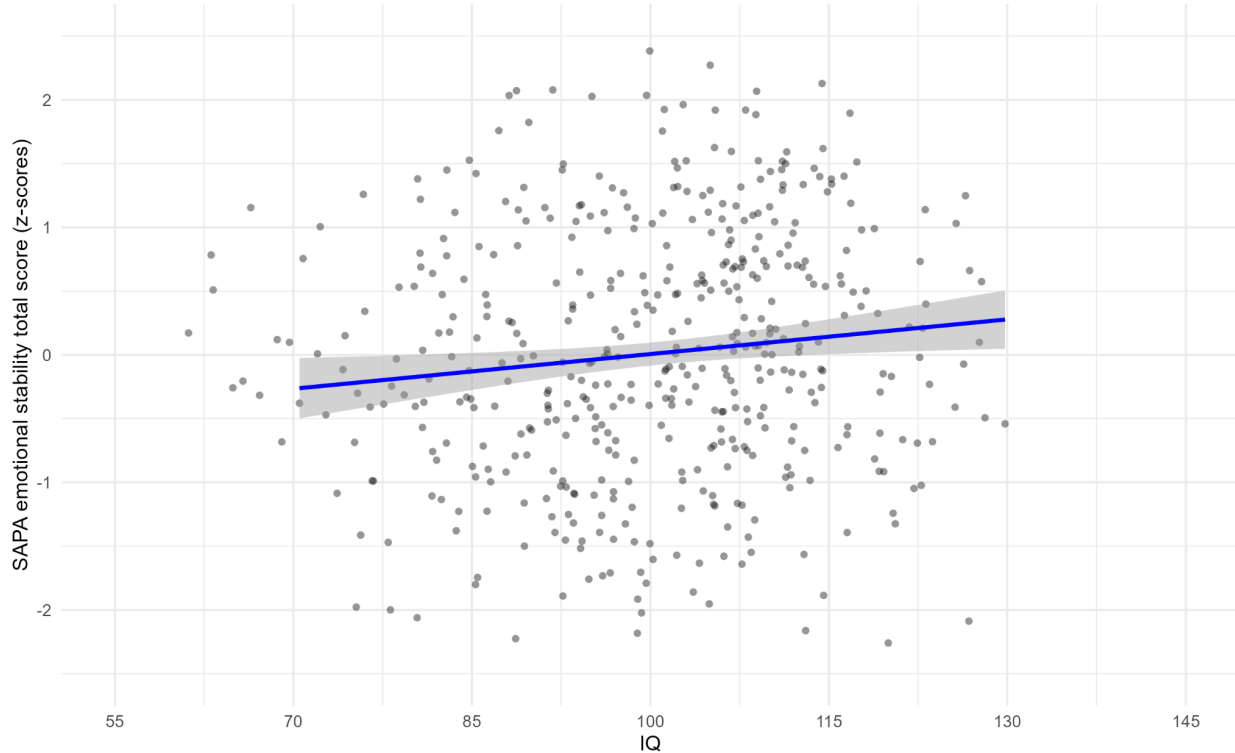
Relationship between IQ and SAPA well-being (both variables controlled for age, gender, data source)



Relationship between IQ and SAPA irritability (both variables controlled for age, gender, data source)



Relationship between IQ and SAPA emotional stability total score (both variables controlled for age, gender, data source)



What do the other studies say?

Our results align with two meta-analyses that examined the relationships between personality traits and facets and IQ and showed that the correlation between IQ and emotional stability trait/facets doesn't exceed $r = 0.10$ ([Anglim et al., 2022](#); [Poropat, 2009](#)).

Takeaways

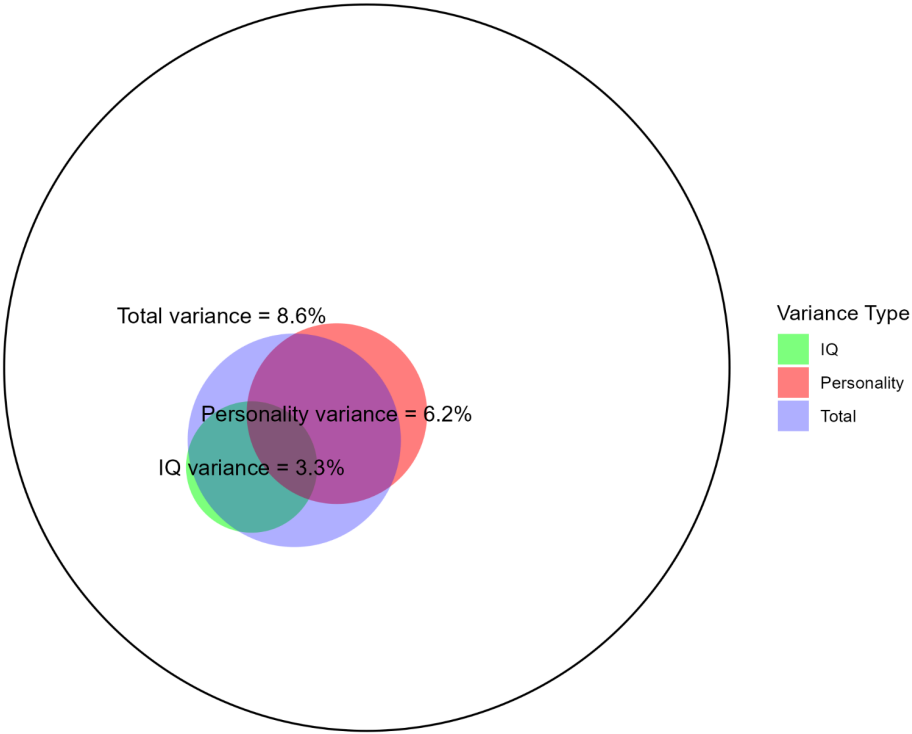
- IQ and emotional stability are not related.

12. Is personality a better predictor of important life outcomes than IQ?

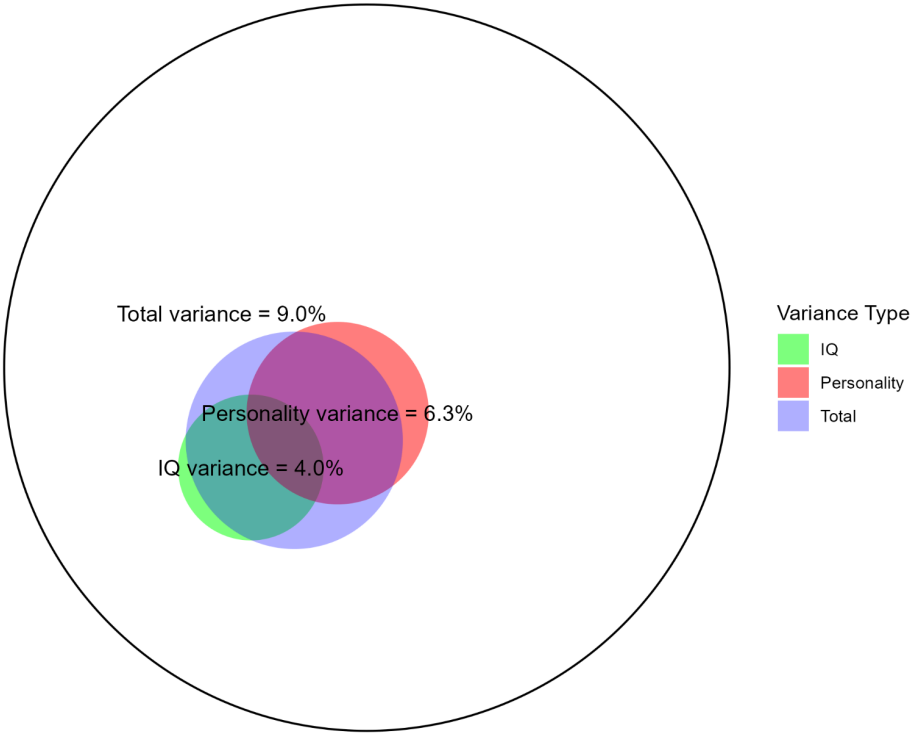
For the outcomes that we measured, mostly yes. We have asked our participants to report their a) highest level of education, b) high-school GPA, c) college GPA, d) personal income, e) household income, f) current happiness level (i.e., "Right now, at this very moment, how happy or unhappy do you feel?") and g) life satisfaction. For almost every outcome, personality was a better predictor than IQ. In technical terms, five personality traits (openness, conscientiousness, extraversion, agreeableness and neuroticism) explained more variance in the outcomes than IQ. The only examples in which personality and IQ fared similarly were high-school and college GPA scores. On the other hand, personality was a substantially better predictor than IQ of happiness and life satisfaction.

We illustrated this graphically with circles. The biggest, white circle represents the whole outcome, and smaller colored circles represent the percentage of that outcome that is explained either by IQ alone (green circle), personality alone (red circle) or IQ and personality together (blue circle - labeled "total"). In all cases, the personality circle is bigger than the IQ circle meaning that it explains a higher percentage of variance in an outcome. In some cases personality circle is almost as big as the blue circle, meaning that IQ adds only a negligible predictive power over personality (i.e., we can predict that outcome almost equally well using only personality compared to using personality and IQ together. Here are our circle plots for each of the outcomes.

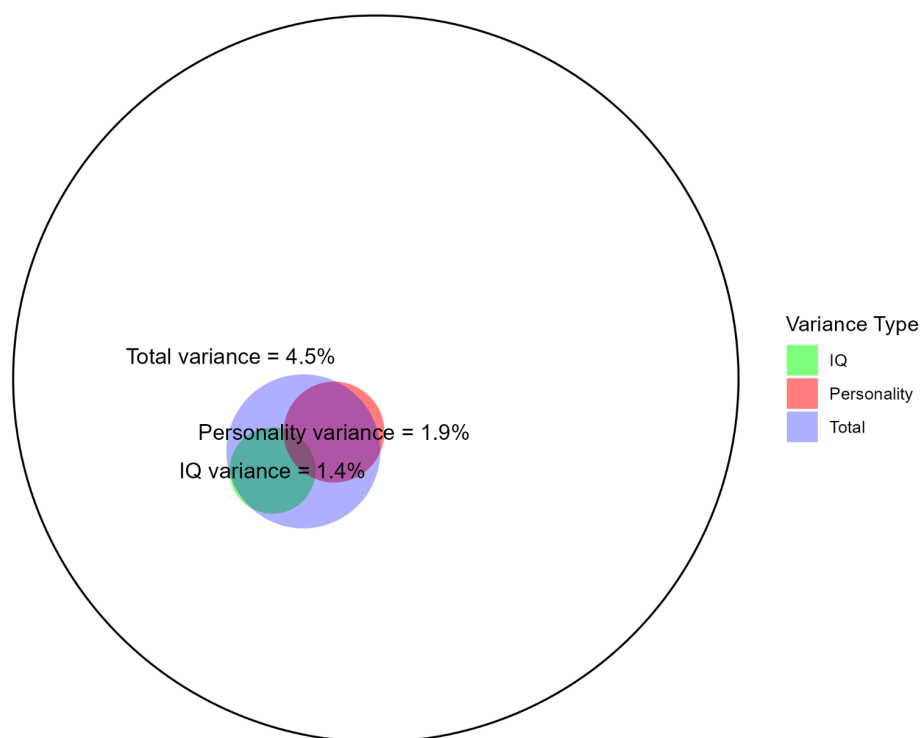
Variance in level of education explained by IQ and Personality



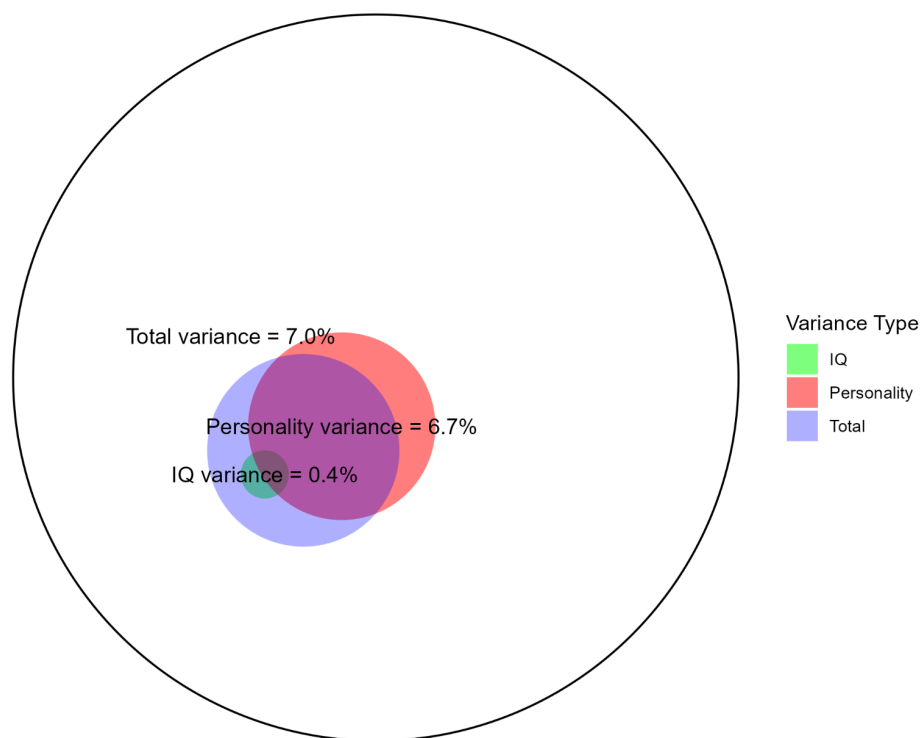
Variance in high-school GPA explained by IQ and Personality



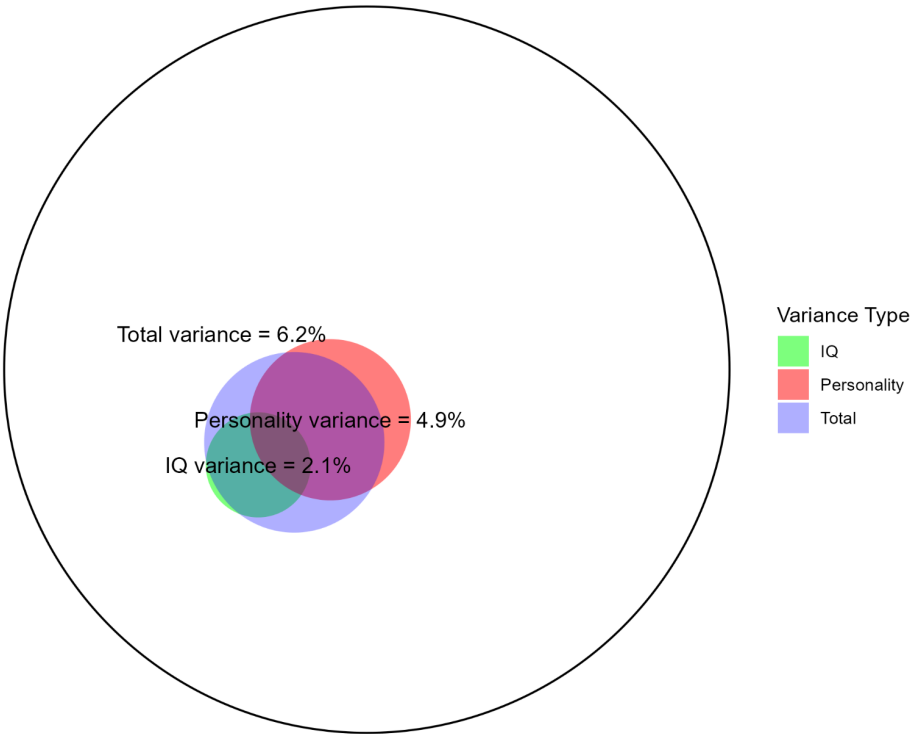
Variance in college GPA explained by IQ and Personality



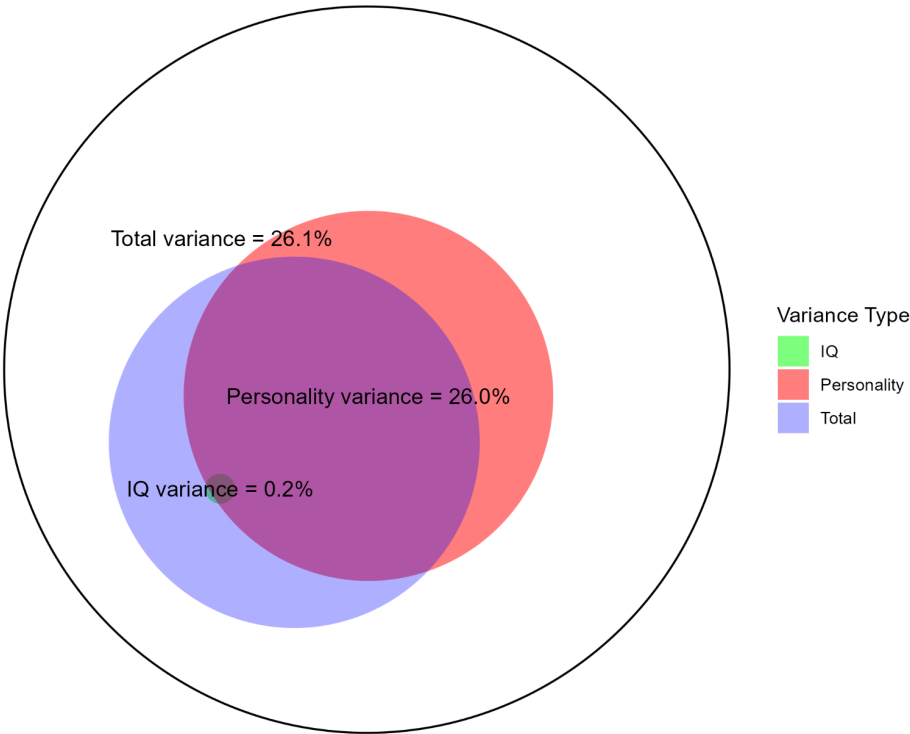
Variance in personal income explained by IQ and Personality



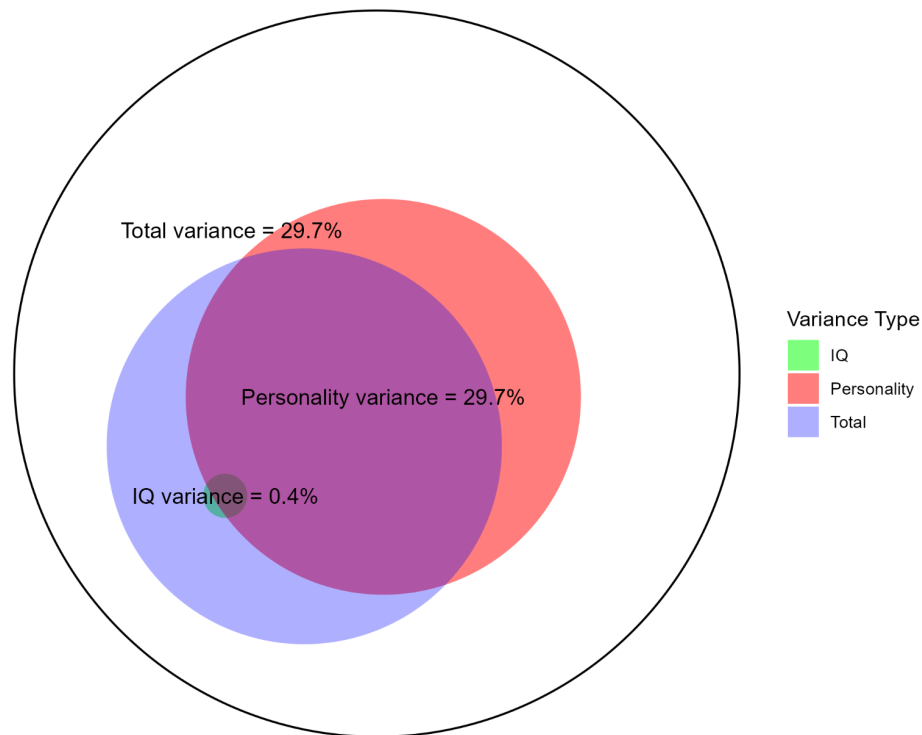
Variance in household income explained by IQ and Personality



Variance in happiness explained by IQ and Personality



Variance in life satisfaction explained by IQ and Personality



What do the other studies say?

Research on personality traits and cognitive abilities as predictors of life outcomes shows mixed results. While some studies suggest personality traits, particularly conscientiousness, are strong predictors of academic achievement, job performance, and life satisfaction ([Roberts et al., 2007](#); [Palczyńska & Świst, 2018](#)), others find cognitive abilities to be more influential ([Hartmann et al., 2009](#); [Zisman & Ganzach, 2022](#)). Personality traits appear to have incremental validity beyond cognitive abilities in predicting various outcomes ([Borghans et al., 2016](#)), however, the relative importance of personality versus cognitive abilities may vary depending on the specific outcome measured and the study design. Overall, both personality traits and cognitive abilities contribute to predicting important life outcomes, with their relative importance differing across various domains and contexts.

Takeaways

- The relative importance of IQ and personality depends on the outcome: some outcomes, such as high-school and college GPA, they predict approximately equally well, while for some outcomes personality is much stronger predictors (happiness and life satisfaction).
- The effects of IQ and personality tend to be additive, so using both typically makes predictions more accurate than just using one.

