Relevant Ambiguity vs Irrelevant Ambiguity

February 21, 2018

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They're trying to work backwards, and map from the sentences to the grammar.

$$\{S_1 S_2 S_3 \ldots\} \rightarrow G$$

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- a vector of per-parameter confidence levels, as in Katherine's learner:

$$\begin{bmatrix} 0.05 & 0.6 & 0.98 \end{bmatrix}$$

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- If we characterize the learner as forming a hypothesis for each parameter value separately, we can classify a sentence s as evidence for the setting of parameter P_i in the following three ways.

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- The only grammars in the domain that ever license sentence s are those that have have $P_5 = 1$, for example.
- Observing s in the input data is a globally valid trigger for $P_5 = 1$. We would never observe s in a language with $P_5 = 0$.

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- s exists in languages where $P_5 = 0$ and in languages where $P_5 = 1$.
- The fact that we've observed s is not useful information on its own, it's not a global trigger.
- But maybe we can still learn something relevant to the setting of P_5 by inspecting the contents of s.

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- G and G' are minimal pairs on P_5.
- Like the ambiguous case, the fact that we've observed s is not useful information on its own,
- But we can also conclude that because *it never matters* what P_5 is set to, we should not try to learn about P_5 from s.

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- Whatever syntactic phenomena P_5 describes is simply not expressed at all in s (can we actually draw this strong conclusion from the domain-level data?).

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[2] another grammar in G^s that's exactly the same as g except for P_3.

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   - else if it doesn't exist, we've found an example where P_3 actually has some effect on the appearance of s in a language. It's not irrelevant, just ambiguous. Emit a *.

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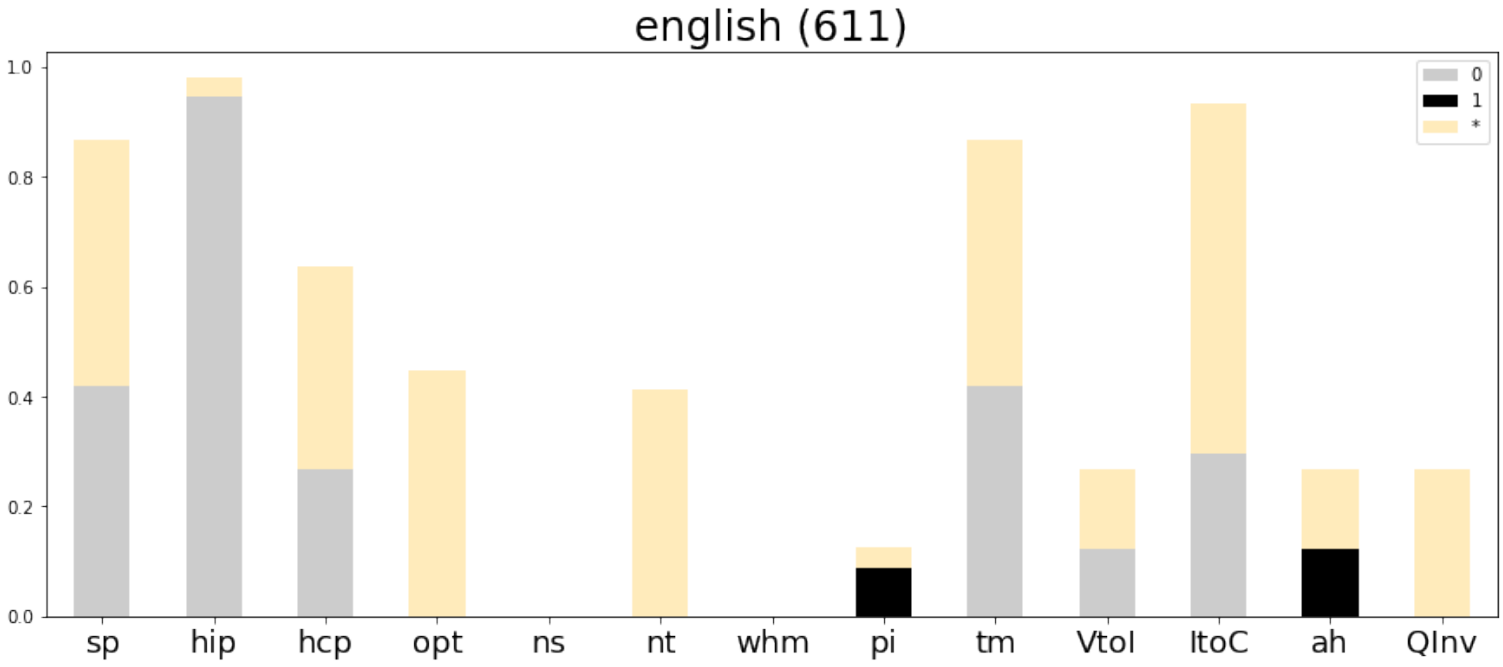
Question

```
if (minimal_pair not in generators and
    minimal_pair not in disallowed):
    relstr[param] = '*'
    break
```

