Naïve association

FDR,
Effect Size

Additional random
effect lrt

$$\frac{\text{lmer}(y \sim D + (1|R))}{\text{lmer}(y \sim (1|R))}$$

A

$$\frac{\text{lmer}(y \sim D + C1 + (1|R))}{\text{lmer}(y \sim C1 + (1|R))}$$

B

$$\frac{\text{lmer}(y \sim D + C1 + (1|R))}{\text{lmer}(y \sim D + (1|R))}$$

Significant association to feature?

— yes → other significant covariates?

— yes → A >= 0.05 AND B < 0.05

— no → A >= 0.05 AND B >= 0.05

— no → A < 0.05 AND B >= 0.05

— yes → ConfInt(A) Includes 0

Significant association to feature? — no → ★ NS

other significant covariates? — no → ★ OK_nc

A >= 0.05 AND B < 0.05 — yes → ★ C: …

A >= 0.05 AND B >= 0.05 — yes → ★ AD

ConfInt(A) Includes 0 — yes → ★ OK_d

ConfInt(A) Includes 0 — no → ★ OK_sd
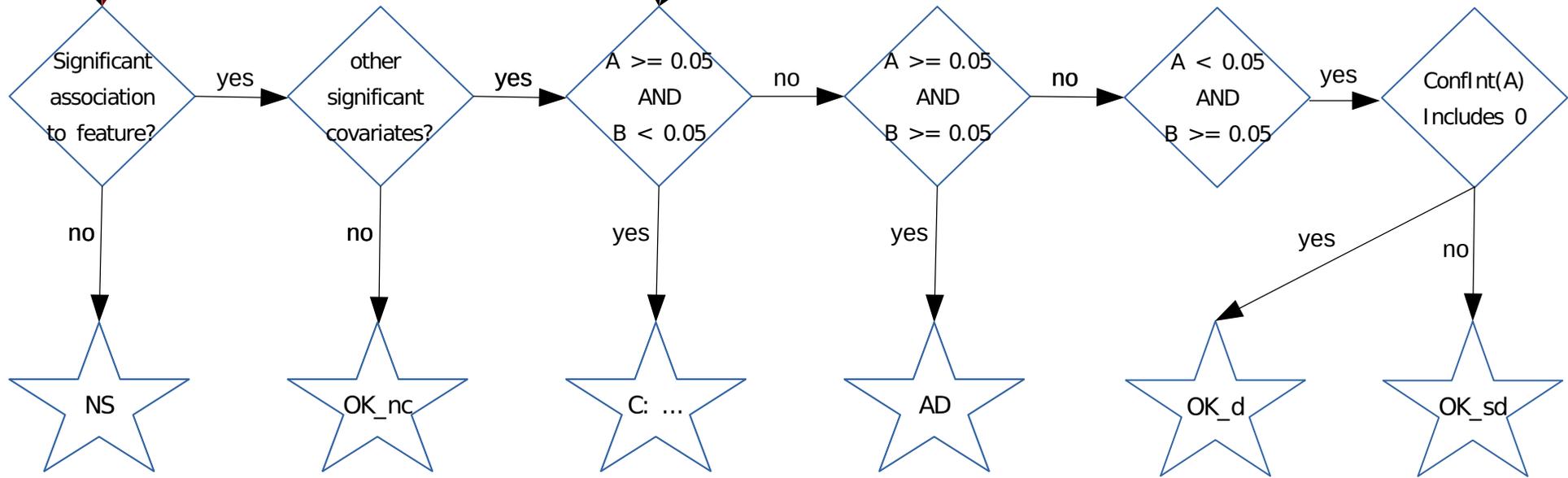
Not **S**ignificant: This covariate (D) is not significantly associated with the feature (y) in the first place or can be reduced to random effects (R).

No other **C**oavriates: This covariate is the only one significantly associated to the feature – it is trivially deconfounded.

Associaton of this covariate and feature is confounded by another covariate (C1). A **list of names** of all confounders will be returned as status.

Ambiguously **D**econfounded: Another covariate is also associated but neither association is significantly stronger than the other.

Doubtful: Another coavriate is associated to the feature, but the signal can be reduced to this covariate. Confidence interval of A includes zero.

Strictly **D**econfounded: Another coavriate is associated to the feature, but the signal can be reduced to this covariate. This label is hardest to reach.