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First-Session Linguistic Predictors of Outcome in Depressed Patients Attending Internet-Enabled Cognitive Behavioural Therapy

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Introduction. As part of the Improving Access to Psychological Therapies (IAPT) initiative aimed at transforming access to talking therapy treatment for adults with common mental health problems, the delivery of Internet-enabled CBT (IECBT) programmes involves synchronous real-time text-based communication between the therapist and the patient. Most studies based on written language in social media or textual prompts, have identified correlations between depression and an increased use of first-person singular pronouns and negative emotion words (e.g., [1]-[2]) and past-tense words (e.g., [3]-[5]), but a reduced use of positive emotion words [6]. Within the context of IECBT, the few available studies revealed correlations between improvements in depression and an increased use of discrepancy words and positive emotion words, but a reduced use of first-person singular pronouns, negative word, negative emotion words, and past focus (e.g., [7]-[10]). The current study utilized a large real-world clinical dataset of IECBT-delivered patient-therapist interactions. We hypothesized that patients' frequencies of linguistic features in the first therapeutic session would predict treatment outcomes as measured in the last session. Prediction was based on a set of linguistic features identified from empirical literature.

Methodology. A naturalistic cohort design was utilized. The data comprised an anonymous dataset of linguistic features based on 89,081 IECBT sessions from a total of 14,763 patients diagnosed with a mood disorder (~90,000 hours of therapy). The data were used solely for research purposes, and patient language or session transcripts were never shared or removed from the IECBT provider's server. The Patient Health Questionnaire (PHQ-9) [11] was completed at both the initial and final assessments to measure the clinical threshold of depressive symptoms. The Language features were gathered using several freely available word lists [12], POS (parts-of-speech) tags extracted from the spaCY parser [13], and freely available sentiment analysis tool VADER [14]. A series of regression analyses were conducted to identify significant predictors of pre-treatment depression severity and changes in clinical outcomes.

Results. The results showed that the set of linguistic features provided prognostic information on pre-treatment symptom severity and treatment outcomes as measured using the PHQ-9—thus, whether patients' depressive symptoms will improve or deteriorate after therapeutic intervention, as predicted based on their language use during the first session.

Conclusions. The results of this study provide meaningful data on the relationship between patients' language use and depressive symptom severity and change, with important implications regarding language as a potential risk factor for predicting symptom deterioration.

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