Some languages



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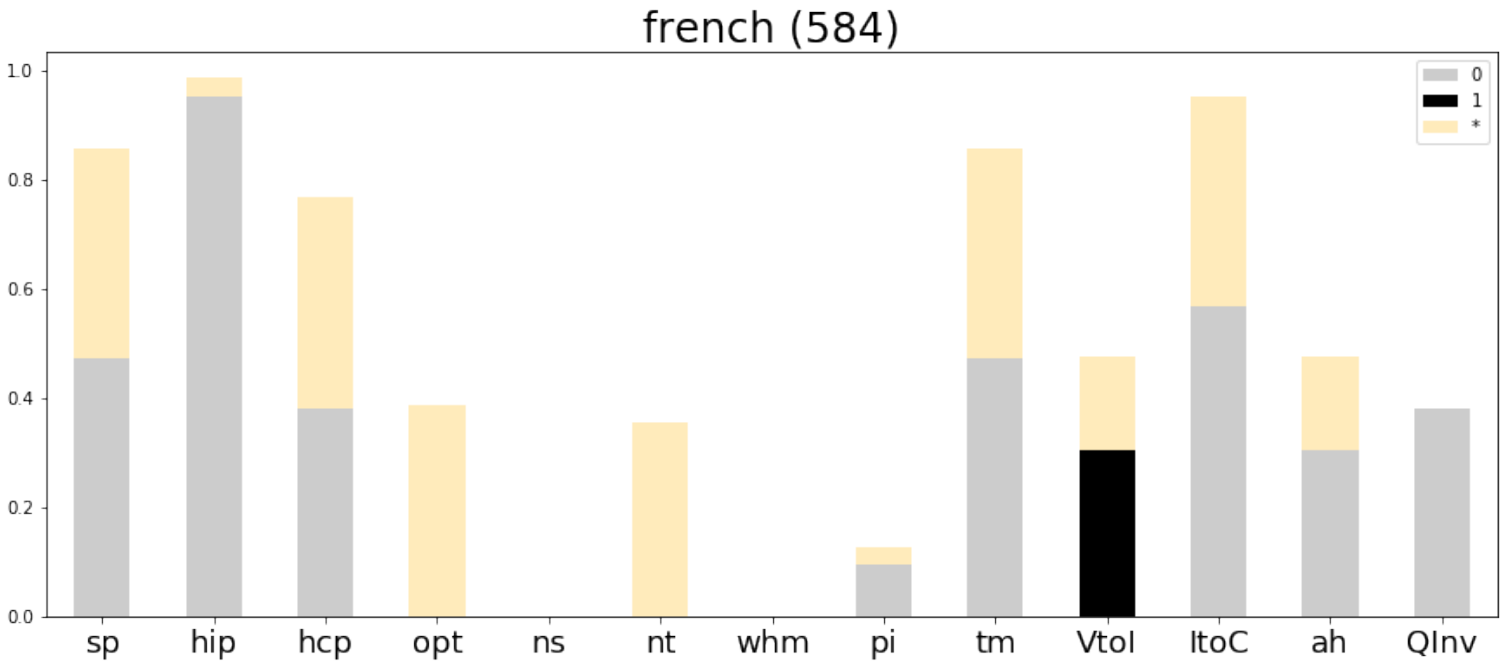