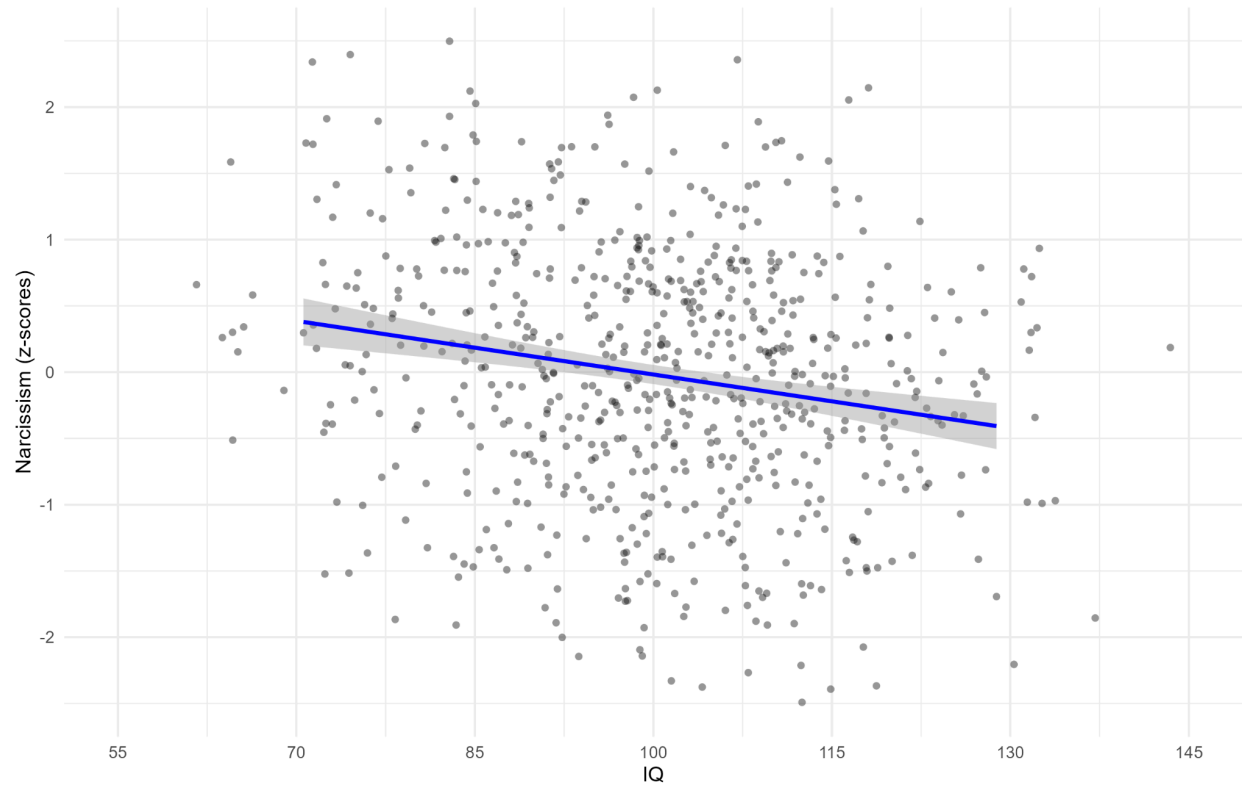
13. Is IQ related to "dark triad" traits, like machiavellianism, narcissism, and sadism?

Yes, to some of them. Specifically, the dark triad consists of personality traits that are often viewed as being socially harmful: machiavellianism, narcissism, and sadism.

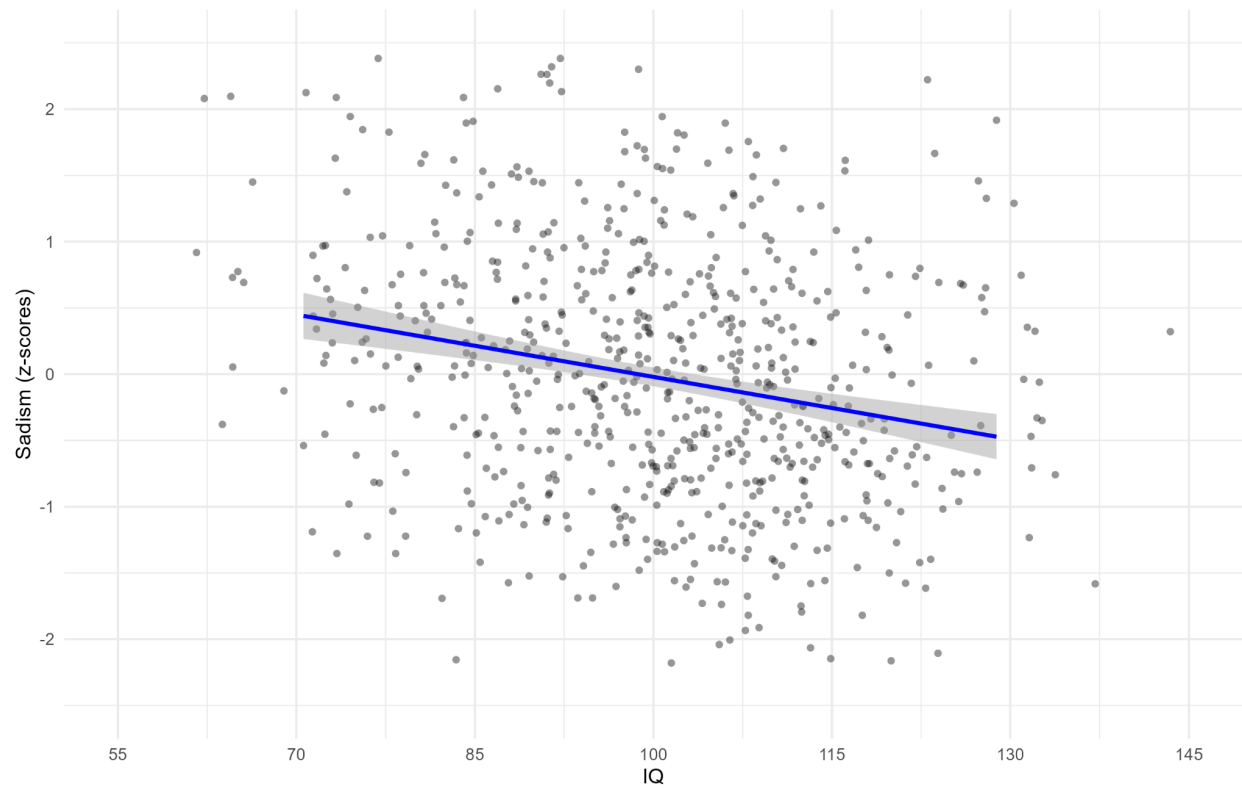
- **Machiavellianism** is a personality trait characterized by manipulateness, a strategic, calculating approach to social interactions, and a focus on self-interest and deception.
- **Narcissism** is marked by grandiosity, an inflated sense of self-importance, a need for admiration, attention-seeking, and favoring the self over the needs of others.
- **Sadism** is characterized by enjoyment of inflicting pain or humiliation, as well as a lack of empathy.

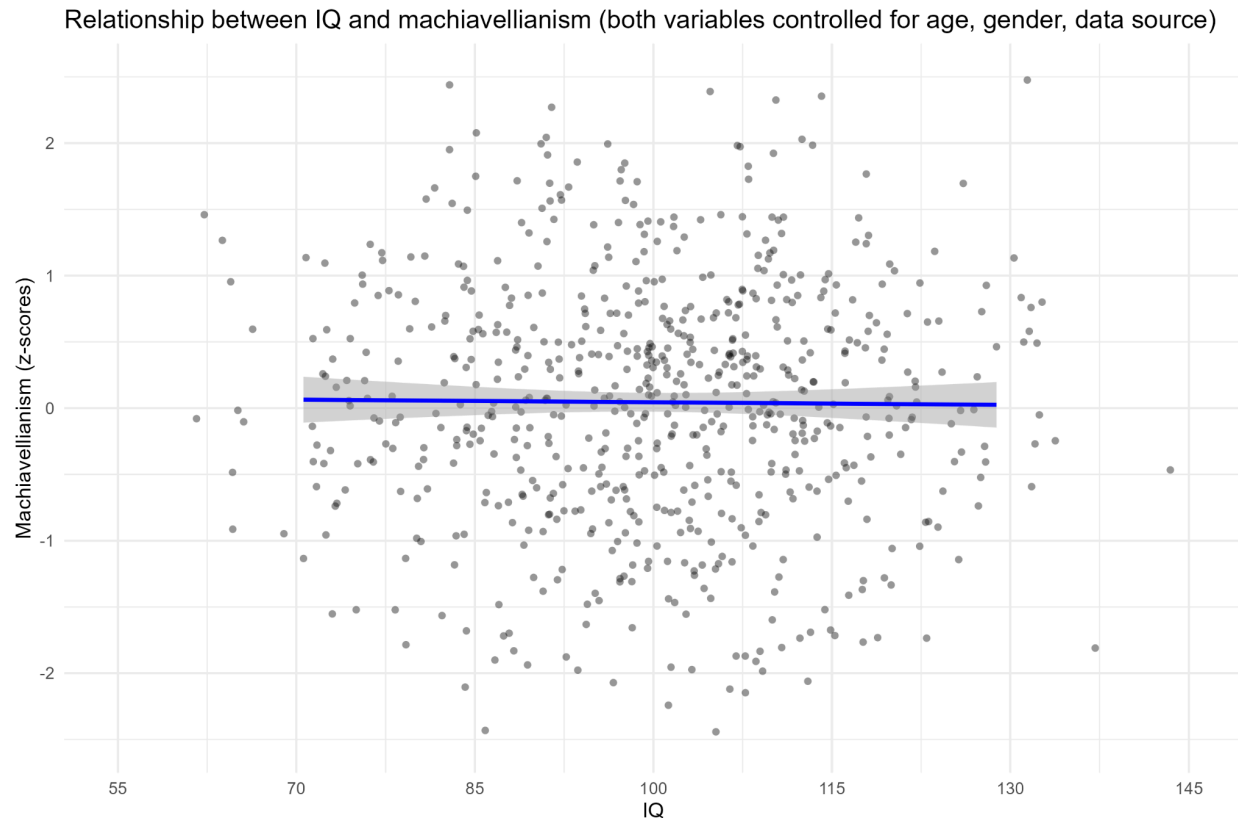
What we uncovered on a subsample of $n = 701$ was that IQ was negatively related to narcissism ($r = -0.20$) and sadism ($r = -0.24$), but had no relationship with machiavellianism ($r = -0.02$). Thus, higher IQ people in our sample exhibited lower levels of socially aversive traits, except for machiavellianism. Here are the scatterplots that illustrate these correlations.

Relationship between IQ and narcissism (both variables controlled for age, gender, data source)



Relationship between IQ and sadism (both variables controlled for age, gender, data source)





What do the other studies say?

We found two meta-analyses that investigated the relationship between cognitive ability and dark triad traits. Interestingly, in both meta-analyses the correlations between cognitive ability and dark triad traits were practically non-existent.

Specifically, in [O'Boyle et al. \(2013\)](#) meta-analysis, the correlations between the three traits and IQ ranged from -0.05 to 0.03, while in [Michels \(2022\)](#) meta-analysis they ranged from -0.06 to 0.08.

We are unsure why our findings differ from these meta-analyses. However, there was a substantial heterogeneity of effects in both meta-analyses, meaning that some effects were strong and some were weak. It is still not clear what accounts for these differences in effect sizes, and the effects we obtained seem to be similar to some of the bigger effects reported in these meta-analyses. However, the existence of weaker effects drove the overall effect in the meta-analyses down, and studies still have to explain what drives these differences in effect sizes across studies.

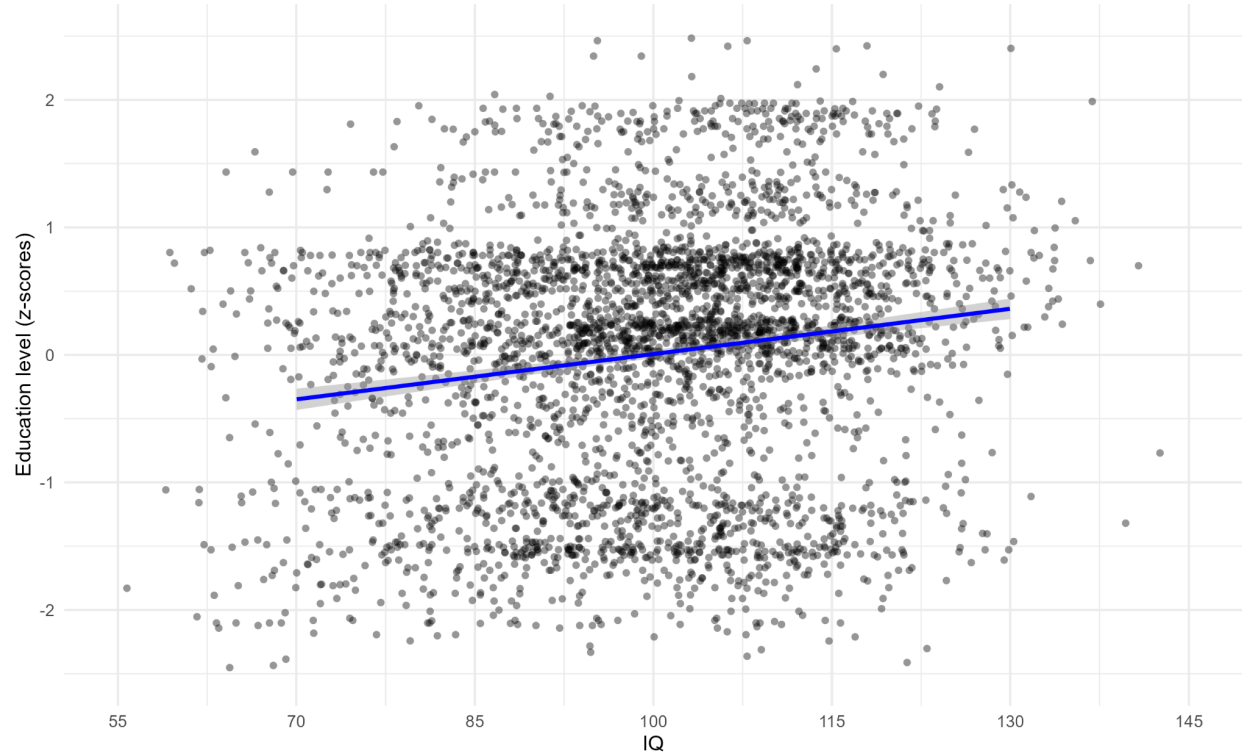
Takeaways

- We found higher IQ people to be lower on two out of three dark triad traits, narcissism and sadism, but not on machiavellianism (with which there was no correlation)
- However, meta-analyses appear to find no relationship between IQ and these traits

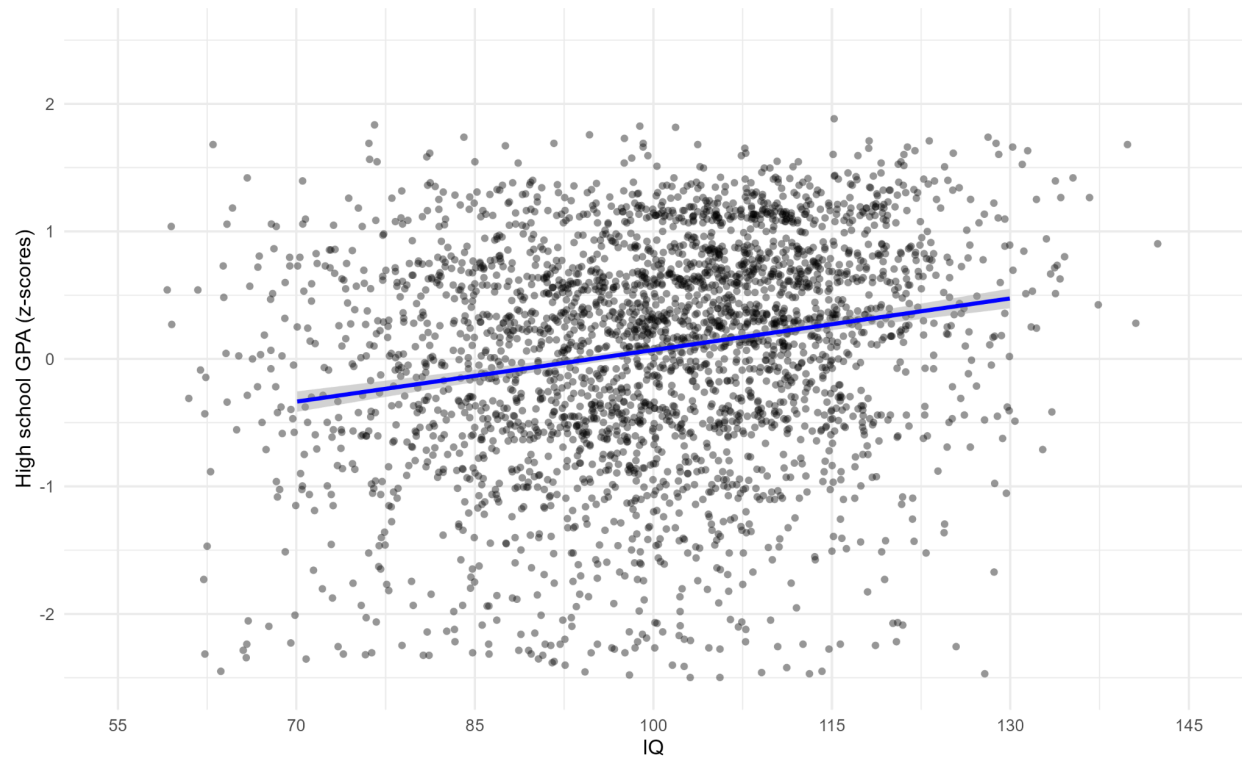
14. What is the relationship between IQ and education?

IQ is positively related to education. We measured education by asking participants to report on three things: their a) highest level of education, b) high-school GPA, c) college GPA. IQ was positively related with all three education variables and the magnitude of these correlations was $r = .19$ ($n = 3688$) for level of education, $r = 0.21$ ($n = 3173$) for high-school GPA and $r = 0.04$ ($n = 3205$) for college GPA. Therefore, it seems that IQ is important for general level of education one obtains during the lifetime and for GPA in high-school, but not so much for GPA in college (though the lower correlation with college GPA might, in part, be due to range restriction - college students are more similar to each other in IQ, on average, than members of the general population). Here are the scatterplots of these correlations:

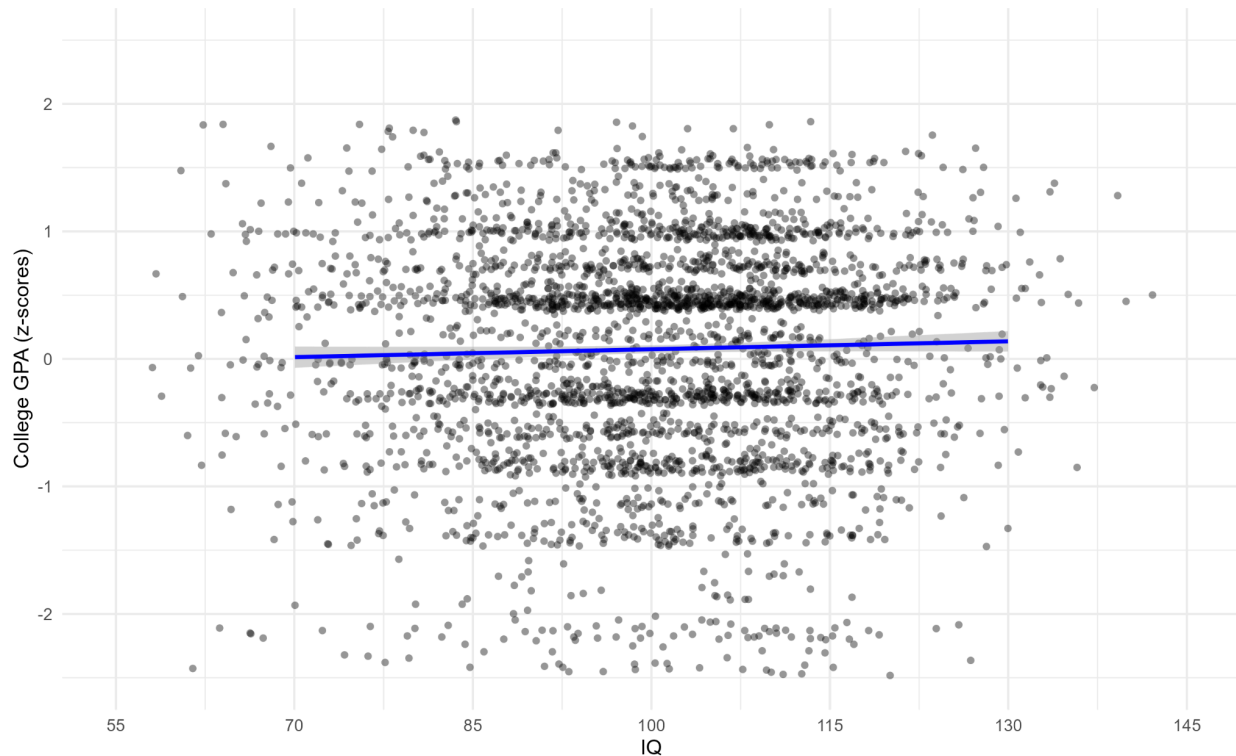
Relationship between IQ and Education level (both variables controlled for age, gender, data source)



Relationship between IQ and High school GPA (both variables controlled for age, gender, data source)



Relationship between IQ and College GPA (both variables controlled for age, gender, data source)



What do the other studies say?

Research consistently shows a positive relationship between IQ and educational outcomes. A meta-analysis found that education improves cognitive abilities by 1–5 IQ points per year of schooling, with effects persisting across the lifespan ([Ritchie & Tucker-Drob, 2018](#)). IQ is also a significant predictor of academic performance, with a moderate positive correlation ($r = 0.367$) observed across multiple studies ([Lozano-Blasco et al., 2022](#)).

