
Modelos Theta:
Comparando las Thetas de Hits y FA por clase

Estudios en Detección de Señales - Tesis de Licenciatura

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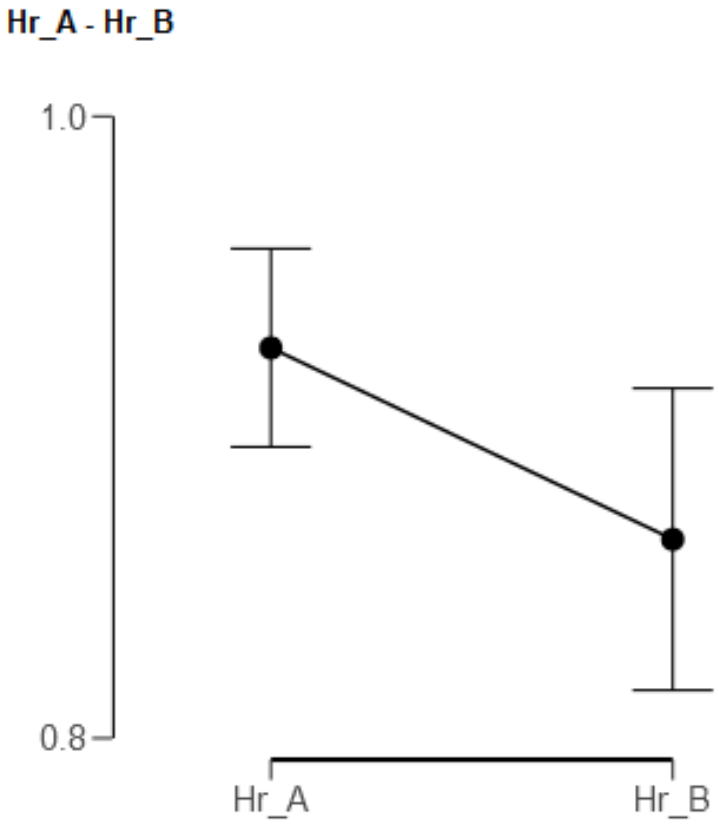
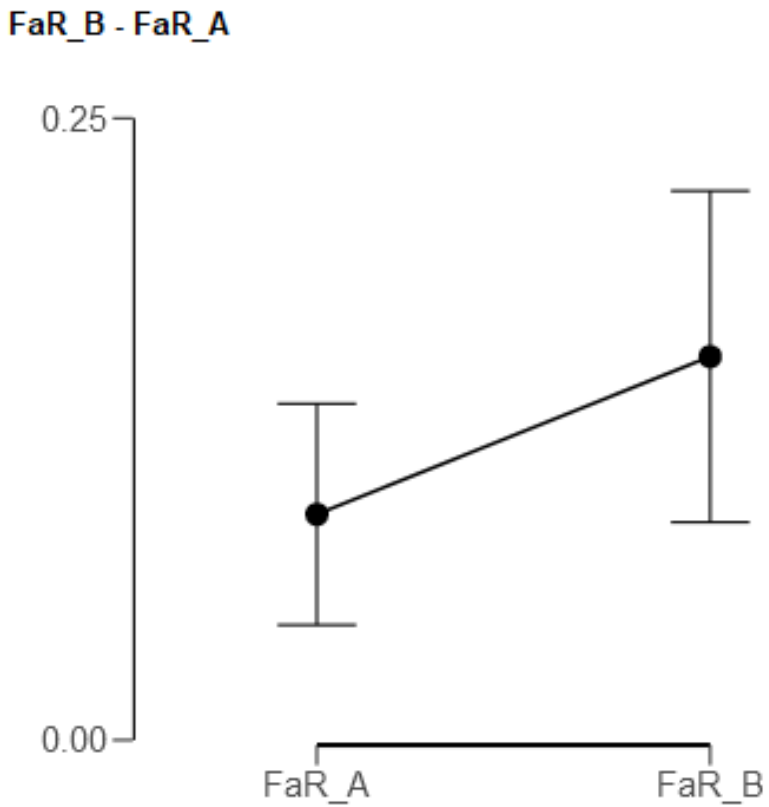
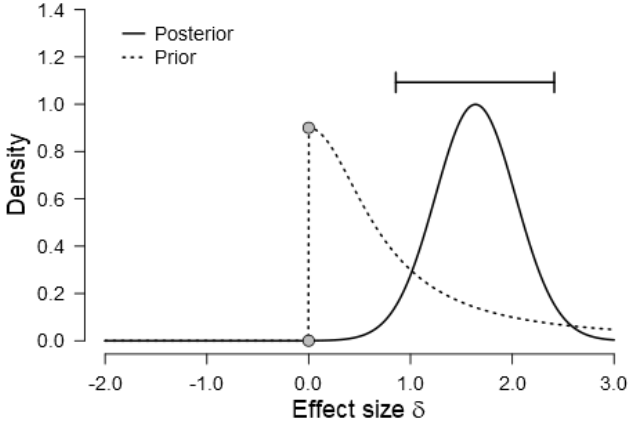
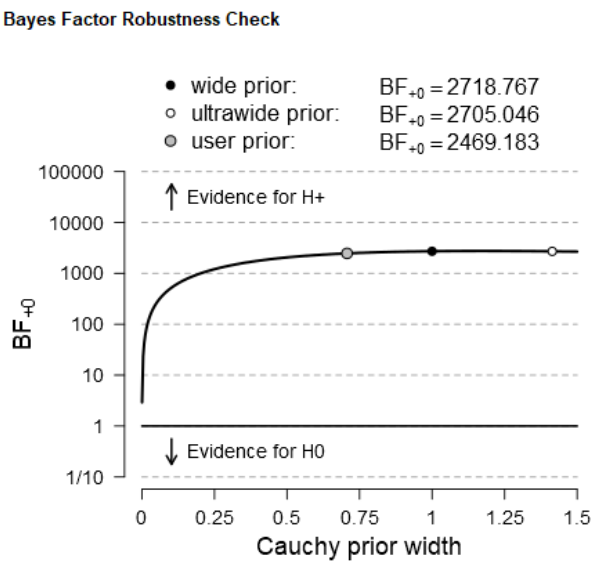
EXPERIMENTO 1

(Figura de Ebbinghaus vs Círculo))

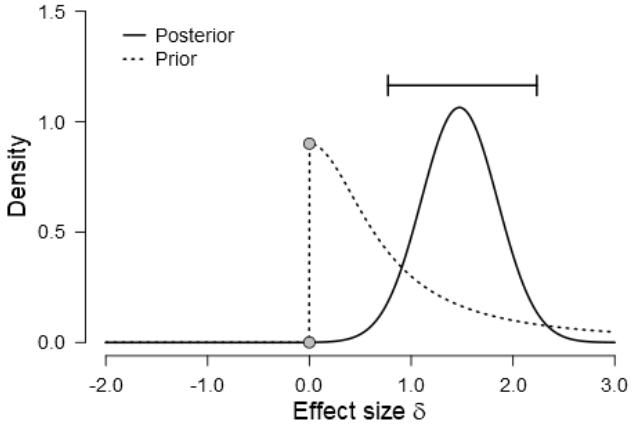


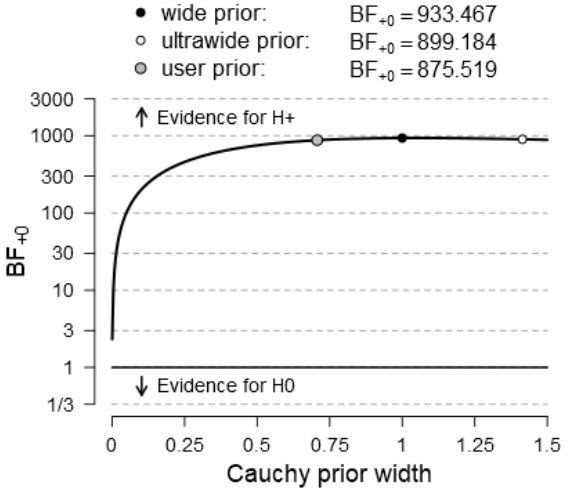



Posterior
Prior
Density
Effect size δ


Bayes Factor Robustness Check
wide prior: BF+0 = 2718.767
ultrawide prior: BF+0 = 2705.046
user prior: BF+0 = 2469.183
Evidence for H+
Evidence for H0
BF+0
Cauchy prior width