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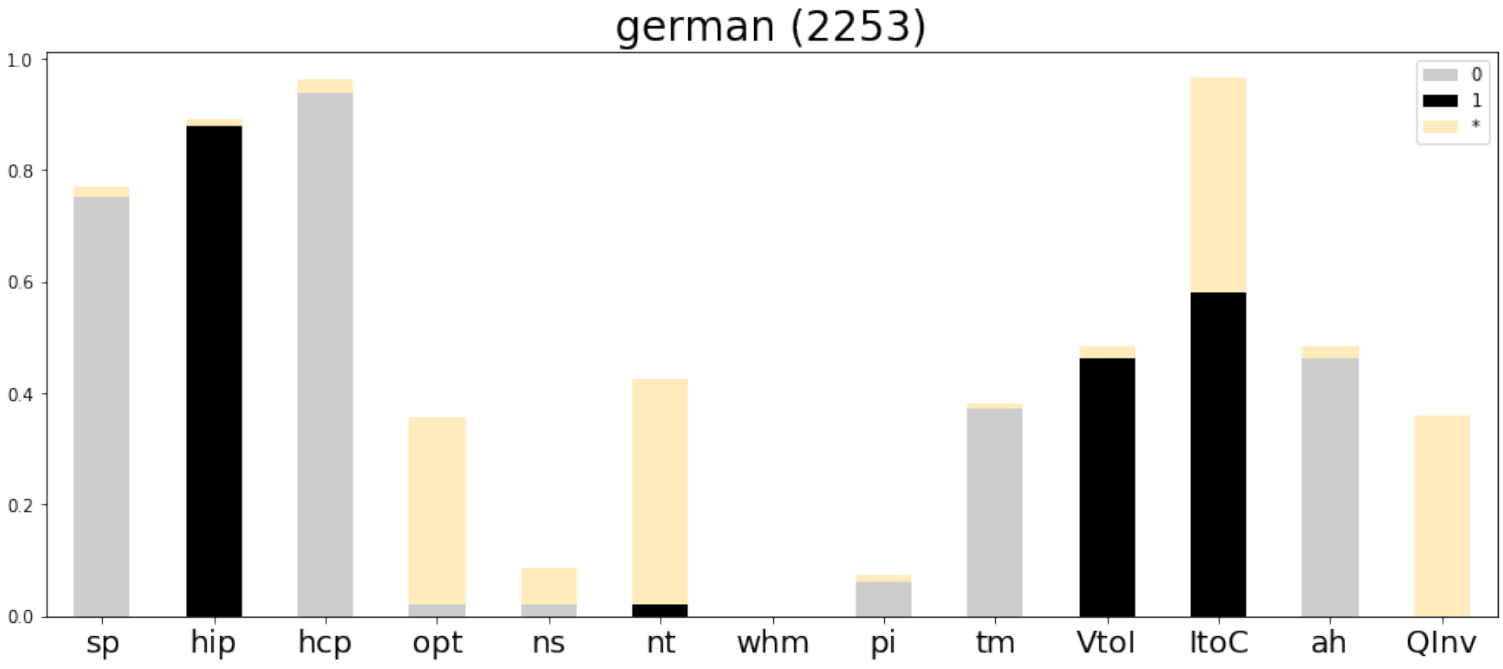

