A decade into Facebook: where is psychiatry in the digital age?

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Introduction

Social networking sites are a part of everyday life for over a billion people worldwide.[1] They show no sign of declining popularity, with social media use increasing at three times the rate of other internet use.[2] Despite this proliferation, mental health care has yet to embrace this unprecedented resource. We argue that data from social networking sites should become a high priority for psychiatry research and mental health-care delivery.

We illustrate our views using the world's largest social networking site, Facebook, which currently has over 1 billion daily users[1] (one in seven people worldwide). Facebook users can create personal profiles, socialise, express feelings, and share content, which Facebook stores as time-stamped digital records dating back to when the user first joined. Evidence suggests that 92% of adolescents go online daily[3] and disclose considerably more about themselves online than offline.[4] Thus, working with Facebook data could further our understanding of the onset and early years of mental illness, a crucial period of interpersonal development.[5] Furthermore, a diminishing so-called digital divide has allowed for a broader sociodemographic to access Facebook, including homeless youth,[6] young veterans,[7] immigrants, people with mental health problems,[8,9] and

seniors,[10] enabling greater contact with traditionally hard-to-reach populations.

While acknowledging that issues are far from settled about the role that social media should play in mental health, we argue that it should no longer be a debate about whether researchers and health-care providers engage with social networking sites, but rather how best to use this technology to promote positive change. We discuss how Facebook data can advance psychiatry research and how user-level data could potentially enhance the clinical delivery of personalised patient care. More specifically, we illustrate how Facebook data can assist with identification, intervention, and possibly prediction and prevention of mental illness.

Social media and advancing psychiatric research

Identification

To what extent might Facebook measures improve detection of mental health factors? We address this question by implementing a novel online-offline framework that combines Facebook data with pre-existing offline longitudinal cohort information (figure). This approach presents several opportunities to improve detection. Facebook data: (1) tends to be more reliable than offline self-reported information,[11,12] (2) often reflects valid

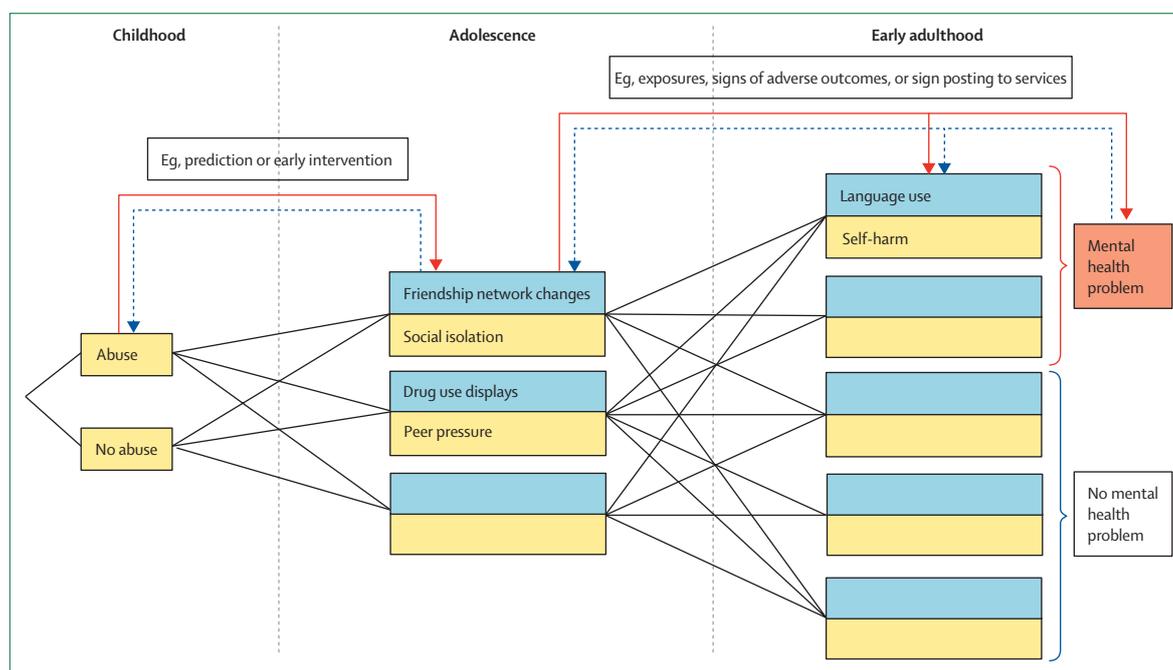*Figure:* **Online-offline longitudinal mental health framework**
An online-offline longitudinal mental health framework offers opportunities to assist with evidence-based identification, intervention, and possibly prediction and prevention. Facebook measures (blue boxes); offline clinical and behavioural measures (yellow boxes). Arrows indicate that information from one timepoint can be used across an individual's history.

