Il fascino delle neuroimmagini nella valutazione dell'imputabilità: linee guida per evitare la malinterpretazione dei risultati – The Charm of Neuroimaging in Mental Insanity Evaluation: Guidelines to Avoid Possible Misinterpretation of the Findings

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Neuroimaging are now worldwide often introduced to assist the assessment of mental insanity in criminal forensic evaluations[1] with the aim to provide a "convergence" of evidences (including anamnestic, clinical and neuroscientific information) on the *mens rea* of the defendant that may be pivotal to support judge's decision[2]. It is thus increasingly important to have clear guidelines on how neuroimaging evidences in the mental insanity process should be correctly applied and interpreted. It is also increasingly important for judges and jurors to have sufficient knowledge to understand the way in which neuroimaging evidences can be relevant to legal questions and to recognize when they are not[3]. Thus, we aim to present practical guidelines to be used in the delicate process of neuroimaging results interpretation.

Firstly, we defined some important rules that should be applied to allow the group-to-individual inference of neuroimaging results in court. These rules focus on the importance of: i) descriptive diagnosis; ii) anatomo-clinical correlations; iii) brain plasticity (i.e. not every brain abnormalities leads to behavioral symptoms); iv) avoiding logical fallacies as the reverse inference[4,5](i.e. to infer the presence of altered mental states from the presence of brain pathology). Secondly, through the detailed analysis of real forensic cases, and through the description of the errors one might end up with if the imaging results are not correctly interpreted, we defined clear guidelines that clarified when neuroimaging should/should not be used and how eventual results must be interpreted.

Despite we are aware that neuroimaging is a potent tool that is very easy to be mis-used[3,6], we believe that is likewise wrong to *a priori* deny its potential helpful applications. Despite it is certainly true that neuroscientists often committed logical errors when presenting isolated imaging findings, we also believe that similar logical errors are also committed when ignoring these data[7,8].

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