HITS

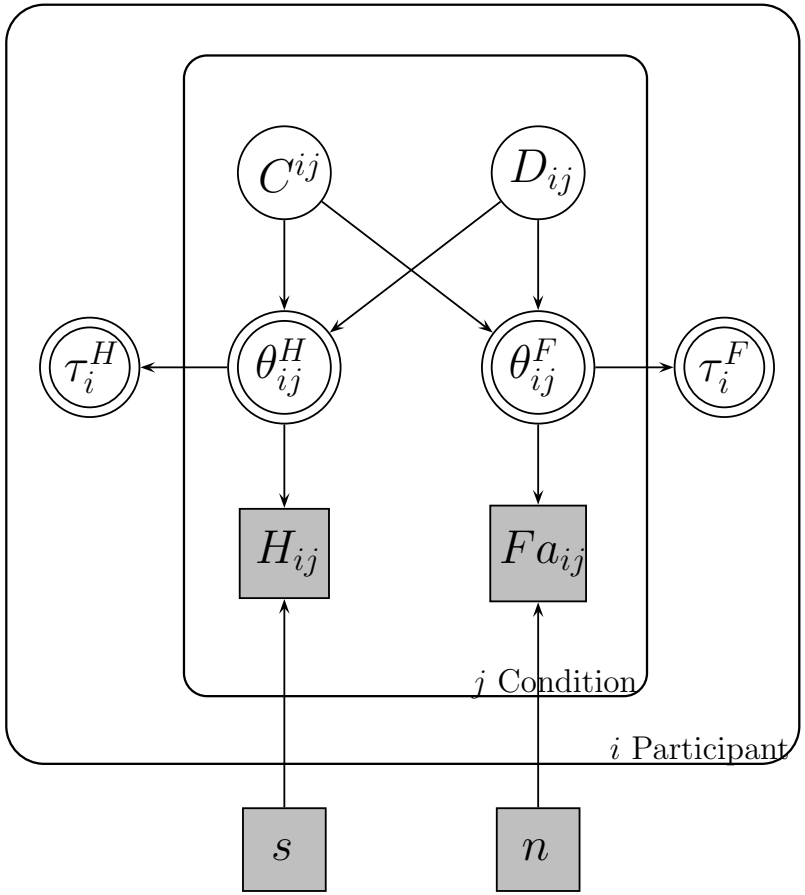

Posterior
Prior
Density
Effect size δ


wide prior: BF+0 = 933.467
ultrawide prior: BF+0 = 899.184
user prior: BF+0 = 875.519
Evidence for H+
Evidence for H0
BF+0
Cauchy prior width

F.A.

Modelo gráfico 1:

(El parámetro Tau estima la diferencia entre las ThetaH y Theta FA))



$$H_{ij} \sim \text{Binomial}\big(\theta_{ij}^H, s\big)$$

$$Fa_{ij} \sim \text{Binomial}\big(\theta_{ij}^F, s\big)$$

$$\theta_{ij}^H \leftarrow \phi(\tfrac{1}{2}D_{ij} - C_{ij})$$

$$\theta_{ij}^F \leftarrow \phi(-\tfrac{1}{2}D_{ij} - C_{ij})$$

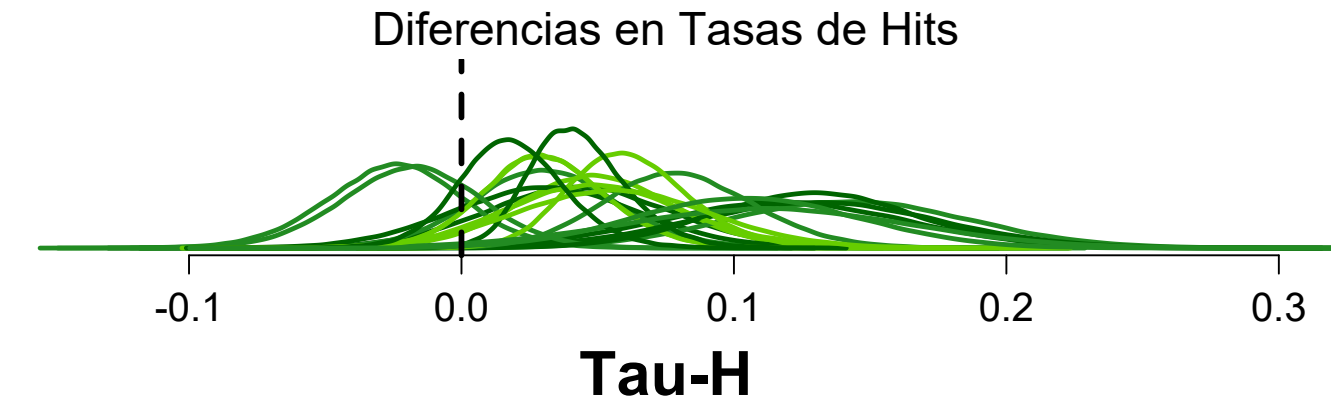
$$D_{ij} \sim \text{Gaussian}\big(0, 0.5\big)$$

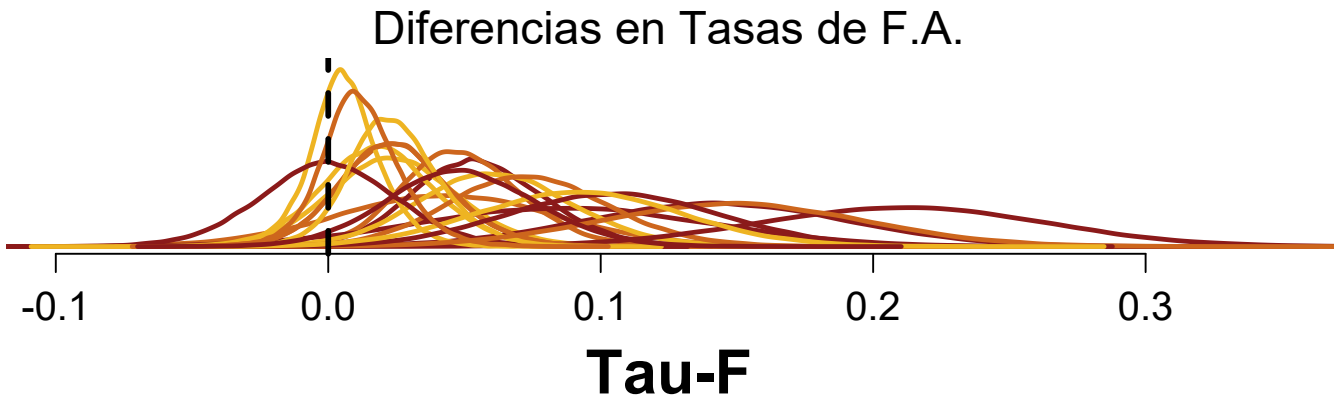
$$C_{ij} \sim \text{Gaussian}\big(0, 2\big)$$

