

# Como elaborar uma metanálise?

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# METANÁLISE



Revisão sistemática

Análise quantitativa  
(metanálise)

1. Buscar literatura
2. Avaliar a metodologia e extrair as informações
3. Descrição estatística e combinação dos efeitos
4. Diagnóstico e apresentação dos resultados

1

**Literatura.**  
**Onde buscar? Como buscar?**

# Onde buscar?

Scopus



Por que consultar em +1 banco de dados?

↑ chance de extrair registros relevantes  
↓ variabilidade da indexação dos bancos de dados

# Como buscar?

Estratégia	Descrição	Exemplo
Truncagem	Inclui palavras com um mesmo radical	depress*
Wildcards	Endereça variações na ortografia	analy?e
Restrição de campos	Restringe a busca a campos como Abstract, Título...	TITLE-ABS-KEY( ) [ti], [au]
Frases	Inclui termos que aparecem próximos (“ ”) ou frase exata ({ })	“zika dengue” {oxidative stress}
Booleanos	Restringem, expandem ou excluem um termo de busca	gato <b>AND</b> rato gato <b>OR</b> cachorro gato <b>NOT</b> rato

Por que utilizar estratégias de busca?

↑ *recall* | ↑ *precision*

# Gerenciamento



zotero



- Encontrar duplicatas
- Triagem



DEMONSTRAÇÃO



2

## **Extração de informações e Qualidade metodológica dos estudos**

# Eligibilidade

Table 5.3 Examples of Published Conceptual Breakdowns

Acronym	Concepts	Usage
PICO/PECO (European Food Safety Authority 2010; Lefebvre et al. 2011)	Population, intervention or exposure, comparator, outcomes	Reviews evaluating the effects of an intervention or exposure
PIT (de Vet et al. 2008; European Food Safety Authority 2010)	Population, index test, target condition	Reviews of test accuracy
PO (European Food Safety Authority 2010)	Population, outcome	Reviews that aim to answer descriptive questions: questions about prevalence, occurrence, consumption, and incidence
PICOT-D (Elias et al. 2015)	Population, intervention/exposure, comparator, outcomes + time + data	Reviews with measures of outcomes of interest, for example, blood glucose tests or hba1c levels
PICOCs (Petticrew and Roberts 2006)	Population, intervention or exposure, comparator, outcomes + context + study design	Reviews in the social sciences
ECLIPSE (Wildridge and Bell 2002)	Expectation, client group, location, impact, professionals, service	Reviews of service change
SPIDER (Cooke et al. 2012)	Sample, phenomenon of interest, design, evaluation, research type	Reviews of qualitative and mixed method studies
SPICE (Booth 2006)	Setting, perspective, intervention, comparison, evaluation	Reviews in which perspectives of the intervention need to be captured and the impact of the evaluation is important

P: depressão maior

I: terapia cognitivo-comportamental

C: controle saudável

O: escala HAM-D

S: ensaios clínicos randomizados controlados

# Extração das informações

Pasta1 - Excel								
Arquivo	Página Inicial	Inserir	Layout da Página	Fórmulas	Dados	Revisão	Exibir	Ajuda
H12								
	A	B	C	D	E	F	G	H
1	study	Me	SDe	Mc	SDc	Ne	Nc	control_type
2	Fulano 2009	9.5	2.5	12.8	3.1	25	30	active
3	Sicrano 2015	10.2	1.4	15.1	1.8	20	20	passive
4	Beltrano 2019	8.8	3.2	13.3	2.2	40	40	active

*Média, SD, N...*

Meta_Analysis_Data																
Arquivo	Página Inicial	Inserir	Layout da Página	Fórmulas	Dados	Revisão	Exibir	Ajuda	Compartilhar							
C28																
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Author	TE	seTE	RoB	Control	intervention duratic	intervention ty	population	type of studen	preven	gender	mode c	ROB str	ROB su	compe	instrun
2	Call et al.	0,7091		0,2608 low	WLC	short	mindfulness	undergraduate st	psychology	selective	female	group	high	high	none	DASS
3	Cavanagh et al.	0,3549		0,1964 low	WLC	short	mindfulness	students	general	universal	mixed	online	low	high	none	PSS
4	DanitzOrsillo	1,7912		0,3456 high	WLC	short	ACT	undergraduate st	general	universal	mixed	group	high	high	voucher/r	DASS
5	de Vibe et al.	0,1825		0,1178 low	no intervention	short	mindfulness	undergraduate st	general	universal	mixed	group	low	low	voucher/r	other
6	Frazier et al.	0,4219		0,1448 low	information only	short	PCI	students	psychology	universal	mixed	online	low	low	credit	PSS
7	Frogeli et al.	0,6300		0,1960 low	no intervention	short	ACT	undergraduate st	nursing students	selective	mixed	group	low	low	none	PSS

