

← Back to Original Article

Using Twitter to track people's moods

An analysis of two years of tweets concludes, among other things, that people wake up happy but get grumpier as the day progresses.

September 29, 2011 | By Eryn Brown, Los Angeles Times

There's a lot you can read about on Twitter — including, it now appears, the patterns of human moods.

After analyzing two years' worth of tweets by 2.4 million people around the world, researchers at Cornell University have concluded that individuals wake up happy but that their mood deteriorates as the day progresses.

That discovery, among others reported Thursday in the journal *Science*, will interest researchers who are trying to understand how circadian rhythms and other natural influences shape our states of mind. But the study's primary significance may have more to do with its methods than its results.

"We now have the ability to view societies at a massive scale using the Internet," said study leader Scott Golder, a graduate student in sociology at Cornell. "This will open up opportunities for social scientists."

Golder said he intended to use Twitter to study behavior, not emotion. He and a fellow graduate student wrote a computer program that sampled all Twitter user accounts created between February 2008 and April 2009, collecting up to 400 messages from each account.

The program compiled more than half a billion Twitter messages, none longer than 140 characters. Most were written by English speakers and deemed good candidates for analysis with other software. The researchers looked at keywords in the tweets to figure out what people were doing and used timestamps embedded in the tweets to peg those activities to particular times of day and locations around the world.

They surmised that bacon is more popular than sausage (but eaten at the same time of day) and that a television show about someone named "Oprah" aired at 4 p.m. on weekdays. They estimated that it takes seven hours to become inebriated, based on the lag between tweets about "beer" and tweets about being "drunk."

They also figured out that they could search for mood-oriented keywords just as easily as they searched for behavior-oriented ones, Golder said.

The team employed a well-known text analysis program that is often used by researchers to sort words based on their emotional content; it seeks out words such as "happy," "awesome" and "fantastic" that have positive overtones as well as words like "afraid," "remorse" and "fury" that have negative ones. Sure enough, patterns emerged.

Positive-mood tweets peaked twice a day throughout the world, early in the morning and again near midnight. The morning peak came later on weekends, presumably because people slept in. That the cycle was similar on weekdays (when pressures like work deadlines and school exams pile up) and weekends (when most people are more relaxed) showed that sleep schedules and circadian rhythms were important influencers of mood, regardless of day-to-day stresses, the authors reported.

They also found that, on average, moods improved as the days lengthened in the spring and worsened as days shortened in the fall.

Dr. Nicholas Christakis, a medical sociologist at Harvard University who was not involved in the research, said that such insights might seem underwhelming at first: "Do we need scientists to tell us our mood is better in the morning?"

But the real importance of the paper, he said, was how well it demonstrated researchers' ability to interpret the "little digital bread crumbs" Internet users leave behind as they move through their lives.

"Eventually this type of research will yield important new results," he said.

Psychologist Martin Seligman of the University of Pennsylvania agreed that analyzing social media content "vastly improves" scientists' ability to track emotion. But he cautioned that services such as Twitter and Facebook also introduce new complications for researchers.

People who use Twitter might not be representative of the larger world, which makes it complicated to extrapolate the findings of a study like this. "Young, educated, rich people use social media. Rural Indian farmers do not," said Seligman, who was not involved in the study.

Cornell sociologist Michael Macy, the study's senior author, acknowledged that this was a problem. But he said that traditional methods of studying mood relied on much smaller and even more homogenous samples — often U.S. undergraduates who volunteer to take part in psychological research.

"We have greater confidence in results from millions of people around the globe," he said.

eryn.brown@latimes.com