$$\tau_i^H \leftarrow \theta_{i1}^H - \theta_{i2}^H$$

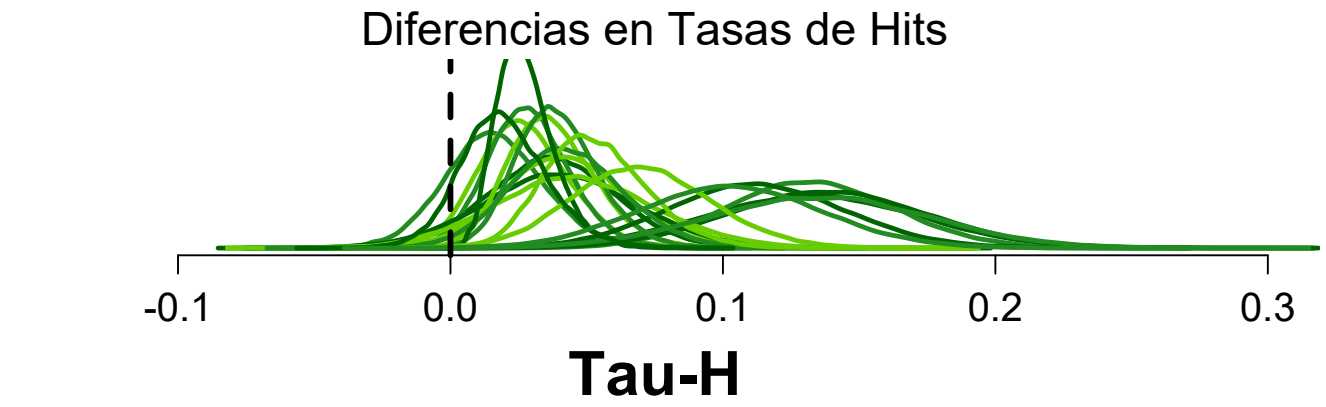
$$\tau_i^F \leftarrow \theta_{i1}^F - \theta_{i1}^F$$

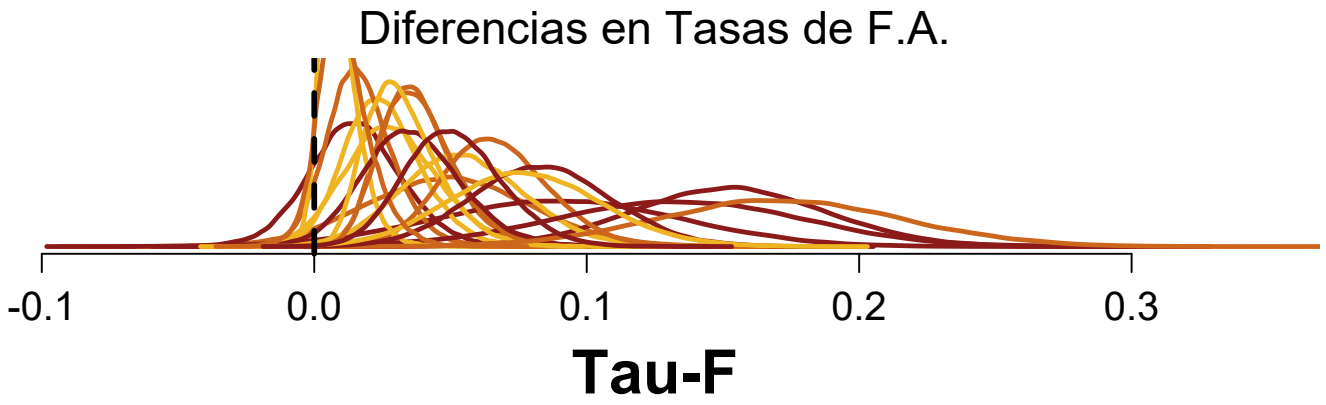
Experimento 1





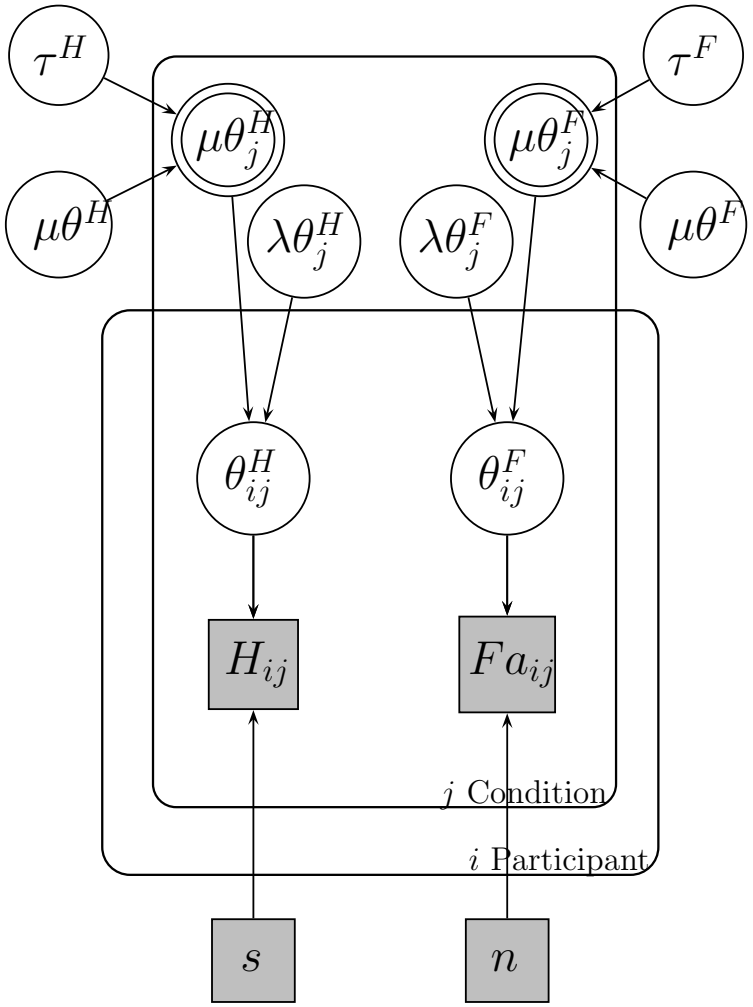
Experimento 1





Modelo gráfico 2:

(El parámetro Tau estima la diferencia entre las ThetaH y Theta FA))



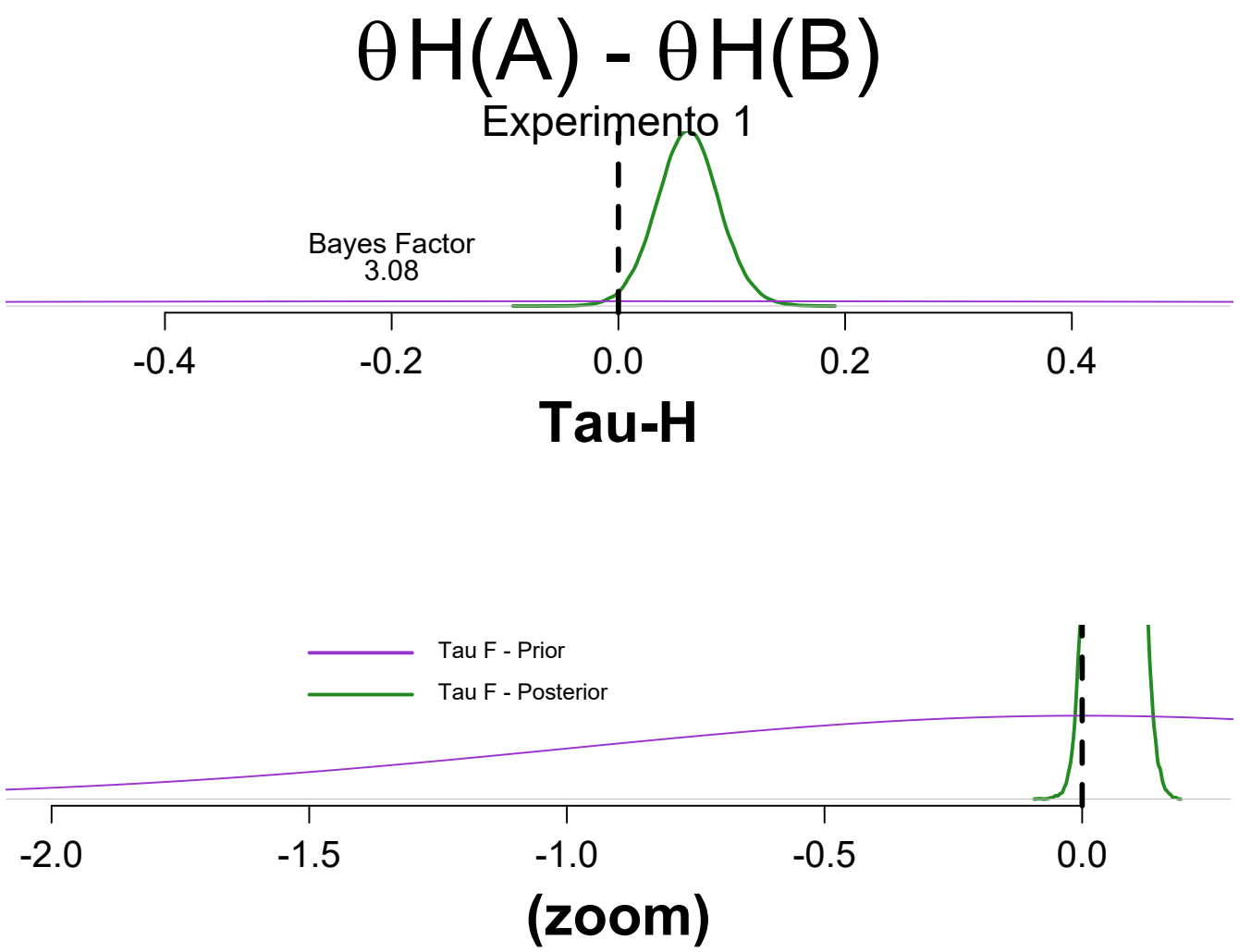
$$\tau_i^H \sim \text{Gaussian}\big(0, 1\big)$$
$$\tau_i^F \sim \text{Gaussian}\big(0, 1\big)$$
$$\mu\theta^H \sim \text{Gaussian}\big(0, 1\big)$$
$$\mu\theta^F \sim \text{Gaussian}\big(0, 1\big)$$

