The project uses the study of deaf and blind individuals to engage in the nature vs. nurture debate in the domain of human cognitive science. The human brain can be compared to a cabinet. To perform its amazing work efficiently, it is divided into functional regions that deal with specialized functions: the visual cortex, the auditory cortex, language areas, and so on. Like a cabinet, it is then divided into smaller, more specialized functions smaller regions such as the face area, speech production area, and so on. In this project, we we want to understand, how much this division is fixed by the genetic, developmental blueprint, and how much it can be changed by the environment. To this aim, we will study blind and deaf individuals. Permanent sensory deprivation caused by blindness or deafness has long been a source of insights into cortical plasticity. Sensory deprivation is a natural experiment, in which the input to the developing brain is permanently altered. It offers the unique opportunity of finding out how, and to what extent this change of input modifies the architecture of the brain-cabinet. Over the years, two influential hypotheses have emerged, and guide our understanding of brain development in sensory deprivation One is the **task-specific principle,** which asserts that following deafness or blindness, the deprived cortex is re-organized**,** in a manner where the **function of a given area is preserved** even though its **input modality has been switched** In support of this hypothesis, several studies have shown that showed that most of the known specialized regions in higher-order 'visual' cortices, as well as two specialized regions of the auditory cortex maintained their anatomically consistent category-selective functions (e.g. for faces or movement) in the absence of visual experience, when input was provided via other senses. The second is the **concept of pluripotentiality,** according to which, the deprived cortex (e.g. the visual cortex in the blind) will **assume new functions** such as **language** or **memory** (Bedny, 2017). This hypothesis resides on the fact that cortical tissue across the entire cortex is remarkably similar, and **potentially capable of assuming any role**, depending on its neural environment i.e. the type of information that it receives. In the current project, these two hypotheses will be tested using two methods: Magnetic Resonance Imaging, and Transcranial Magnetic Stimulation. Using Magnetic Resonance Imaging we will 1) build a the most precise yet map of connections in the blind brain, 2) conduct a pioneering study looking, for the first time, at the differences in the blinds' cortical sheet itself, 3) determine whether, in accord with the task-specific principle, the reading system in the visual cortex in the blind shares key characteristics of the sighteds reading system, such as the tendency for "mirror inversions" seen for example in sighted children learning to read. Turning our attention to the deaf, we will build on our recent finding that the high-level auditory cortex in the deaf switches its input modality from sound to vision but preserves its task-specific activation pattern independent of input modality, and establish 4) whether the same auditory cortex in the deaf can take its information from the tactile modality, as it is the case with the blinds' visual cortex. Finally using Transcranial Magnetic Stimulation, which allows one to turn off non-invasively brain regions for a short amount of time, we will determine, whether the superior abilities of the deaf can be explained by the fact, that their auditory areas become a second "attentional area" in the brain. The experiments proposed here should answer when do brain areas develop towards a pre-programmed task-specific function even when their sensory input is changed and what are the factors and conditions that keep them on this pre-determined trajectory. They should also answer when do brain areas veer towards a new developmental path, develop new functions and what are the factors and conditions that steer them towards their new capacities.