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The dynamics of emotion expression on Twitter and mental health in a UK longitudinal study

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Introduction & Background

An estimated 4.95 billion people used social media in 2023, with the average user active on around seven platforms for over two hours per day. This widespread use leads to abundant digital footprint data around interactions with social media. These data can be collected continuously and reflect real behaviour of users in naturalistic settings. These strengths have led researchers to propose the use of social media data in digital phenotyping, where digital footprints can be used to quantify and predict health conditions. Mental health assessment in particular could benefit, as existing approaches, such as self-report questionnaires and inpatient assessment, are unable to perform the real-time monitoring that digital phenotyping could potentially achieve.

Digital phenotyping models for mental health require careful consideration of what aspects of social media data to include. Including all data users generate could result in models that are overfitted and difficult to explain. Studies are required that explore the relationship between specific aspects of social media data, such as the time course of expressed emotion, and gold-standard measures of mental health.

Objectives & Approach

With participants' consent, we linked Twitter data to self-reported measures of mental health from the Avon Longitudinal Study of Parents and Children. We performed sentiment analysis using three different approaches—LIWC, VADER and RoBERTa—to estimate the amount, variability and instability of positive and negative emotional content in each participant's Tweets over a one-year period. We explored the association between these measures of emotion expression and self-reported scores of depressive symptoms, anxiety symptoms and wellbeing. These mental health measures are the Short Mood and Feelings Questionnaire, the Generalized Anxiety 7 and the Warwick Edinburgh Mental Wellbeing Scale.

Relevance to Digital Footprints

Our research is highly relevant to digital footprint research, as it involves the use of digital footprint data (i.e. Twitter data) to predict mental health outcomes.

Conclusions & Implications

The results of our analysis will inform the development of digital footprint based phenotyping for mental health that could one day provide information to supplement clinical assessments.