Takeaways

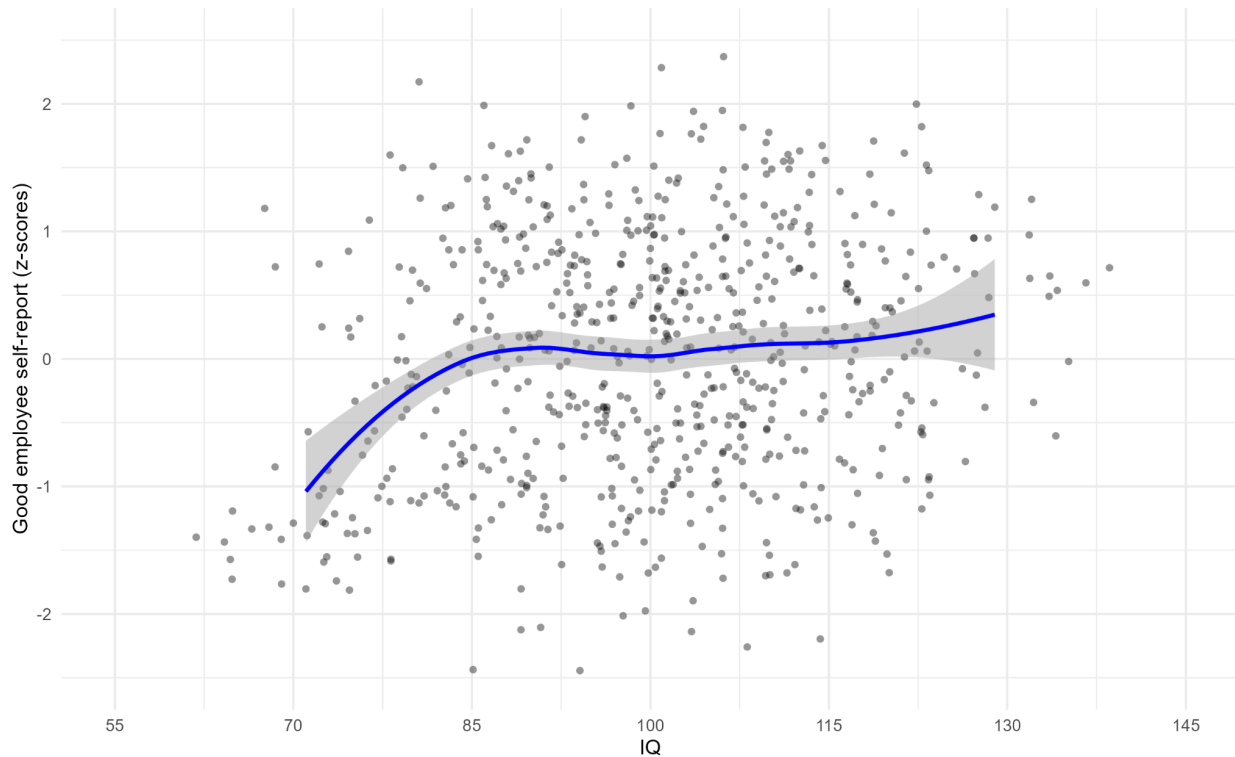
- IQ is related to highest level of education obtained, as well as with high-school GPA
- However, its relationship with college GPA is substantially lower

15. What is the relationship between IQ and job performance?

IQ is positively related to job performance. We measured job performance by asking our participants to rate themselves on a series of statements such as "I have been told by a boss before that I need to improve at work.", "I regularly exceed expectations with the quality of my work.", "I don't always try very hard to do an exceptional job at work.", "I have had times in the last three years where I was a bad employee." or "I always get my work done on time." (31 such statements in total) and summed up their responses to get the total "good employee" score. Here, a higher score means that the participant rated him/herself to be a better employee.

When correlating this score to IQ, we obtained a correlation of $r = 0.18$ ($n = 686$). However, in additional analyses we uncovered something interesting: the relationship between IQ and good-employee score was not linear. It seems that IQ predicted job performance up to a certain IQ level, after which it ceased to be a good predictor of job performance. We divided our sample into three separate groups: low IQ group ($IQ < 92$), average IQ group (≥ 92 & ≤ 108) and high IQ group ($IQ > 108$) and correlated IQ to a good-employee score in each of these groups. Only in the lower-IQ group was IQ a significant predictor of good-employee score and this correlation was quite large ($r = 0.46$). In other groups, IQ was practically unrelated to good-employee score. This means that IQ was a potent predictor of job performance only at lower levels of IQ, but not for people with average or high IQ. Here is a graph that illustrates this non-linear relationship between IQ and good-employee score.

Relationship between IQ and Good employee self-report (both variables controlled for age, gender, data source)



What do the other studies say?

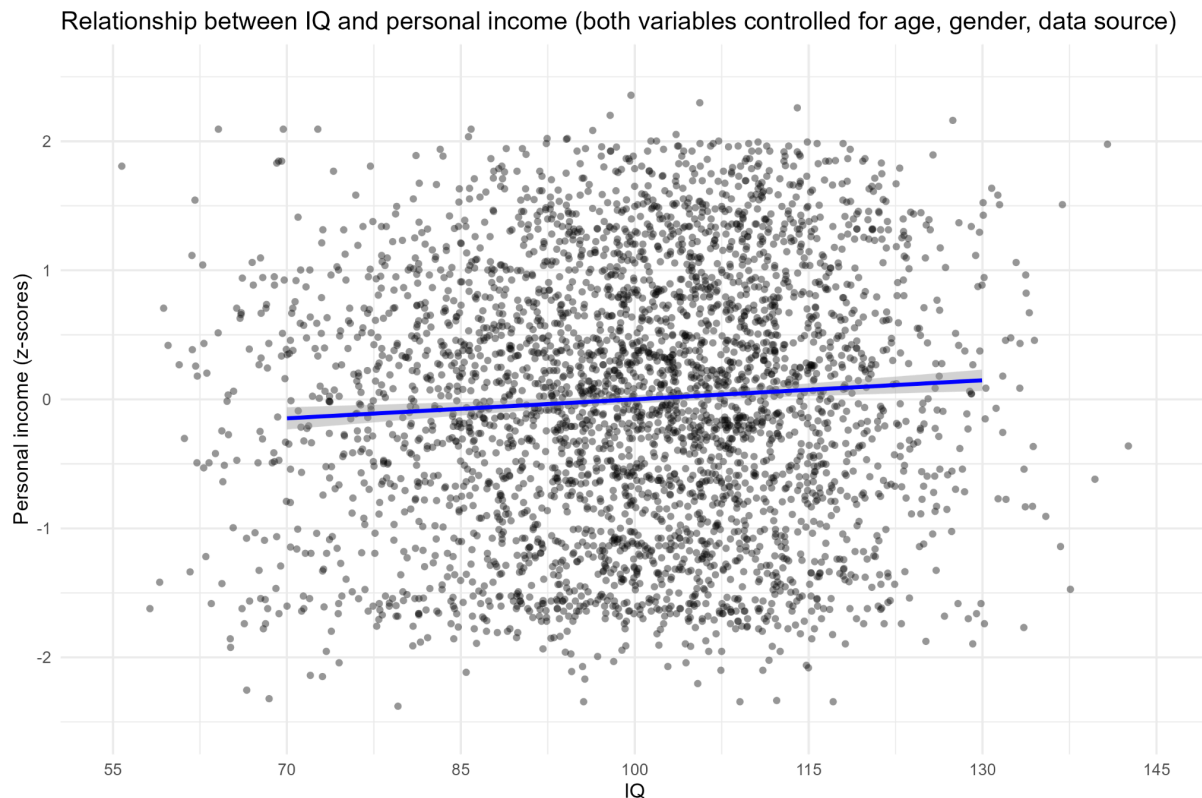
First, it is important to note that studies generally show that IQ has a linear effect on various outcomes (e.g., [Brown et al., 2021](#)) and in this sense our study does not agree with the literature. However, regarding the question of whether IQ predicts job performance, our results align with general consensus in literature that IQ does positively predict job performance. Earlier meta-analysis on this by Schmidt & Hunter (1988) found a very large meta-analytical correlation between IQ and job performance ($r = 0.51$). However, a more recent meta analysis by Sackett et al. (2022) that revisited these estimates and corrected them by using more realistic statistical procedures for effect-size estimation estimated this correlation to be $r = 0.31$.

Takeaways

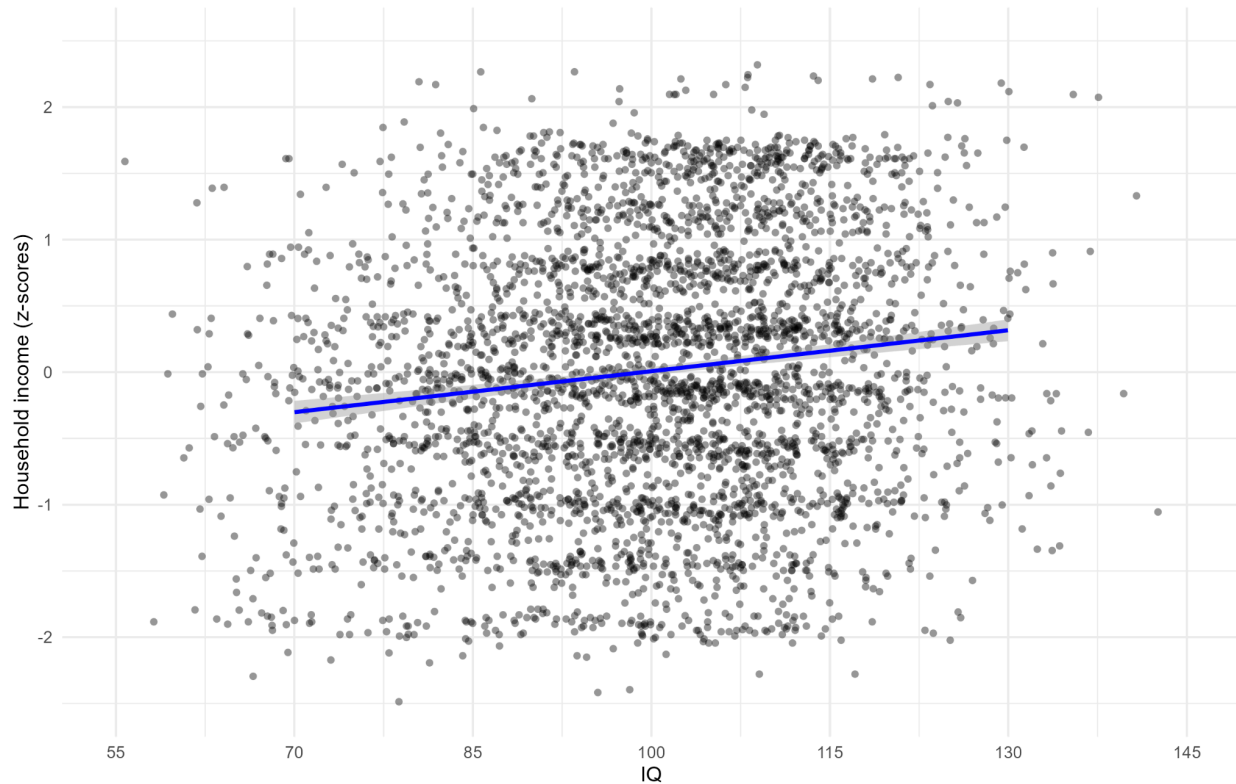
- IQ predicts better self-reported job performance, but only in a subsample of participants with IQ lower than average.

16. Is IQ positively related to income?

To a small degree, yes – we found that higher IQ people had higher incomes, but only slightly. We collected two types of income: personal income (of each individual) and a household income. The correlation between IQ and self-reported personal income in our study was $r = 0.07$, while the correlation between IQ and self-reported household income was twice as strong: $r = 0.15$ ($n = 3688$ for both). Both of these correlations are quite low, but in a nutshell, they mean that as the IQ rises, the income rises too, albeit to a small degree. It's interesting that we found a greater correlation with household income than personal income, because it's easier to see how IQ might directly cause more personal income than to see how it could cause household income (that's not due to personal income) to rise – this suggests that the link between IQ and income is more complicated than higher IQs simply causing individuals to earn more. Here are the scatterplots showing the relationships between personal/household income and IQ. Each study participant is shown as a black dot, and the blue line shows the trendline.



Relationship between IQ and household income (both variables controlled for age, gender, data source)



What do the other studies say?

Our estimate is generally in line with previous studies on the relationship between IQ and income, although the effect sizes we obtained are somewhat lower than what has previously been found in the literature. For example, a meta-analysis by [Ng et al. \(2005\)](#) analyzed eight different data sets and reported a correlation between cognitive ability and salary of $r = 0.27$. Somewhat more inclusive meta-analysis by [Strenze \(2007\)](#) estimated a correlation between IQ and income at $r = 0.22$ based on the analysis of 20 data sets. We are unsure why our study found a lower correlation, but it may be that our samples were more restricted in income (i.e., had a narrow range) than some other samples.

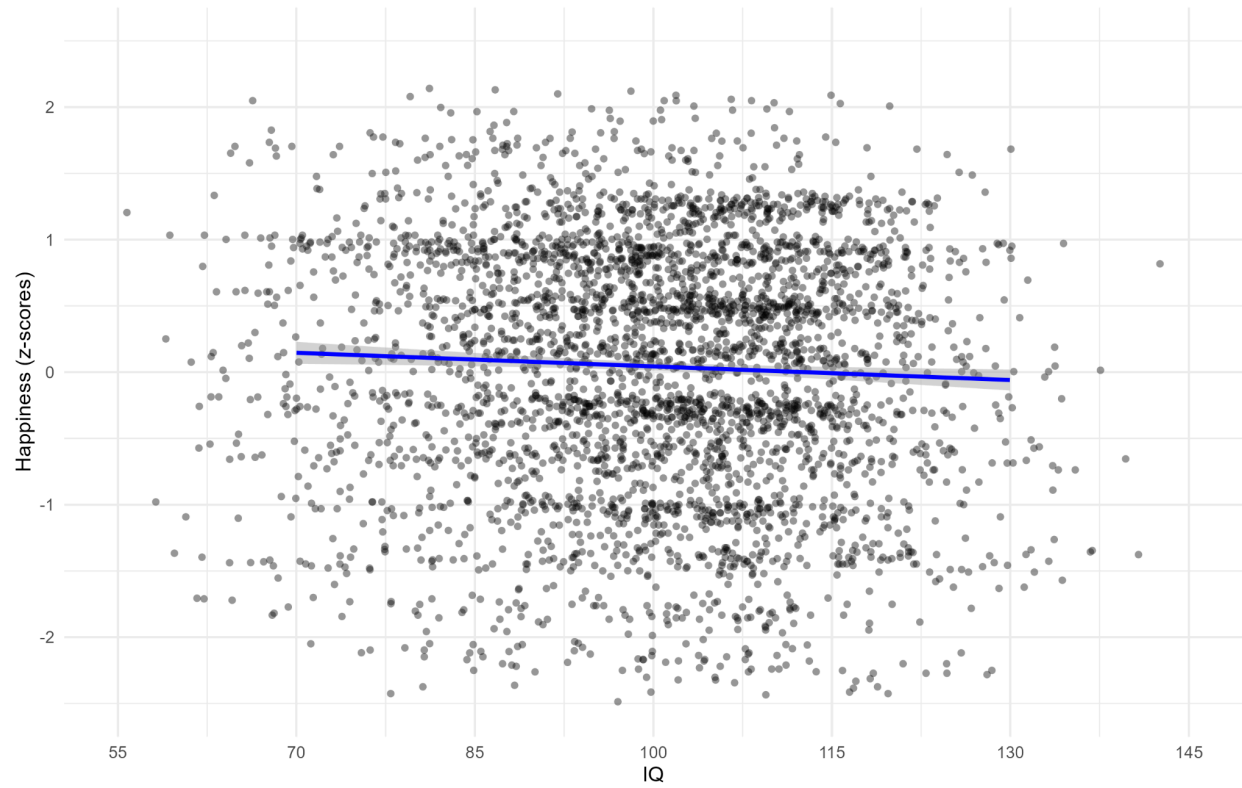
Takeaway

- Higher IQ is linked to greater income but the link isn't very strong. Part of this effect may be that higher IQ people can get hired and perform better at some high paid jobs. There are also other plausible explanations for why the effect is weak such as that other abilities are more important in work or that income depends more on the field of work rather than on the cognitive abilities. However, this is beyond the scope of this report.

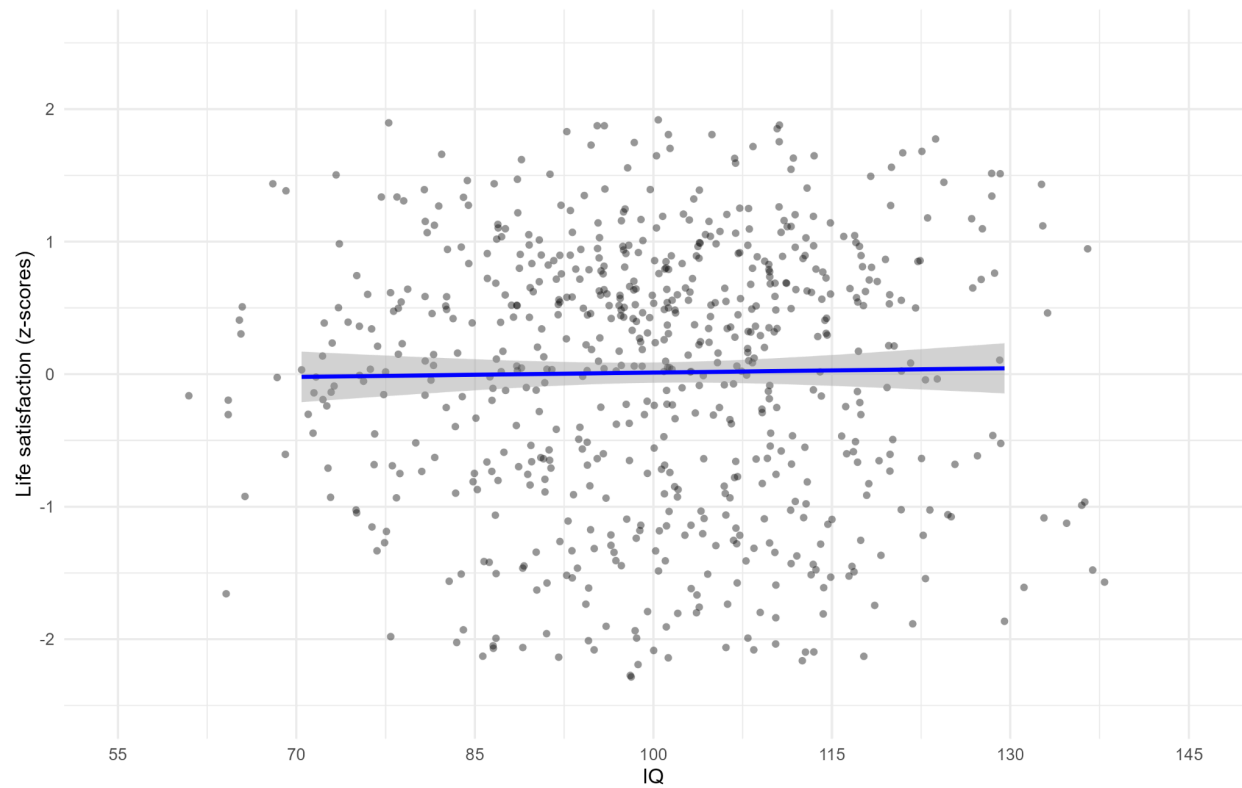
17. Is IQ related to happiness and life satisfaction?

No. In our sample, IQ was virtually unrelated to both momentary happiness ($r = -0.04$, $n = 3688$) and life satisfaction ($r = -0.001$, $n = 674$). To investigate this, we asked our participants "Right now, at this very moment, how happy or unhappy do you feel?" - which is our measure of "happiness." . Additionally, we gave a subset of our participants a short Satisfaction With Life scale by Diener et al. (1985) that consisted of five statements related to life satisfaction (e.g., "In most ways my life is close to my ideal.", "The conditions of my life are excellent." and "I am satisfied with my life.") that we averaged to get a final score for life satisfaction. The two plots below with their (almost) horizontal lines of best fit illustrate this lack of relationship between IQ and happiness/life satisfaction.

Relationship between IQ and happiness (both variables controlled for age, gender, data source)



Relationship between IQ and life satisfaction (both variables controlled for age, gender, data source)



What do the other studies say?

Research on the relationship between IQ and happiness/life satisfaction show mixed results. At the individual level, a lot of studies have found very low and usually not statistically significant correlations between IQ and happiness ([Kanazawa, 2014](#); [Veenhoven & Choi, 2012](#); [Sigelman, 1981](#)), but there are exceptions that reported a positive association (Ali et al., 2012), though the effect was quite weak. Thus, our study is generally in line with the existing literature.

Takeaways

- IQ likely has little to no correlation with either momentary happiness or life satisfaction.

18. Is IQ related to different mental health challenges?

Not in our sample. To evaluate this question, we asked all our participants both whether they have been diagnosed with different mental health conditions, as well as whether they believe they currently suffer from them. These included:

- anxiety disorder,
- major depressive disorder,
- bipolar disorder,
- psychosis disorder,
- personality disorder,
- food disorder,
- sleep disorder,

- sex disorder,
- impulse disorder,
- dissociation disorder,
- development disorder,
- conduct disorder,
- attention deficit hyperactivity disorder (ADHD) and
- autistic spectrum disorder.

Most of the correlations we obtained were negative, but in terms of magnitude, they were extremely low and practically negligible (between $r = 0$ and $r = -0.1$, $n = 3688$).

What do the other studies say?

The existing studies that examined the relationship between cognitive ability and mental health have used vastly different approaches and designs and arrived at different conclusions for different mental health issues. Findings in these studies are often contradictory and inconclusive. For example, regarding the relationship between cognitive ability and anxiety or depression, studies so far generally show either negative relationships with IQ or non-existent relationships, but there are exceptions. A meta-analysis by [Martin et al. \(2010\)](#) that compared the mental health of gifted and nongifted youth (which can be seen as a proxy for cognitive ability) found that gifted children exhibited significantly lower levels of anxiety than nongifted children, but found no differences regarding depression or suicidal ideation. Two studies correlated childhood cognitive ability with mental health outcomes in adulthood. A study by [Hatch et al. \(2007\)](#) on $n = 1875$ participants found that childhood cognitive ability was associated with reporting fewer symptoms of anxiety and depression in women, but not men. [Wraw et al. \(2016\)](#), in a sample of $n = 5793$ participants, found that higher childhood cognitive ability predicted decreased self-reported mental health problems in adulthood, but, surprisingly, increased risk of receiving a diagnosis of depression by the age of 50. However, the effect sizes here were quite low. Finally, a big study by [Williams et al. \(2023\)](#) that compared a high g-factor group (g-factor 2 SD above the UK mean; $n = 16,137$) with an average

g-factor group (g-factor within 2 SD of the UK mean; $n = 236,273$) found that individuals with high g-factors had less general anxiety but there were no differences regarding the depression.

On the other hand, some studies found a positive correlation between cognitive ability and other mental health issues. For example, [Karpinski et al. \(2018\)](#) compared Mensa members' scores of mood and anxiety disorders, attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) with national averages and found that Mensa members scored higher on questionnaires that assessed these disorders in comparison to national averages. On the other hand, Mensa members are self-selecting, and may differ from the general high IQ population.

The results so far on the relationship between cognitive ability and mental health are complex and inconclusive.