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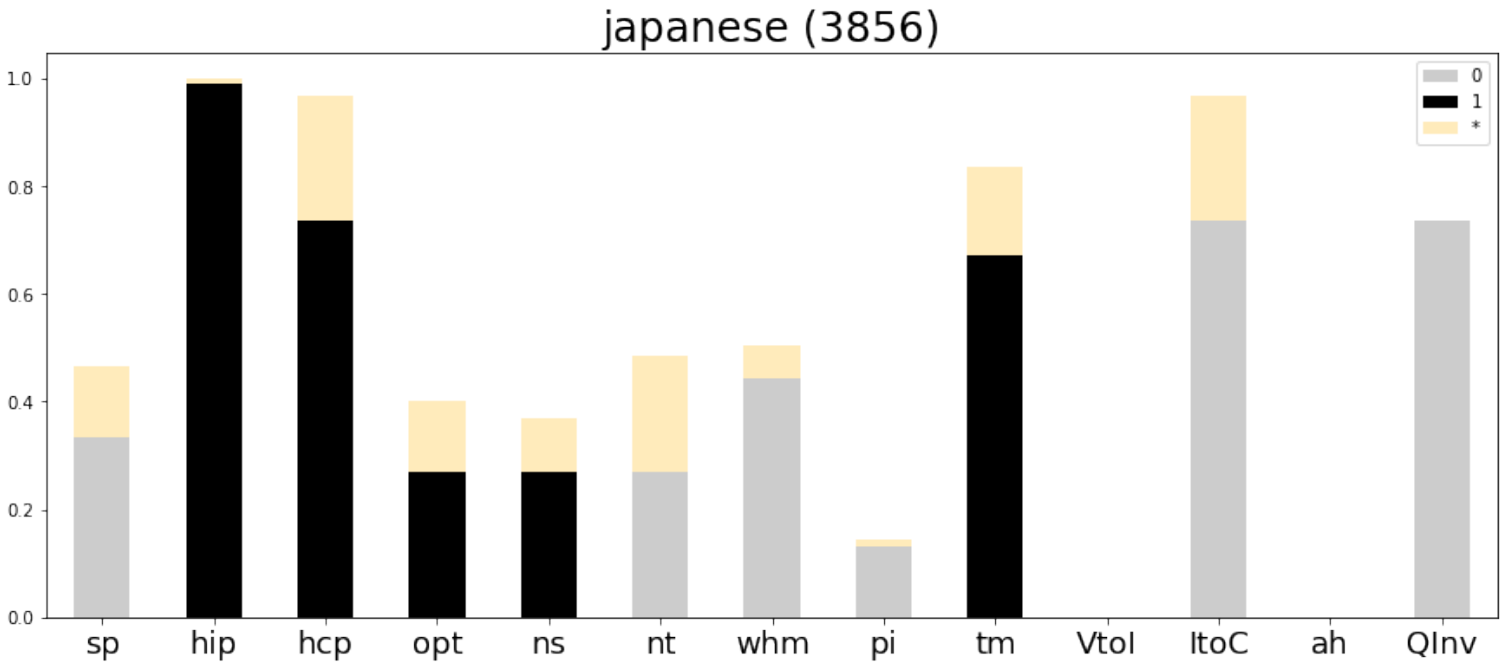
