Human-Model Divergence in the Handling of Vagueness

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Vagueness and Supervised Learning

- Supervised learning

"Is *x* a dog?" → $x \in [\![\text{dog}]\!]$

$\in [\![\text{dog}]\!] \rightarrow \text{True}$

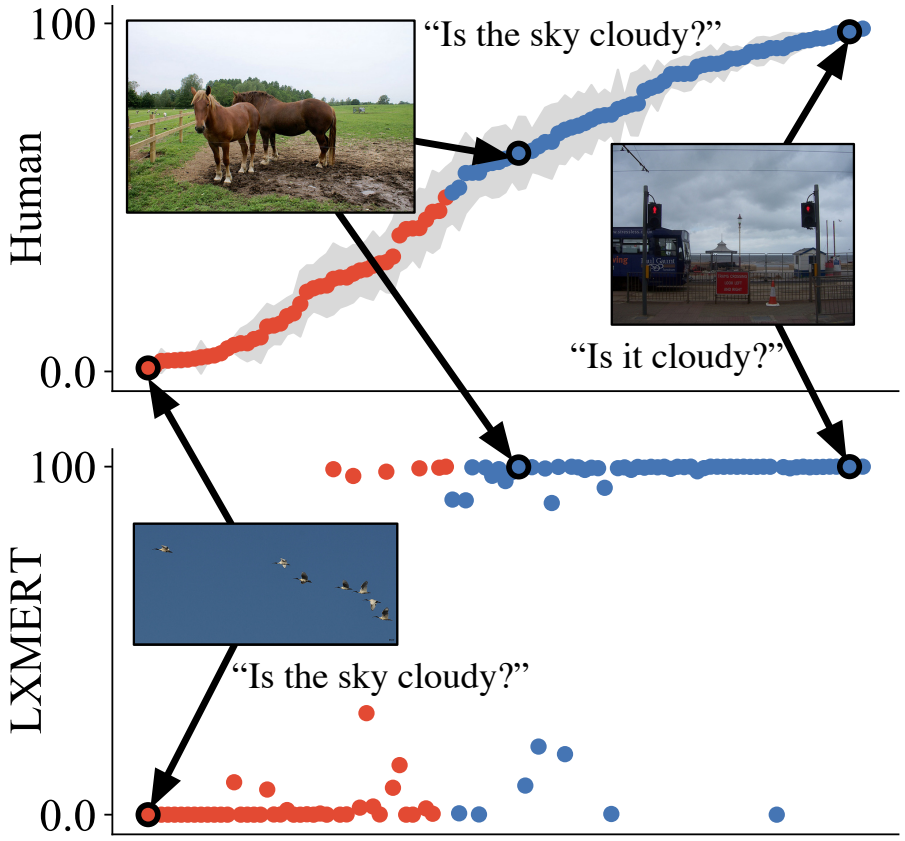
$\in [\![\text{dog}]\!] \rightarrow \text{False}$

- Real Life

Vague predicates have borderline cases

$\in [\![\text{dog}]\!] \rightarrow ???$

Question: Do models learn to model vague terms implicitly?



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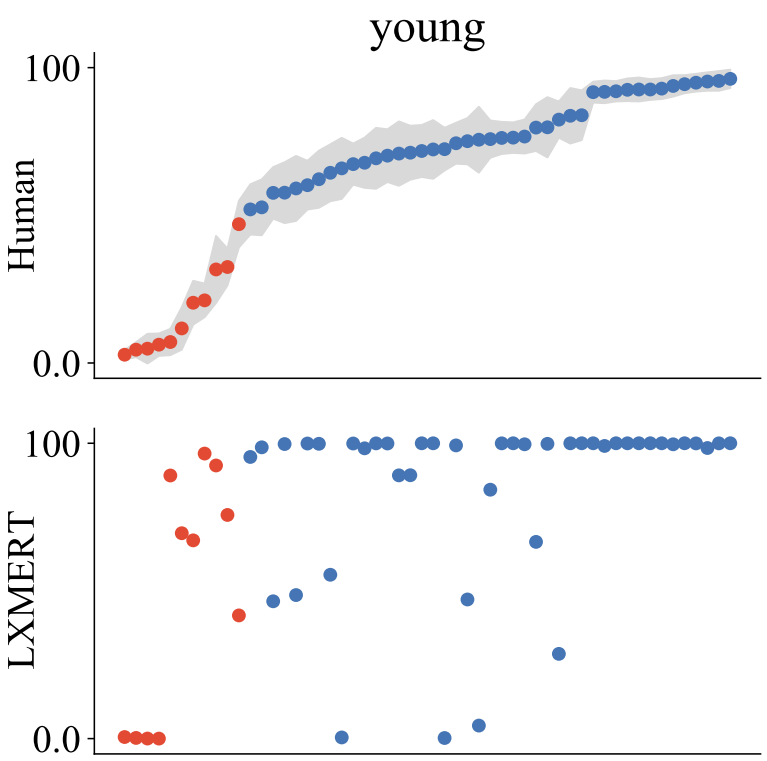
Data collection