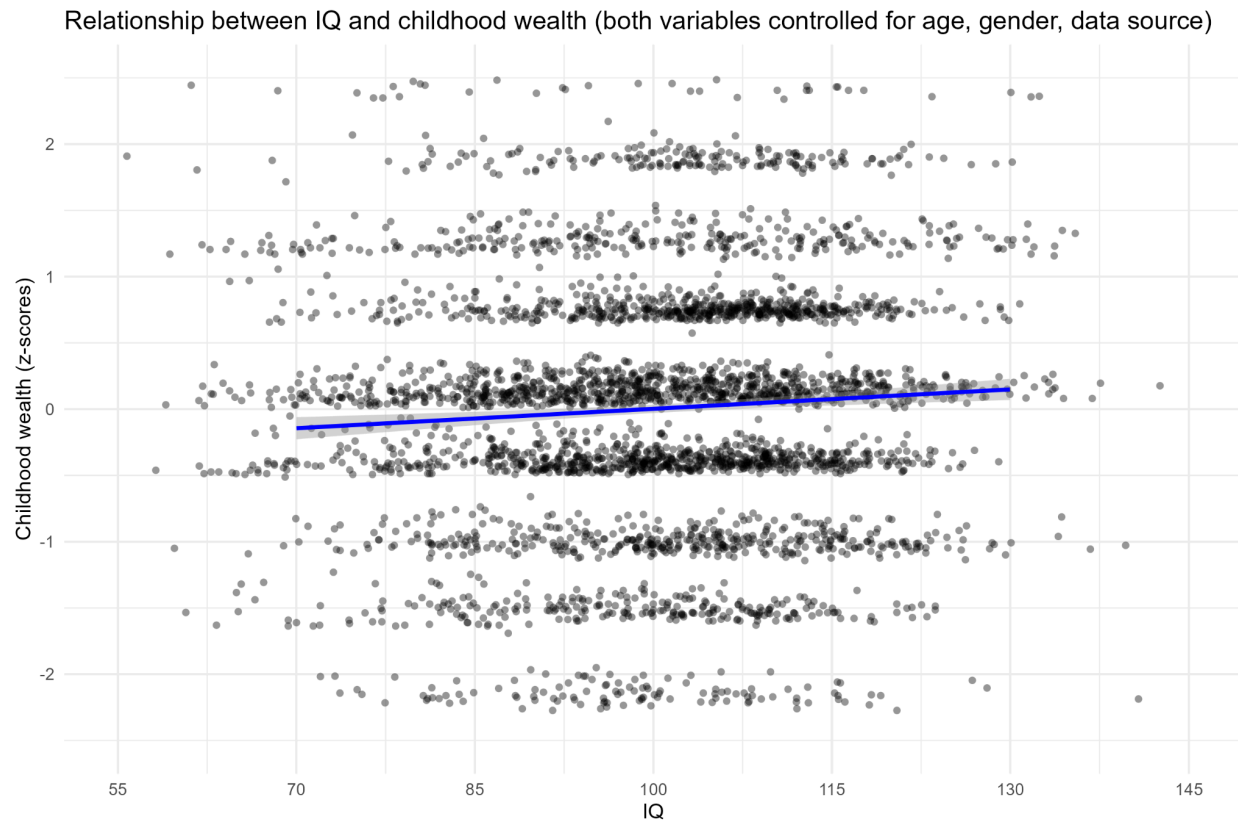
Takeaways

- IQ was not related to any of the 14 mental challenges we screened in our study, and more broadly there is a lack of consensus on the relationship between IQ and mental health.

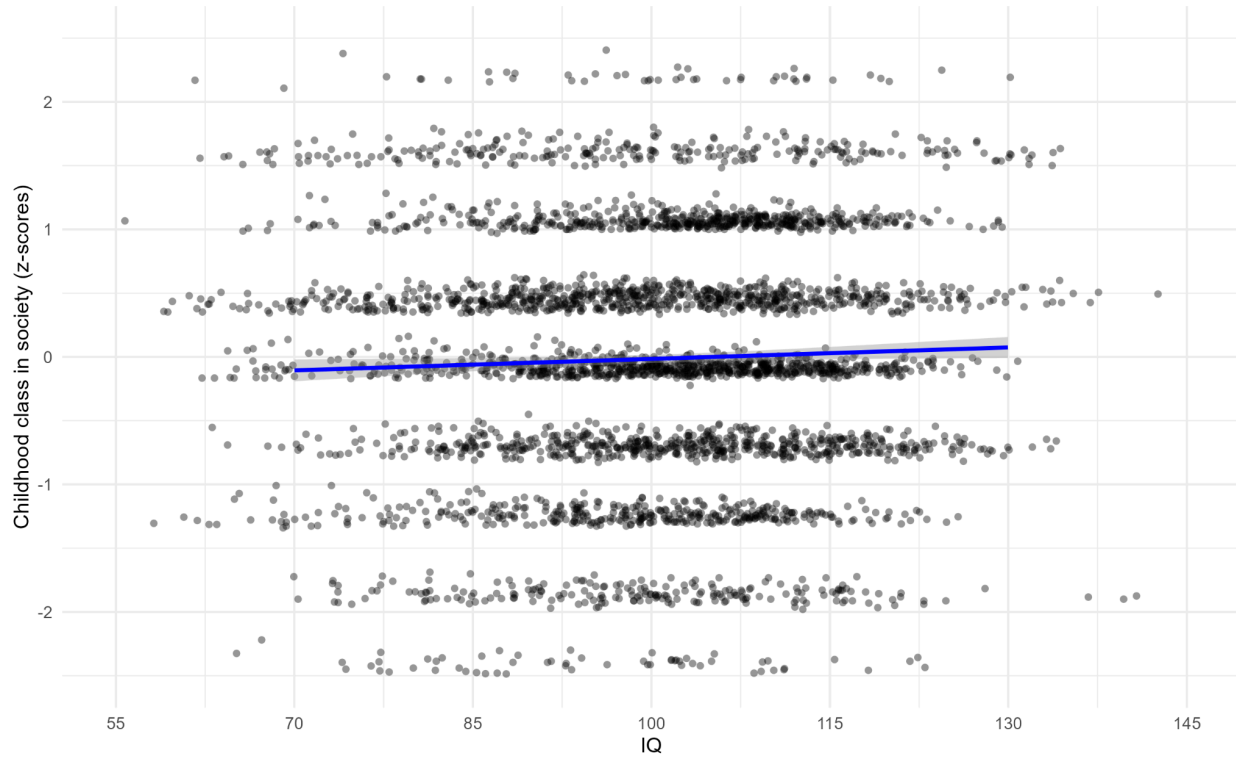
19. Does childhood poverty or low socioeconomic status in childhood predict lower IQ in adulthood?

Not in our sample. We asked our participants two questions related to their childhood socioeconomic status: a) How wealthy or poor would they say they were growing up (on a scale from 0 = poor to 4 = wealthy), and b) Where would they put themselves on a scale from 0 = lower class to 4 = upper class while they were growing up. Correlations between IQ and both measures were very weak, basically negligible ($r =$

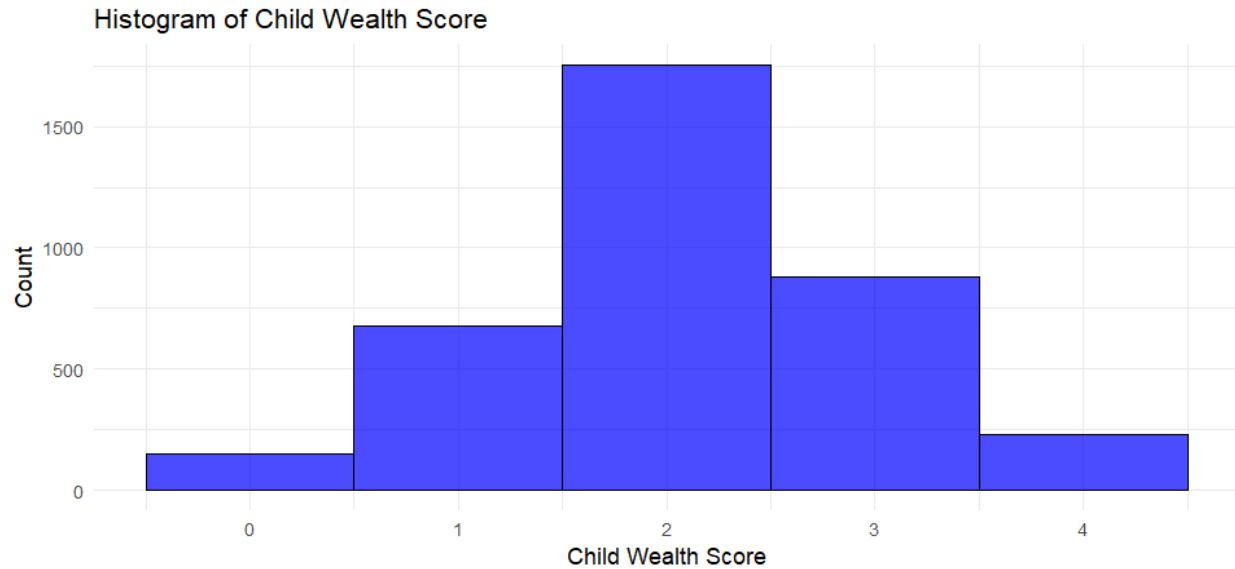
0.06 for a wealth question and $r = 0.03$ for the social class question; $n = 3688$). Here are the two scatterplots showing these correlations.



Relationship between IQ and childhood class in society (both variables controlled for age, gender, data source)



One explanation for the lack of correlation between IQ and childhood socioeconomic status could be that we did not capture the full range of childhood socioeconomic status, e.g., that we had only people with higher socioeconomic status in our sample which would decrease the correlation due to range restriction. However, this is not true as people of both higher and lower socioeconomic status were represented in our sample. Here are two plots that show the distribution of our childhood wealth and childhood class in society.



What do the other studies say?

Our results somewhat contradict previous reports about the negative relationship between childhood poverty and later cognitive functioning. For example, [Najman et al. \(2009\)](#) found that poverty experienced at any stage of the child's development is associated with reduced cognitive outcomes at the age of 14. [Skoblow et al. \(2023\)](#) provided meta-analytical estimates of the relationship between childhood

socio-economic position and later-life cognitive functioning showing that the mean correlation between the two was $r = 0.18$.

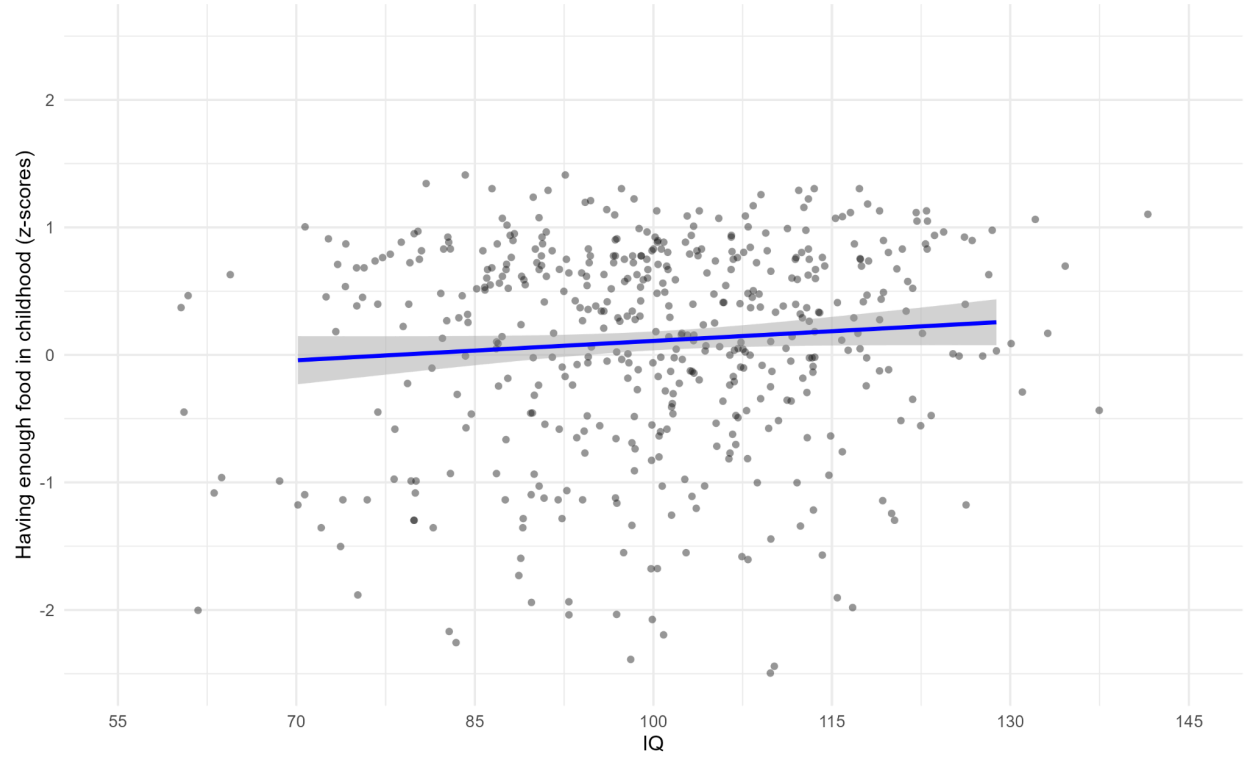
Takeaways

- In our study childhood poverty and low childhood socioeconomic status was not related to IQ, although this contradicts findings from other studies that find a modest negative correlation between these factors and IQ.

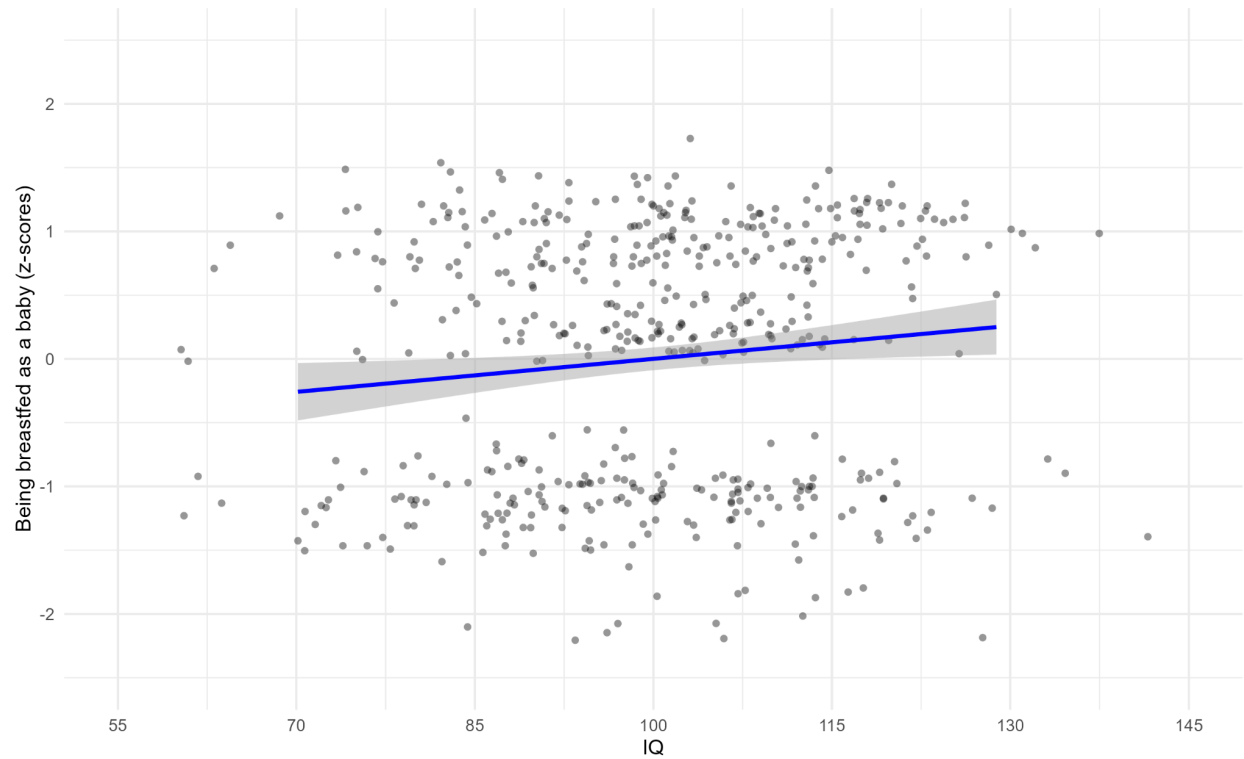
20. Is childhood nutrition related to IQ as an adult?

Yes, to a small degree. We asked our participants ($n = 499$) several questions related to their childhood nutrition. Specifically, we asked them when they were children, how often they had enough food, how often they ate fruits and vegetables daily, how often they drank milk daily or consumed an alternative source of calcium and how often they ate fast food. Additionally, we asked them if they were breastfed as babies. We obtained two significant, albeit low correlations: $r = 0.16$ between having enough food in childhood and IQ and $r = 0.11$ between being breastfed as a baby and IQ. IQ was not significantly correlated with eating fruits and vegetables daily ($r = 0.05$), frequency of drinking milk or consuming an alternative source of calcium ($r = 0.08$) or frequency of eating fast food ($r = -0.08$). Importantly, these results held even after we statistically accounted for participants' general childhood wealth to make sure that the correlation between, for example, having enough food and IQ does not exist solely because those that had more food were wealthier. Here are the scatterplots of the two statistically significant correlations.

Relationship between IQ and having enough food in childhood (both variables controlled for age, gender, data source, childhood wealth)



Relationship between IQ and being breastfed as a baby (both variables controlled for age, gender, data source, childhood wealth)



Note that our study was asking adults to self-report about what happened in childhood. These self-reports may not be that accurate, which might reduce the correlations compared to what they would be if measurements had actually been conducted in childhood.

What do the other studies say?

Previous studies generally found that the relationship between childhood nutrition habits and later life IQ exists, but is not particularly strong. For example, [Northstone et al. \(2012\)](#) found that a poor diet associated with high fat, sugar and processed food content in early childhood may be associated with small reductions in IQ in later childhood. Regarding breastfeeding, one earlier meta-analysis by [Der at al. \(2006\)](#) found that breastfeeding has little or no effect on IQ in children, while a more recent one by [Horta et al. \(2015\)](#) found a small benefit of breastfeeding for children's IQ.

Takeaways

- We found that some aspects of childhood nutrition, specifically self-reports (as an adult) of having enough food in childhood and being breastfed as a baby, had a small positive correlation with later life IQ

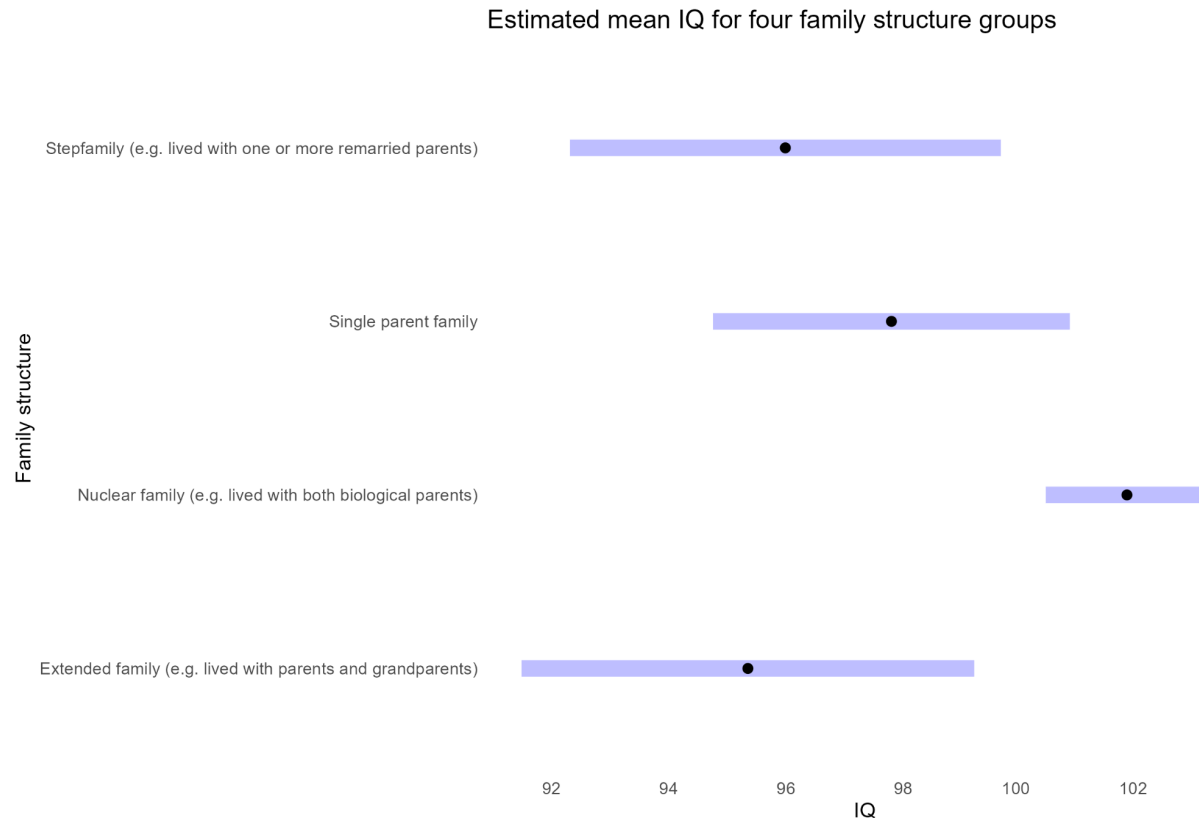
21. Does IQ differ depending on the family structure in which one grew up?

Yes, and those that grew up in a nuclear family seem to have the highest IQ. In our battery, we had a question that asked our participants about the family structure in which they grew up with following seven response options:

- Nuclear family (e.g. lived with both biological parents)
- Single parent family
- Stepfamily (e.g. lived with one or more remarried parents)
- Extended family (e.g. lived with parents and grandparents)
- Grandparent family (e.g. raised by one or more grandparent)
- No family (e.g. orphanage)
- Other family structure

One important thing to note is that, as very few people in our sample choose one of the last three options, we discarded them from the analysis. Another thing to note is that, of the remaining options, nuclear family was chosen most often ($n = 427$), with single parent family ($n = 91$), stepfamily ($n = 60$) and extended family ($n = 54$) being chosen much less often. This means that the IQ score for these three groups were estimated with less precision, as indicated by larger confidence intervals in the figure below. Finally, before checking the differences in IQ between these different family structures, we have statically adjusted our IQ scores to be independent of the effects of gender, age and data source.

With these caveats, the largest IQ was estimated in participants that grew up in their nuclear families (mean IQ = 102), followed by those that grew up in single parent families (mean IQ = 98), stepfamily (mean IQ = 96) and extended family (mean IQ = 95). However, even though these mean IQ estimations differ, statistically speaking, nuclear family IQ significantly differed only from stepfamily and extended family IQ, but not from single parent family IQ. Importantly, these differences seem to be independent of a childhood class and wealth as they remained even after we statistically accounted for these factors. A figure below shows how the four family structures differ in IQ, together with confidence intervals around those IQ estimations.