depictions of offline behaviours (eg, Facebook alcohol displays indicate actual misuse[13]), (3) measures content difficult to assess offline (eg, conversation intensity), (4) potentially generates novel online measures, (5) achieves previously inconceivable sample sizes,[14] and (6) is cost effective.[12] Furthermore, having access to offline clinical outcomes and behavioural measures can be used to frame the analysis and interpretation of novel Facebook measures. Offline validation could improve the quality of online data and guide prioritisation of online parameter selection. Pairing sensitive online-offline health data is feasible, with a recent study reporting that 71% of participants consented to sharing their social networking site data (primarily Facebook) and having it linked with their electronic medical records.[15]

Facebook data collection
Provided that participant consent is obtained,[12] many Facebook measures, which have yet to be extensively examined in psychiatric populations, can be collected for data analysis.

So-called "status updates" allow users to share videos, photos, and written content. Preliminary findings[16] showed that 25% of 200 US college students (aged >18 years) sampled disclosed text-based status updates showing depressive-like symptoms (five [2·5%] profiles met a major depressive episode using "proxy DSM criteria"[16]). Momentary thoughts, emotions, and topics that people discuss online can be examined using natural language processing. Such analyses have already been used to study personality traits,[17] assess psychological stress,[18] and distinguish age groups.[19] Sentiment and topic analyses should be examined in the context of psychiatric disorders and whether symptoms and illness stage can be differentiated.

Facebook "likes" are statements of endorsement. Users can "like" other users' content and Facebook Pages. Research shows that personality predictions made by a computer using "likes" are more accurate than those made by friends, family members, and spouses,[20] and that "likes" can predict psycho-demographic traits.[21]

Facebook is the world's largest photo sharing website (350 million photos uploaded daily).[22] Automated picture analysis is an active area of computer science research. For example, emotional facial expressions can be measured in photographs. This promising area is still in its infancy, but photographic analysis might offer unique representations of offline behaviours.

Facebook friendship networks allow users to establish and maintain connections. Data collection can map friendship interactions and changes in social structure (eg, subgroup clustering). Preliminary research shows that having more Facebook friends is associated with differing clinical symptoms[23] and being "unfriended" can elicit negative emotions.[24] Facebook users mostly interact with close friends, but users receive large amounts of content shared by their broader network through their News Feed. In a study,[25] a reduction of the amount of positive content displayed by peers on News Feeds led to an increase in negative status updates by users (and reducing negative content resulted in more positive updates). Although ethically controversial,[26] these findings indicate that Facebook users are influenced by emotional content displayed by others.

Several caveats about social networking site research need addressing. For example, psychiatric diagnoses have been inferred by brief self-report questionnaires in non-clinical samples of people, people of wide age ranges, well educated participants, and cross-sectional designs.[11,29] Although some self-report measures of certain clinical symptoms and personality traits have been associated with increased Facebook use,[11,27,28] findings from studies using self-report measures must be interpreted cautiously as, for example, participants tend to overestimate use of social networking sites.[12,29]

Clinical interventions
Many mental health-related tragedies have been documented on Facebook[30] and social media.[31] These tragedies should prompt a sense of urgency to address the clinical validity of such messages. Positive experiences of Facebook use have also been reported, for example, people with schizophrenia and psychosis reported that social networking sites helped them socialise and did not worsen symptoms.[8,9] Although such testimonies are intriguing, evidence is insufficient to determine whether Facebook has an overall positive or negative effect on mental illness. We propose several ways in which Facebook data could help translate evidence-based discoveries toward improving mental health care.

Patient–provider interventions
The delivery of bespoke summary measures derived from a patient's Facebook user-level data should be trialled for integration into treatment sessions. Facebook measures could help care providers identify online patterns and deviations, supplemented as graphical displays to facilitate data-centred patient–provider dialogues. Some Facebook measures could theoretically be implemented immediately (eg, Facebook usage or activity), whereas other metrics will be more complex to derive (eg, wall posting rates).

