You had me at hello: How phrasing affects memorability

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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.
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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
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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?
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Motivation/Related work

- Does **phrasing** affect memorability?
  - the choice of words
  - the way it is phrased
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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?
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Motivation/Related work

- Related studies characterize memorable quotes by...
  - recognition
  - production
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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
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Motivation/Related work

- Related studies characterize memorable quotes by...
  - recognition
  - production
- Focus in domain in which...
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  - we can control for setting in which text was used

⇒ 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

- 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]
- 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?
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 ($\leftrightarrow \sim$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 phase
- memorable quotes invoke general themes that aren’t tied to context
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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)
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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

<table>
<thead>
<tr>
<th>“common language” model</th>
<th>IMDb-only</th>
<th>+Google</th>
</tr>
</thead>
<tbody>
<tr>
<td>lexical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-gram</td>
<td>61.13%***</td>
<td>59.21%***</td>
</tr>
<tr>
<td>2-gram</td>
<td>59.22%***</td>
<td>57.03%***</td>
</tr>
<tr>
<td>3-gram</td>
<td>59.81%***</td>
<td>58.32%***</td>
</tr>
<tr>
<td>syntactic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-gram</td>
<td>43.60%***</td>
<td>44.77%***</td>
</tr>
<tr>
<td>2-gram</td>
<td>48.31%</td>
<td>47.84%</td>
</tr>
<tr>
<td>3-gram</td>
<td>50.91%</td>
<td>50.92%</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Generality metric</th>
<th>IMDb-only</th>
<th>+Google</th>
</tr>
</thead>
<tbody>
<tr>
<td>fewer pers. pronoun</td>
<td>60.52%***</td>
<td>60.14%***</td>
</tr>
<tr>
<td>more indef. article</td>
<td>57.21%***</td>
<td>58.23%***</td>
</tr>
<tr>
<td>less past tense</td>
<td>57.91%***</td>
<td>59.74%***</td>
</tr>
<tr>
<td>more present tense</td>
<td>54.60%***</td>
<td>55.86%***</td>
</tr>
</tbody>
</table>

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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Cross-Domain Application

<table>
<thead>
<tr>
<th>(Non)memorable language models</th>
<th>Slogans</th>
<th>Newswire</th>
</tr>
</thead>
<tbody>
<tr>
<td>lexical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-gram</td>
<td>56.15%**</td>
<td>33.77%***</td>
</tr>
<tr>
<td>2-gram</td>
<td>51.51%</td>
<td>25.15%***</td>
</tr>
<tr>
<td>3-gram</td>
<td>52.44%</td>
<td>28.89%***</td>
</tr>
<tr>
<td>syntactic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-gram</td>
<td>73.09%***</td>
<td>68.27%***</td>
</tr>
<tr>
<td>2-gram</td>
<td>64.04%***</td>
<td>50.21%</td>
</tr>
<tr>
<td>3-gram</td>
<td>62.88%***</td>
<td>55.09%***</td>
</tr>
</tbody>
</table>

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