[U Penn researchers' study of emailed NYT stories finds science stories are disproportionately shared, and highly emailed stories tend to be emotional, positive, surprising or about things that inspire awe (which they defined as "emotion of self-transcendence, a feeling of admiration and elevation in the face of something greater than the self.")]

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FINDINGS

Will You Be E-Mailing This Column? It's Awesome

By JOHN TIERNEY

Sociologists have developed elaborate theories of who spreads gossip and news — who tells whom, who matters most in social networks — but they've had less success measuring what kind of information travels fastest. Do people prefer to spread good news or bad news? Would we rather scandalize or enlighten? Which stories do social creatures want to share, and why?

Now some answers are emerging thanks to a rich new source of data: you, Dear Reader.

Researchers at the University of Pennsylvania have intensively studied the New York Times list of most-e-mailed articles, checking it every 15 minutes for more than six months, analyzing the content of thousands of articles and controlling for factors like the placement in the paper or on the Web home page.

The results are surprising — well, to me, anyway. I would have hypothesized that there are two basic strategies for making the most-e-mailed list. One, which I've happily employed, is to write anything about sex. The other, which I'm still working on, is to write an article headlined: "How Your Pet's Diet Threatens Your Marriage, and Why It's Bush's Fault."

But it turns out that readers have more exalted tastes, according to the Penn researchers, Jonah Berger and Katherine A. Milkman. People preferred e-mailing articles with positive rather than negative themes, and they liked to send long articles on intellectually challenging topics.

Perhaps most of all, readers wanted to share articles that inspired awe, an emotion that the researchers investigated after noticing how many science articles made the list. In

general, they found, 20 percent of articles that appeared on the Times home page made the list, but the rate rose to 30 percent for science articles, including ones with headlines like “The Promise and Power of RNA.” (I swear, the science staff did nothing to instigate this study, but we definitely don’t mind publicizing the results.)

“Science kept doing better than we expected,” said Dr. Berger, a social psychologist and a professor of marketing at Penn’s Wharton School. “We anticipated that people would share articles with practical information about health or gadgets, and they did, but they also sent articles about paleontology and cosmology. You’d see articles shooting up the list that were about the optics of deer vision.”

To make sense of these trends in “virality,” the Penn researchers tracked more than 7,500 articles published from August 2008 to February 2009. They assessed each article’s popularity after controlling for factors like the time of day it was published online, the section in which it appeared and how much promotion it received on the Web home page.

A random sample of 3,000 of these articles was rated by independent readers for qualities like providing practical value or being surprising. The researchers also used computer algorithms to track the ratio of emotional words in an article and to assess the relative positivity or negativity.

The computer textual analysis could identify “affect-laden” articles like “Redefining Depression as Mere Sadness” or “When All Else Fails, Blaming the Patient Often Comes Next.” It distinguished positive articles like “Wide-Eyed New Arrivals Falling in Love With the City” from downers like “Germany: Baby Polar Bear’s Feeder Dies.”

More emotional stories were more likely to be e-mailed, the researchers found, and positive articles were shared more than negative ones. Longer articles generally did better than shorter articles, although Dr. Berger said that might just be because the longer articles were about more engaging topics. (The best way to test that, he said, would be for The Times to run shorter and longer versions of the same article that would be seen by different readers.)

Surprising articles, like one about free-range chickens on the streets of New York, were also more likely to be e-mailed — which was a hardly a surprising discovery, of course.

But the researchers also kept finding popular articles with a quality that went beyond surprise.

“If I went into my classroom dressed up like a pirate, that would be surprising, but it wouldn’t be awe-inspiring,” Dr. Berger said. “An article about square watermelons is surprising, but it doesn’t inspire that awed feeling that the world is a broad place and I’m so small.”

Building on prior research, the Penn researchers defined the quality as an “emotion of self-transcendence, a feeling of admiration and elevation in the face of something greater than the self.”

They used two criteria for an awe-inspiring story: Its scale is large, and it requires “mental accommodation” by forcing the reader to view the world in a different way.

“It involves the opening and broadening of the mind,” write Dr. Berger and Dr. Milkman, who is a behavioral economist at Wharton.

“Seeing the Grand Canyon, standing in front of a beautiful piece of art, hearing a grand theory or listening to a beautiful symphony may all inspire awe. So may the revelation of something profound and important in something you may have once seen as ordinary or routine, or seeing a causal connection between important things and seemingly remote causes.”

The motivation for mailing these awe-inspiring articles is not as immediately obvious as with other kinds of articles, Dr. Berger said. Sharing recipes or financial tips or medical advice makes sense according to classic economic utility theory: I give you something of practical value in the hope that you’ll someday return the favor. There can also be self-interested reasons for sharing surprising articles: I get to show off how well informed I am by sending news that will shock you.

But why send someone an exposition on quantum mechanics? In some cases, it, too, could be a way of showing off, particularly if you accompanied the article with a note like, “Perhaps this will amuse, although of course it’s a superficial treatment. Why can’t they use Schrödinger’s full equation?”

But in general, people who share this kind of article seem to have loftier motives than trying to impress their friends. They're seeking emotional communion, Dr. Berger said.

"Emotion in general leads to transmission, and awe is quite a strong emotion," he said. "If I've just read this story that changes the way I understand the world and myself, I want to talk to others about what it means. I want to proselytize and share the feeling of awe. If you read the article and feel the same emotion, it will bring us closer together." (Go to nytimes.com/tierneylab to discuss your motives for e-mailing articles.)

The Penn researchers found evidence of readers' sharing other emotions, too, like anxiety — which, based on the old "fear sells" theory of journalism, might be expected to be the most influential emotion on readers. But of all the variables studied, Dr. Berger said, awe had the strongest relationship with an article making the most-e-mailed list, and that finding strikes me as a high compliment to the Times audience.

In fact, Dear Reader, you could consider this new study to be firm scientific evidence of your own awesomeness. And if you want to share that feeling with anyone, you know what to do next.