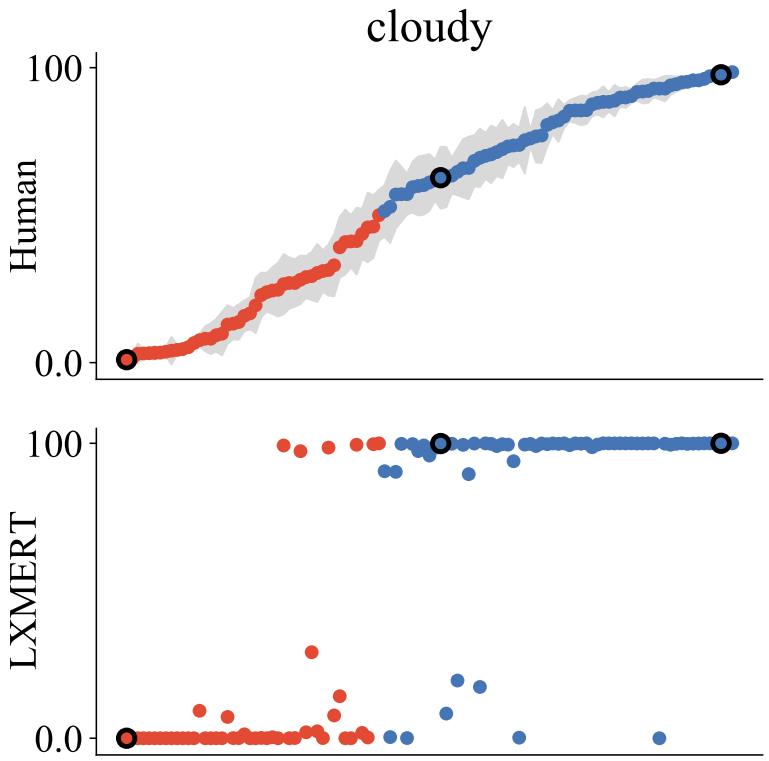
- 2 datasets
  - VQA
  - GQA
- 6 predicates
  - Sunny, cloudy, adult, young, new, old
- Regex against captions
- Manual checking
- MTurk annotation

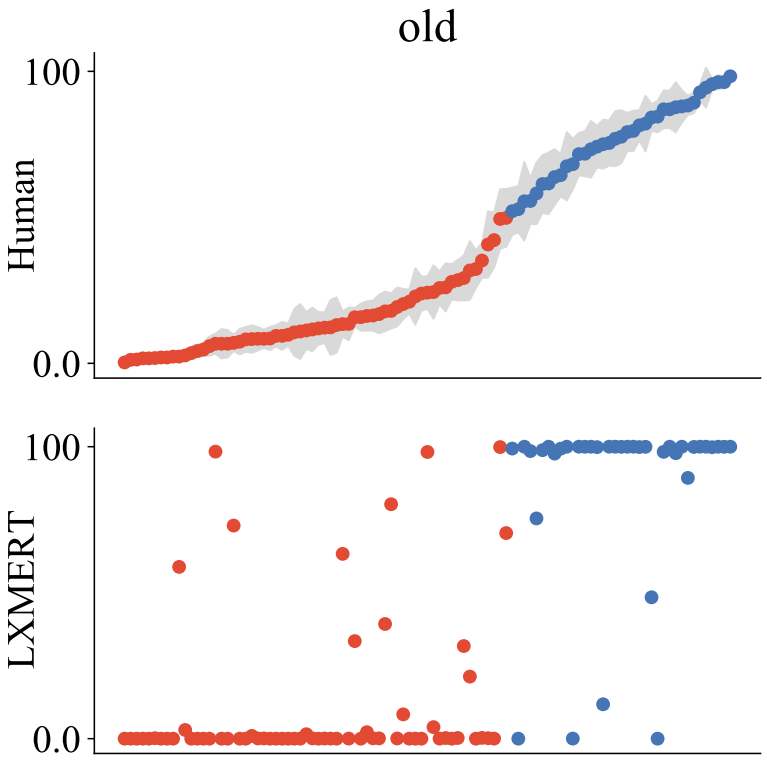
```
([iI]s|[aA]n|[aA])?(([^\\w])+ ([oO]ld) ?
```