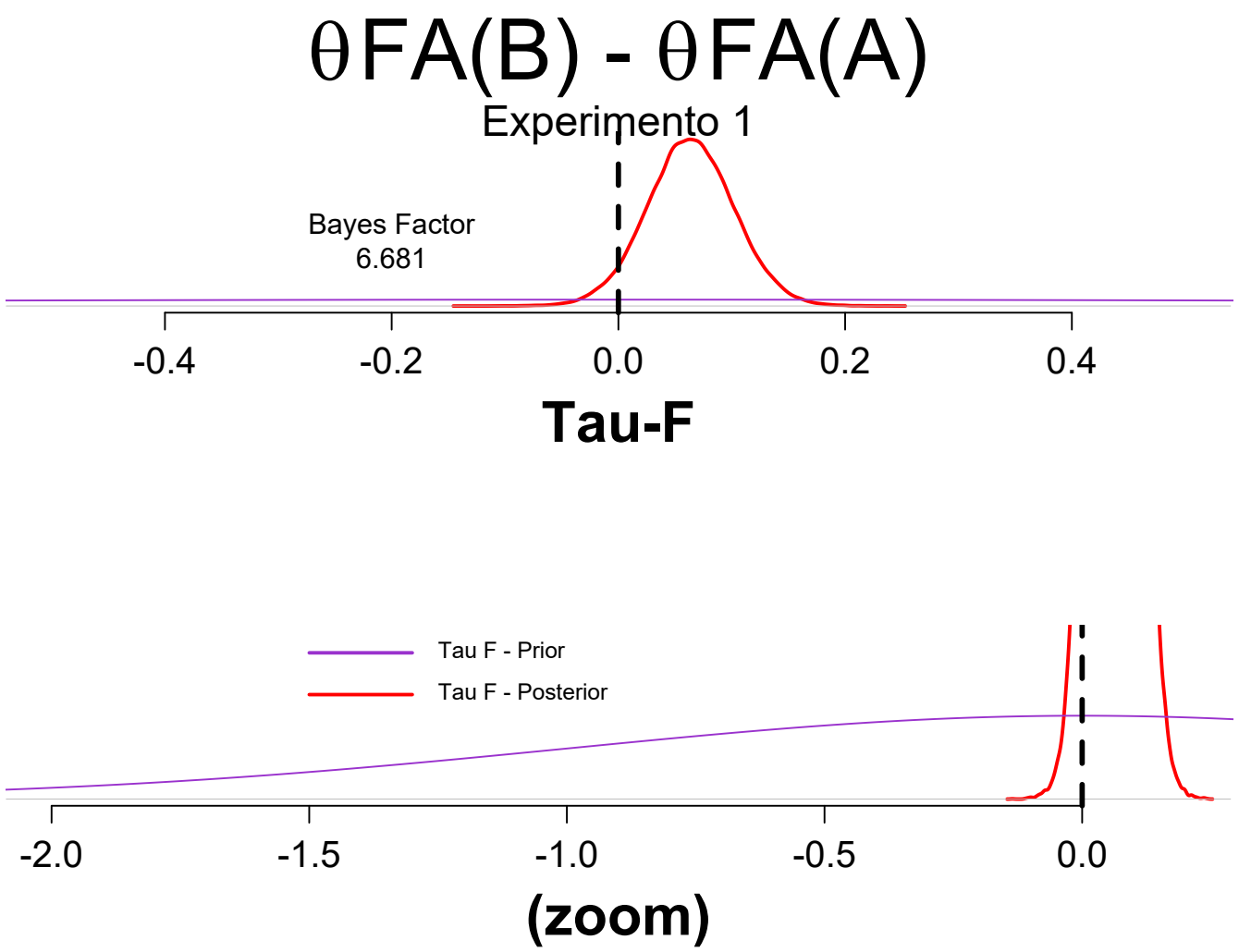
$$\mu\theta_A^H \leftarrow \mu\theta^H + \frac{\tau^H}{2}$$
$$\mu\theta_B^H \leftarrow \mu\theta^H - \frac{\tau^H}{2}$$
$$\mu\theta_A^F \leftarrow \mu\theta^F - \frac{\tau^F}{2}$$
$$\mu\theta_B^F \leftarrow \mu\theta^F + \frac{\tau^F}{2}$$

$$\lambda\theta_j^H \sim \text{Gamma}\big(.001, .001\big)$$
$$\lambda\theta_j^F \sim \text{Gamma}\big(.001, .001\big)$$

$$\theta_{ij}^H \sim \text{Gaussian}(\mu\theta_j^H, \lambda\theta_j^H)$$
$$\theta_{ij}^F \sim \text{Gaussian}(\mu\theta_j^F, \lambda\theta_j^F)$$

