Confidence and Accuracy in Sarah Nexus
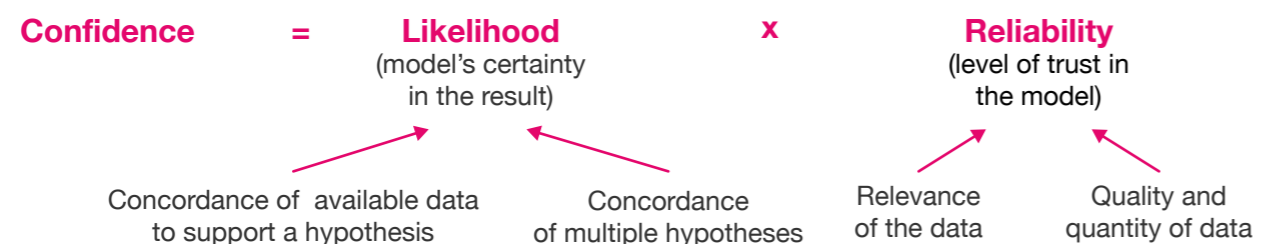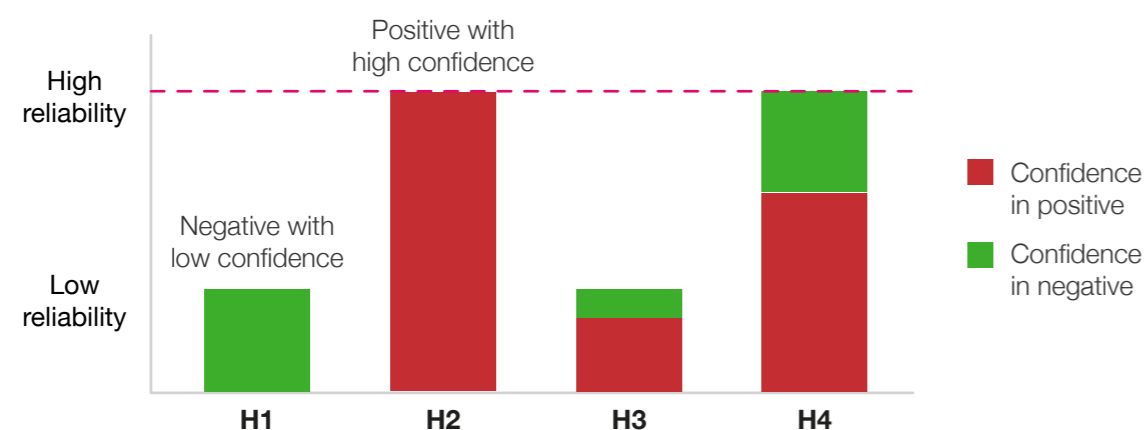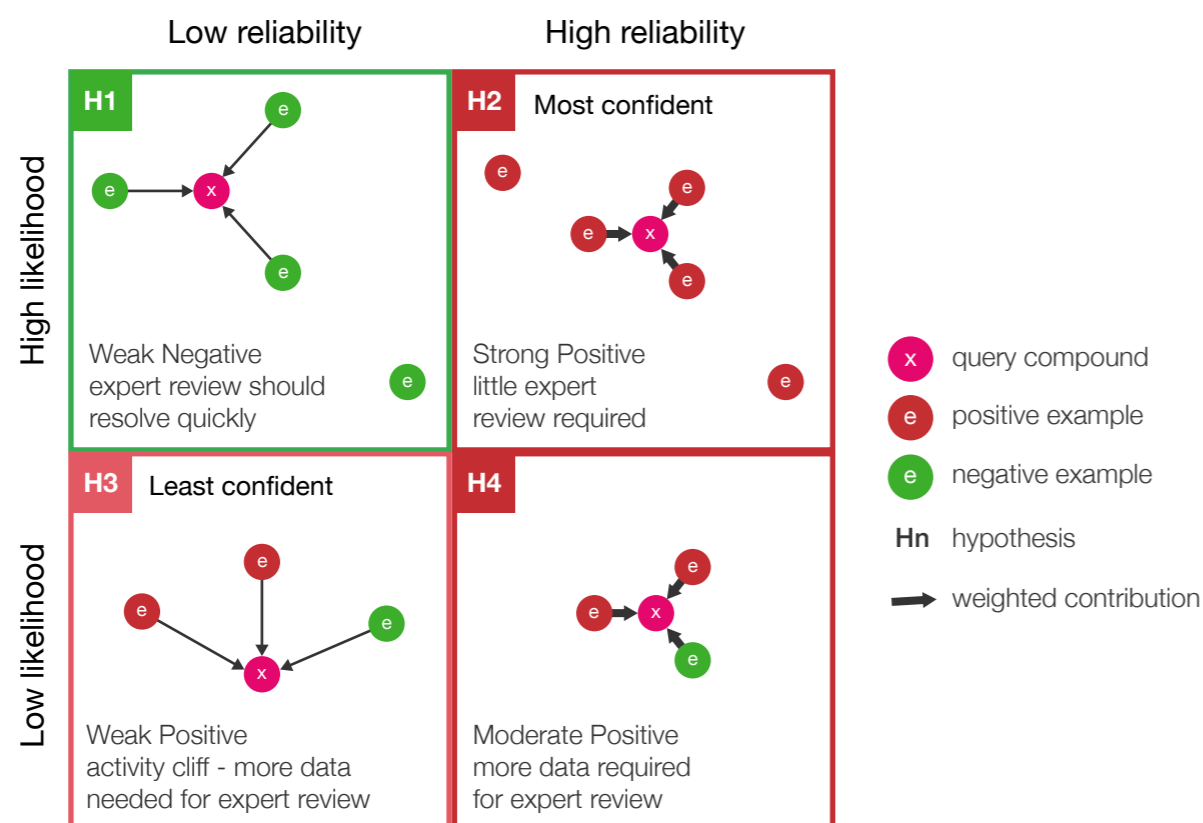
Sarah
nexus

1 Unlike other systems, **Sarah confidence is not a measure of probability**, it is a confidence in the accuracy of a prediction. This method considers the data used to make the prediction and not just the prediction itself.

As such, a high confidence is correlated to a high accuracy.

Confidence = **Likelihood** x **Reliability**
(model's certainty in the result) (level of trust in the model)

Concordance of available data to support a hypothesis — Concordance of multiple hypotheses — Relevance of the data — Quality and quantity of data

2 Confidence of a hypothesis for a given query compound is derived from the similarity and activity of training set examples.

Low reliability | High reliability

H1 (High likelihood)
Weak Negative
expert review should resolve quickly

H2 Most confident
Strong Positive
little expert review required

H3 Least confident (Low likelihood)
Weak Positive
activity cliff - more data needed for expert review

H4
Moderate Positive
more data required for expert review

x — query compound
e — positive example
e — negative example
Hn — hypothesis
→ — weighted contribution

High reliability / Low reliability

Positive with high confidence
Negative with low confidence

H1 | H2 | H3 | H4

Confidence in positive
Confidence in negative

3 Overall confidence considers contribution from relevant hypotheses and examples.

e1, e2, e3 → **H1**
e7, e8 → **H3**
Overall prediction
e4, e5, e6 → **H2**
e10, e11, e12 → **H4**

KEY

TP - True Positive
TN - True Negative
FP - False Positive
FN - False Negative
--- - Trend line

$$Accuracy = \frac{TP + TN}{TP + TN + FP + FN}$$

Accuracy / Confidence