FC5: Predicting adherence to psychotherapy with mHealth data using deep learning

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Objectives: Effectiveness of psychotherapy depends on patients' adherence to between-session homework (HW) to practice therapeutic skills. mHealth apps can offer continuing reminders, although frequent reminders overwhelm or burden patients and therefore are ineffective. Predicting likelihood of completing daily HW and sending contextual reminders has the potential to improve HW adherence and therefore improvesymptoms.

Methods: Depressed older participants (N = 51) undergoing psychotherapy provided daily active ratings on mood, anhedonia, stress and pain via an mHealth app. Data on activity, mobilization, sociability and sleep passively were also recorded via device sensors (e.g., microphone, accelerometer, GPS etc.). Using active and passive mHealth data, we developed predictive models of daily home-work completion status using a naïve semi-supervised deep learning algorithm. Prediction accuracy was determined via time-dependent cross-validation.

Results: Study participants had a mean (SD) age of 71.4 (7.76) years, mean (SD) of 14.9 (2.93) years of education, mean (SD) BIS/BAS total of 22.6 (3.36), mean (SD) MADRS total score of20.4 (6.04) and 88.2% were of female gender, 29.4% were single, 83.8% were of non-Hispanic ethnicity, 58.8% belonged to Caucasian race and 38.2% practiced Catholic religion. With 4700 person-days HW completion response, our models show an AUC of 84.7% (sensitivity = 76.2%; specificity = 80%) estimated by cross-validation.

Conclusions: This paper demonstrates the feasibility of predicting adherence to psychotherapy in depressed older adults using actively and passively collected mHealth data. Digital interventions based on such predictive models can potentially increase adherence to psychotherapy and thereby improve its effectiveness without increasing the user notification burden.

Keywords: mHealth, artificial intelligence, psychotherapy adherence

FC6: Impact of work activity on cognitive functioning in older adults

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Objectives: The aim of this study was to analyze the impact of maintaining professional activity on cognitive functioning at advanced ages.

Methods: The sample comprised 131 people aged 60 years-old and older (M = 68,15 years) of whom 41 were still working (30 women and 11 men, Mage = 65.24), and 89 retired (74 women and 15 men Mage = 69.48). To assess participants' cognitive functioning the following instruments were used: Rey-Osterrieth Complex Figure Test, Digit Span Test, Trail Making Test (TMT), Verbal Fluency Test and Boston Naming Test (Short Form). Since age differences among participants of the two groups were found an ANCOVA test was used, and age was included as a covariable.

Results: Statistically significant differences were found between the two groups in the Part A of TMT ($F = 7.383$, $p < 0.05$) and the Boston Naming Test (Short Form) ($F = 3.495$, $p < 0.05$). Compared with retired participants those who were still active had better scores on both measures.

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