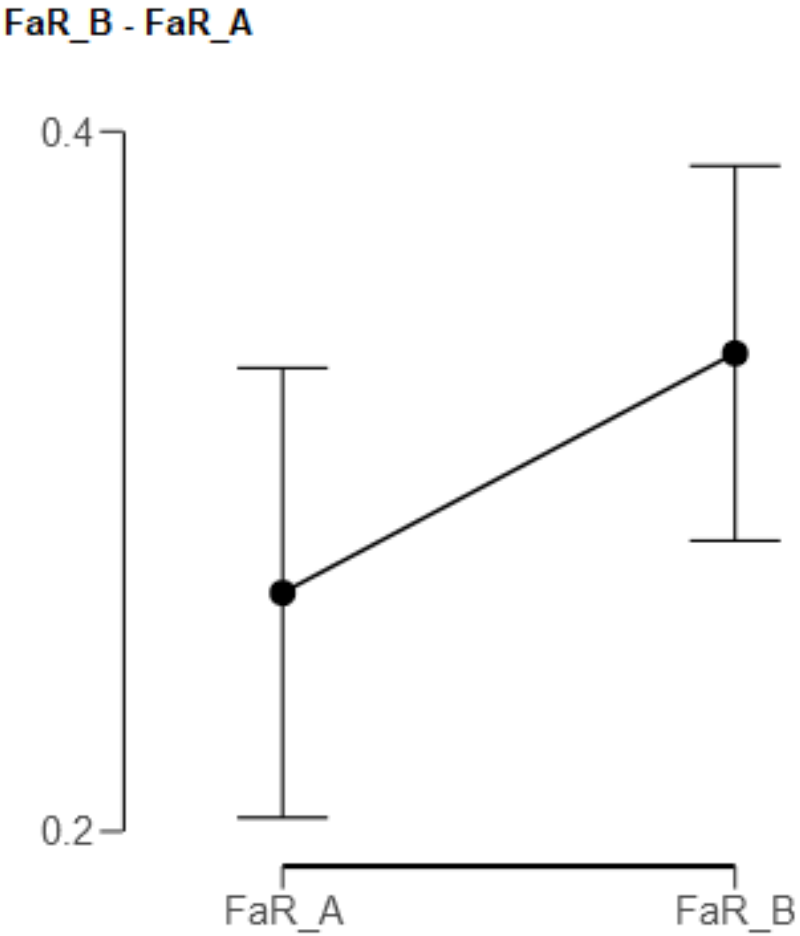
$$H_{ij} \sim \text{Binomial}\big(\theta_{ij}^H, s\big)$$
$$Fa_{ij} \sim \text{Binomial}\big(\theta_{ij}^F, s\big)$$

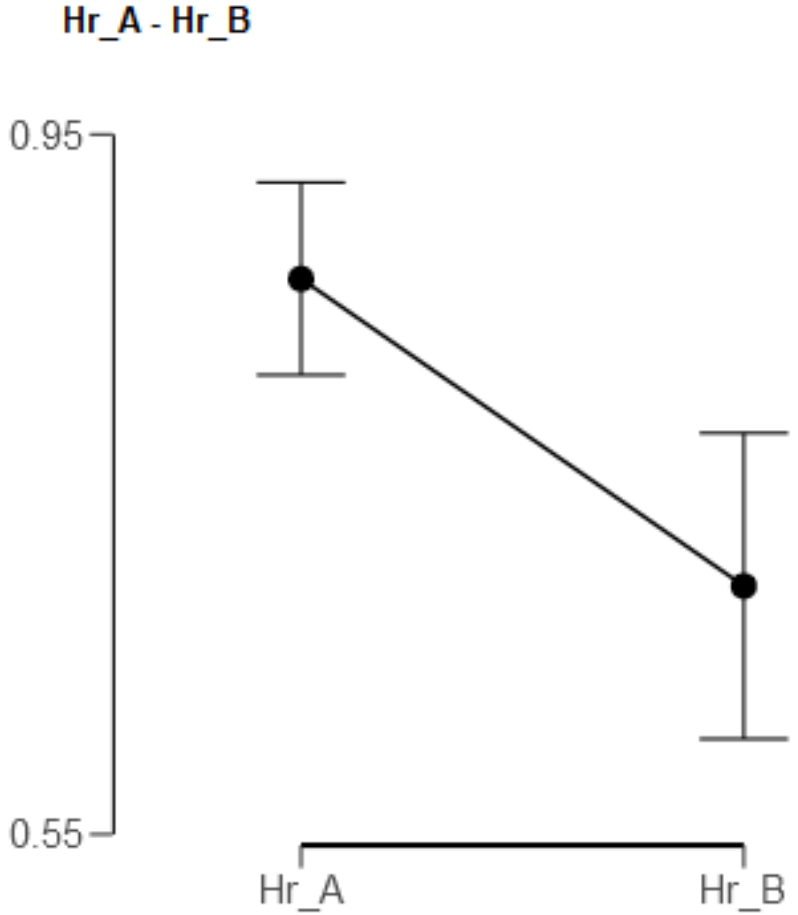

θH(A) - θH(B)
Experimento 1
Bayes Factor
3.08
-0.4
-0.2
0.0
0.2
0.4
Tau-H
Tau F - Prior
Tau F - Posterior
-2.0
-1.5
-1.0
-0.5
0.0
(zoom)

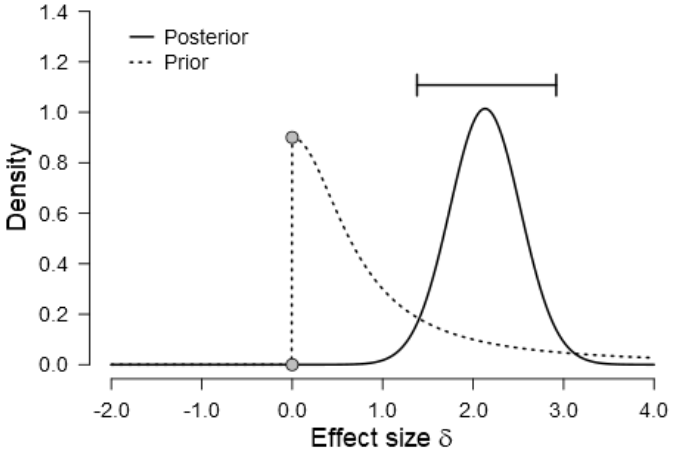

θFA(B) - θFA(A)
Experimento 1
Bayes Factor
6.681
-0.4
-0.2
0.0
0.2
0.4
Tau-F
Tau F - Prior
Tau F - Posterior
-2.0
-1.5
-1.0
-0.5
0.0
(zoom)

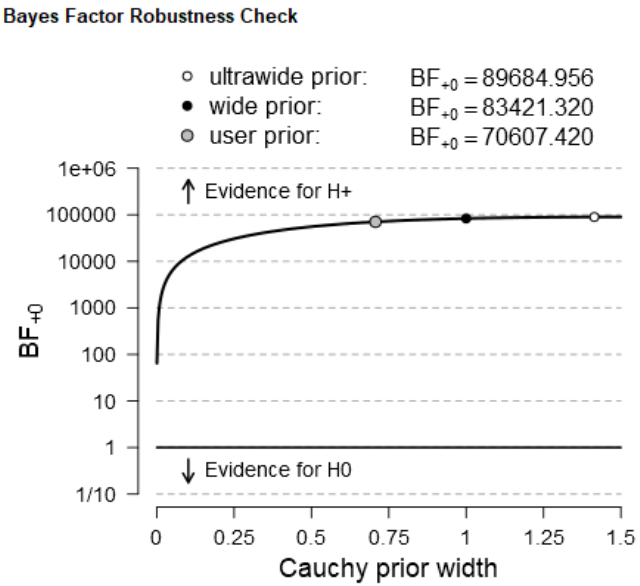
EXPERIMENTO 2

(Figura de Ebbinghaus vs Círculo))