Is the dog old? ✅
Is there some gold? ❌
Is the man old? ✅
Is the old man walking? ❌

Examples







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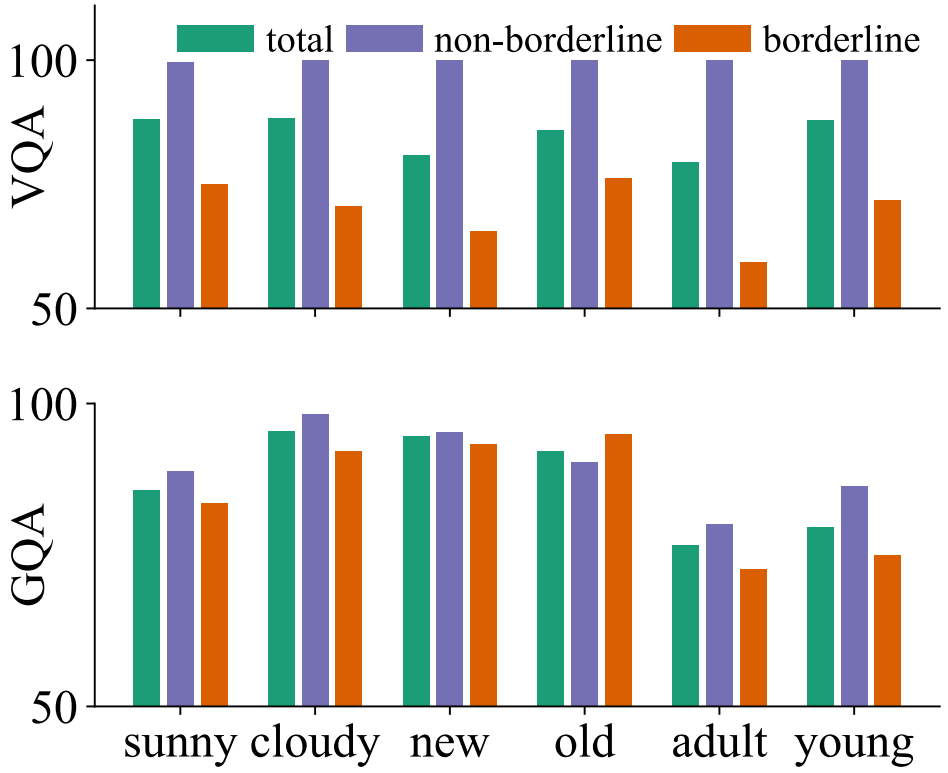
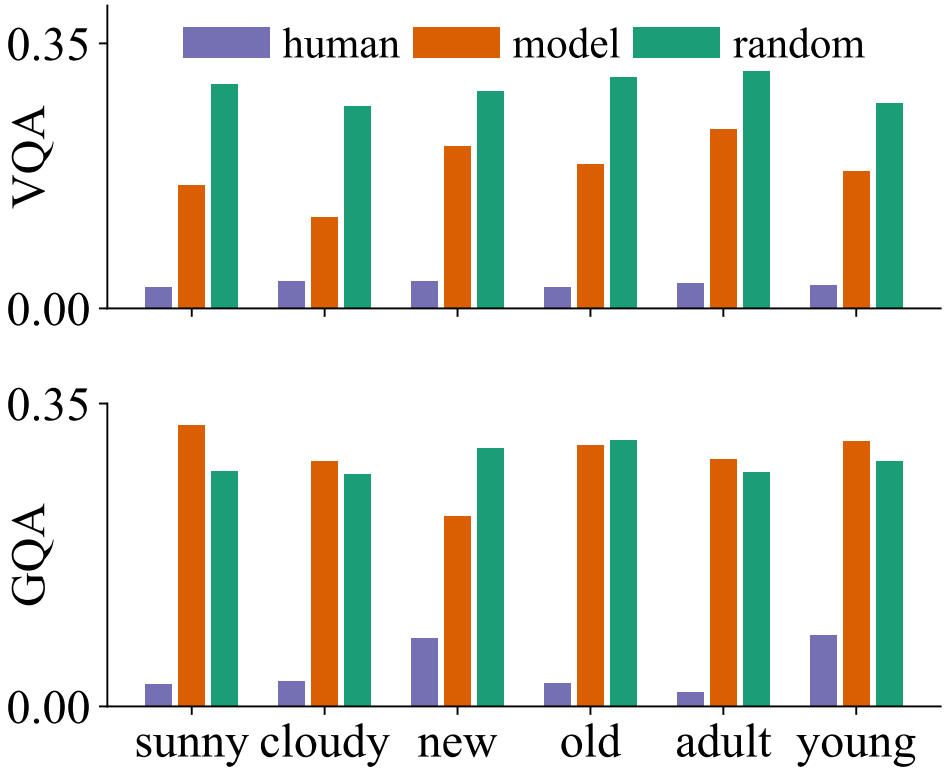
LXMERT performance





