The Interconnectedness of Words

The interconnectedness of words is a fascinating subject; there are countless ways of connecting words to other words, phrases to other phrases, sentences to other sentences, etc. We looked at the connections between words with regard to the classic game of Hangman. The objective in Hangman is to guess a mystery word. All that is initially known about this word is its length; one must guess the mystery word by progressively guessing the individual letters in the word in order to accomplish the task. However, every time a letter is guessed incorrectly, a stroke of a stick-figure man being hung is drawn. Once the figure is completed the player loses (hence the name “Hangman”).

The word-connectedness stems from the connections between the mystery word, letters which have and haven’t been uncovered, and entire dictionary of words. The algorithm we deduced to optimally guess the mystery word considers a number of truths about the syntax of Hangman. At every step from start to finish, we know: the length of the mystery word, which guessed letters are in the word where they are located, and which the guessed letters are not in the mystery word. We can preliminarily eliminate words which aren’t of the correct length from the dictionary of possible words. We then choose the not-yet guessed letter that occurs in the most words in the dictionary (unaffected by multiple occurrences within the same word). If there are multiple letters that have the same number of word occurrences, we choose the letter which occurs the most, including multiple appearances in the same word. If this letter is in the mystery word, we know its location by rules of Hangman and can then eliminate all words from the dictionary which do not fit the exact pattern as the mystery word. If the guessed letter does not appear in the mystery word, we can instead eliminate all words in the dictionary which do contain the guessed letter. We can repeat this process until either the mystery word is

successfully guessed or until we run out of guesses. While this process for playing a single game is significantly longer than guessing letters blindly or randomly (due to the extensive cataloging of letters' occurrences in the dictionary), it is definitely significantly safer, which is arguably more important.

One problem that we couldn't account for is taking risks. At times, choosing the letter that has the highest probability to yield a word is not the best solution. Since we are trying to guess a mysterious word, within a certain number of lives, it is not necessarily always the case that the most frequently occurring letter is the most useful letter to distinguish between the remaining available words. This concept of not using the highest probable letter but to think ahead is advanced level thinking that many humans cannot do easily. Although it does seem opportune to avoid losing a life whenever possible, will it ever be the case that optimal strategy permits us to sacrifice a life for a better opportunity to win?