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Note Title

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Athenian Crisis

Reference A. Tverski and Daniel Kahneman.

"Evidential impact of base rates," In:

Judgement under Uncertainty: Heuristics and Biases. D. Kahneman, P. Slovic, A. Tverski (eds), Cambridge Univ. Press, 1982.

1. 85% of the cabs in the city are green, and 15% are blue.

A witness identified the cab as blue.

2. ... the witness correctly identified each one of the two colors 80% of the time and failed 20% of the time.

What is the probability that the cab involved in the accident was blue?

"Base rate" is a synonym
of prior probability
of variable w/out
parents

Color(c) (C) {b, g}

Apparent
Color(A) (A) {ab, ag}

$$P(c) = (.15, .85)$$

$$P(A|C) = \begin{array}{c|cc} & b & g \\ \hline a & .8 & .2 \\ g & .2 & .8 \end{array}$$

$$P(C=b | A=b) = ?$$

$$P(A, c) = P(c) \times P(A|c) =$$

$A \backslash c$	b	g
ab	$.8 \times .15 = .12$	$.17$
ag	$.03$	$.68$

$$P(A, C, e) = P(A, c) \cdot e =$$

$A \backslash C$	b	g
ab	$.12$	$.17$
ag	0	0

$$P(C|A=ab) = (\text{normalized version of } P(A, C, e) =$$

$$= \left(\frac{.12}{.21}, \frac{.17}{.21} \right) \approx \underline{\underline{(.413, .587)}}$$

$$P(C=b | A=ab)$$