Text-only setting

- Analytic truth

  "A bachelor is an unmarried man." ✅

  "A bachelor is a type of flower." ❌

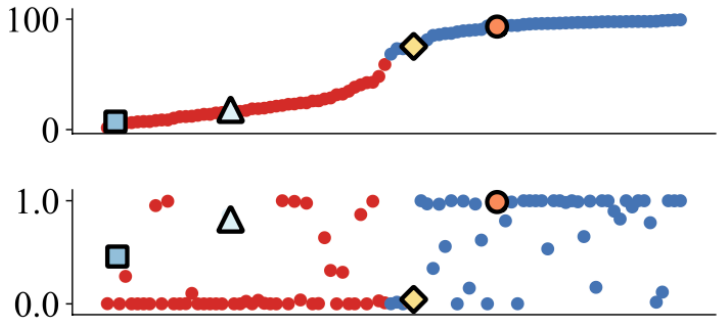
- Synthetic truth

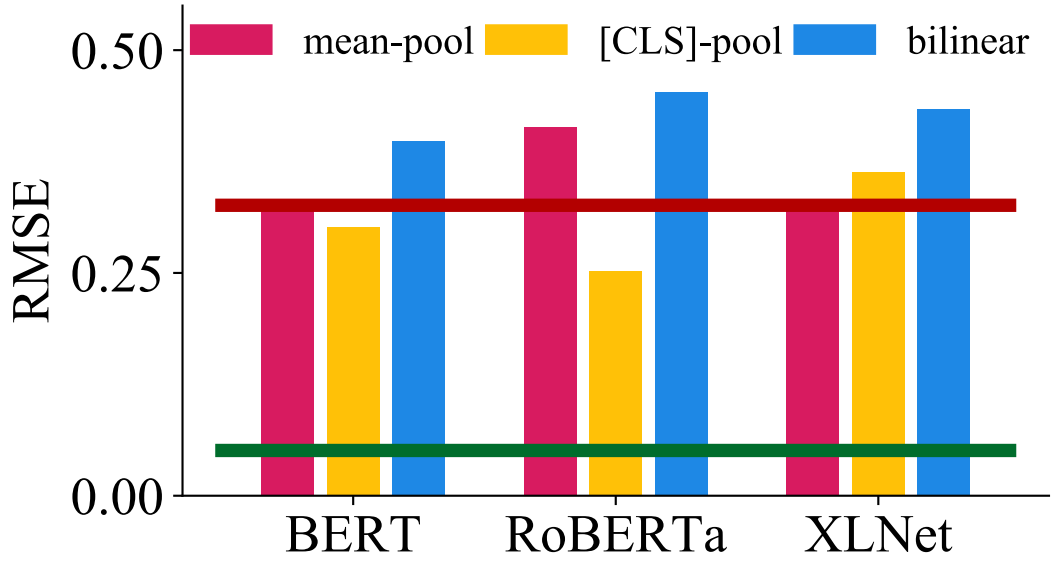
  "Garfield is a bachelor."

Text-only results

Sentence	T/F	Mark
journalism is newspapers and magazines collectively	T	◇
T-shirt is an archaic term for clothing	F	△
T-shirt is a close-fitting pullover shirt	T	○
a teammate is someone who is under suspicion	F	□

Table 1: Example sentences, with their label in the created dataset and corresponding color in Fig. 4.





Credits

- https://www.jamiesale-cartoonist.com/free-cartoon-dog-vector-clip-art/
- https://www.jamiesale-cartoonist.com/free-cartoon-cat-vector-clip-art/
- https://www.freepik.com/premium-vector/grey-wolf_5803444.htm#page=1&query=wolf%20cartoon&position=19
- https://en.wikipedia.org/wiki/Garfield_(character)