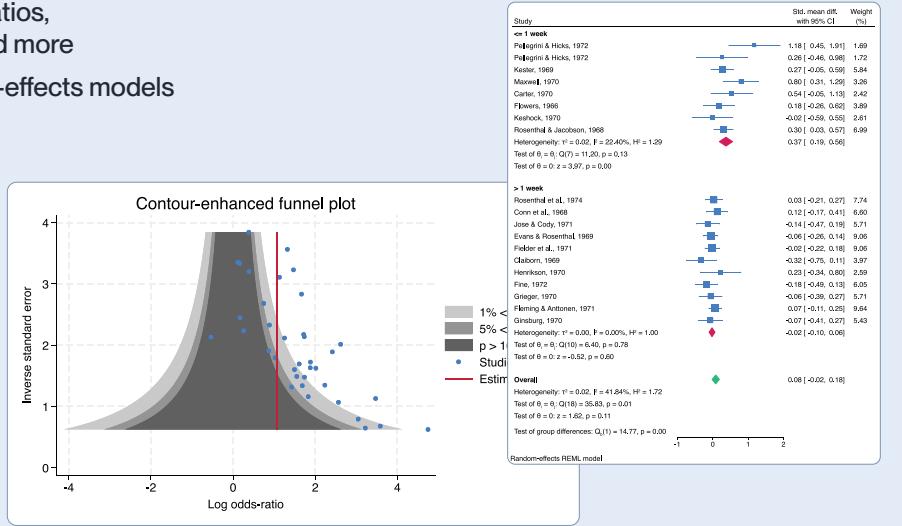


# Meta-analysis

Stata's suite of commands for meta-analysis is broad yet easy to use.

- Effect sizes: Hedges's  $g$ , Cohen's  $d$ , odds ratios, risk ratios, proportions, correlations **New**, and more
- Common-effect, fixed-effects, and random-effects models
- Forest, funnel, Galbraith, and more plots
- Subgroup analysis
- Meta-regression
- Tests of small-study effects
- Trim-and-fill analysis of publication bias
- Cumulative meta-analysis
- Leave-one-out meta-analysis
- Multivariate meta-analysis
- Multilevel meta-analysis
- More



## Prepare your data

### Continuous summary data

Compute Hedges's  $g$  effect sizes (default)

```
. meta esize n1 m1 sd1 n2 m2 sd2
```

Compute Cohen's  $d$  effect sizes

```
. meta esize n1 m1 sd1 n2 m2 sd2, esize(cohend)
```

### Binary summary data

Compute log odds-ratios (default)

```
. meta esize n11 n12 n21 n22
```

Compute log risk-ratios

```
. meta esize n11 n12 n21 n22, esize(lnrratio)
```

### Generic effect sizes

Specify precomputed effect sizes and their standard errors (and label effect sizes)

```
. meta set es se, eslabel(Log hazard-ratio)
```

Or specify effect sizes and their confidence intervals (and label studies)

```
. meta set cil ciu, studylabel(studylbl)
```

## Summarize meta-analysis data

Compute basic summaries and display in a table

```
. meta summarize
```

Or produce a forest plot

```
. meta forestplot
```

## Explore heterogeneity

Perform subgroup analysis for levels of **group**

```
. meta forestplot, subgroup(group)
```

Produce a Galbraith plot

```
. meta galbraithplot
```

Perform meta-regression and also account for continuous **x**

```
. meta regress i.group x
```

# Cumulative and leave-one-out meta-analysis

Perform cumulative meta-analysis in the order of **year**

```
. meta forestplot, cumulative(year)
```

Perform leave-one-out meta-analysis

```
. meta forestplot, leaveoneout
```

## Explore small-study effects

Produce a funnel plot

```
. meta funnelplot
```

Produce a funnel plot by **group**

```
. meta funnelplot, by(group)
```

Perform Egger test for funnel-plot asymmetry

```
. meta bias, egger
```

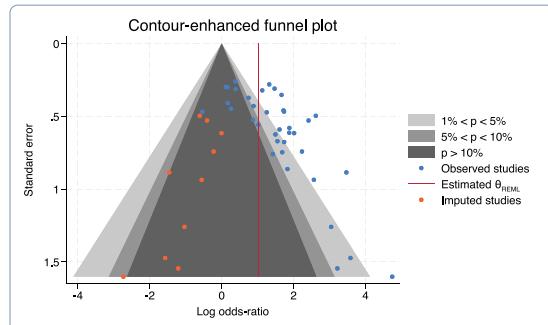
Adjust for heterogeneity due to **group** during testing

```
. meta bias i.group, egger
```

## Assess publication bias

Assess publication bias using the trim-and-fill method; produce contour-enhanced funnel plot including omitted studies

```
. meta trimfill, funnel(contours(1 5 10))
```



## Perform multivariate and multilevel meta-analysis

Multivariate meta-regression

```
. meta mvregress y1 y2 = x1 i.x2,  
wcovvariables(v11 v12 v22)
```

Assess multivariate heterogeneity or multilevel heterogeneity

```
. estat heterogeneity
```

Multilevel meta-regression

```
. meta mregress y x1 i.x2 || level3var: x1 ||  
level2var:, essevariable(se)
```

## Use commands or GUI

The screenshot shows the StataNow/MF 1.9.5 interface. On the left, the command line displays:

```
. meta summarize  
Number of studies = 19  
Heterogeneity:  
    tau^2 = 0.0388  
    I2 (%) = 41.84  
    H2 = 1.72
```

The main window shows a table of study results:

Study	Effect size	[95% conf. interval]	% weight
Rosenthal et al., 1974	0.039	-0.115 - 0.279	7.74
Conn et al., 1968	0.120	-0.168 0.408	4.68
Jose & Cody, 1971	-0.140	-0.467 0.187	5.71
Pellegrini & Higgins, 1972	1.180	1.041 1.311	1.69
Pellegrini & Higgins, 1972	0.200	-0.463 0.863	1.72
Evans & Rosenthal, 1969	-0.068	-0.262 0.142	9.06
Fielder et al., 1971	-0.450	0.124 0.946	9.46
Fielder et al., 1970	-0.320	-0.751 0.131	3.97
Kester, 1969	0.270	-0.051 0.591	5.94
Hausler, 1969	0.200	0.000 0.400	3.26
Carter, 1970	0.140	-0.052 1.332	2.11
Flowers, 1966	0.180	-0.257 0.617	3.89
Kestens, 1970	-0.200	0.142 0.442	4.51
Henrikson, 1970	0.230	-0.338 0.798	2.59
Fine, 1972	-0.180	-0.499 0.132	6.05
Oishi, 1969	-0.060	0.250 0.567	5.72
Fleming & Antoniou, 1971	0.080	0.028 0.172	6.99
Rosenthal & Jacobson, 1968	0.070	-0.114 0.254	9.64
Ginsburg, 1978	-0.070	-0.411 0.273	5.43
theta	0.084	-0.018 0.185	

At the bottom of the command line, the output of the command is shown:

```
Test of theta = 0: Z = 1.62  
Prob > |Z| = 0.1052  
Test of homogeneity: Q = chi2(18) = 35.83  
Prob > Q = 0.0074  
. meta forestplot, subgroup(weeks)
```