Facebook feature-based therapies and social connection strategies need exploration. For example, Facebook picture-based and timeline reminiscent therapies should be assessed in view of preliminary evidence that re-visiting Facebook posts or photos has a positive effect on wellbeing.[29] This method might assist with accessing autobiographical memories (eg, for depression) and improving cognition and mood with older patients (similar to offline therapies for early dementia). Professionals could evaluate a patient's Facebook News Feed or comments in therapeutic contexts to reduce

social isolation and reframe social disclosure behaviours. Facebook relationships can generate social capital by supporting those with reduced self-esteem[32] and increase companionship for socially isolated individuals.[11] Given offline research showing that socially isolated adolescents have increased rates of depression and suicidal thoughts,[5] these online stepping stones could encourage patients to reform offline social connections.

Peer-based interventions

Peer-based interventions have the potential to leverage pro-social connections.[33] For example, research has shown that homeless youth (a population at increased risk of mental health problems[6]) benefited from prosocial online connections (ie, decreased alcohol intake and decreased number of depression-like symptoms).[34] This finding is especially encouraging given that 85% of the 136 homeless youth sampled could access mobile and social networking sites at least weekly.[6] Network interventions that leverage companion support appear promising.[35] User-level Facebook data could be superimposed onto patient group-level data for matching patients with similar Facebook measures, which might augment health conversations and expand their social support networks.

Unlike virtual patient communities (ie, groups of patients who come together to seek support online), an advantage of using social networking sites, especially Facebook, is their naturalistic positioning in people's daily lives,[36] which addresses concerns about the limited duration of participation in virtual communities.

The use of social networking sites as clinical tools for patient care holds great promise, however, this area is very much in its infancy and several caveats need addressing. Will these approaches interfere with certain illnesses or symptoms more than others (eg, digital surveillance-based paranoid themes)? Are we equipped within mental health services to keep pace with social networking technology and how would implementation into clinical practice affect clinician time and other costs? Social networking site interventions can prove difficult or dangerous when patients are very ill; therefore, careful consideration is needed of the possible negative effects on patient treatment. Standardised mental health social media policies and guidelines must become a high priority for ensuring confidentiality and data protection rights for vulnerable people, online professionalism, and protecting patients enrolled in online-based therapies.

Prediction and prevention

Early detection of digital warning signs could enhance mental health service contact and improve service provision. Facebook already allows users who are worried about a friend's risk of suicide to report the post,[37] although clinic-based social networking site interventions might be more trusted by patients. Such avenues need exploring given that many young people do not seek professional help.[38] Furthermore, evidence-based research and clinical investigations should examine the feasibility and complexities of implementing social media data use to guide preventive measures across primary, secondary, and tertiary care.

Ethical considerations

Ethical issues related to social networking sites require immense scrutiny and debate,[12] especially in the context of mental illness and young people.[39] A key ethics challenge for using social networking site data in psychiatry research and mental health-care practice will be to ensure that vulnerable individuals have a comprehensive and sustained understanding of what participation involves and that consent is monitored throughout the patient journey (ie, across stages of illness). Patient and public involvement should play a fundamental role in research development and care provision to gain perspectives from those needing and using mental health-care services.

Several important unanswered ethics questions remain; for example, what best practices should be implemented for incident reporting and safeguarding of social networking site disclosures, and what obligations do care providers have when potentially threatening disclosures are made?[40] This is further complicated by the unknown clinical validity of statements provided by some adolescents who conceivably post false or exaggerated information on their social networking site profiles.

Another factor that must be carefully considered is public unease and adverse reactions to social media monitoring and privacy infringements, as was recently witnessed with the abrupt suspension of the Samaritans Radar Twitter app that briefly enabled users to monitor their friends' Twitter activity for suicidal messages.[41] Another study inadvertently revealed participants' identities through the uniqueness of their data[42] and manipulated News Feeds without consent.[26] Public concerns of personal social networking site information infringements are highly justifiable, especially given the lack of transparency surrounding many questions of governance, ethics, professionalism, and confidentiality.

Patient education on social networking site safety should be incorporated into care, and this should become easier for doctors as time goes on, since use is common among medical students and psychiatry residents,[43] with a predicted six-fold increase in social media use by next generation physicians.[44]

Conclusions

Facebook has held its position as the most popular social networking site since 2008, but other forms of social media should be examined, including those increasingly aimed at children. It is unlikely that online social networking will decrease in popularity, so it is necessary for mental health-care professionals and researchers to engage with them. Although it is unclear how social networking sites

might best be leveraged to improve mental health care, they hold considerable promise for having profound implications that could revolutionise mental healthcare.

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