What do the other studies say?

Although we did not find studies that specifically examined the differences in IQ between people growing up in different family structures, there are studies that investigated different, but potentially related outcomes. For example, children in nuclear families generally show better health outcomes, fewer behavioral issues, and higher academic achievement compared to those in single-parent or blended families (e.g., [Blackwell, 2010](#); [Ginther & Pollak, 2004](#)). Thus, it could be said that our findings did not contradict previous findings, further expanding prior results to include IQ.

Takeaways

- IQ differs depending on the family structure in which a person grew up, being highest in those from nuclear families compared to other family types (extended family or stepfamily)

22. Is there a relationship between IQ and adverse childhood experiences?

Not really. We asked our participants whether they experienced a variety of potentially traumatic experiences in their childhood (prior to your 18th birthday) based on the Adverse Childhood Experiences (ACEs) questions. In particular, we asked them the following ten yes/no questions about their childhood:

1. Did a parent or adult in your home often swear at you, insult you, or put you down?
2. Did a parent or adult in your home ever hit, beat, kick, or physically hurt you in any way?
3. Did you experience unwanted sexual contact (such as fondling or oral/anal/vaginal intercourse/penetration)?
4. Did you feel that no one in your family loved you or thought you were special?
5. Did you feel that you didn't have enough to eat, had to wear dirty clothes, or had no one to protect or take care of you?
6. Did you lose a parent through divorce, abandonment, death, or other reason?
7. Did your parents or adults in your home ever hit, punch, beat, or threaten to harm each other?
8. Did you live with anyone who had a problem with drinking or using drugs, including prescription drugs?
9. Did you live with anyone who was depressed, mentally ill, or attempted suicide?
10. Did you live with anyone who went to jail or prison?

Correlations between IQ and responses to all of these questions were basically negligible, with the one between IQ and having lived with someone who went to prison being the only one higher than 0.10 in absolute terms (but it was still small, with $r = -0.12$, $n = 684$; this corresponds to a five-point IQ difference between people who did and did not live with anyone who went to prison, after statistically adjusting IQ for the effects of age, gender and data source). In addition to this, we have also created a total ACE score by summing up all the adverse experiences that a participant reported, essentially tracking how many, out of the ten possible adverse experiences, did each participant have. This total ACE score was also not related to IQ ($r = -0.01$). Thus, it seems that having a range of difficult experiences in childhood does not have a meaningful relationship to later life IQ.

What do the other studies say?

It seems that our results differ from those in the academic literature, as several studies that we found in the literature indicate that childhood trauma exposure can negatively impact cognitive development and academic performance. Several studies have found associations between interpersonal trauma in childhood and decreased IQ scores that persist into later childhood and adulthood ([Bosquet Enlow et al., 2012](#); [van os et al., 2017](#)). Similarly, violence exposure and trauma-related distress in young children have been linked to substantial decrements in IQ and reading achievement ([Delaney-Black et al., 2002](#)).

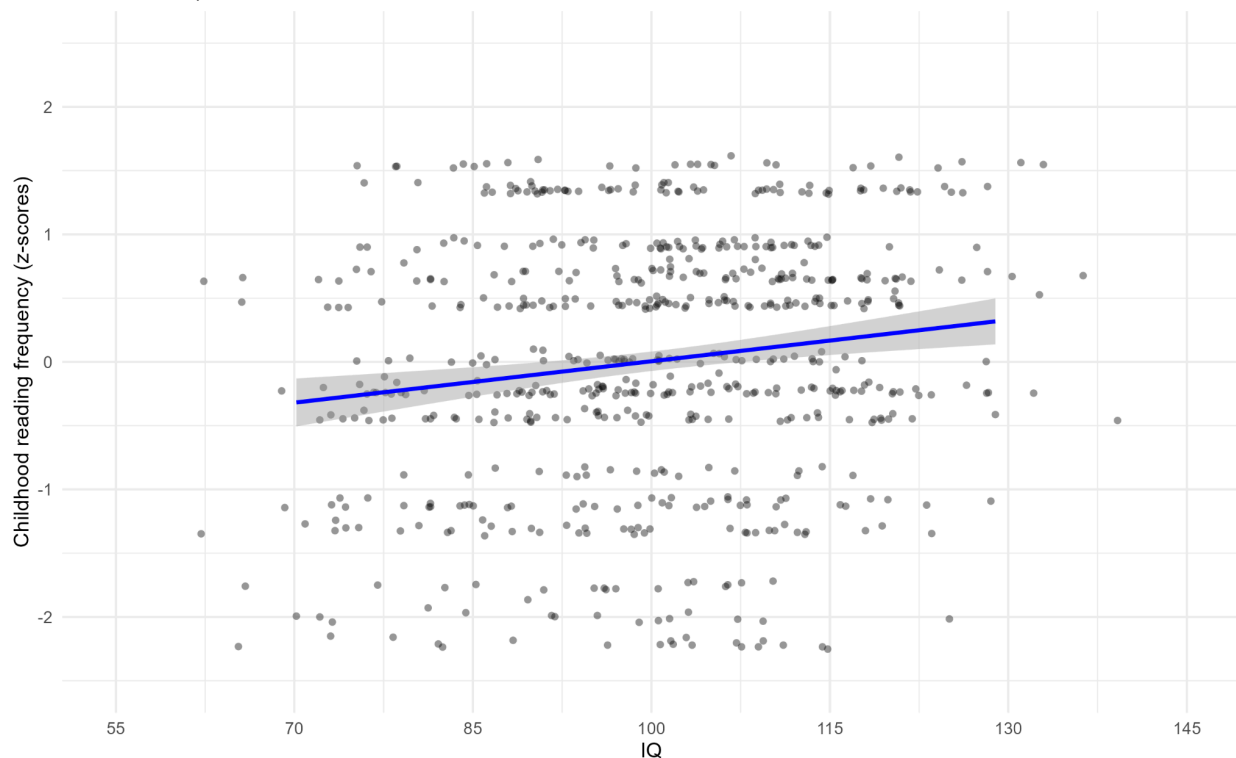
Takeaways

- In our study, childhood adverse experiences had little to no association with adult IQ, but it must be noted that other studies found that these traumatic experiences are associated with detrimental effects

23. Is there a relationship between IQ and how much a person was read to as a child?

Yes. We asked our participants how much they were read to as children (with answer options ranging from never to nearly every day) and correlated their response to IQ. This correlation turned out to be $r = 0.17$ ($n = 652$) which indicates that participants who were read to more often during childhood ended up being slightly more intelligent in adulthood. Importantly, this correlation did not change once we statistically controlled for childhood wealth or class in society, meaning that childhood reading frequency is not related to IQ only because it is a proxy for wealth or higher societal status. Here is a graphical illustration of this correlation.

Relationship between IQ and childhood reading frequency (both variables controlled for age, gender, data source)



What do the other studies say?

A recent randomized control trial ([Weisleder et al., 2018](#)) that tested the effectiveness of a parental program that included giving parents access to children's books and

enrolling them in monthly reading workshops resulted in an increase in reading quality and quantity compared to a control group of parents who were not enrolled in the program. Importantly, children of parents who were enrolled in the program scored significantly higher on IQ test and the effect size of this difference was similar to the effect size we obtained.

Takeaways

- People who say that they were read to more in childhood also score higher on IQ tests in adulthood, and this effect does not appear to be due to childhood wealth or childhood social class.

24. Is there a relationship between IQ and having been breast-fed?

Yes, but a very small one. Specifically, we found that the correlation between IQ and reporting having been breast-fed in early childhood is $r = 0.12$ ($n = 499$). After we statistically adjust IQ for the effects of gender, age and data source on IQ, this negative correlation corresponds to a difference of 4 IQ points, on average, between those that were breastfed (IQ = 101) and those that were not (IQ = 97).

What do the other studies say?

These results are generally in line with several other studies that found that breastfed children had higher IQ scores, even after controlling for various confounding factors ([Mortensen et al., 2002](#); [Kanazawa, 2015](#); [Boutwell et al., 2018](#)).

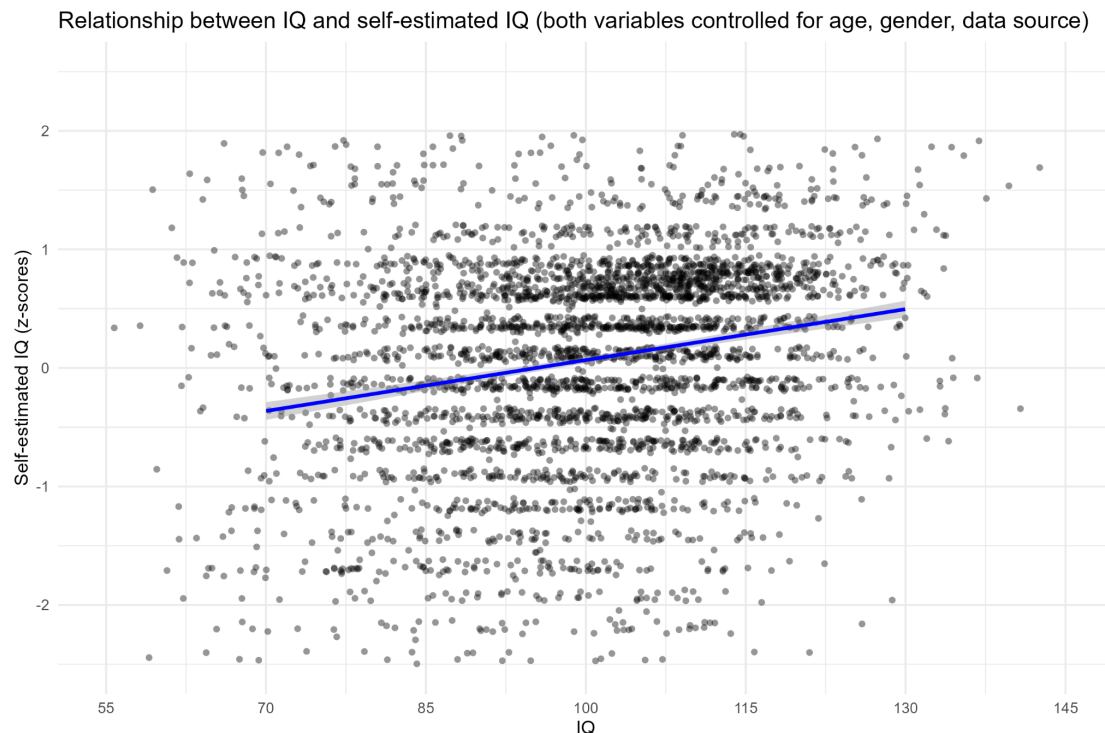
Takeaways

- People that report having not been breastfed in infancy seem to have slightly lower IQ than people that were breastfed

25. Is there a correlation between self-estimated IQ and measured IQ?

Yes. We asked participants the following question: “Out of 100 random people in your country who are of your own age and gender, how many of those 100 people do you think you would do better than on an intelligence test designed to accurately measure I.Q. (if you all took the same test)?” Essentially, this question asks for their IQ percentile. Since IQ is known to be normally distributed, this question can be directly converted to a self-estimated IQ: the more people think they would outperform, the higher they estimate their IQ to be.

We found a moderate positive correlation between their response to this question and their real, measured IQ ($r = 0.23$, $n = 3688$). This means that people are only modestly good at predicting their own IQ. Here is the scatterplot of this relationship - it is apparent that the line is quite flat which means that both higher IQ and lower IQ people tend to estimate themselves as being closer to the mean than they really are.



What do the other studies say?

Our findings are aligned with meta-analytical estimates of the relationship between self-estimated and measures abilities, with [Freund & Kasten \(2012\)](#) meta-analysis showing a mean correlation of $r = 0.33$ and [Zell & Krizan \(2014\)](#) meta-analysis showing a mean correlation of $r = 0.29$ between measured IQ and self-estimated performance.

Takeaways

- Just like in other studies, in our study measured IQ was modestly related to the self-estimated IQ
- Both higher IQ and lower IQ people may have a tendency to estimate themselves closer to the average than they really are

26. What is the relationship between IQ and political views?

In general, those with higher IQs tend to have more liberal/progressive views. Specifically, we have asked our participants ($n = 3688$) the following four questions, each of which looks at progressivism vs. conservatism in a slightly different way:

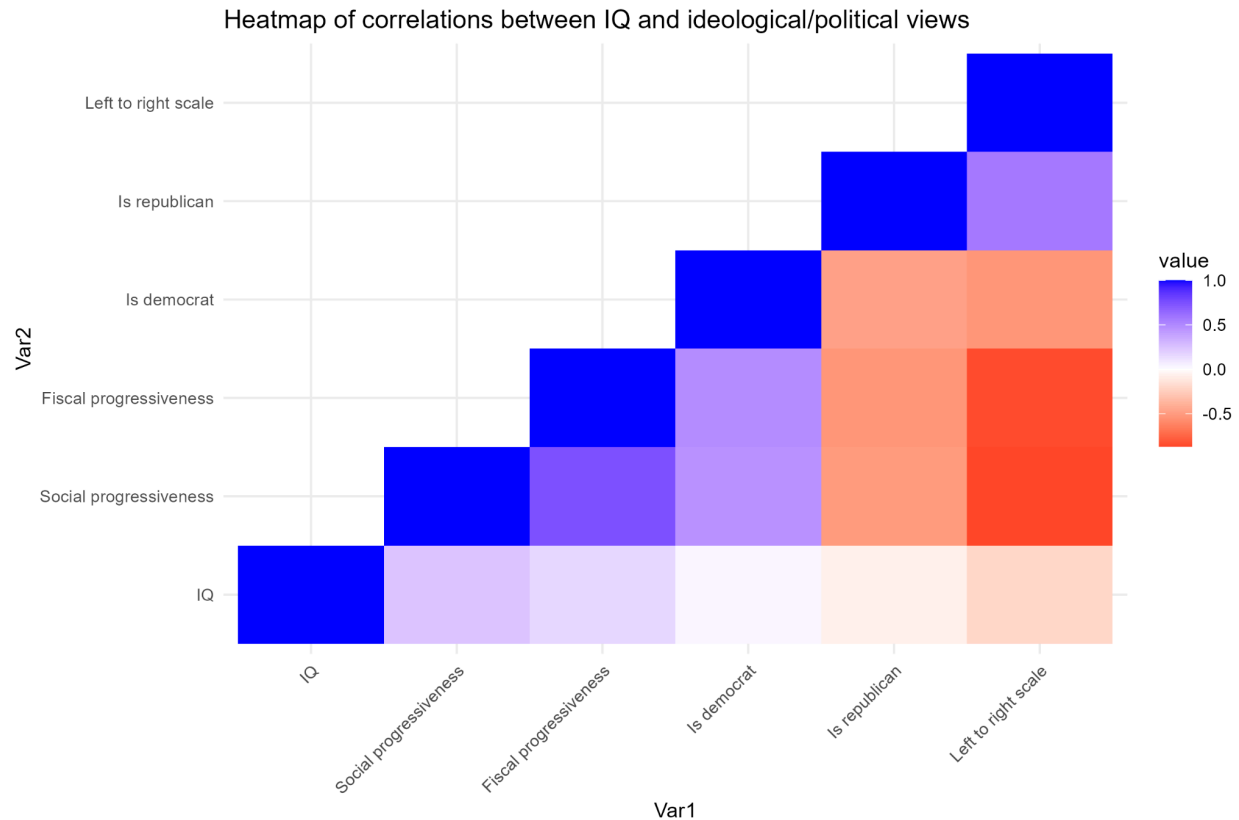
- In political matters, where do your views generally fall on the scale from "left" (progressive) to "right" (conservative)? ("Left to right conservatism scale")
- Are you registered to vote with any U.S. political parties?
- Currently, where do your views fall on a scale from completely fiscally progressive, to completely fiscally conservative? ("Fiscal progressiveness")
- Currently, where do your views fall on a scale from completely socially progressive, to completely socially conservative? ("Social progressiveness")

Note that we gave our participants explanations for the last two questions. For example, we explained that fiscal progressives usually prefer that the government provides more services, and passes more regulation in order to try to make society better, while fiscal conservatives usually advocate low taxes, reduced government spending and minimal government debt, and typically are in favor of deregulation, free trade, free markets, privatization, and tax cuts. We provided similar explanations for the social progressiveness question.

Here are the correlations between IQ and our ideological/political variables, followed by the heatmap for easier visualization of these relationships. The strongest correlation is between IQ and social progressiveness, followed by the correlation between IQ and left-right self-placement with those with higher IQ placing themselves more left on the scale.

Interestingly enough, we found much larger correlations between progressivism and IQ when measured as social progressivism or an overall left-to-right scale than we did when measured as fiscal progressiveness or as U.S. political party affiliation.

Variable	Correlation with IQ
Social Progressiveness	0.225
Fiscal Progressiveness	0.108
Is Democrat	0.065
Is Republican	-0.059
progressive to conservative slider scale (higher numbers mean more conservative)	-0.180



What do the other studies say?

Several meta analyses have explored this question before and generally found negative low-to-moderate correlations (ranging from $r = -0.25$ to $r = -0.20$) between IQ and right-wing ideological attitudes ([Onraet et al., 2015](#); [Van Hiel et al., 2010](#)). However, when focusing exclusively on economic attitudes, the relationship has been found to be very low, albeit positive this time with higher IQ predicting more conservative economic attitudes (meta-analytical $r = 0.07$ in [Jedinger & Burger, 2022](#)). Our results are thus consistent with these findings in prediction of social ideological attitudes, though slightly contradictory with regard to fiscal conservatism.

Takeaways

- Those with higher IQs tend to have more socially progressive (i.e., less socially conservative) views.

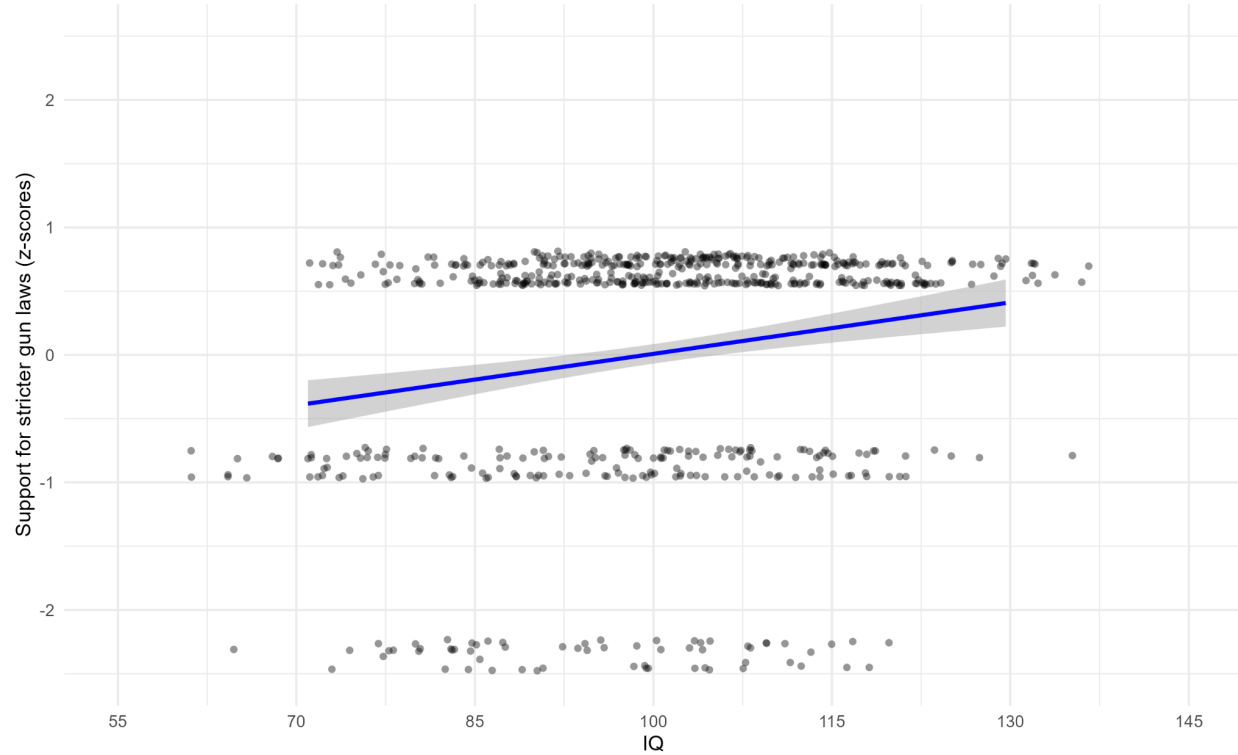
27. Is IQ related to gun possession and/or gun support?

IQ is related to support for stricter gun laws, but not to actual gun possession. To investigate this question, we asked our participants two questions: a) whether they possess guns and b) whether they think that the gun control laws should be more or less strict. The correlation between IQ and gun possession was essentially zero ($r = -0.02$, $n = 661$).. The correlation between IQ and support for stricter gun laws was stronger, and this time significant both in statistical and practical terms, $r = 0.22$ ($n = 661$). This means that people with higher IQs think that gun laws should be stricter than they currently are.