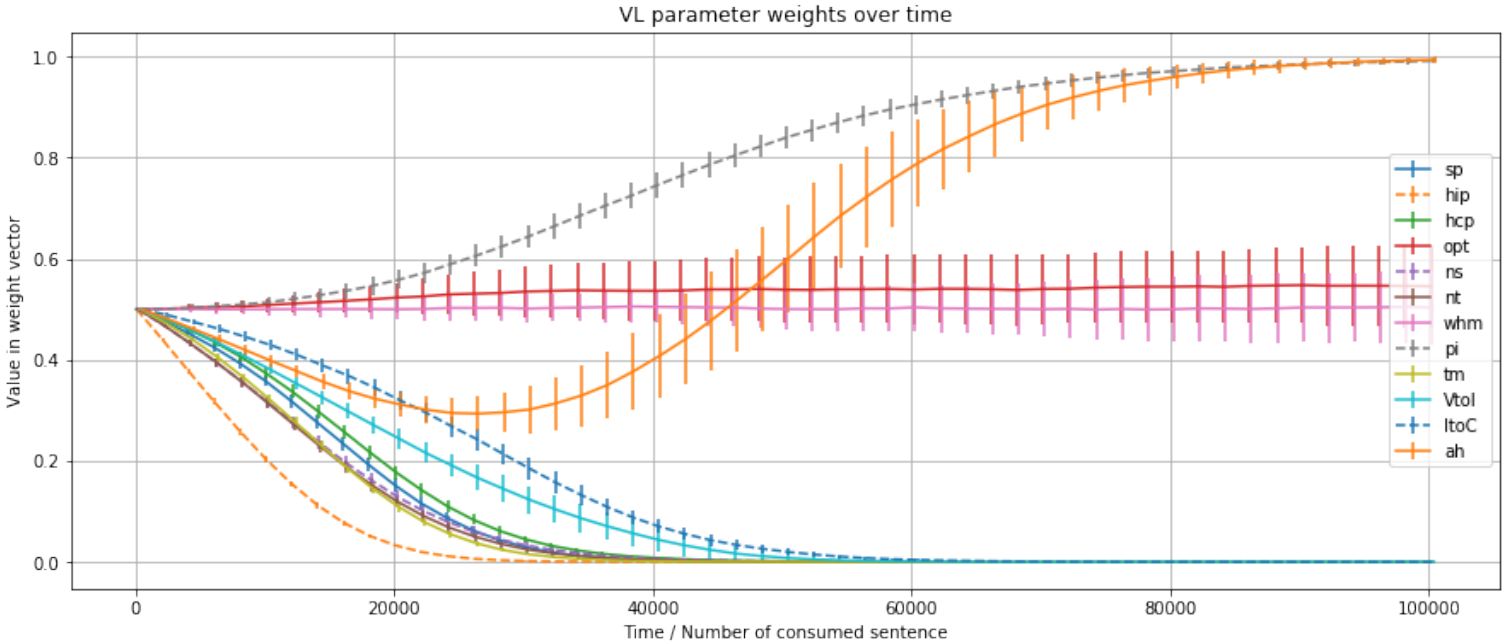
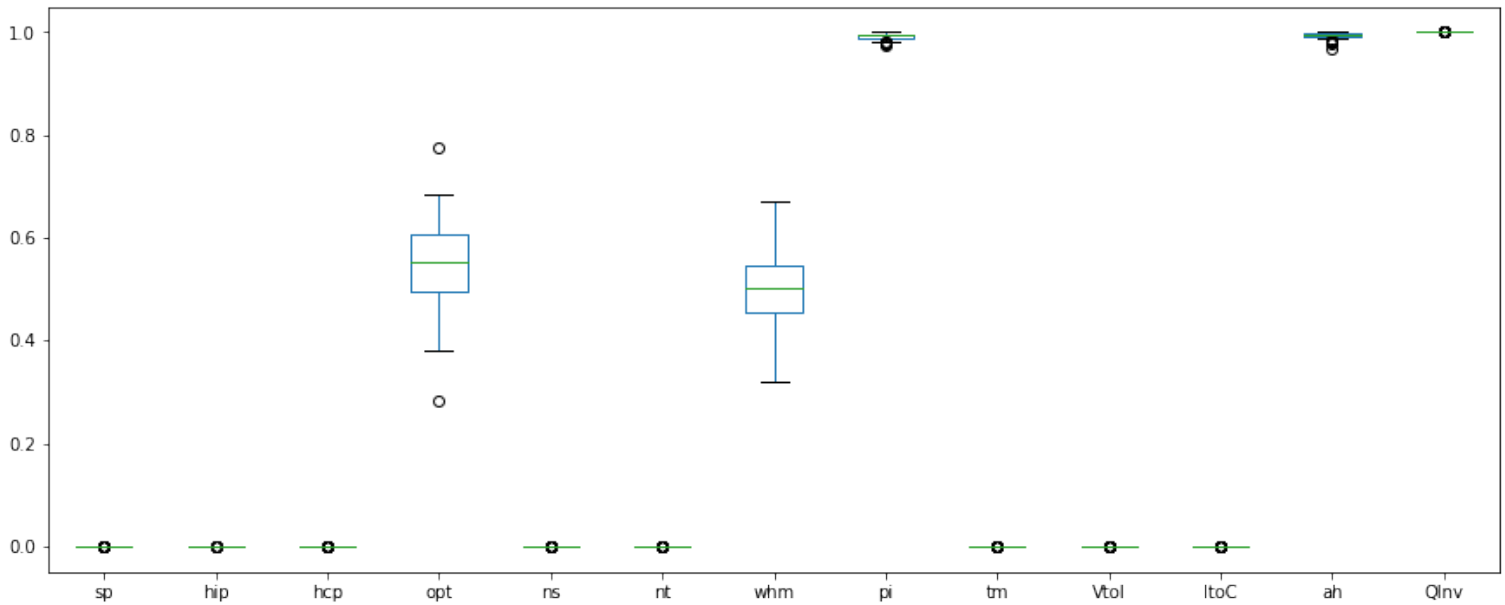