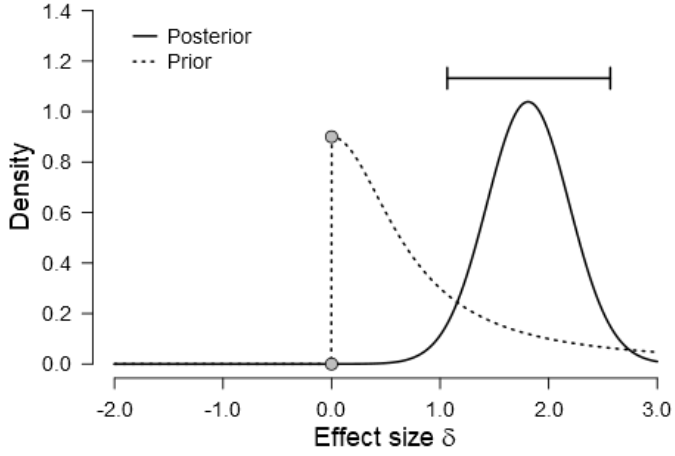


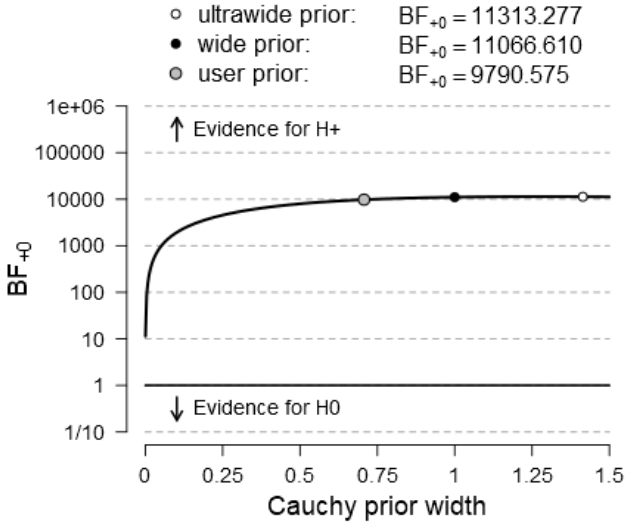



Posterior
Prior
Density
Effect size δ


Bayes Factor Robustness Check
ultrawide prior: BF+0 = 89684.956
wide prior: BF+0 = 83421.320
user prior: BF+0 = 70607.420
Evidence for H+
Evidence for H0
BF+0
Cauchy prior width

HITS

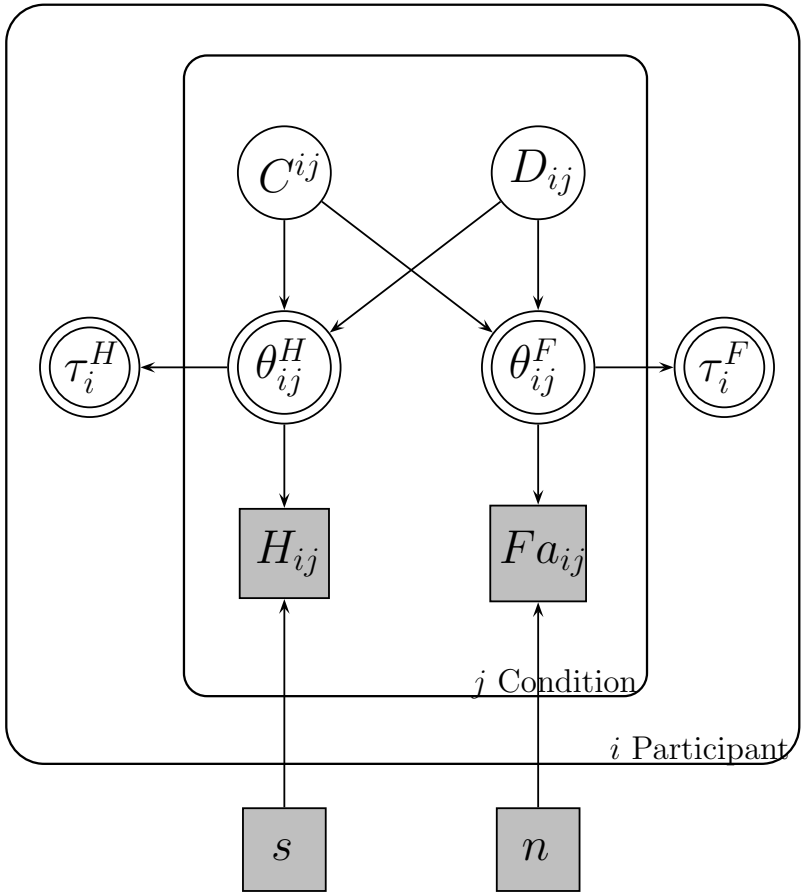

Posterior
Prior
Density
Effect size δ


ultrawide prior: BF+0 = 11313.277
wide prior: BF+0 = 11066.610
user prior: BF+0 = 9790.575
Evidence for H+
Evidence for H0
BF+0
Cauchy prior width

F.A.

Modelo gráfico 1:

(El parámetro Tau estima la diferencia entre las ThetaH y Theta FA))



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$$Fa_{ij} \sim \text{Binomial}\big(\theta_{ij}^F, s\big)$$

$$\theta_{ij}^H \leftarrow \phi(\tfrac{1}{2}D_{ij} - C_{ij})$$

$$\theta_{ij}^F \leftarrow \phi(-\tfrac{1}{2}D_{ij} - C_{ij})$$

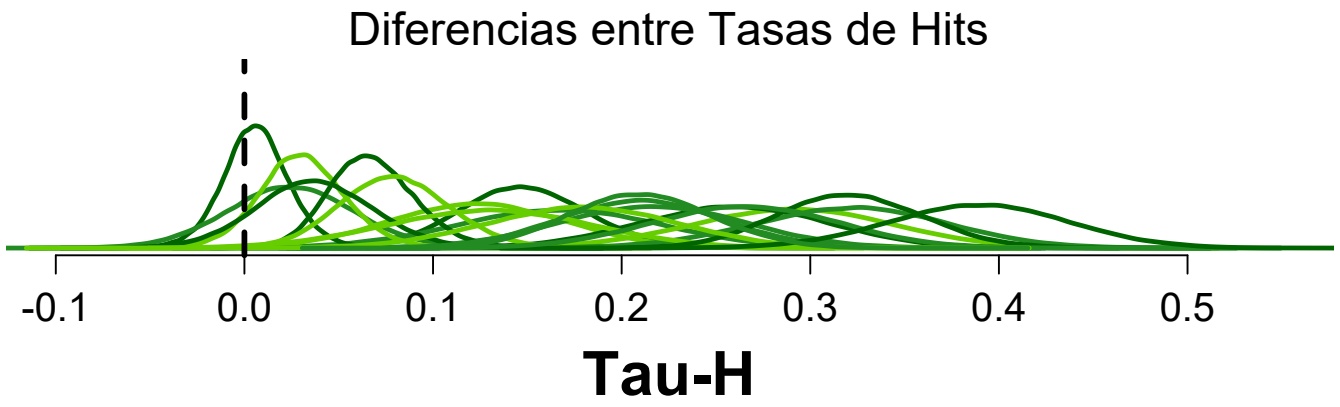
$$D_{ij} \sim \text{Gaussian}\big(0, 0.5\big)$$

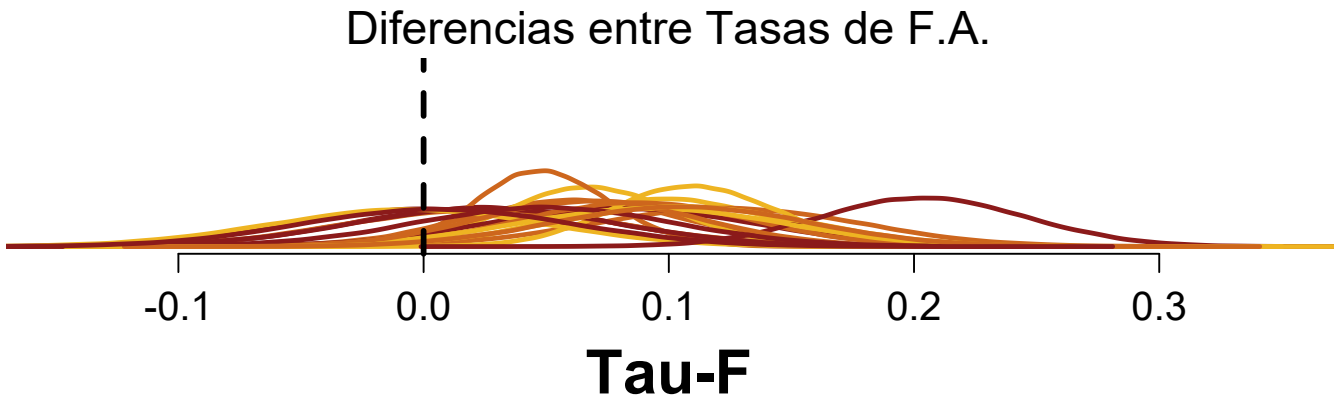
$$C_{ij} \sim \text{Gaussian}\big(0, 2\big)$$

