You had me at hello: How phrasing affects memorability

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Understanding influence

- How can you be influential if I can’t remember what you say?
- marketing, politics, entertainment, social media, etc.
Hello. My name is Inigo Montoya

Motivation/Related work

- Understanding influence
  - How can you be influential if I can’t remember what you say?
  - marketing, politics, entertainment, social media, etc.

- Challenge: devising an evaluation setting that separates the phrasing of a message from its context
Hello. My name is Inigo Montoya

Motivation/Related work

- You can put lipstick on a pig, but it’s still a pig - Barack Obama
Hello. My name is Inigo Montoya

Motivation/Related work

You can put lipstick on a pig, but it’s still a pig - Barack Obama
Hello. My name is Inigo Montoya

Motivation/Related work

- You can put lipstick on a pig, but it’s still a pig - Barack Obama

- Actually a reference to a quote by Sarah Palin
- Did the wording "lipstick on a pig" not actually have any effects?
Hello. My name is Inigo Montoya

Motivation/Related work

- Does **phrasing** affect memorability?
  - the choice of words
  - the way it is phrased
Hello. My name is Inigo Montoya

Motivation/Related work

- Does **phrasing** affect memorability?
  - the choice of words
  - the way it is phrased

- Does the form of the language add an effect *beyond* or *independent* of context?
Related studies characterize memorable quotes by...
  - recognition
  - production
Hello. My name is Inigo Montoya

Motivation/Related work

- Related studies characterize memorable quotes by...
  - recognition
  - production

- Focus in domain in which...
  - rich use of language
  - already exist a large number of external human judgements
  - we can control for setting in which text was used
Hello. My name is Inigo Montoya

Motivation/Related work

- Related studies characterize memorable quotes by...
  - recognition
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- Focus in domain in which...
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 ⇒ Movies!
I’m ready for my close-up

Data

- How do we select the right data so that we can show effects based in the **language** of the quotes themselves?
  - ⇒ We need some kind of control for the speaker and context!
  - ⇒ Movies!
I’m ready for my close-up

Data

- From Star Wars 4...
  
  Obi-Wan: You don’t need to see his identification
  Stormtrooper: [ditto]
  Obi-Wan: These aren’t the droids you’re looking for
  Stormtrooper: [ditto]
  Obi-Wan: He can go about his business
  Stormtrooper: [ditto]
  Obi-Wan: Move along
  Stormtrooper: [ditto]
I’m ready for my close-up

Data

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- Only the bold-faced line went viral
  ⇒ Apart other external factors including context, speaker, etc., what **linguistic** trait makes this phrase more memorable than others?
I’m ready for my close-up

Data

From \( \sim 1000 \) movie scripts,
Pair IMDB “memorable” quotes with ”non-memorable” quote such that it differs only in choice of words

i) same-scene (\( \Leftrightarrow \sim \text{adjacent} \))

ii) same-speaker

iii) same-length

\( \Rightarrow \) 2200 such (Mem, Non-mem) pairs
I’m Ready for my close-up
Pilot Study: Let’s try!

- Survey: 11 or 12 of these (Mem, Non-mem) pairs from the movies a participant has never watched.
- Asked to predict which quote sounds more memorable out of two, so it was comparative.
- 14,000 people responded to http://memo.clr3.com/
I’m Ready for my close-up
Pilot Study: Range of possible result

50%
There exists no language signal

100%
Language is all that matters
I’m Ready for my close-up
Pilot Study: Turns out to be

50% There exists no language signal
72~78% What makes this tasks interesting
100% Language is all that matters
I’m Ready for my close-up

Pilot Study: This task is not trivial for sure
Subjects of pilot study suggested two basic forms textual signals could take

- memorable quotes often involve a distinctive turn of phrase
- memorable quotes invoke general themes that aren’t tied to context
I’m Ready for my close-up
Incorporating search engine counts

- Various problems to consider
- Found most effective to use search engine counts as additional filter rather than a free-standing numerical value
- +Google dataset
  - for each memorable non-memorable quote pair \((M,N)\), only keep pairs for which \(M\)...
    - produced more than five results
    - produced at least twice as many results as \(N\)
Never send a human to do a machine’s job.