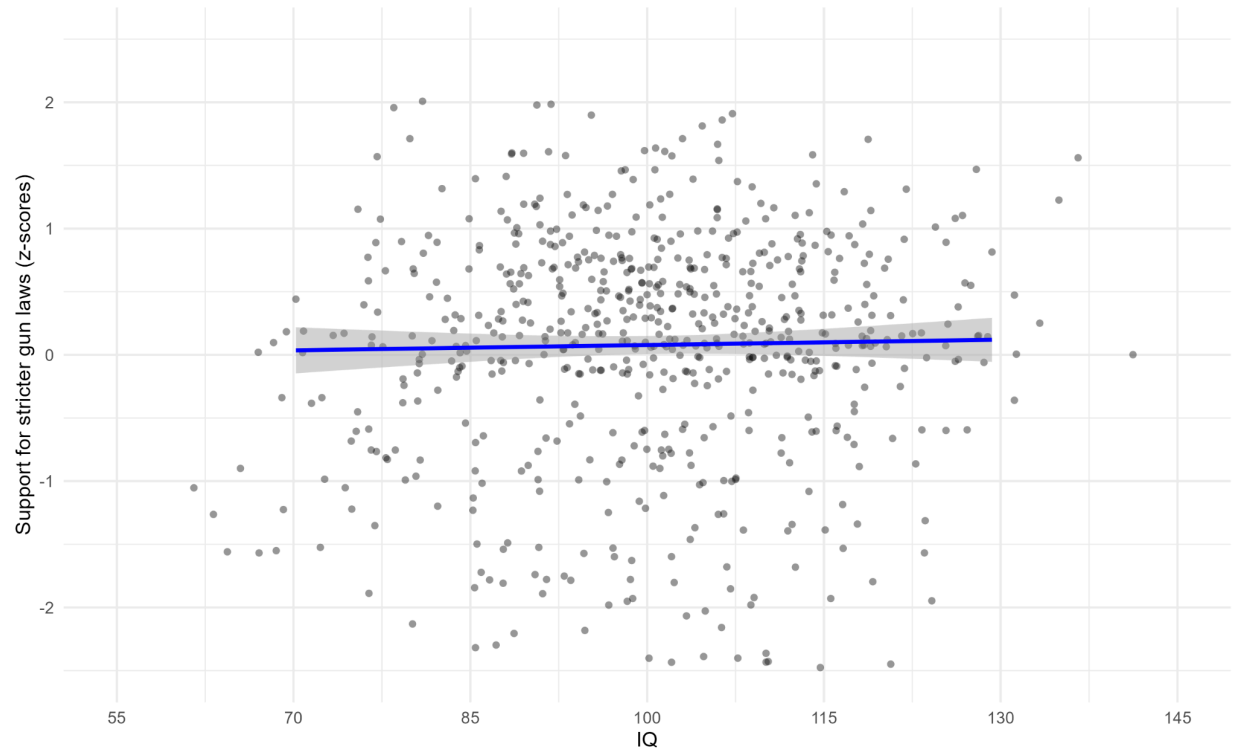
We decided to check what would happen to the relationship between IQ and support for stricter gun laws if we statistically control for political ideology (i.e, where a person falls on the left-to-right political spectrum). It is possible that political ideology accounts for the relationship between IQ and gun attitudes in a sense that higher IQ people are more progressive and this is what drives their support for gun control. Thus, if we statistically control for political ideology, the relationship between IQ and gun laws support should disappear or diminish. That is exactly what happened - once we accounted for ideology, the correlation between IQ and support for stricter gun laws was essentially cut in half to $r = 0.11$ ($n = 661$).

Two scatterplots below show these relationships, first one without and second one with political ideology as a control variable.

Relationship between IQ and support for stricter gun laws (both variables controlled for age, gender, data source)



Relationship between IQ and support for stricter gun laws (both variables controlled for age, gender, data source and political ideology)



What do the other studies say?

While we did not manage to find studies that specifically examined the link between IQ and gun attitudes, there are studies that investigated how the education level (which is positively related to IQ and sometimes taken as a proxy for IQ) is related to gun ownership and support. These studies generally find that higher education levels are associated with lower gun ownership and greater support for gun control measures ([Ross, 2001](#); [Kleck, 1996](#); [Oraka et al., 2019](#)).

Takeaways

- Higher IQ people would like to see stricter gun laws compared to people with lower IQs.

28. Is IQ positively related to political tolerance?

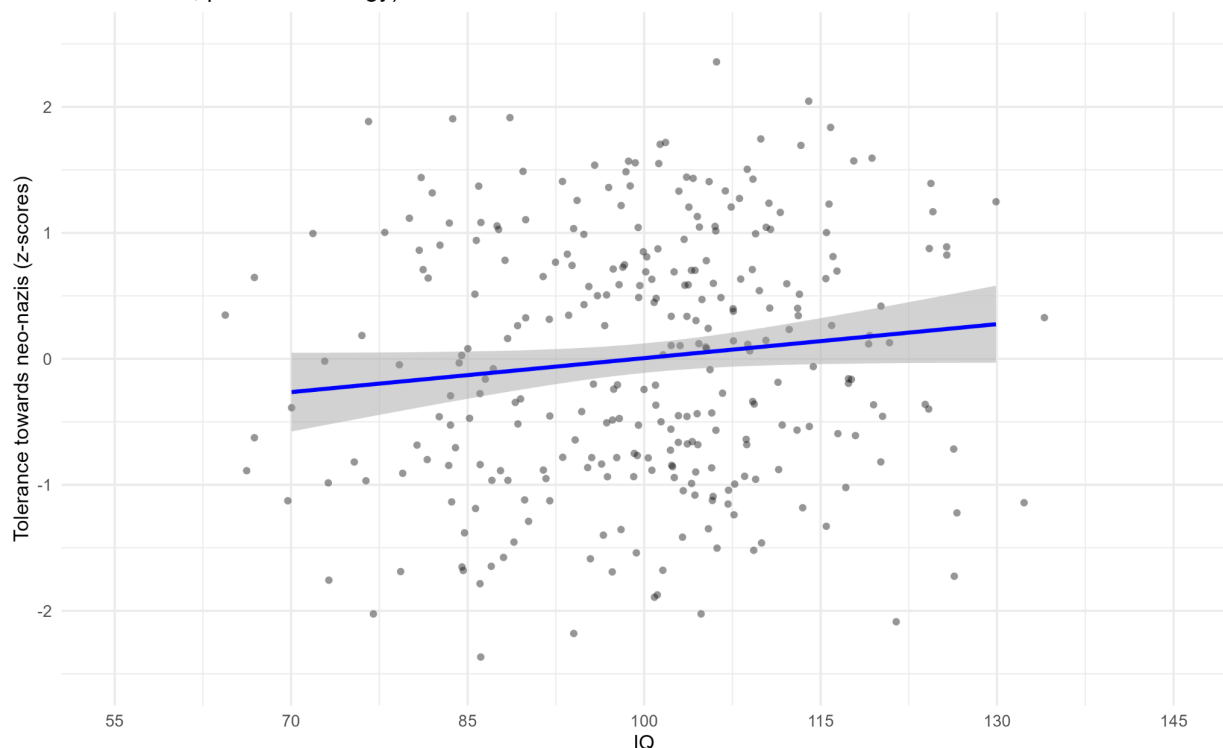
Yes. But for some groups more than for the others. We tested this by asking a subset of our participants how tolerant they are towards two polarizing groups, neo-nazis (which was an especially aversive group), and Christian fundamentalists. To get a more accurate measure of tolerance, we excluded from the analyses those participants that said that they actually liked neo-nazis/Christian fundamentalist (because tolerance doesn't apply for a group you already like). This left us with subsamples of $n = 291$ participants that did not like neo-nazis and $n = 197$ of participants that did not like Christian fundamentalists.

After this we asked them whether they agreed or disagreed with four tolerance-related statements:

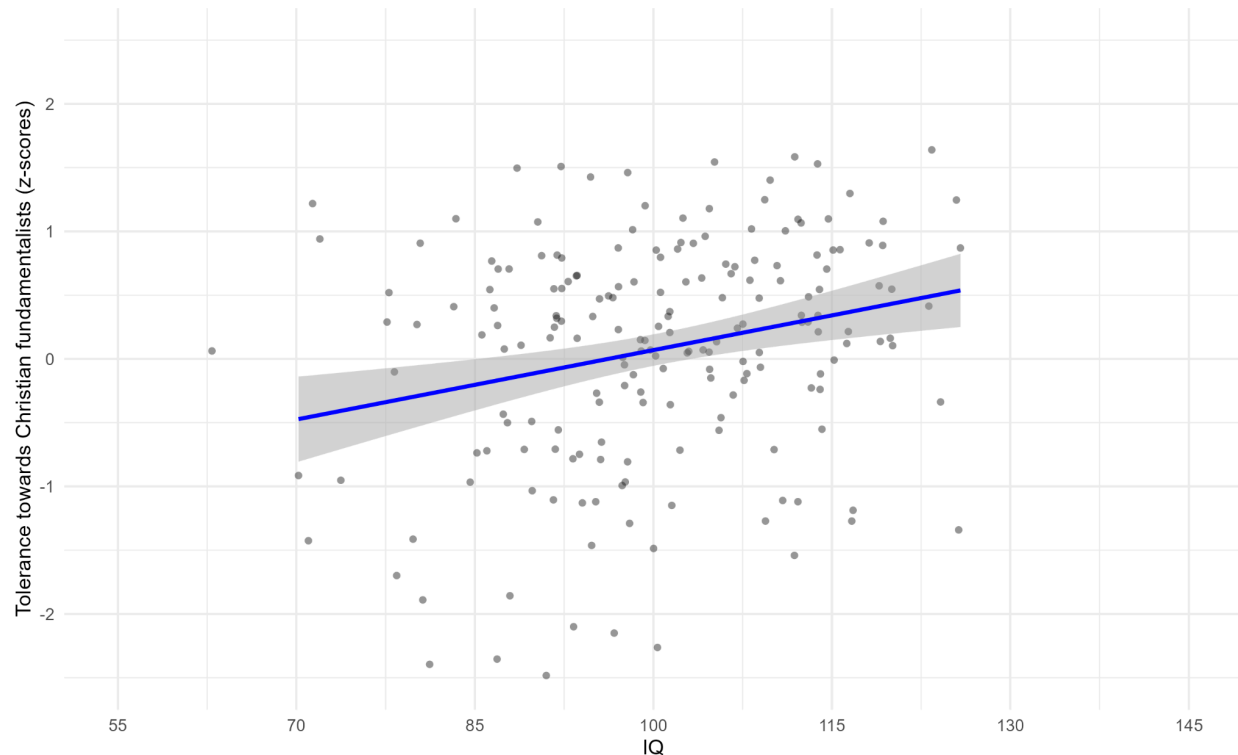
- Representatives for Neo-Nazis/Christian fundamentalists should have the right to speak at high schools or the like.
- Neo-Nazis/Christian fundamentalists should be allowed to hold demonstrations.
- Representatives for Neo-Nazis/Christian fundamentalists should be allowed to express themselves in public debate.
- The police should have better opportunities for tapping telephones owned by Neo-Nazis/Christian fundamentalists. (reverse coded)

We then summed these responses to form a total tolerance score for neo-nazis and Christian fundamentalists (separately) and correlated IQ to those scores. The correlations turned out to be $r = 0.11$ between IQ and tolerance for neo-nazis (which is quite low and, in this case not statistically significant), and $r = 0.27$ between IQ and tolerance for Christian fundamentalists. Thus it seems that IQ may be slightly positively correlated with political tolerance. Here are the two plots showing the relationships between IQ and tolerance for our two groups.

Relationship between IQ and tolerance towards neo-nazis (both variables controlled for age, gender, data source, political ideology)



Relationship between IQ and tolerance towards Christian fundamentalists (both variables controlled for age, gender, data source, political ideology)



What do the other studies say?

Our results are generally in line with research that consistently shows a significant relationship between cognitive ability and political tolerance, with higher cognitive ability generally predicting greater tolerance ([Rasmussen & Ludeke, 2021](#); [De keersmaecker et al., 2020](#)). In addition, lower cognitive ability predicts greater prejudice ($r=-0.19$) ([Hodson & Michael, 2012](#); [Onraet et al., 2015](#)).

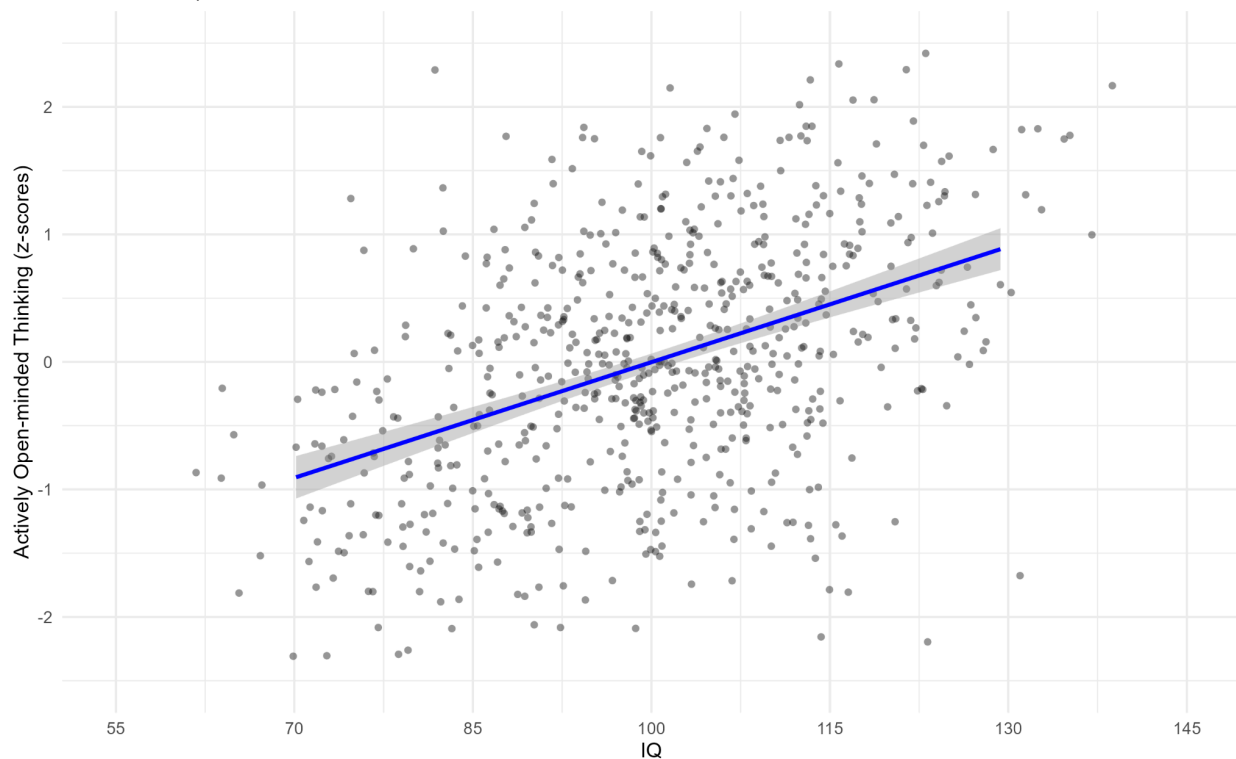
Takeaways

- Higher IQ people are probably a little bit more likely to have tolerance for groups that they politically oppose

29. Is IQ related to actively open-minded thinking?

Yes. On a subsample of $n = 670$, the correlation was $r = 0.43$, meaning that the more intelligent people report thinking in a more actively open-minded way. Actively open-minded thinking (AOT) refers to the cognitive disposition to consider different perspectives, evidence, and possibilities before forming judgments or decisions. Individuals high in AOT tend to be more willing to revise their beliefs in light of new evidence and are less prone to cognitive biases or rigid thinking. We measured this disposition with statements such as "It is important for me to be "open-minded", even with regards to topics that challenge my deeply held beliefs." or "I think that people should stick to their important beliefs even in the face of contradictory information." (reverse-coded). Here is the scatterplot of the correlation we obtained.

Relationship between IQ and Actively Open-minded Thinking (both variables controlled for age, gender, data source)



What do the other studies say?

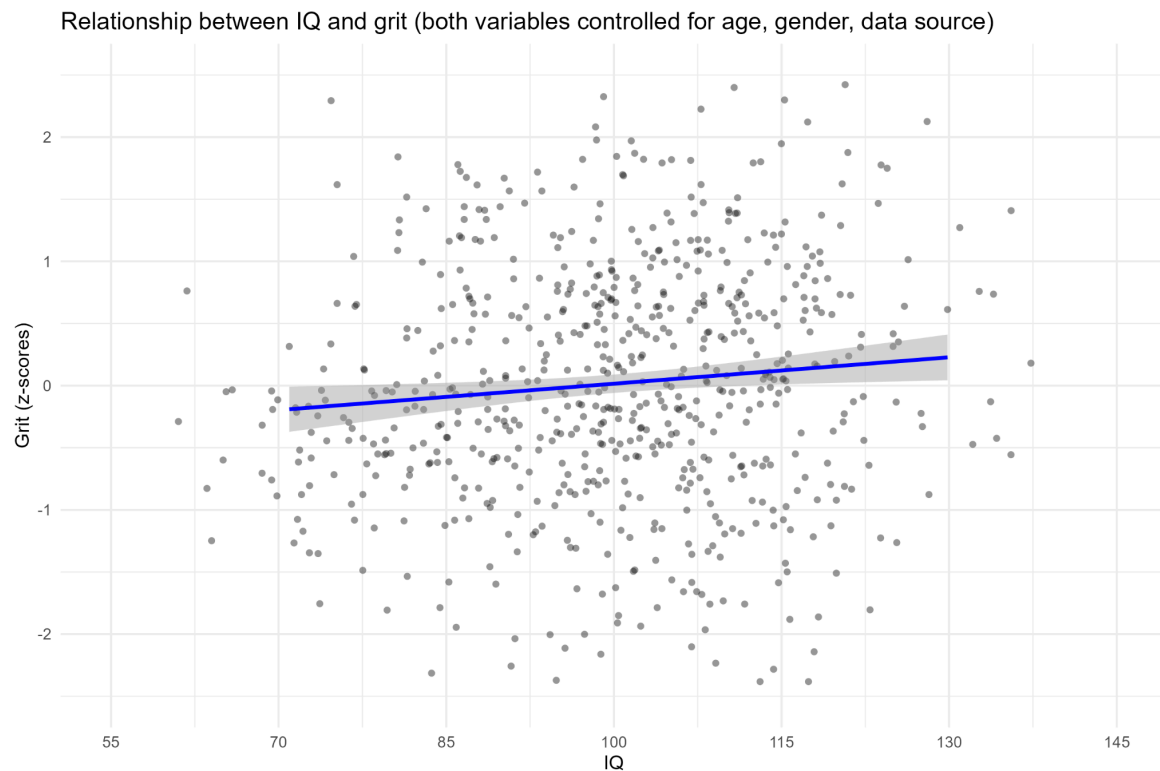
Our results align with other studies that generally report positive correlations between AOT and different cognitive abilities, with correlations varying from small to medium (e.g., [Erceg et al., 2022](#); [Haran et al., 2013](#); [West et al., 2008](#)).

Takeaways

- Higher IQ people are substantially more prone to actively open-minded thinking.

30. Is there a relationship between IQ and grit?

The relationship between IQ and grit in our sample was very small, bordering on negligible ($r = 0.10$ calculated on a subsample of $n = 686$ participants). Grit is a personality trait characterized by perseverance and passion for long-term goals and in our study we measured it with 12 items such as “I often set a goal but later choose to pursue a different one.” (reverse scores), “I have overcome setbacks to conquer an important challenge.” and “I finish whatever I begin.” This very small correlation between IQ and grit total score is shown in the scatterplot below.



What do the other studies say?

Our results are in line with many other studies in the literature that examined the correlation between IQ and grit and found that it is either very low or non-existent (e.g., [Duckworth et al., 2007](#); [Zisman & Ganzach, 2020](#)).

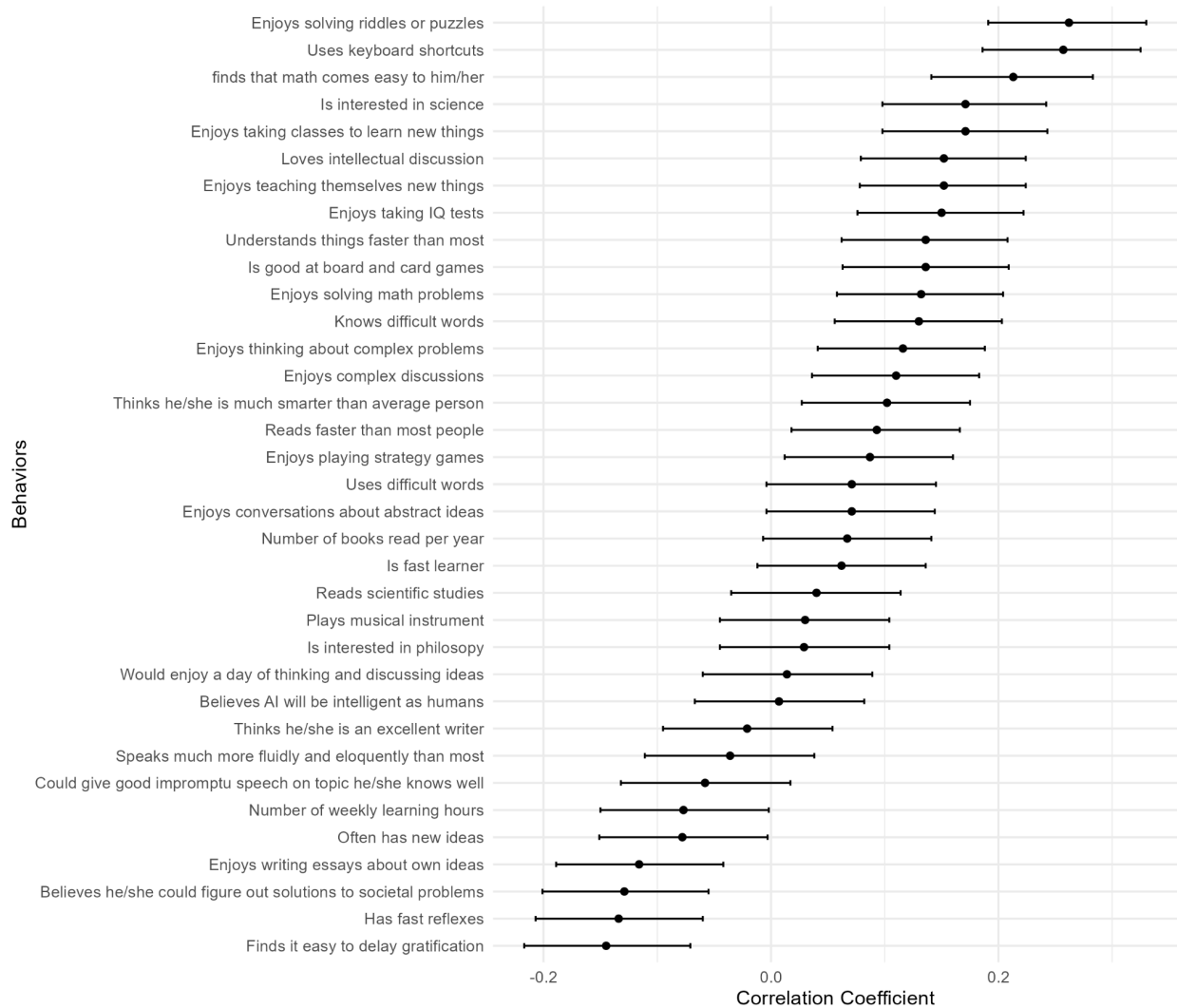
Takeaways

- Grit and IQ have little to no correlation.