$$\tau_i^H \leftarrow \theta_{i1}^H - \theta_{i2}^H$$

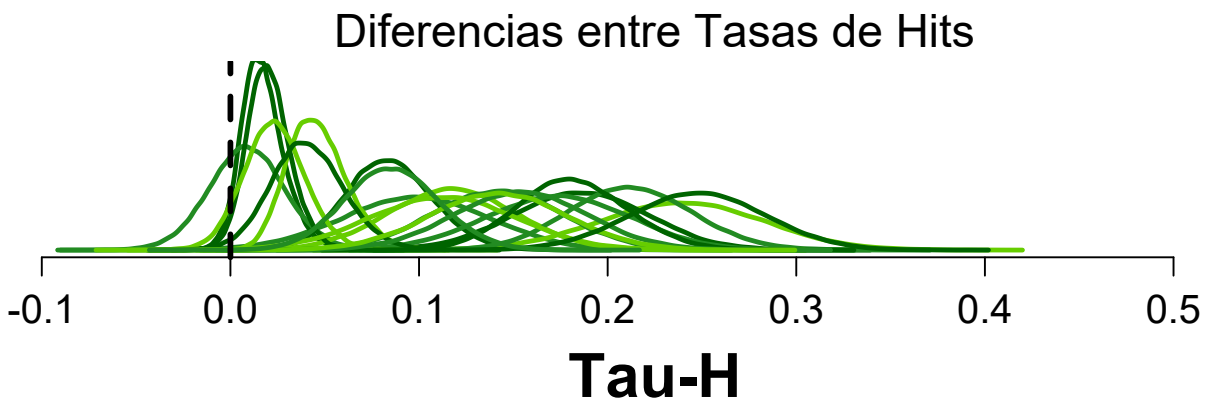
$$\tau_i^F \leftarrow \theta_{i1}^F - \theta_{i1}^F$$

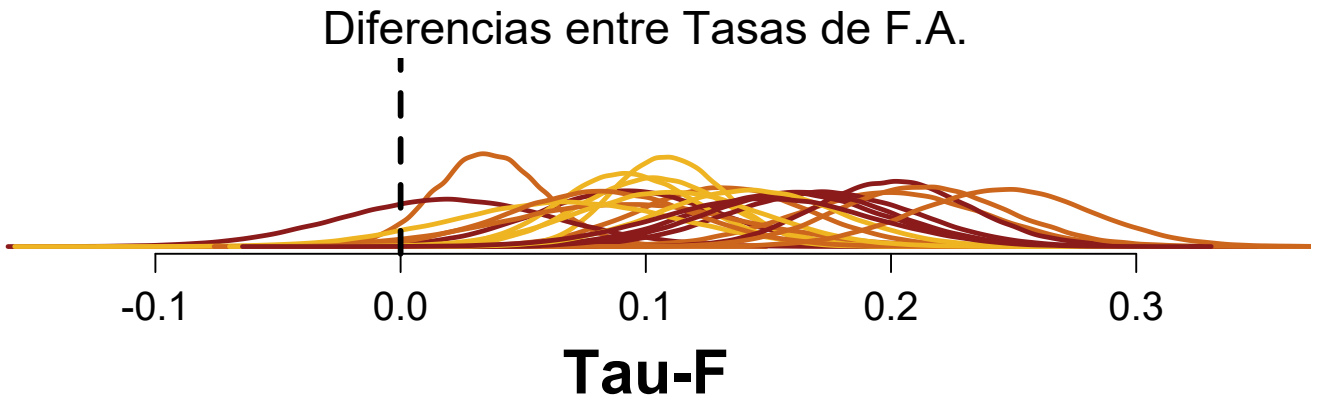
Experimento 2





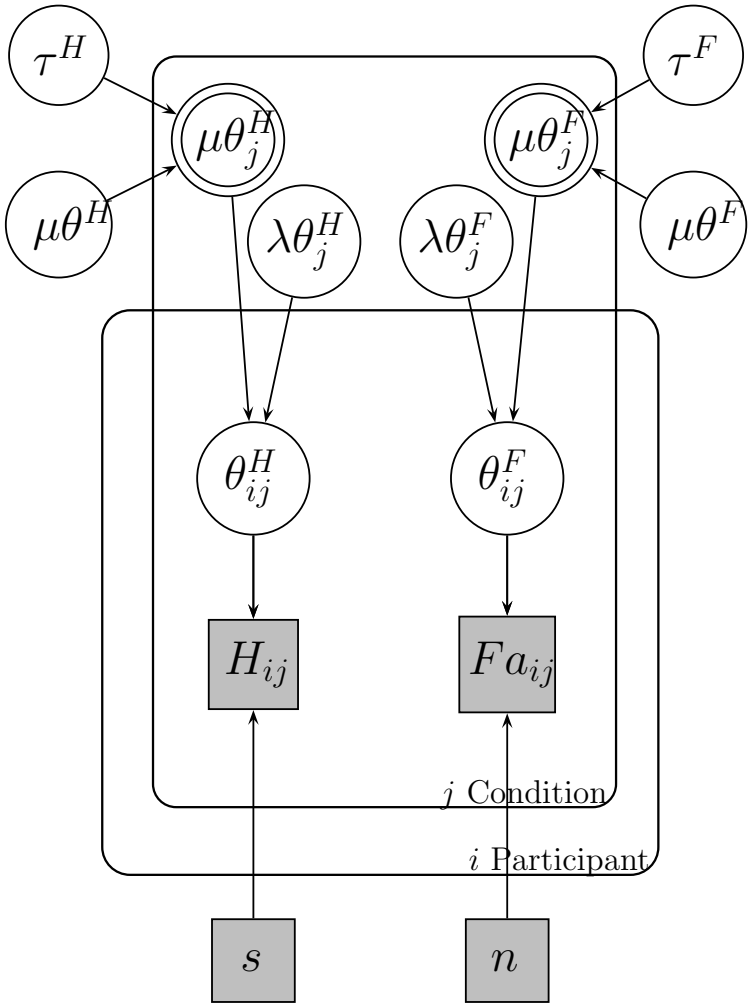
Experimento 2





Modelo gráfico 2:

(El parámetro Tau estima la diferencia entre las ThetaH y Theta FA))