Discarding useless data

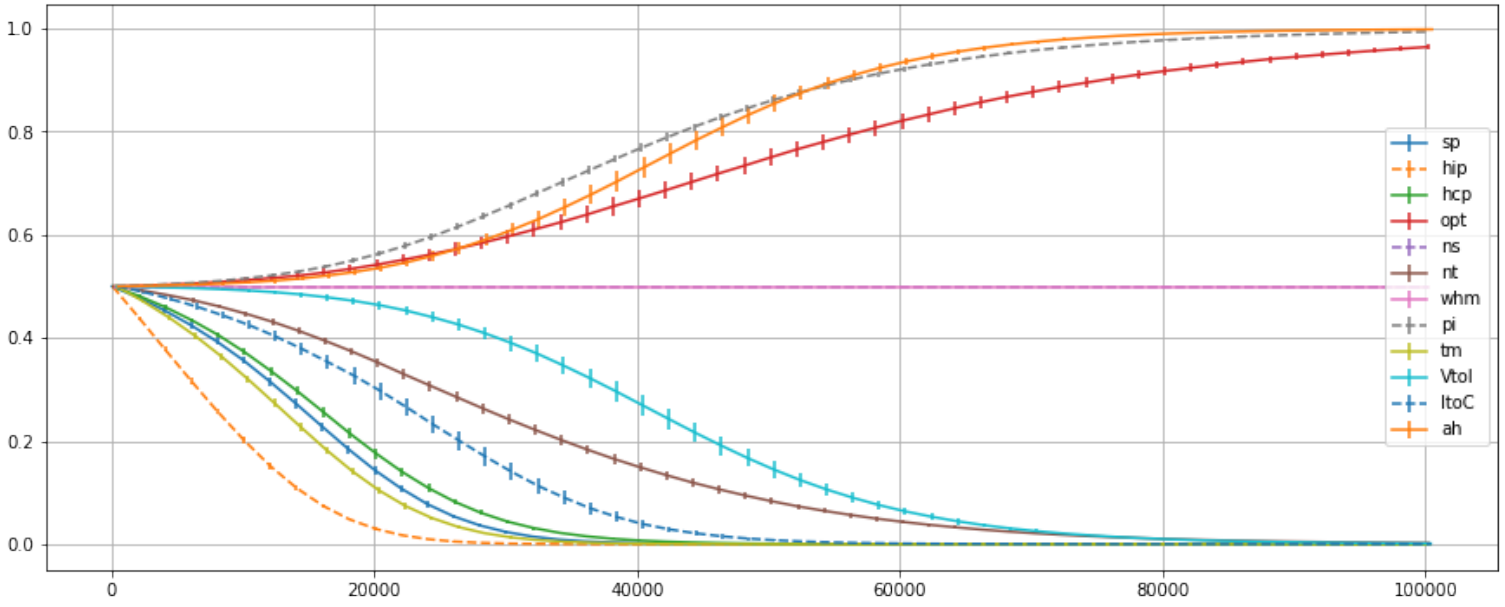
- What happens if a learner uses information about irrelevance to discard sentences?