31. Is there a positive correlation between IQ and a range of behaviors that some might think could be positively related to IQ?

We have asked participants ($n = 692$) to report on 35 diverse behaviors that some might think higher IQ people could exhibit more often than lower IQ people. We show the correlations (together with their 95% confidence intervals) between IQ and each of these self-reported behaviors in the forest plot below:

Relationship between IQ and range of behaviors (both variables controlled for age, gender, data source)



Note that not all correlations were positive. There were negative correlations between IQ and self-reported delayed gratification (i.e., Finding it easy to do useful things one doesn't really like) and having fast reflexes. Although these two negative correlations are perhaps not so surprising, we were surprised to see that those more intelligent were less likely to say that they could figure out solutions for society's big problems, or that they would enjoy writing an essay about their own ideas.

Two highest positive correlations were enjoying riddles and puzzles and using keyboard shortcuts, followed by finding math easy and then a bunch of behaviors related to enjoying learning new things and solving problems.

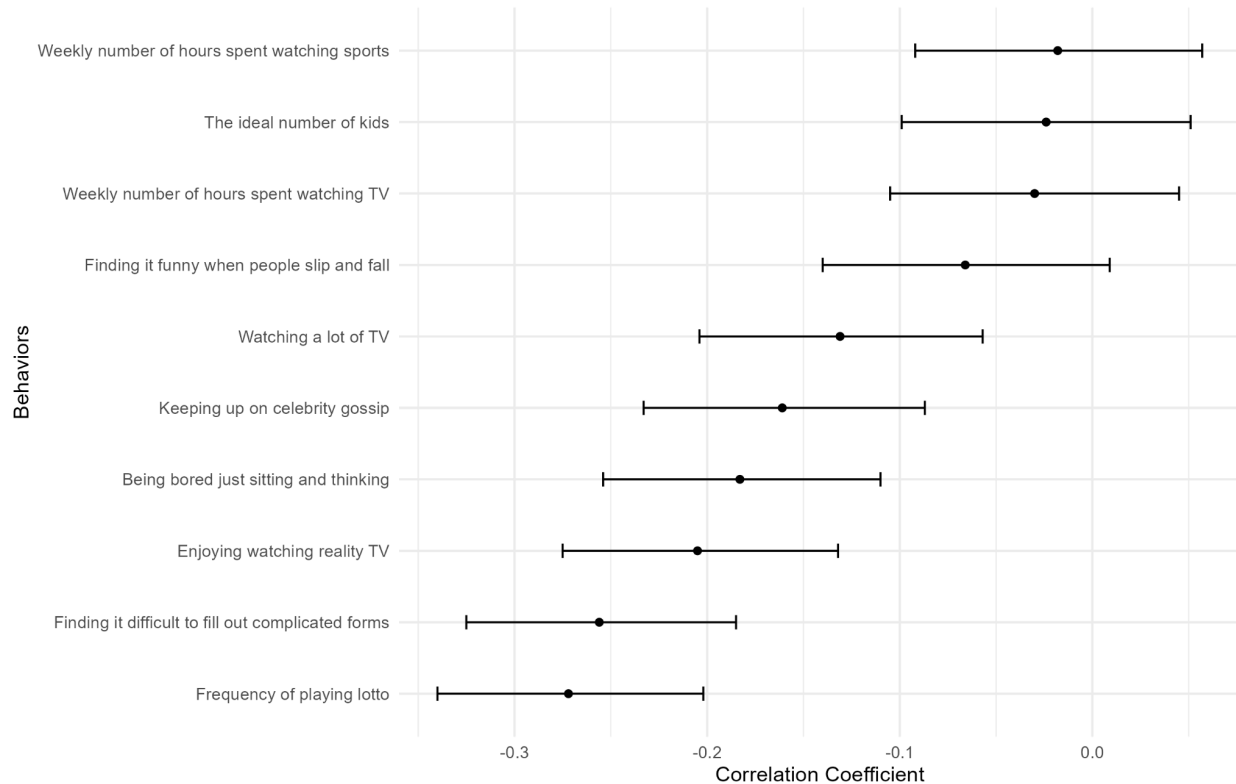
Takeaways

- IQ is generally positively correlated to a variety of different self-reported behaviors that one might think could be associated with IQ, such as enjoying solving riddles/difficult puzzles, finding that math comes easy, and being interested in science, but there were a few surprising negative correlations as well, such as believing one could figure out solutions for society's big problems.

32. Is there a negative correlation between IQ and the range of behaviors that some might think could be negatively related to IQ?

We have asked participants ($n = 688$) to report on 10 different behaviors for which some might think there could be a negative correlation with IQ. We show the correlations (together with their 95% confidence intervals) between IQ and each of these behaviors in the forest plot below.

Relationship between IQ and range of behaviors (both variables controlled for age, gender, data source)



This time all the correlations were negative, as expected. However, not all were statistically significant from zero, so we will comment on the six that are. The highest negative correlation is between IQ and the frequency of playing lotto, meaning that people with lower IQ play lotto more often than people with higher IQ. Similarly, people that scored lower on our IQ tests report that they find it more difficult to fill out complicated forms. They also watch more reality TV and TV in general and keep up more with celebrity gossip. Finally, people with lower IQ reported that they find it more boring to just sit around and think than higher IQ people.

Takeaways

- People with lower IQ are more likely to report playing the lotto, watching more TV, keeping up with celebrity gossip, have difficulties filling out complicated forms, and getting bored with just sitting and thinking than people with higher IQ

33. Are there cognitive tasks that women are especially good at relative to men, and are their cognitive tasks that men are especially good at relative to women? For instance, are women better on processing speed and verbal tasks than men, and men perform better on numerical and spatial tasks?

Yes, we found some tasks that women were especially good at relative to men, and some that men were especially good at relative to women. However, not all differences were in line with predictions based on prior literature, and some depended on the type of task we used.

It's important to note that any such observed gender differences do not imply an innate gender differences, since the differences might be caused by a variety of factors, including experience, interest levels, motivation, opportunities, or the ways that people of different genders are socialized.

Verbal tasks

Regarding verbal tasks, there were tasks on which women performed better than men and tasks on which men performed better than women.

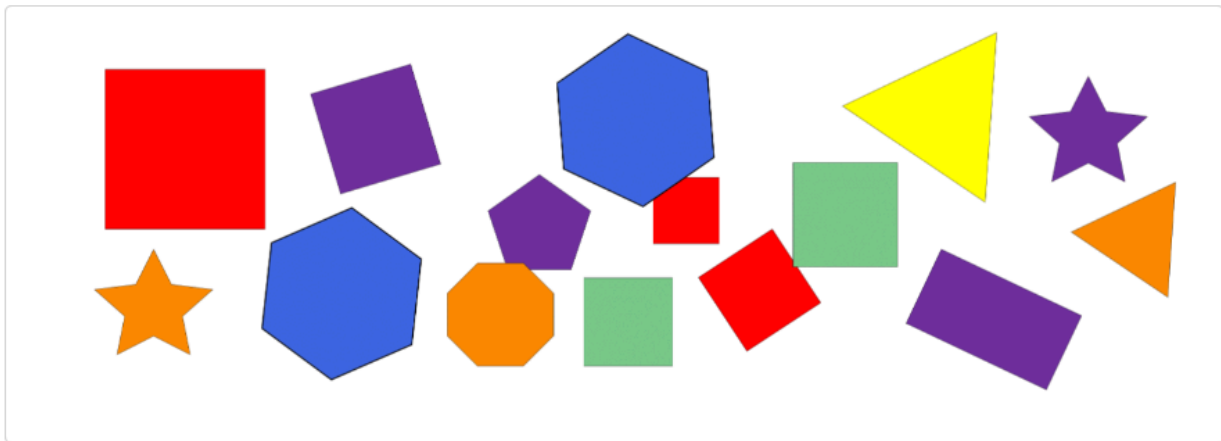
Women on average outperformed men on tests that require word generation, such as a verbal fluency task , (i.e., listing as many words as you can meeting certain criteria in a short period of time; $r = 0.11$ in favor of women, $p = 0.02$), a linking words test (i.e., coming up with one word that links two concepts together; $r = 0.08$, $p = 0.10$ [non-significant]), and word unscrambles (i.e., coming up with words that can be constructed from four presented letters; $r = 0.06$, $p = 0.21$ [a positive correlation but not statistically significant]).

On the other hand, men on average outperformed women on vocabulary tests (one in which the task was to recognize either synonym or antonym of a given word and another where the task was to identify words that are closest in meaning to each other; $r = 0.18$ in favor of men, $p < 0.001$) and analogy test (i.e., recognizing the relationship between the two pair of words; $r = 0.18$ in favor of men, $p < 0.001$).

Processing speed

Regarding processing speed, the results also depended on the test. For example, there were no differences between men and women on a processing speed test (e.g., finding the color that is the most repeated across all shown shapes as fast as possible as well as more complex variations of this; $r = 0.03$, $p = 0.52$), while men performed somewhat better than women on the digit-symbol coding test in which the task was to figure out which symbol goes with the number that was displayed (see below the sample task from both tests; $r = 0.20$ in favor of men, $p < 0.001$).

Processing speed test (no difference)



Click on the color that is the most repeated across all shapes:

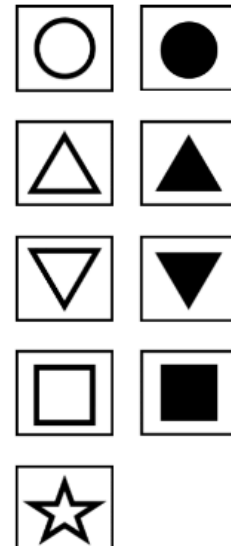


Digit-symbol coding (men performed better than women)

1	2	3	4	5	6	7	8	9
▲	○	□	▼	▽	■	△	☆	●

Use the answer key above to figure out which symbol goes with the number that is displayed below. Then click on the corresponding shape on the right to select your answer.

6



Numerical tasks

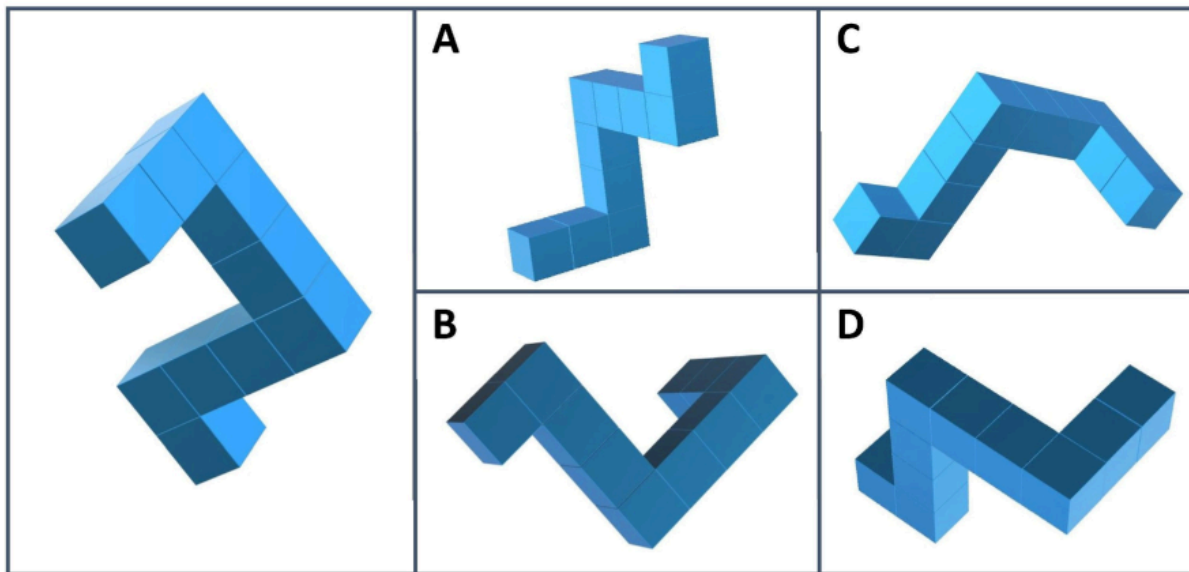
Men outperformed women on average. on each of the seven numerical tasks that we had in our battery, and the biggest difference was on a test that consisted of 15 math problems ($r = 0.42$ in favor of men, $p < 0.001$) and on our probabilistic reasoning test ($r = 0.37$ in favor of men, $p < 0.001$).

Spatial tasks

Spatial tasks typically require people to imagine manipulating certain objects in space and answering questions regarding those manipulations (e.g., rotations, foldings etc.). In our sample, men outperformed women on these types of tasks on average, with the difference being highest on the mental rotations test (i.e., mentally rotating a set of cubes; $r = 0.37$ in favor of men, $p < 0.001$) and the paper-folding test

(i.e., imagining how paper would look like after folding it multiple times and piercing through it; $r = 0.31$ in favor of men, $p < 0.001$). See below the sample task from both tests.

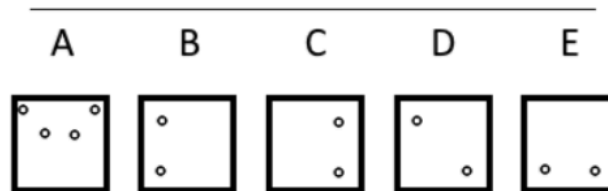
Mental rotations



Select the **two** drawings that show rotated versions of the object in the first image.

Paper-folding test

This image represents a squared piece of paper being folded and then a hole is punched through the paper:



Which of these five images accurately represents how the paper will look when it is unfolded?

In sum, in our sample, men performed better than women on numerical and spatial tasks, and women performed better than men on tasks involving generation of words (but not other verbals tasks). Results were less clear for processing speed tasks, differing depending on the task used.

What do the other studies say?

Studies have found that women tend to outperform men in verbal abilities, particularly in speech production and verbal fluency ([Hyde & Linn, 1988](#); [Barel & Tzischinsky, 2018](#)), while men show a moderate advantage in spatial abilities, especially in 3D mental rotation tasks ([Hyde, 2016](#); [Kaufman, 2007](#); [Barel & Tzischinsky, 2018](#)). Gender differences in mathematical abilities have been found to be minimal/non-existent (e.g., [Hyde, 2016](#)) to small (e.g., [Reinhold et al., 2020](#)) depending on the study, while processing speed has been found to favor women ([Siedlecki et al., 2019](#); [Maitland et al., 2000](#)). Our findings are, thus, in line with general literature regarding gender differences in verbal fluency (especially tasks related to

word generation) and spatial abilities, but not regarding numerical abilities and processing speed.

Takeaways

- On average, women appear to perform better, relative to men, at verbal tasks related to word production, while men appear to outperform women on spatial tasks. It's unclear, however, why these differences occur.

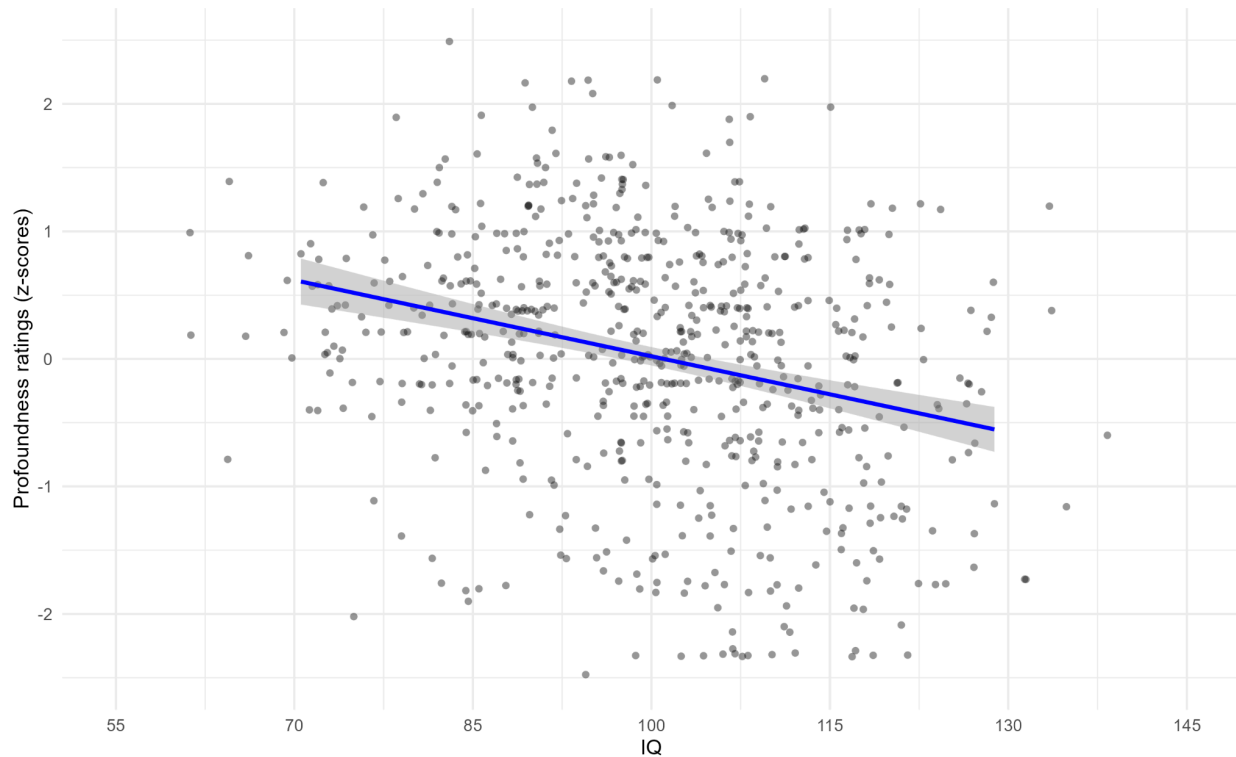
34. Do people with higher IQ rate pseudo-profound made-up statements as less profound than people with lower IQs?

Yes. We have found a moderate negative correlation of $r = -0.28$ between IQ and profoundness ratings that participants gave to pseudo-profound made-up statements (sometimes referred to as "pseudo-profound bullshit" [in the literature](#)). To test this, we asked a sample of $n = 672$ people to read the following statements and tell us how profound (i.e., of deep meaning) they thought the statements were (spoiler: all the statements were made up using an AI designed to generate meaningless but grammatically acceptable combinations of words, therefore presumably they are not actually particularly profound):

- "A formless void serves the mechanics of destiny."
- "Interdependence is an ingredient of unparalleled experiences."
- "Innocence itself interacts with unique acceptance."
- "Nature unfolds through the light of mortality."

And here is the scatterplot of this negative relationship between profoundness rating and IQ:

Relationship between IQ and profoundness ratings (both variables controlled for age, gender, data source)



What do the other studies say?

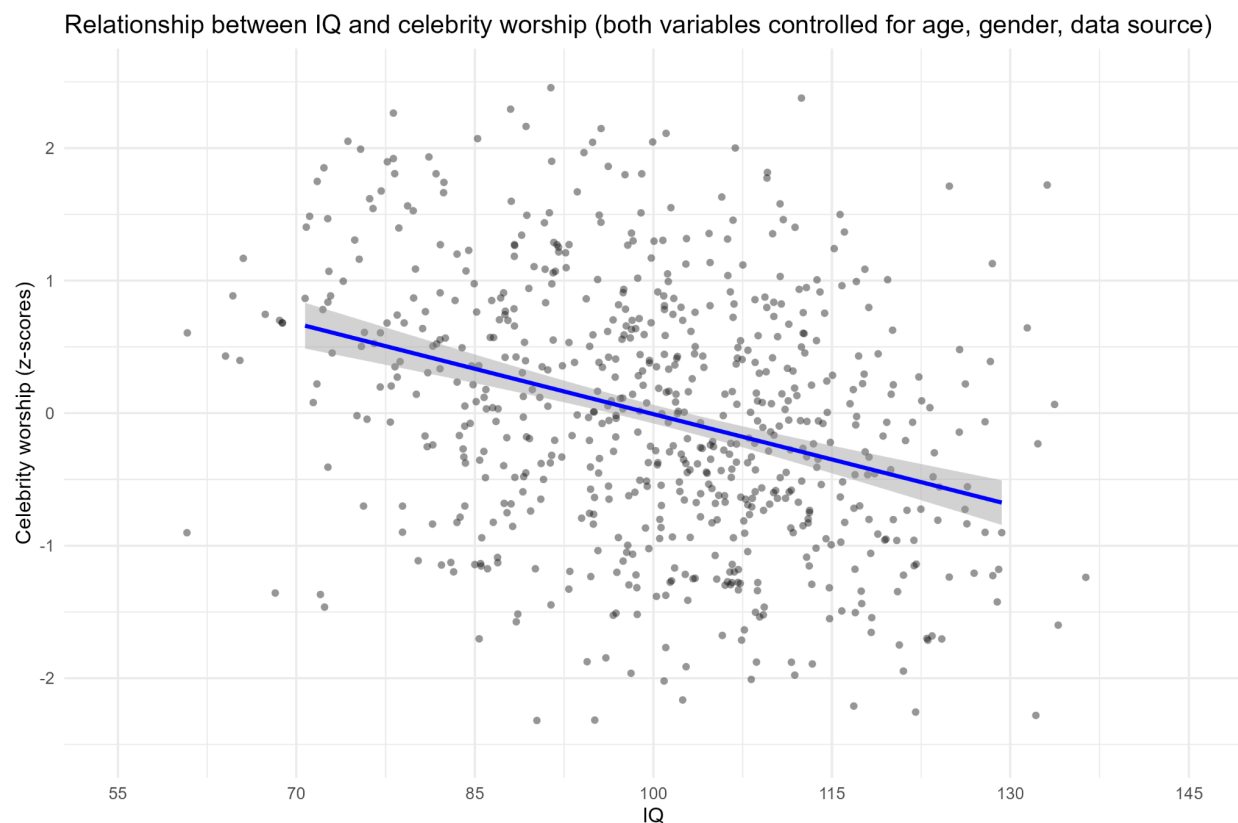
While there are no meta-analyses that examined this relationship, there are several studies whose findings point to the same direction as ours. For example, [Pennycook et al. \(2015\)](#) conducted two studies in which they correlated profoundness ratings of pseudo-profound bullshit statements and different cognitive abilities and consistently found moderately sized negative correlations. Some of the correlations they tested were between profoundness ratings and verbal intelligence ($r = -0.37$ in Study 1 and $r = -0.30$ in Study 2), cognitive reflection ($r = -0.33$) and Raven's Advanced Progressive Matrices ($r = -0.27$).

