

Abstract

Background: Attachment styles are sets of consistent behaviour that impact our cognitive function and emotional regulation throughout lifespan, leading to its wide association with various psychiatric diagnoses. Structural imaging and physiological studies had failed to identify specific patterns in various attachment styles despite its strong biological basis. Over the past decade, functional magnetic resonance imaging (fMRI) sheds light on attachment theory research by revealing potential neurocorrelation patterns. However, fMRI studies are expensive to conduct. Primary studies are often limited by factors such as small sample sizes and inability to incorporate all attachment styles into a single study for comparison. Despite a rapid rise in fMRI studies in attachment styles, primary studies have failed to identify more precise brain regions due to its limited power. Functional MRI studies were unable to specify the brain regions responsible for the neuronal circuit.

Objectives: The aim of this meta-analysis was to summarise the existing literature on fMRI findings in various attachment styles quantitatively in order to provide insights on associated brain regions for future research.

Methodology: English literature published through start date of search engines to 21 February 2017 was retrieved from MEDLINE, PubMed, PsychINFO and Embase, together with backward reference search of included articles and reviews. Functional MRI studies that examined neuronal responses in healthy adults in correlation to attachment styles measured by well-validated assessment tools were included. Coordinate-based meta-analysis (CBMA) using Activation Likelihood Estimation (ALE) was then performed on the articles retrieved to obtain brain region activity

density.

Results: Nineteen articles were included, amounting to a total of 948 healthy adults. ALE values were arranged into four groups according to primary studies clinical assessment – avoidance, anxiety, secure and insecure attachment. Avoidance group showed one hyperactivating cluster ($p < 0.01$) over superior temporal gyrus and nearby regions. Secure and insecure groups showed mixed activation patterns ($p < 0.05$) over mainly occipital lobe and areas along Papez-Limbic circuit, respectively. No significant cluster formation was identified in anxiety group.

Conclusion: This meta-analysis is the first to examine fMRI findings in various attachment styles using a coordinate-based method. Avoidance attachment is purported to be associated with superior temporal gyrus and the nearby regions.

Key-Words: Functional Magnetic Resonance Imaging, Attachment Styles, Activation Likelihood Estimation, Coordinate-based meta-analysis