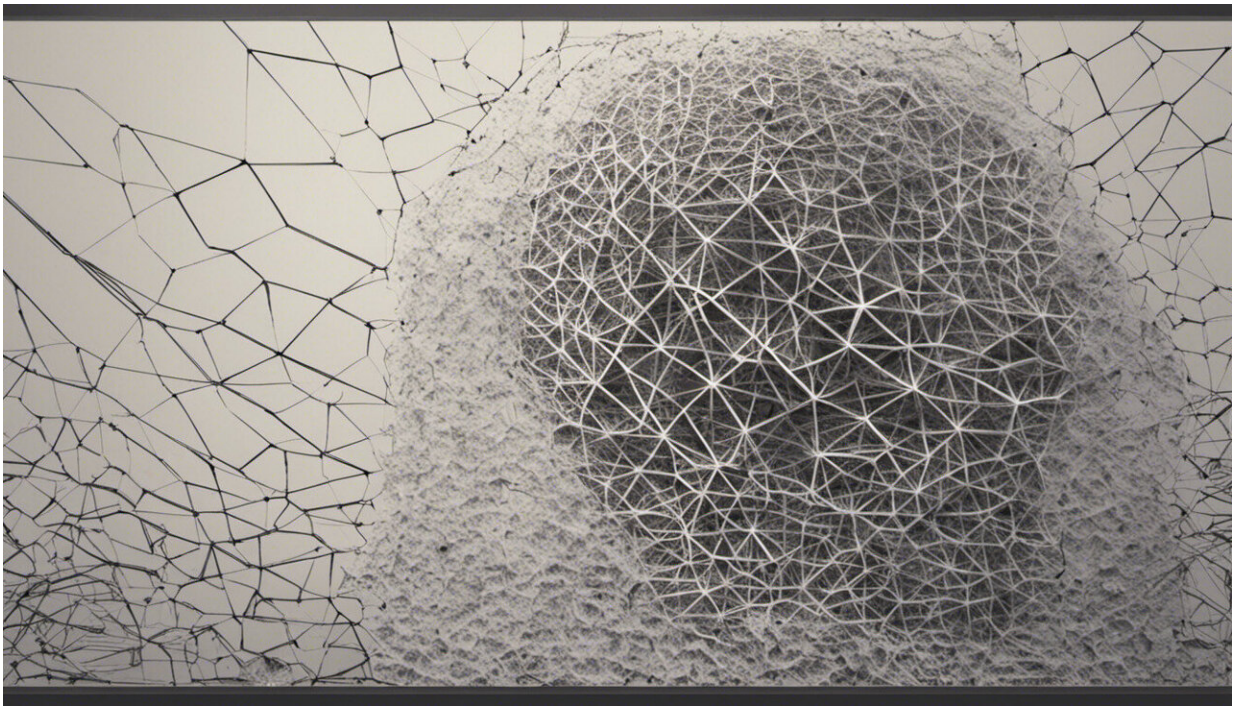
Why you can't stop playing Wordle, according to a computational linguist

February 9 2022, by Max Witynski



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Over the past few months, Wordle has skyrocketed in popularity, with cryptic grids of gray, green and yellow squares appearing on social media. But why has the online word game captivated so many people? And what makes it interesting from a linguistic standpoint?

The game is challenging, but simple: Once a day, players have six guesses to identify a new five-letter word (all players receive the same word on a given day). Each guess provides color-coded hints: a letter turns green if it is in the correct spot, yellow if it is part of the word but in a different spot, and gray if it is not in the word at all.

But what makes Wordle so charming and addictive, said University of Chicago linguist Jason Riggle, is the sense of validation it offers—affirming our intuitions about language when we land on the correct answer. It's a process akin to what happens when we converse with people we know well: They intuit what we mean quickly—even with minimal context—which makes us feel understood.

But Wordle is intriguing for a number of other reasons, said Riggle, whose research focuses on the computational modeling of communication. An associate professor of linguistics, Riggle sees Wordle as a window into the subconscious ways we engage with and break down language.

In effect, it turns everyone into a linguist, forcing us to wrestle with sound fragments and stitch them together according to probability distributions. Though algorithms could be optimized to "beat" Wordle, Riggle said the fun actually comes from doing that work on your own: "I don't want to know how the trick is done. I just want to be amazed."

You're a computational linguist. Does that mean it counts as work if you play games like Wordle online?

I suppose that if I think about a game like Wordle mathematically—especially if I write some little algorithms to probe the depths, which I have done over the past week—then sure, why not!

Where does Wordle's thrill come from, in your opinion?

I think the thrill comes from the fact that you get feedback, which leads you to sense that you know the answer, then validation when your intuition is correct: You get to feel that you know how words "work."

As people, we all like being understood. In fact, we are frustrated when people don't understand us. We're happy to be with people who have a "correct understanding of the probability distribution of our likely utterances," which is a fancy way of saying "people who get us." For instance, people who know you well will often respond to what you meant to say, rather than what you said, even if you misspeak!

