Computational psychotherapy: enhancing evidence-based therapy through the integration of predictive machine learning models into the Greta-InTherapy online platform

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Introduction:
In mental health care, effective therapies grounded in evidence are ethical imperatives. Cognitive-Behavioral Therapy (CBT), endorsed by the UK's Improving Access to Psychological Therapies (IAPT) program, emphasizes evidence-based treatments through validated assessments during therapy sessions (Clark, 2011; Griffiths & Steen, 2013). Despite CBT's proven efficacy, early dropouts (10% to 50%) hinder expected recovery (Kegel & Flückiger, 2015), prompting the need for proactive intervention.
Recent years have witnessed a pivotal shift in psychotherapy, embracing digital platforms for real-time data collection, aligning with evidence-based practice (Clark, 2011; Granello & Wheaton, 2004; Klein et al., 2021). Concurrently, Artificial Intelligence (AI), notably Machine Learning (ML), integration into this landscape promises deeper insights into therapy processes (Aafjes-van Doorn et al., 2021; Delgadillo, 2021).
The confluence of ML and digital platforms presents opportunities to predict and address early dropouts, yet a comprehensive computational psychotherapy framework harnessing this potential is underdeveloped (Briganti & Le Moine, 2020; Imel et al., 2015). Embedding predictive ML models within digital platforms could empower clinicians with insights into potential early dropouts, aiding clinical decisions (Bennemann et al., 2022).
This project aims to fill this void by creating an innovative computational psychotherapy framework merging digital platforms and ML models. By exploring this uncharted territory, the present research seeks to contribute novel insights to evidence-based psychotherapy practices, advancing the international research community's understanding.
Method: The Studi Cognitivi Center collaborates as a clinical and research partner, and collects data regarding diagnosis and CBT procedures through the digital platform "Greta" (https://greta.digital/). Data obtained from the Greta-InTherapy platform will undergo analysis using supervised ML models. Predictors will encompass sociodemographic data, pre-treatment symptomatology, and patient diagnostic presentations. The prediction output will focus on early dropout/treatment discontinuation due to improvement.
Results: Results regarding the best predictive model obtained will be presented.
Conclusion: The introduction of computational psychotherapy, a pioneering approach in the Italian context, signifies a significant stride in evidence-based therapy. This innovation holds the potential to promptly identify cases at risk of premature therapy discontinuation (Briganti & Le Moine, 2020; Clark, 2011). Leveraging AI-based models could aid clinicians in tailoring treatment plans for individual patients.

Research advancements: Recent developments in this research area highlight the increasing role of predictive AI models in enhancing clinical practice. These models offer cutting-edge support in identifying potential early treatment discontinuations, thereby contributing to personalized and effective therapeutic interventions. Additionally, ongoing efforts continue to refine the integration of AI into psychotherapeutic practices, emphasizing the evolution toward more precise and patient-centered treatment strategies.

Keywords: Computational Psychotherapy, Machine Learning, Predictive Models, Clinical Practice Digitalization, Early Dropout

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