

Apathy dimensions and the connectivity of salience and default-mode networks in behavioural variant frontotemporal dementia

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STATE OF THE ART: Functional connectivity correlates of apathy assessed as a multidimensional construct, using ecological behavioral metrics, have never been explored in behavioral variant frontotemporal dementia (bvFTD).

METHODOLOGY: We recorded the behavior of 20 bvFTD patients and 16 healthy controls in a close-to-real-life situation including a free phase (FP – in which actions were self-initiated) and a guided phase (GP – in which initiation of actions was facilitated by external guidance). Activity time and walking episode features were investigated as quantifiers of apathy. We used the means $((FP+GP)/2)$ and the differences $(FP-GP)$ of these metrics and measures by questionnaires to extract apathy dimensions by factor analysis. We explored the relationships between extracted apathy dimensions and two types of fMRI-based resting state connectivity measures (local and distant).

RESULTS: Lower time spent in activity combined with walking episodes of higher frequency, lower acceleration and higher duration were confirmed as behavioral markers of apathy in bvFTD. Using these behavioral metrics contributed to the extraction of two dimensions: the global reduction of goal-directed behaviors and the specific deficit of self-initiation. Global apathy was associated with lower local connectivity of prefrontal cortex and lower connectivity of salience network hubs. The deficit of self-initiation was related to increased connectivity between parietal default-mode network hubs and medial motor/pre-motor cortex.

CONCLUSION: Through a novel approach of apathy measurement in bvFTD, we dissociated the functional connectivity correlates of the global reduction of goal-directed behaviors and the specific self-initiation deficit. We discuss implications for diagnosis and treatment of apathy.

Conflicts of interest

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