When we intend to say something that the listener is not expecting to hear, we phrase it differently, and they know to be alert before we even complete our statement. In Wordle's case, the way I see it, we are enjoying that same sensation, but with language and spelling, rather than conversation.

The other cool thing about Wordle is its level of simplicity—just five letters. It doesn't feel so daunting. The complexity is bounded; it's a bite-sized, manageable piece of enjoyment.

Tell me a little bit more about what your research actually involves.

I study the process of communicating—either the sending of signals or the coding of signals—as a computational problem in and of itself. I look for ways that computational properties or mathematical characterizations of those problems can inform the way the process works.

When humans are communicating, for example, they tend to shorten, reduce or even eliminate words entirely when the content of what they're communicating is highly predictable from context. We constantly modulate the degree of precision that we pronounce things with based on our assessment of whether or not our audience is likely to understand us, which is interesting.

In the case of Wordle, players are clearly doing this kind of on-the-fly optimization with regard to spelling, which is fascinating to me.

How do Wordle players optimize their use of language as they play the game?

Assessing how interpretable our messages are going to be is a big part of the calculation we make when communicating. So, if I plan to say something that's new or surprising—or a total non sequitur—I'll change my tone.

That kind of "calculation of expected novelty" factors into figuring out puzzle games, too. Like Mastermind, Wordle gives you feedback after each turn that you take, with color symbols that indicate that you have a letter correct but in the wrong position, or a correct letter in the correct position.

Wordle taps into people's knowledge about the relationships between spelling and pronunciation; what linguists call "phonemes." English is a messy language, but often, consonants come at the ends of short words, and vowels come in the middle.

Five letter words are also often monosyllabic in English. So most words are likely to be constructed with consonant clusters at the ends; or just letter clusters, as in the case of "ought." We intuitively know this, and it

helps us make informed guesses.

Is there a 'best' way to make informed guesses when playing, according to linguists?

That actually would depend on how you weight the value of getting the right letters—potentially in the wrong places—versus the right letters in the right places. The utility functions for those two things would be slightly different, because some letters like "e" and "a" are very common and highly likely to be in the word, whereas "ch" is rarer but still reasonably common, and likely to appear at the beginning or end.

Another way to think about it is this: What if we were just guessing five random letters from the alphabet? That would be frustrating, and nearly impossible! So the fact that Wordle involves guessing a set of reasonably familiar English words, using our knowledge of letter frequencies and typical word structure, makes it a lot less hard.

Knowing that "z" is a rare letter barely scratches the surface though. The game tickles your lexicon bone—your dictionary. You start to notice the relationships between sequences: You might have a pair of letters around a gap in the middle and your brain tells you "I know what that letter is, because there are actually relatively few possible solutions here." That's how you hone in on the answer.

Do you have any tips or advice for people who want to get better at Wordle or other games?

I was thinking about this before the interview. I even started to write an algorithm that would optimize the playing of Wordle, but then I realized that if I completed it, Wordle wouldn't be fun anymore, because once utility is optimized and you've "solved" a game, you're just mindlessly

choosing what a computer predicts the next best move to be. You might also end up being forced to use the same starting word every time, which wouldn't be very interesting.

So too much understanding will rob you of using your own intuitive sense of how common letter and sound sequences are, which is where the joy comes from. Now, of course, there are some people who derive joy from solving complex problems optimally. And to those people, I say, go write an algorithm.

But I think for the casual Wordle player, you're going to have more fun if you think hard about sound sequences, syllables, consonants and vowels, and find the ways in which that enables you to intuitively access how you think about language, which might surprise you. You can also consider letter frequencies—"q" and "z" are rare, for example, and not good choices in starting words.

Ultimately, though, I don't want to know how the trick is done: I just want to be amazed.

What else do you think is interesting about Wordle?

I've been fascinated by Wordle spinoffs, because I think they reveal very interesting things. My students were telling me about a game called Absurdle, which employs the concept of a "diabolical adversary" as we would call it in computational linguistics.

In Absurdle, the target word changes as you play, but new information that you learn remains true and consistent. So if the word initially was "poise" and you guess "mince," Absurdle might then change the target word to "spice" without you knowing, but tell you that the "e" was in the correct place and the "i" remains in the word.

So the goalposts move according to what you already know. But they still have to obey the rules: If they tell you a letter is in the correct place, it remains true. It's fascinating, because it's a different kind of game where you have to back the computer into a tight corner of linguistic space where there are no words that it could change to that are still consistent with all the things it's said so far!

It's like linguistic whack-a-mole. Some words with many similar neighbors are difficult to solve for, like the many words ending in -ight. Others, like "hyrax," are quite unique. For me, it would be interesting to create some computational tools for thinking about that.

Provided by University of Chicago

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