

Left-handers, you are not smarter after all!

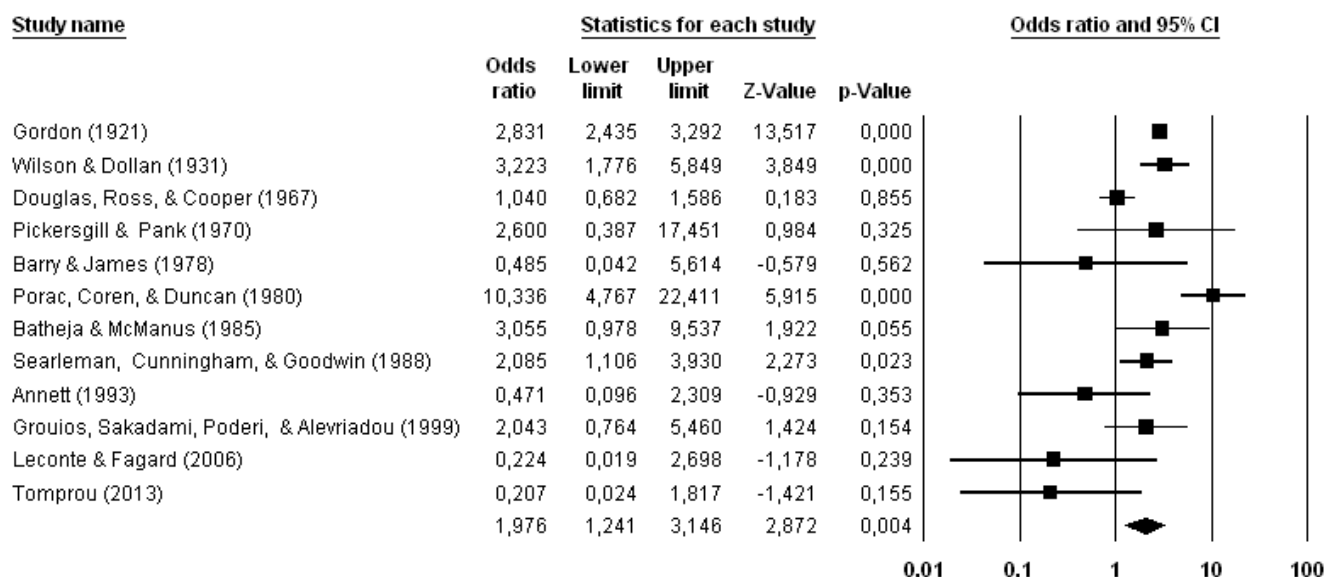
People often wonder who is smarter: right-handers or left-handers? In order to answer this question, we tried to find out whether left-handers are over-represented in groups of people who have very high IQ (and who are sometimes called “gifted individuals”) compared to the rest of us (lets call us the “general population”). We also looked at the other side of the pond and investigated whether left-handers are over-represented in groups of people who have very low IQ (“intellectually disabled”), again compared to the rest of us.



We did not go out and try to recruit people and measure their IQ and which hand they prefer. Instead, we used a technique called “meta-analysis”. Using meta-analysis, we can combine evidence from studies that have already taken place, thereby increasing how powerful the statistical analysis can be. In other words, we read all the scientific literature there is on the handedness of gifted and intellectually disabled individuals compared to the general population. We located 19 studies, which we have already looked into this question, the oldest one published in 1921! Combined, these studies report on 16,076 individuals; 5,795 intellectually disabled individuals, 1,969 gifted individuals and 8,312 individuals from the general population. We then analyzed the results of these 19 studies in a combined fashion.

We were careful to only include in our meta-analysis studies that included not only individuals from special groups (gifted or intellectually disabled), but also individuals from the general population. This way, the general population acted as a “control” group –sort of like a placebo group in medicine. Otherwise, we might had found a low or high prevalence of left-handers in our special groups, but we would not know if this was due to there actually being less or more left-handers or due to the way handedness was measured in each study. It could be the case that some

researchers used very lax criteria for defining left-handedness and... boom! There you have a lot of left-handers amongst gifted individuals (or intellectually disabled individuals). Yet, if the same study had used the same measurement for general population individuals, we can compare the results and see if they are any different.



This is how we usually depict the results graphically in meta-analyses. This plot is called the forest plot. It allows us to see each tree (i.e., each study, which is represented by a square) as well as the forest. At the bottom there is a diamond which shows what the overall result is, when taking into account all studies' findings. Some studies included more participants; in this case, they contribute more to the overall result. This forest plots depicts all the studies that measured left-handedness in intellectually disabled individuals and individuals from the general population. The overall result is that intellectually disabled individuals are 1.98 times more likely to be left-handed compared to the general population.

What we found out is that amongst gifted individuals, there are slightly less left-handers compared to the general population (this result was what we call "statistically significant", yet it was so only marginally; in other words, not a very sure bet). However, if studies used more lax criteria for left-handedness (in which case we call it "non-right-handedness"), then there appears to be no difference between gifted and general population individuals. So, there you go left-handers, you are not smarter than everyone else!

What is the case with intellectually disabled individuals? In those groups, we did find an elevated prevalence of left-handedness. We found that intellectually disabled individuals are 1.98 times more likely to be left-handed and 2.66 times more likely to be non-right-handed compared to the

general population. This means that if we hypothesize that exactly 10% of the general population is left-handed, then the left-handedness prevalence amongst intellectually disabled individuals is 19.6%. That is higher than the general population's 10%, but not very much higher!

How can we explain these findings? Whether we are right- or left-handed tells us a little bit about how brains are organized. If we are right-handed we have a 97% chance that our left-hemisphere will be dominant for language. If we are left-handed, though, this chance goes down to 73%. Intellectually disabled individuals have more chances of being left-handed, because -some of them- might have experienced some sort of brain damage before or after they were born. This damage could have led to both left-handedness and intellectual disability. Another explanation could be that the brains of some of the intellectually disabled people are reorganized. In their brain language functions might have shifted from the left to the right side of the brain. The right side should now be the home of too many functions, something we call "cognitive crowding". This could lead to reduced cognitive ability and a shift of hand control from right to the left; in other words intellectual disability and left-handedness.

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Publication

[Intelligence and handedness: Meta-analyses of studies on intellectually disabled, typically developing, and gifted individuals.](#)

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