I know the pain you feel-how the human brain's default mode predicts our resonance to another's suffering.

Introspective and self-referential in nature, the human brain's default mode network (DMN) is presumed to influence our behavior in response to the environment in predictive manner [Raichle ME, Gusnard DA (2005) J Comp Neurol 493:167-176; Bar M (2009) Philos Trans R Soc Lond B Biol Sci 364:1235-1243]. In the current study, we hypothesize that the strength of DMN-connectivity contributes to distinct introspective psychological processes in every-day social life such as the intuitive understanding of other people through inner representation of their affective states - e.g. his or her pain. 19 healthy individuals underwent functional MRI scanning, which consisted of a resting-state-scan followed by the presentation of visual stimuli depicting human limbs in painful and non-painful situations. After scanning, participants were asked to evaluate the stimuli in terms of pain intensity perceived from the first person perspective. Independent component analysis (ICA) demonstrated that higher integration of the left medial orbitofrontal cortex (BA 32) into the anterior default mode network (aDMN) was associated with higher post-scan pain ratings. Furthermore, the exposition to the "Pain"-pictures led to relative increases of aDMN-activity compared to "No Pain"-stimuli which were also correlated with the subjective pain intensity. The behaviorally predictive functional
architecture during a task-free period supports the notion that the DMN serves as a "memory of the future" [Ingvar DH (1985) Hum Neurobiol 4:127-136] in terms of a neuronal cache, storing "a priori scripts," which are recalled to deal efficiently with upcoming environmental events. In addition, our results suggest that an individual predisposition to identify oneself with another's pain influences the automatic response of the DMN during the observation of painful situations.