Distinctiveness: How to measure distinctiveness

- Using a model of “common language” from Brown corpus, evaluate how much of lexical and syntactic distinctiveness these quotes have
- 1-,2-,3-gram word Language Model (lexical)
- 1-,2-,3-gram part-of-speech Language Model (syntactic)
Never send a human to do a machine’s job

Distinctiveness: Result

- Lexically more distinctive
  - Obi-Wan: These aren’t the droids you’re looking for
    ⇒ Unusual word choice is more likely to stick in head

- Syntactically less distinctive
  - “You’re gonna need a bigger boat” vs “You’re gonna need a boat that is bigger”
    ⇒ Rather than complicatedly structured sentence like relative clause, simpler adjective is easier to memorize

⇒ Memorable quotes consist of unusual word sequences built on common syntactic scaffolding.
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Distinctiveness: Result

| “common language” model | IMDb-only | +Google |
|-------------------------|-----------|---------|
| lexical                 |           |         |
| 1-gram                  | 61.13%*** | 59.21%*** |
| 2-gram                  | 59.22%*** | 57.03%*** |
| 3-gram                  | 59.81%*** | 58.32%*** |
| syntactic               |           |         |
| 1-gram                  | 43.60%*** | 44.77%*** |
| 2-gram                  | 48.31%    | 47.84%  |
| 3-gram                  | 50.91%    | 50.92%  |

Table 3: Distinctiveness: percentage of quote pairs in which the the memorable quote is more distinctive than the non-memorable one according to the respective “common language” model. Significance according to a two-tailed sign test is indicated using *-notation (***=“p<.001”).
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Generality

- Distinctive phrases stick better but simultaneously **generality** plays its role in memorability as well
- The more general quote is, the easier it gets for people to use the quote in their lives, outside of the specific context
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Generality: How to measure generality

- Personal Pronouns
  “he, they” vs “you, we”
- Indefinite articles
  “a, an” vs “the”
- Past tense
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Generality: Result

| Generality metric       | IMDb-only       | +Google        |
|-------------------------|-----------------|----------------|
| fewer pers. pronoun     | 60.52%***       | 60.14%***      |
| more indef. article     | 57.21%***       | 58.23%***      |
| less past tense         | 57.91%***       | 59.74%***      |
| more present tense      | 54.60%***       | 55.86%***      |

Table 4: Generality: percentage of quote pairs in which the memorable quote is more general than the non-memorable ones according to the respective metric. Pairs where the metric does not distinguish between the quotes are not considered.

- “You need a bigger boat” vs “He needs the bigger boat”
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Generality: Result

| Generality metric                      | IMDb-only | +Google |
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### (Non)memorable language models

|               | Slogans   | Newswire  |
|---------------|-----------|-----------|
| **lexical**   |           |           |
| 1-gram        | 56.15%**  | 33.77%*** |
| 2-gram        | 51.51%    | 25.15%*** |
| 3-gram        | 52.44%    | 28.89%*** |
| **syntactic** |           |           |
| 1-gram        | 73.09%*** | 68.27%*** |
| 2-gram        | 64.04%*** | 50.21%    |
| 3-gram        | 62.88%*** | 55.09%*** |

Table 5: Cross-domain concept of “memorable” language: percentage of slogans that have higher likelihood under the memorable language model than under the non-memorable one (for each of the six language models considered). Rightmost column: for reference, the percentage of newswire sentences that have higher likelihood under the memorable language model than under the non-memorable one.
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Prediction Task

SVM 10-fold Cross Validation Results

Human Average Performance (Bottom of range)

Accuracy (%)

Random Choice

Bag of Words (962 fts)
Distinctiveness (24 fts)
Generality (2 fts)
Slogan Sim. (24 fts)
All three together (52 fts)

Feature Set (# of fts)