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Neuroticism modulates resting activity metrics in distinctive regions Not in one metric: Neuroticism modulates different resting state metrics within distinctive brain regions

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<ABS-HEAD>Highlights ► Neuroticism (NE) can be associated with stable Resting State (RS) features, ► Several metrics have been used to describe RS, yielding to inconsistent results. ► Different metrics portray different RS properties ► Despite regional similarities NE affects different metrics, in different ways. ► Multiparametric approach is needed for the characterization of psychological traits.

<ABS-HEAD>Abstract

<ABS-P><ST>Introduction</ST> Neuroticism is a complex personality trait encompassing diverse aspects. Notably, high levels of neuroticism are related to the onset of psychiatric conditions, including anxiety and mood disorders. Personality *traits* are stable individual features; therefore, they can be expected to be associated with stable neurobiological features, including the Brain Resting State (RS) activity as measured by fMRI. Several metrics have been used to describe RS properties, yielding rather inconsistent results. This inconsistency could be due to the fact that different metrics portray different RS signal properties and that these properties may be differently affected by neuroticism. To explore the distinct effects of neuroticism, we assessed several distinct metrics portraying different RS properties within the same population.

<ABS-P><ST>Method</ST> Neuroticism was measured in 31 healthy subjects using the Zuckerman-Kuhlman Personality Questionnaire; RS was acquired by high-resolution fMRI. Using linear regression, we examined the modulatory effects of neuroticism on RS activity, as quantified by the Amplitude of low frequency fluctuations (ALFF, fALFF), regional homogeneity (REHO), Hurst Exponent (H), global connectivity (GC) and amygdalae functional connectivity.

<ABS-P><ST>Results</ST> Neuroticism modulated the different metrics across a wide network of brain regions, including emotional regulatory, default mode and visual networks. Except for some similarities in key brain regions for emotional expression and regulation, neuroticism affected different metrics in different ways.

<ABS-P><ST>Discussion</ST> Metrics more related to the measurement of regional intrinsic brain activity (fALFF, ALFF and REHO), or that provide a parsimonious index of integrated and segregated brain activity (HE), were more broadly modulated in regions related to emotions and their regulation. Metrics related to connectivity were modulated across a wider network of areas. Overall, these results show that neuroticism affects distinct aspects of brain resting state activity. More in general, these findings indicate that a multiparametric approach may be required to obtain a more detailed characterization of the neural underpinnings of a given psychological trait.

<KWD>Key words: Neuroticism; fMRI; resting state; fALFF; Functional connectivity; brain activity

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