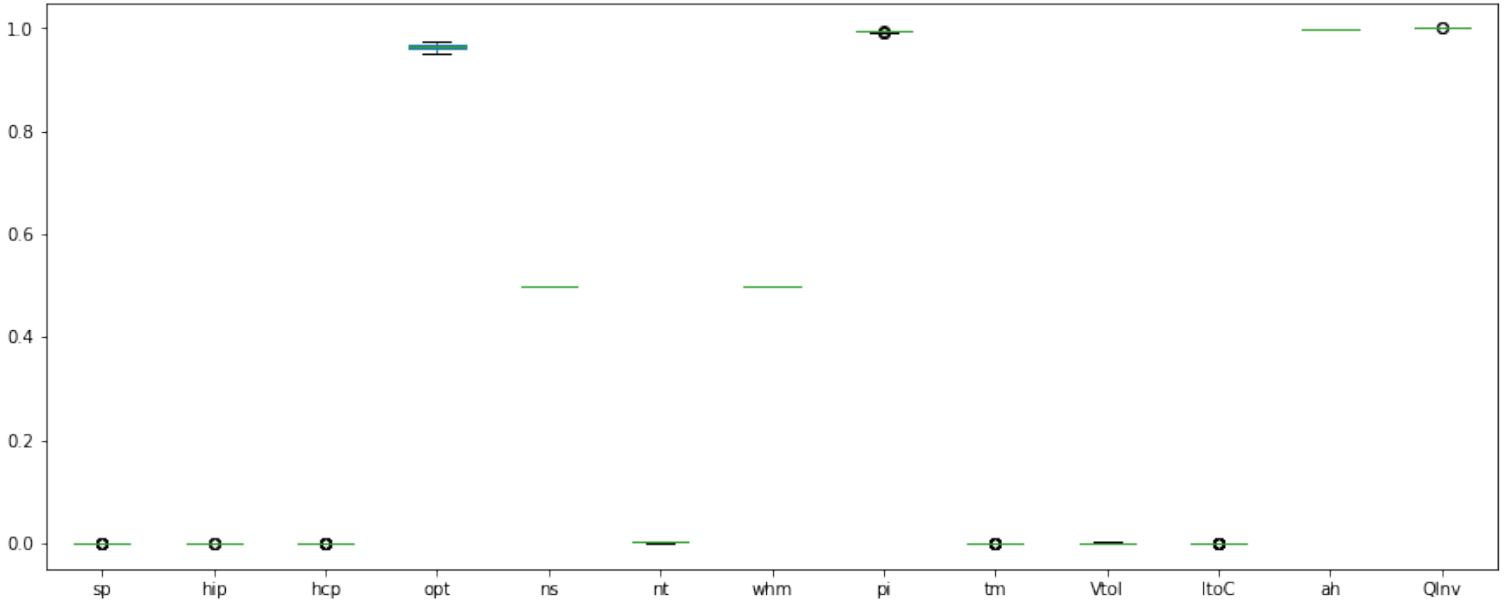
Yang's Reward-only VL Learning English (611)





Reward-relevant-only VL Learning English (611)