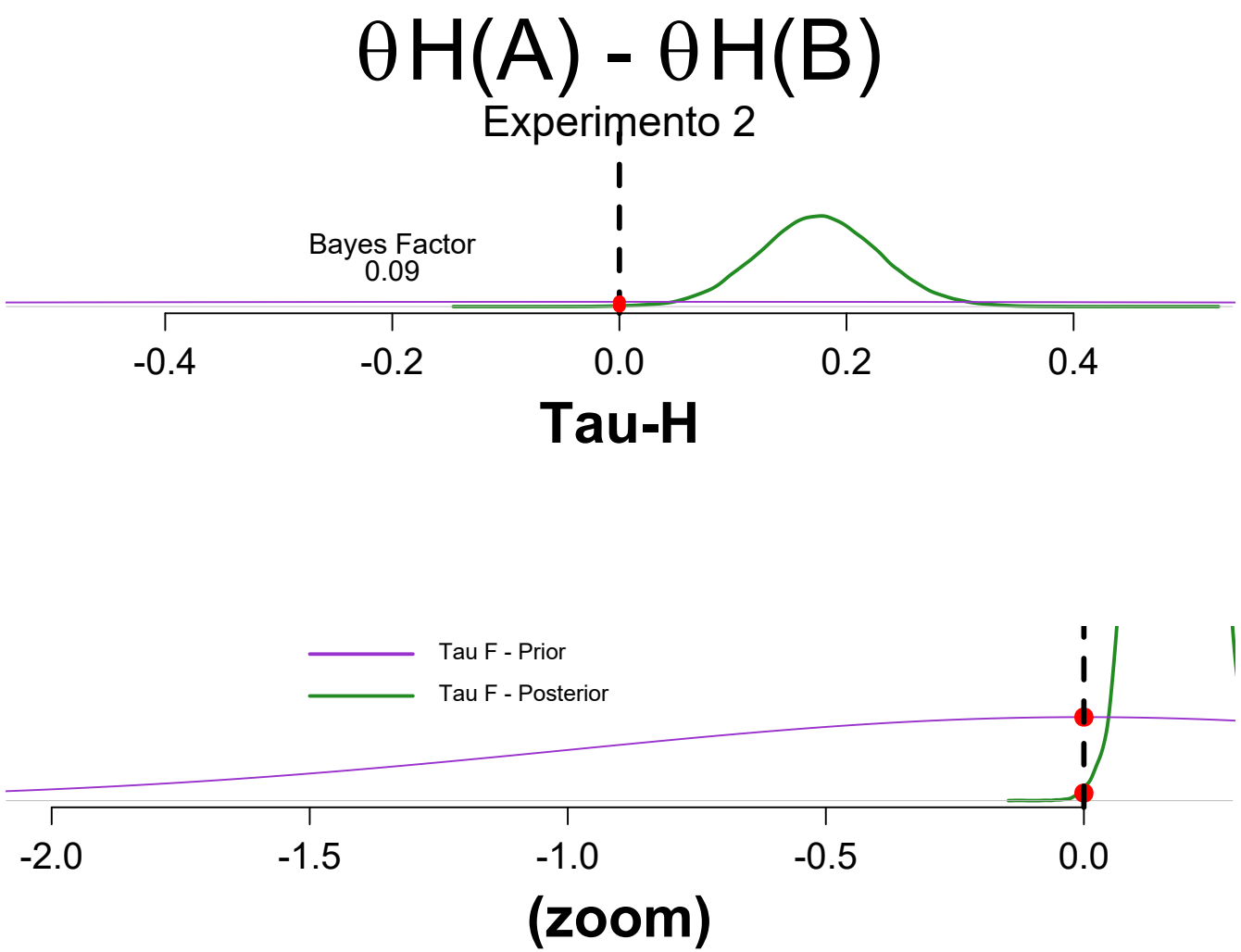
$$\tau_i^H \sim \text{Gaussian}\big(0, 1\big)$$
$$\tau_i^F \sim \text{Gaussian}\big(0, 1\big)$$
$$\mu\theta^H \sim \text{Gaussian}\big(0, 1\big)$$
$$\mu\theta^F \sim \text{Gaussian}\big(0, 1\big)$$

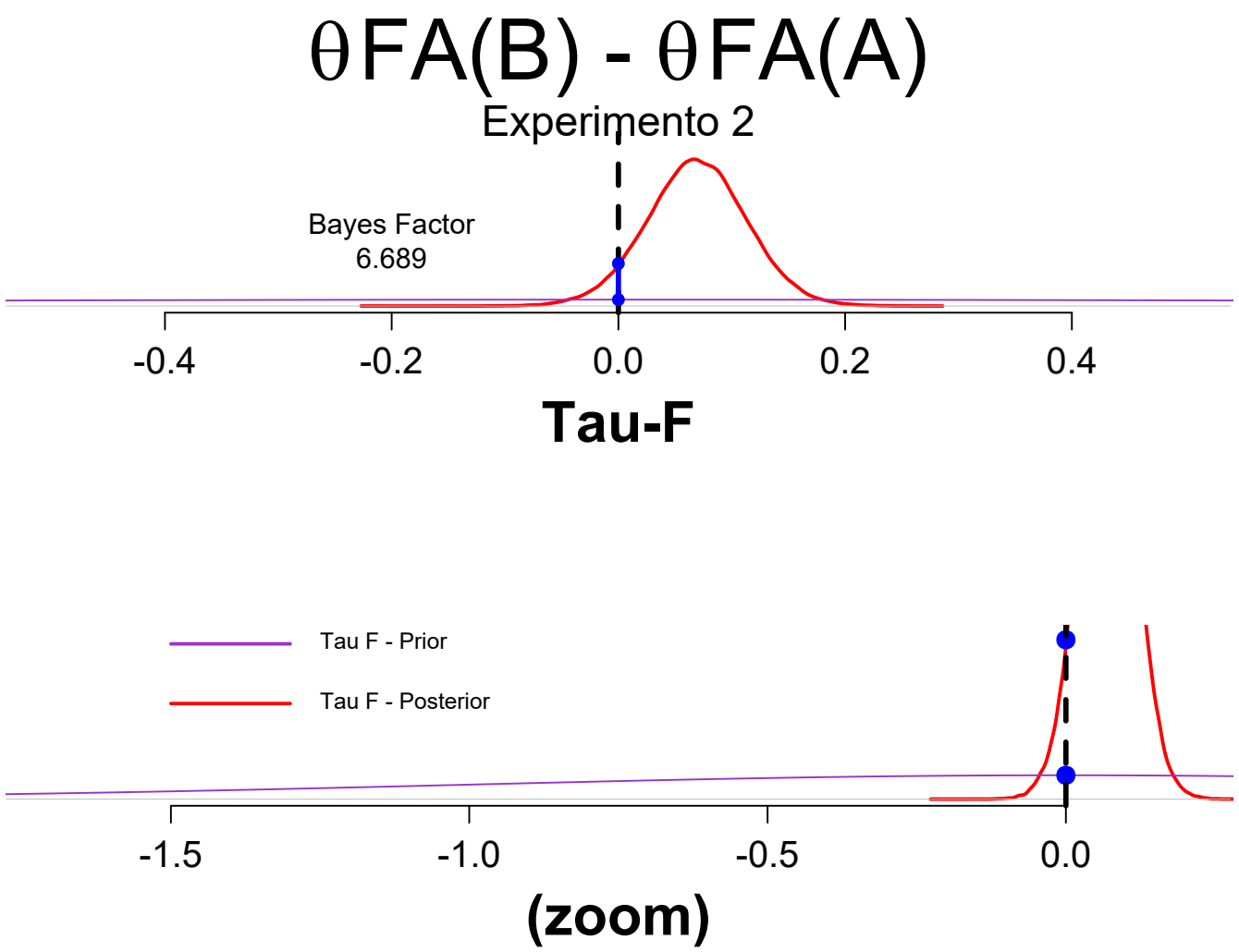
$$\mu\theta_A^H \leftarrow \mu\theta^H + \frac{\tau^H}{2}$$
$$\mu\theta_B^H \leftarrow \mu\theta^H - \frac{\tau^H}{2}$$
$$\mu\theta_A^F \leftarrow \mu\theta^F - \frac{\tau^F}{2}$$
$$\mu\theta_B^F \leftarrow \mu\theta^F + \frac{\tau^F}{2}$$

$$\lambda\theta_j^H \sim \text{Gamma}\big(.001, .001\big)$$
$$\lambda\theta_j^F \sim \text{Gamma}\big(.001, .001\big)$$

$$\theta_{ij}^H \sim \text{Gaussian}(\mu\theta_j^H, \lambda\theta_j^H)$$
$$\theta_{ij}^F \sim \text{Gaussian}(\mu\theta_j^F, \lambda\theta_j^F)$$

$$H_{ij} \sim \text{Binomial}\big(\theta_{ij}^H, s\big)$$
$$Fa_{ij} \sim \text{Binomial}\big(\theta_{ij}^F, s\big)$$


θH(A) - θH(B)
Experimento 2
Bayes Factor
0.09
-0.4
-0.2
0.0
0.2
0.4
Tau-H
Tau F - Prior
Tau F - Posterior
-2.0
-1.5
-1.0
-0.5
0.0
(zoom)


θFA(B) - θFA(A)
Experimento 2
Bayes Factor
6.689
-0.4
-0.2
0.0
0.2
0.4
Tau-F
Tau F - Prior
Tau F - Posterior
-1.5
-1.0
-0.5
0.0
(zoom)