Abstract

Predicting Participant Engagement in a Social Media–Delivered Lifestyle Intervention Using Microlevel Conversational Data: A Pilot Feasibility Randomized Trial

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Abstract

Background: Social media–delivered lifestyle interventions have shown promising outcomes, often generating modest but significant weight loss. Participant engagement appears to be an important predictor of weight loss outcomes in these interventions, but engagement generally declines over time and is highly variable within and across studies. Research on factors that influence participant engagement remains scant in the context of social media–delivered lifestyle interventions.

Objective: The objective of this study was to identify predictors of participant engagement in a social media–delivered lifestyle intervention, including the characteristics of the participants, the posts, and the conversations that followed the posts.

Methods: We performed secondary analyses using data from a pilot randomized trial that delivered 2 lifestyle interventions via Facebook. We analyzed 80 participants' engagement data (defined as replies/comments) for each of the 761 posts generated over the 16-week intervention period and linked them to predictors, including characteristics of the posts they engaged on, conversation sentiment, and participant characteristics, using a mixed-effects model. We also performed machine learning–based classification to explore how well the aforementioned measures can predict whether participants will engage with a specific post.

Results: We found that the probability of participants' engagement with each post decreased by 0.28% (95% CI 0.16%-0.4%; $P<.001$) each week, and the probability of participants engaging with posts generated by interventionists was 6.3% (95% CI 5.1%-7.5%; $P<.001$) higher than their probability of engaging with posts generated by other participants. Participants also had a 6.5% (95% CI 4.9%-8.1%; $P<.001$) and 6.1% (95% CI 4.1%-8.1%; $P<.001$) higher probability of engaging with posts that directly mentioned weight and goals, respectively, rather than other types of posts. Participants were 44.8% (95% CI 42.8%-46.9%; $P<.001$) and 46% (95% CI 44.1%-48%; $P<.001$) more likely to engage with posts when they were replied to by other participants and by interventionists, respectively. A 1 SD decrease in the sentiment of the conversation on a specific post was associated with a 5.4% (95% CI 4.9%-5.9%; $P<.001$) increase in the probability of participants' subsequent engagement with the post. Participants' engagement on previous posts was also a predictor of engagement in subsequent posts (95% CI 0.74%-0.79%; $P<.001$). In addition, an ensemble of gradient boosting machine and deep learning–based classification algorithms confirmed the importance of the predictors previously identified and achieved an accuracy of 90.9% in terms of predicting participants' engagement, using a balanced testing sample with 1600 observations.

Conclusions: Our findings revealed several predictors of engagement derived from the content generated by interventionists and other participants. Our results have implications for increasing engagement in asynchronous, remotely delivered lifestyle interventions, which could improve outcomes. Our results also point to the potential of data science and natural language processing to analyze microlevel conversational data and identify factors influencing participant engagement. Future studies should validate these results in larger trials.

Conflicts of Interest: None declared.

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KEYWORDS

social media; weight loss intervention; engagement; predictors; machine learning

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