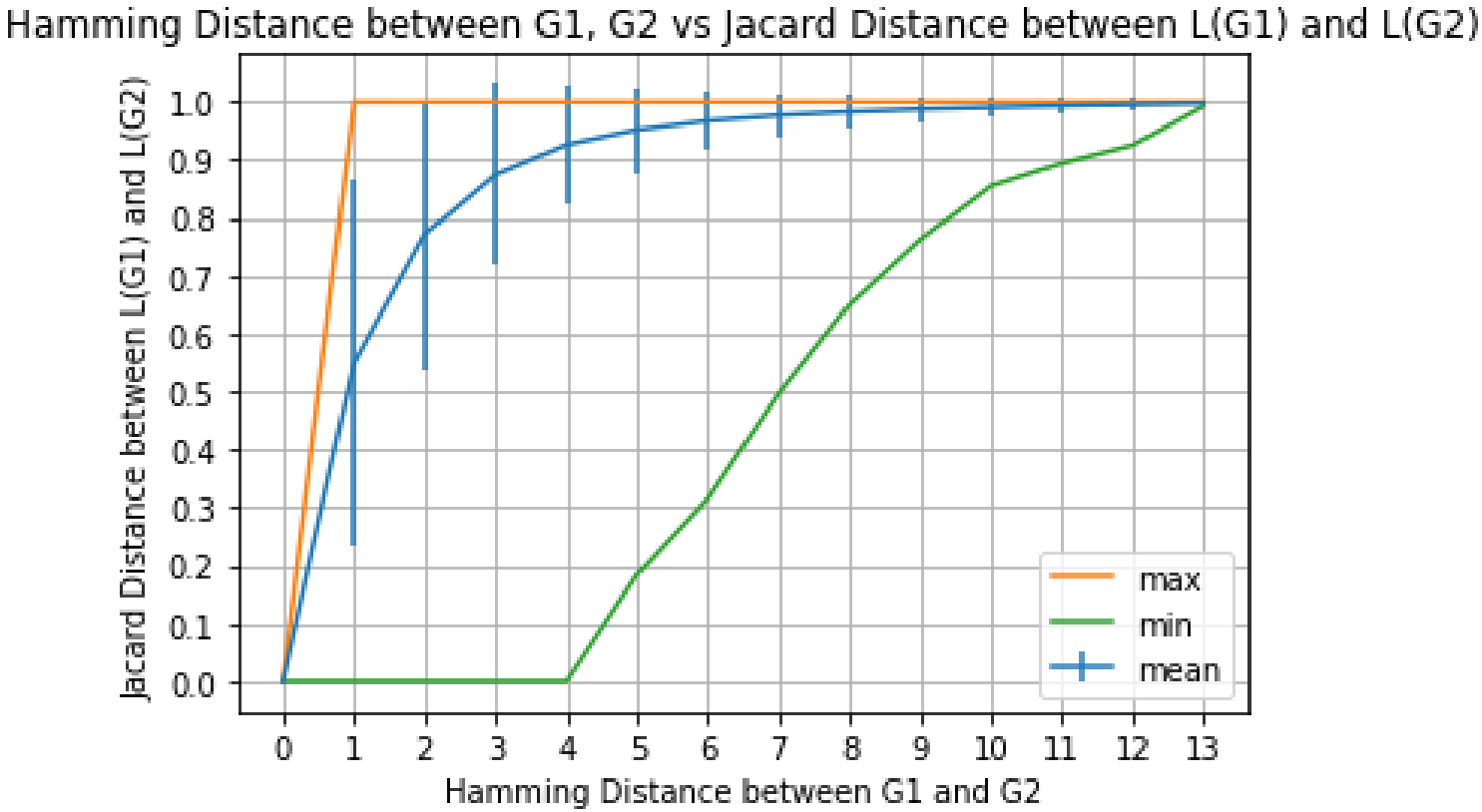




Reward-relevant-only VL Learning English (611)

- Optional Topic converges
- Null Subject fails to converge
- Affix-hopping moves in a single direction
- VtoI, ItoC and Null Topic take longer to learn

Smoothness: Parameters vs Sentences



- hamming distance – number of bits that differ between two bit-strings

$$jacard(L(G1), L(G2)) = \frac{L(G1) \cap L(G2)}{L(G1) \cup L(G2)} = \frac{\#\text{ sentences in common}}{\#\text{ sentences in total}}$$

Smoothness: Parameters vs Trigger-types