

If we want A is independent of C given Y

$$\Rightarrow P(C|A, Y) = P(C|Y) = \frac{P(Y|C)P(C)}{P(Y)} \text{ (By Bayes' Rule)}$$

If we want A is independent of Y given C

$$\Rightarrow P(Y|A, C) = P(Y|C)$$

This means

$$\Rightarrow P(C|A, Y) = P(C|Y) = \frac{P(Y|C)P(C)}{P(Y)} = P(Y|C)$$

$$\Rightarrow P(Y) = P(C)$$

Separated but not Sufficiency

CYA	0.4	~CYA	0.1
CY~A	0.4	~CY~A	0.1
C~YA	0.15	~C~YA	0.35
C~Y~A	0.2	~C~Y~A	0.3

Sufficiency but not Separated

CYA	0.4	~CYA	0.15
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