


# 10 characteristics of the autistic brain.

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We list here -in no particular order- 10 widely replicated differences between the brains of autistic people as a group, and typically developing individuals. These differences may not be found in all people, as autistic or not, individual variation exists. For example, people with speech onset delays do not present with the same brain signature as those without, and male/female cerebral differences may also exist.

- 1 Over-functioning of visual brain areas.** Autistic individuals recruit the brain areas associated with visual processing and perception to a greater extent than non-autistics, even for complex, verbal tasks that require language in non-autistic people.
- 2 Altered long-range brain connectivity.** Although it depends on the brain area, we often observe decreased communication between brain regions, especially between the frontal and more posterior brain regions. This "diminished long-distance connectivity" indicates that brain regions may function more autonomously in autistic people.
- 3 Local over-connectivity.** Conversely, communication is enhanced within functional brain regions, and sometimes between two closely connected regions. This is the case between visual brain areas and other perceptive regions, which could explain high rates of "synesthesia" in autism – such as associating a musical note and a color.
- 4 Differences in cellular size and organisation.** Cell size and organisation differ in certain areas of the autistic brain, which incidentally contains a greater quantity of smaller brain cells (or neurons). This may influence the distance across which the neurons can communicate.
- 5 A larger brain.** Around one third of autistic individuals have a larger head and brain size compared to the average non-autistic population of the same
- 6 Reduced corpus callosum.** This brain structure allows for communication between the left and right hemispheres of the brain. At least some parts or the corpus callosum are thinner in autistic people which may affect the speed and efficiency of the connection between the two hemispheres.
- 7 Less lateralized brain structure and function.** Several brain functions are lateralized. For example, the left hemisphere is more specialised in language processing than the right hemisphere. Conversely the right hemisphere is better at processing music and faces. In the autistic brain these functions seem to be more equivalently processed in the two hemispheres. In line with these findings, there are more left-handed and ambidextrous individuals in the autistic that the non-autistic population.
- 8 Different growth and development trajectory.** In autistic individuals, there is an early brain over-growth, which normalizes after a few years, and is plausibly linked with differences in the way the brain organizes its structure and connections during development.
- 9 More interindividual variability.** In the non-autistic brain, some regions are dedicated to specific functions. For instance, faces are specifically processed in a brain region called "fusiform gyrus". This is also true for autistic people, but to a lesser extent: for example, this face processing region is more variable from one individual to another.
- 10 Organised differently.** Overall, the autistic brain is organised differently, more efficient than the non-autistic brain in some cognitive aspects, less efficient for others. 

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