Fig. 1 Statistical parametric maps (blue and yellow) derived from voxel-based morphometry (VBM) analysis are overlaid on the left hemisphere of an individual's structural MRI image. Brain regions that are 1 to 2 standard deviations lower (A) and higher (B) in regional gray matter volume compared to the population mean (N = 100) are indicated separately. In the VBM analysis, the structural MRI images of 100 subjects are segmented to produce the gray matter map, and warped into a new reference space for diffeomorphic image registration into Montreal Neurological Institute (MNI) stereotactic space, and finally smoothed with a Gaussian kernel. The regional gray matter volume distribution of a single subject relative to the population sample is examined by determining the z-score of each voxel of each subject in the population. The clusters of voxels that exceed a threshold of $z > 1.0$ are displayed as a $z$-score map indicating the brain areas that have a higher volume than normal (B), while clusters of voxels that exceed a threshold of $z < 1.0$ are displayed as a map showing areas with lower volume than normal (A). In this example, the individual has higher regional gray matter volume in the angular gyrus (abstract thinking), motor areas (right hand side motor control), auditory cortex (right hand side hearing), superior and mid frontal gyrus (executive attention) and the mid-temporal gyrus (facial processing) (yellow clusters, B). On the same side of the brain, the regional gray matter volume is lower than normal in the visual cortex (vision), cerebellum (movement coordination and timing), supramarginal gyrus (associations, language and tool use), and prefrontal areas involved in emotional regulation (blue clusters, A).