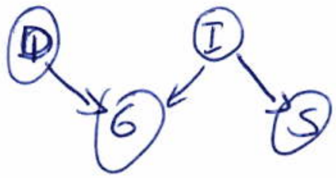

$$P(D,G,I,S) = P(D)\,P(I)\,P(G|D,I)\,P(S|I)$$

(1) CALCULAR $P(S|G)$:

$$P(S|G) = \sum_i P(S|I=i)\,P(I=i|G)$$

USAMOS FACTORIZACIÓN

$$\sum_i P(S, I=i|G) = \sum_i P(I=i|G)\cdot \underbrace{P(S|I=i,G)}_{(S \perp G | I)}$$

POR TANTO

$$= \sum_i P(I=i|G)\,P(S|I=i)$$

AHORA, CALCULAMOS $P(I|G) = \dfrac{P(G|I)\,P(I)}{P(G)}$

$$P(G|I) = \sum_d P(G|I, D=d)\,P(D=d)$$

$$P(G) = \sum_{I=i} P(G|I=i)\,P(I=i)$$

$$P(G|I=i)\,P(I=i) = P(G, I=i)$$

NOTEMOS QUE

$$\frac{P(G, I, \cancel{D=d})}{P(I)\,P(D=d)} = P(G|I, D=d)$$

MULTIPLICO POR $P(D=d)$, TENGO

$$\frac{P(G,I,D=d)}{P(I)} = P(G|I,D=d)\,P(D=d)$$

$$= P(G, D=d|I)$$

SI SUMO: $\sum_{d} P(G, D=d|I)$

$$= P(G|I)$$

CALCULAR $P(D,S)$

$$P(D,S) = \sum_i \sum_g P(D, I=i, G=g, S)$$

$$= \sum_i \sum_g P(D)\, P(I)\, P(G \mid D, I)\, P(S, I)$$

$$= P(D) \underbrace{\left(\sum_i P(I=i) P(S \mid I=i) \right)}_{= P(S)} \underbrace{\left(\sum_g P(G=g \mid D, I=i) \right)}_{= 1}$$

$$= P(D)\, P(S)$$

PARADOJA DE SIMPSON:

	$P(R=1 \mid T=1, G)$	$P(R=1 \mid T=0, G)$
H	0.97	0.95
M	0.87	0.90

GRUPO TRATADO: 90 % MUJERES, 10 % HOMBRES

NO TRATADO: 20 MUJERES, 80 % HOMBRES

$$P(G=M) = P(G=H) = 0.5$$