Takeaways

- Higher IQ people may be less susceptible to believing that B.S. is profound.

35. Is there a correlation between IQ and celebrity worship?

Yes. On a subsample of $n = 681$ who answered questions about their attitude towards celebrities, we have found a medium-sized negative correlation between IQ and celebrity worship of $r = -0.31$ meaning that people with higher IQ tend to worship celebrities less. Here is the scatterplot of this relationship.



However, it has to be noted that we classified attitudes towards celebrities into three categories, social attitudes (e.g., "I find my favorite celebrity really fun to watch, read, or listen to."), intense personal attitudes (e.g., "When my favorite celebrity succeeds, it feels like it's my success too.") and pathological attitudes (e.g., "I am such a fan of my favorite celebrity that I am obsessed with learning about them and about all the details of their life."). This overall negative relationship between IQ and celebrity

worship is mostly driven by the negative relationship between IQ and intense personal ($r = -0.29$) and pathological ($r = -0.42$) attitudes, while the correlation between IQ and social attitudes was practically non-existent ($r = -0.04$).

What do the other studies say?

We have found two other studies that tested the relationship between celebrity attitudes and cognitive abilities. The first one by [McCutcheon et al. \(2003\)](#) on a relatively low sample size ($n = 102$) found moderate negative correlations between celebrity attitudes and cognitive abilities (i.e. $r = -0.31$ for spatial ability and $r = -0.41$ for critical-thinking ability), while a more recent one, on a much larger sample size ($n = 1763$, by [McCutcheon et al., 2021](#)), found substantially smaller correlation between celebrity worship overall score and cognitive tests z-score ($r = -0.11$). Thus, although somewhat differing in the size of their effects, the studies (including ours) seem to consistently find a negative relationship between cognitive ability and celebrity worship.

Takeaways

- Lower IQ is related to a higher obsession with celebrities
- However, this is not true about more typical positive feeling towards celebrities (e.g., really enjoying watching, reading or listening to them), in which case there is no relationship to IQ

36. Is IQ related to the ability to identify facial expressions?

Yes. For this hypothesis, we measured two types of IQ, verbal IQ (i.e., the ability to understand, analyze, and communicate using language) and numerical IQ (i.e., the capacity to work with numbers, solve mathematical problems, and understand quantitative information) and correlated these scores with the ability to recognize facial expressions. We measured this ability by showing 25 photos of faces with

different emotional expressions to our participants and, for each facial expression, asked them to choose among the response options the one that they believed best described the emotion being expressed in this image. They could choose between the following response options: Neutral, Happy, Angry, Afraid, Disgust, Sad or Surprise. We obtained positive moderate correlations between facial recognition ability and verbal IQ ($r = 0.41$, $n = 294$) as well as numerical IQ ($r = 0.36$, $n = 165$). Note that we found no statistically significant difference in ability at this task between men vs. women.

What do the other studies say?

There exists one meta-analysis based on 471 effect sizes ([Schlegel et al., 2020](#)) that examined the relationship between different types of cognitive abilities and facial recognition ability in which the estimated correlation between the two was also positive, albeit smaller ($r = 0.19$) and independent of the cognitive ability type. Thus, our effects seem to be a bit higher than usually found in the literature.

Takeaways

- Both verbal and numerical intelligence is positively correlated with the ability to recognize emotion in facial expressions.

37. Is IQ related to charitable behavior?

Actually no, not in our sample. We asked our participants ($n = 662$) to estimate a) the amount of dollars they donated to charitable causes in the last year and b) the number of hours they spent volunteering for a charity in the last three months. The correlation between IQ and self-reported charitable behavior was negligible both for dollars donated ($r = 0.01$) and for time spent volunteering ($r = -0.06$), and the relationship was still non-significant even after statistically controlling for income.

What do the other studies say?

Research generally suggests a positive relationship between cognitive ability and charitable behavior. Higher cognitive ability has been found to be associated with increased likelihood of charitable giving, even after controlling for factors like age, income, and education ([James, 2011](#)). This relationship is observed in both cross-sectional and longitudinal analyses, and appears to be primarily driven by general intelligence rather than specific cognitive skills ([Elinder & Erixson, 2022](#)). Thus, for some reason, our results contradict typical findings in the literature.

Takeaways

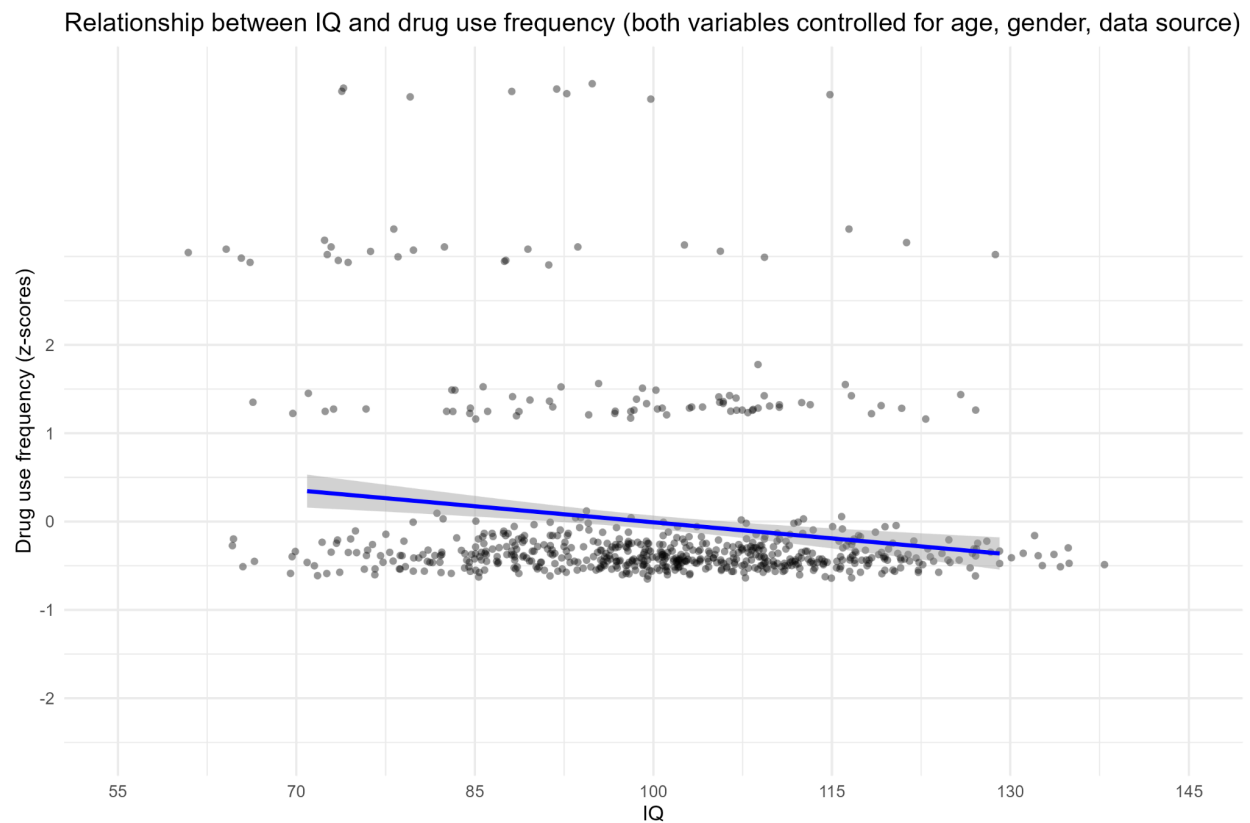
- In our study, IQ was not related to charitable behavior, though this contradicts typical findings by others on this subject.

38. Is there a link between IQ and healthy lifestyle?

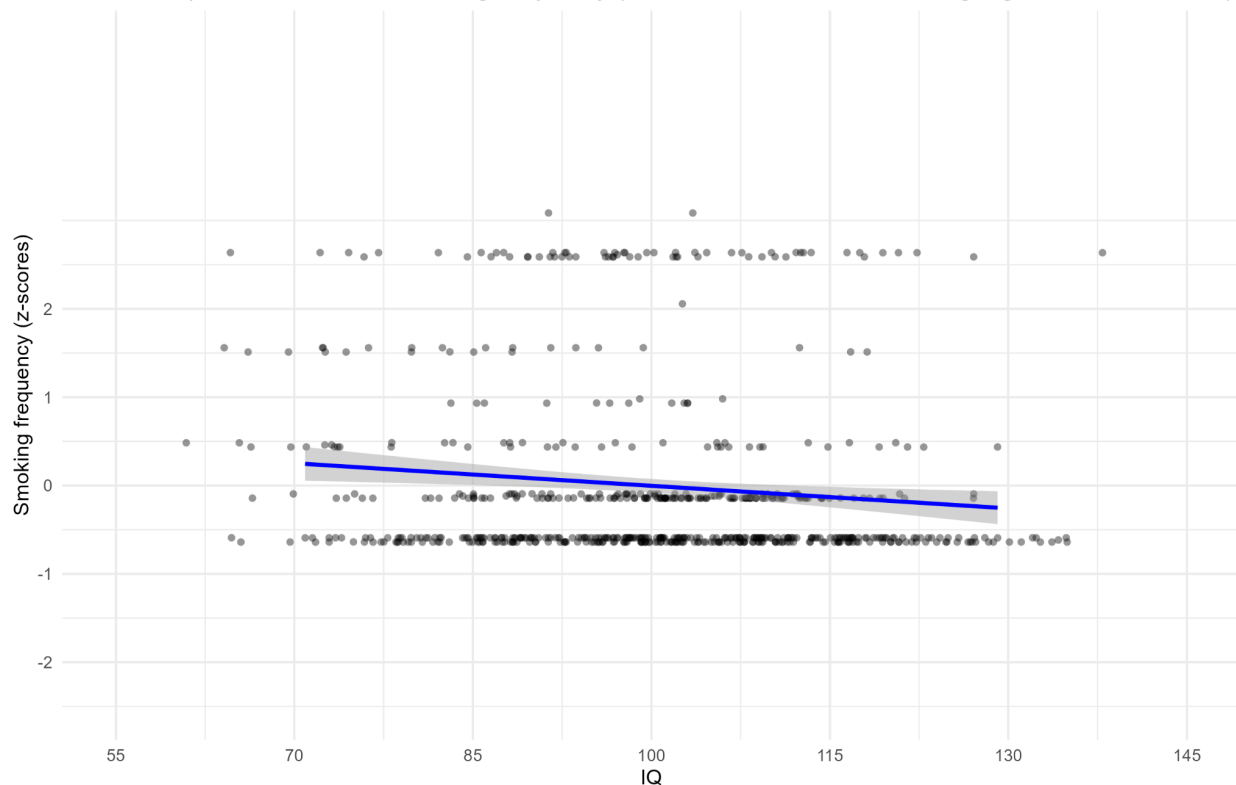
Not in general, but IQ was related to some specific behaviors. To investigate this question, we asked our participants the following questions:

- How often do you eat at least one and a half cups of fruits?
- How often do you eat at least three cups of vegetables?
- How often do you eat fast food?
- How many days per week do you drink alcohol on average?
- How often do you smoke?
- How often do you use marijuana?
- How often do you use drugs other than marijuana or prescription drugs?
- Have you ever practiced meditation?
- How many days per week do you exercise on average?

Only for two of these outcomes IQ turned out to be a significant predictor: for drug use (other than marijuana and prescription drugs) where IQ predicted less drug use ($r = -0.20$, $n = 660$) and for smoking frequency ($r = -0.13$, $n = 660$) where IQ predicted less smoking. However, these correlations were small and all the other correlations were even smaller and non-significant. So we cannot broadly say that IQ generally predicts a healthy lifestyle. Below we show just the two significant correlations.



Relationship between IQ and smoking frequency (both variables controlled for age, gender, data source)



What do the other studies say?

There were some studies conducted on large samples that found a more consistent relationship between IQ and healthy behaviors in general. For example, a study conducted on $n = 5347$ participants found that childhood IQ predicted later-life behaviors that are beneficial to health such as being more likely to be able to do moderate cardiovascular activity and strength training, being less likely to have had a sugary drink in the previous week, a lower likelihood of drinking alcohol heavily, being less likely to smoke, etc. ([Wraw et al., 2018](#)). Similar results were found in another larger study on $n = 8282$ participants by [Batty et al. \(2007\)](#). In this study children with higher mental ability scores reported significantly more frequent consumption of fruit, vegetables, wholemeal bread, poultry, fish, and foods fried in vegetable oil in adulthood. They were also more likely to have a lower intake of french fries, non wholemeal bread, and cakes and biscuits.

Takeaways

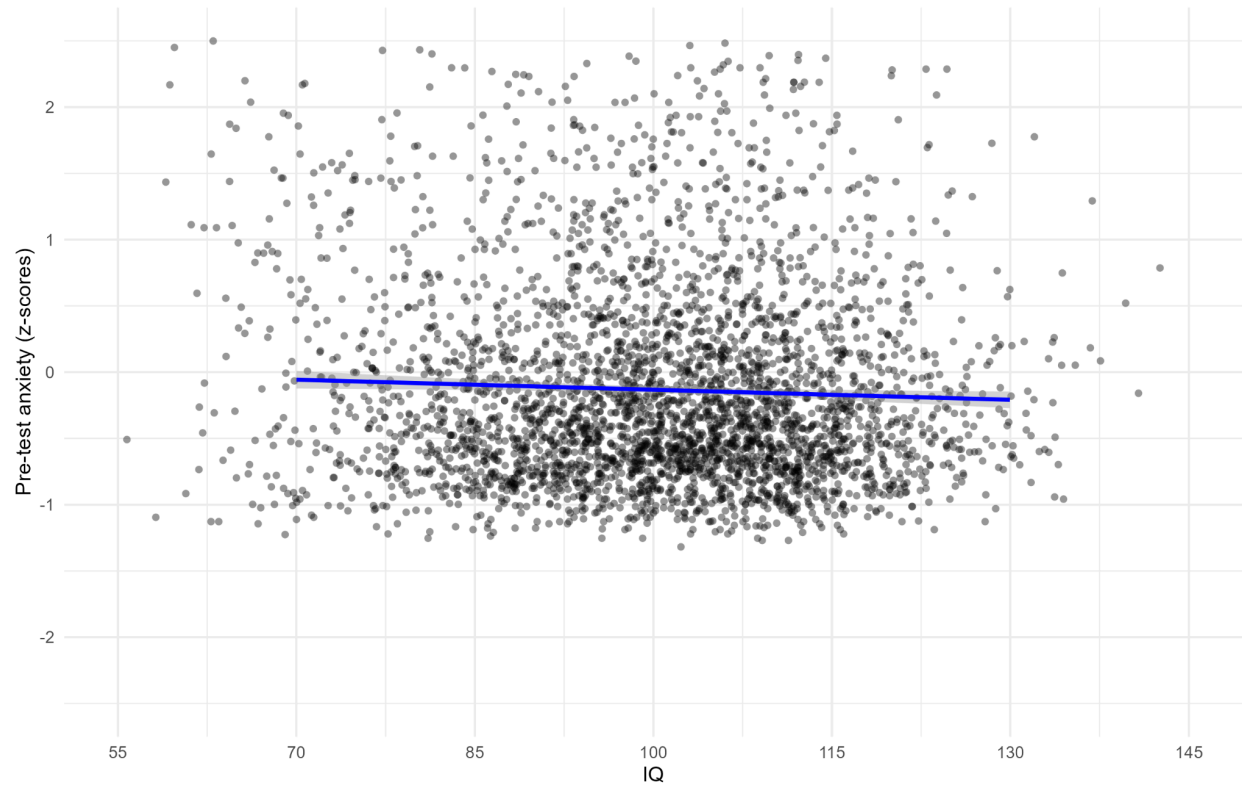
- IQ predicted only two of nine healthy behaviors that we measured
- Higher IQ people were less likely to use drugs and to smoke than people with lower IQ
- However, other studies have found broader positive links between IQ and healthy behavior that we did not find.

39. How does being nervous or anxious before and while taking an IQ test affect performance?

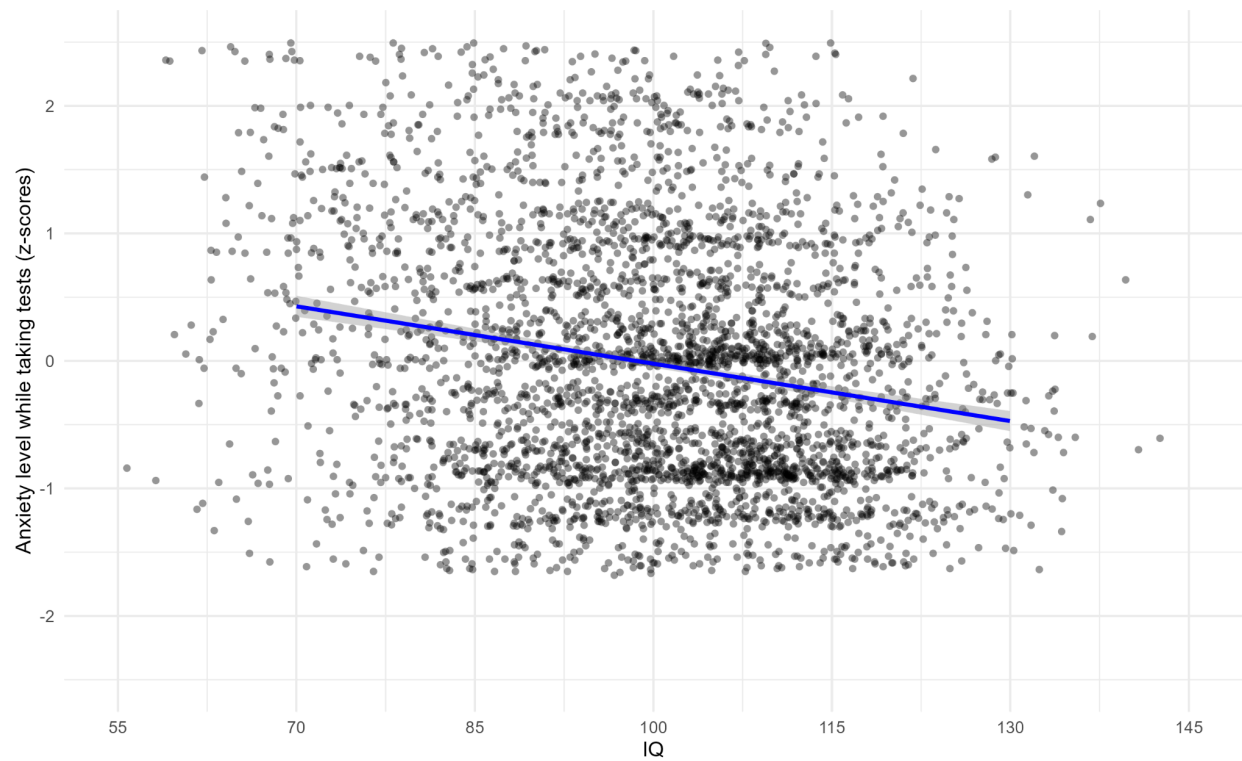
We asked our participants ($n = 3688$) about their anxiety/nervousness level, both before and during taking the tests. Specifically, before taking the tests, we asked them five questions about their current anxiety state (e.g. "I feel upset right now.", "I feel nervous right now.") and summed up their responses to obtain their pre-test anxiety score. After taking the tests, we asked them how nervous or anxious the cognitive/intelligence tasks we had them do in the study caused them to feel and they responded on a five-point scale from "not at all" to "very much." Therefore, we had their levels of anxiety both before tests (pre-test anxiety) and during the tests (test anxiety).

The correlation between their pre-test anxiety and IQ was $r = -0.13$, while the correlation between their test-anxiety and IQ was $r = -0.23$. This means that participants who felt anxious or nervous both before and while solving tasks performed worse on the tasks. The causal direction here could go both ways: being nervous could cause people to underperform, but underperforming on tasks could make people feel nervous or anxious too. Here are the two scatterplot showing these correlations.

Relationship between IQ and pre-test anxiety (both variables controlled for age, gender, data source)



Relationship between IQ and anxiety level while taking tests (both variables controlled for age, gender, data source)



What do the other studies say?

Meta analyses also found that, in general, there is a negative relationship between state anxiety while taking tests and score on that test, including IQ tests (e.g. [Seipp, 1991](#); [von der Embse et al., 2018](#)).

Takeaways

- Participants who were feeling nervous or anxious both before and while taking IQ tests performed worse on those tests

40. Does temperature or air flow in the room impact performance on an IQ test?

Very little. To test this, we have asked our participants ($n = 655$) the following four questions:

1. What is the temperature in the room where you are right now?
2. How fresh is the air in the room where you are now?
3. Is there any window or door *open to the outdoors right now* in the room where you are?
4. Is there any window or door *open to another room right now* in the room where you are?

Next, we correlated their IQ scores with their responses to these questions. Regarding the first two questions (the room temperature and freshness of air), we obtained very low, basically negligible correlation ($r = -0.09$ and $r = 0.06$ respectively). For the questions regarding whether they had windows or doors open, we obtained somewhat higher, but still relatively low correlations of $r = -0.14$ between IQ and having windows or doors open to the outdoors and $r = 0.12$ between IQ and having

windows or doors open to the indoors. Note that the first correlation is negative, meaning that having windows or doors open for fresh air to the outside is related to a bit worse performance on IQ tests, which is surprising. This translates into a difference of 4 IQ points between those that did not have their windows or doors opened to the outdoors (mean IQ = 101) and those that did (mean IQ = 97). On the contrary, having windows or doors opened to the indoors was related to a bit better performance that translated to a IQ point difference in favor of those with opened windows or doors to the indoors (mean IQ = 101) compared to those with closed windows or doors (mean IQ = 98). Given very low correlations, we do not want to overinterpret these findings but, speculatively, a surprising negative impact of open windows/doors to the outdoors could perhaps be related to unfavorable weather conditions or noise from the outside, or it could be caused by hidden confounding factors. Of course, at sufficiently hot or cold temperatures (that are extremely unpleasant) task performance would surely have been impaired, but our test takers were almost entirely situated in places with reasonable temperatures.

What do the other studies say?

Unlike ours, some other studies that examined the relationship between environmental conditions while taking tests indeed found that the performance on tests is negatively influenced by unfavorable room conditions such as room temperature or levels of oxygen (e.g. [Haverinen-Shaughnessy & Shaughnessy, 2015](#); [Hoque & Weil, 2016](#)).

Takeaways

- Room conditions such as temperature or freshness of the air had minimal effects on IQ (though we did not test extreme conditions, just the natural conditions people found themselves in)