*Tamanho de efeito, erro padrão do TE...*

# Escalas de avaliação da qualidade

**Table A1** Jadad scale for reporting randomized controlled trials.

Item	Maximum points	Description	Examples
Randomization	2	1 point if randomization is mentioned	"The patients were randomly assigned into two groups"
		1 additional point if the method of randomization is appropriate	The randomization was accomplished using a computer-generated random number list, coin toss or well-shuffled envelopes
		Deduct 1 point if the method of randomization is inappropriate (minimum 0)	The group assignment was accomplished by alternate assignment, by birthday, hospital number or day of the week
Blinding	2	1 point if blinding is mentioned	"The trial was conducted in a double-blind fashion"
		1 additional point if the method of blinding is appropriate	Use of identical tablets or injectables, identical vials Use of tablets with similar looks but different taste
		Deduct 1 point if the method of blinding is inappropriate (minimum 0)	Incomplete masking
An account of all patients	1	The fate of all patients in the trial is known. If there are no data the reason is stated	"There were 40 patients randomized but the data from 1 patient in the treatment group and 2 in the control were eliminated because of a break in protocol"

Halpern, S. H., & Douglas, M. J. (2005). Appendix: Jadad scale for reporting randomized controlled trials. *Evidence-based Obstetric Anesthesia*. Oxford, UK: Blackwell Publishing Ltd, 237-8.

Review > [J Evid Based Med](#). 2015 Feb;8(1):2-10. doi: 10.1111/jebm.12141.

## The methodological quality assessment tools for preclinical and clinical studies, systematic review and meta-analysis, and clinical practice guideline: a systematic review

[Xiantao Zeng](#)<sup>1</sup>, [Yonggang Zhang](#), [Joey S W Kwong](#), [Chao Zhang](#), [Sheng Li](#), [Feng Sun](#), [Yuming Niu](#), [Liang Du](#)

Affiliations + expand

PMID: 25594108 DOI: [10.1111/jebm.12141](#)



# DESCRIÇÃO E ANÁLISE ESTATÍSTICA

Tamanho de efeito  
Modelos fixos e aleatórios  
Heterogeneidade

# Tamanho de efeito

Magnitude e direção de relacionamento entre duas variáveis ou de diferença entre duas populações

## Considerações

- Invariante
- Interpretável
- Calculado com base em medidas geralmente relatadas
- Boas propriedades técnicas

# Tamanho de efeito

## Famílias

- Comparação de médias
  - Diferença não padronizada das médias ( $D$ )
  - Diferença padronizada das médias ( $d$ ,  $g$ )
- Correlação
  - Coeficiente de correlação ( $r$ )
- Desfechos binários (categóricos)
  - Risco relativo (RR)
  - *Odds ratio* (OR) ou razão de chances

# Comparação de médias

## Diferença não padronizada ( $D$ )

	Grupos independentes	Grupos pareados
Diferença	$D = \bar{Y}_1 - \bar{Y}_2$	$D = \bar{Y}_1 - \bar{Y}_2$
Variância	$V_D = \frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}$	$V_D = \frac{S_{Diff}^2}{n}$
	$V_D = \frac{n_1 + n_2}{n_1 n_2} S_{Pooled}^2$	$V_D = \frac{S_{Diff}^2}{n}$
Erro padrão	$SE_D = \sqrt{V_D}$	$SE_D = \sqrt{V_D}$

- $S_{Pooled}^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}$
- $S_{Diff} = \sqrt{S_1^2 + S_2^2 - 2 \times r \times S_1 \times S_2}$  ou  $S_{Diff} = \sqrt{2 \times S_{Pooled}^2(1 - r)}$



# Comparação de médias

## Diferença padronizada $d$ de Cohen

Grupos independentes

$$d = \frac{Y_1 - Y_2}{S_{Pooled}}, v = \frac{n_1 + n_2}{n_1 n_2} + \frac{d^2}{2(n_1 + n_2)}$$

Grupos pareados

$$d = \left( \frac{\bar{Y}_1 - \bar{Y}_2}{S_{Difference}} \right) \sqrt{2(1-r)}, v = \left( \frac{1}{n} + \frac{d^2}{2n} \right) 2(1-r)$$

# Comparação de médias

## Diferença padronizada $d$ de Cohen

Table 11.1 Computing  $d$ , Independent Groups

Reported	Computation of Needed Quantities
$\bar{Y}_1, \bar{Y}_2, S_{Pooled}, n_1, n_2$	$d = \frac{Y_1 - Y_2}{S_{Pooled}}, v = \frac{n_1 + n_2}{n_1 n_2} + \frac{d^2}{2(n_1 + n_2)}$
$t, n_1, n_2$	$d = t \sqrt{\frac{n_1 + n_2}{n_1 n_2}}, v = \frac{n_1 + n_2}{n_1 n_2} + \frac{d^2}{2(n_1 + n_2)}$
$F, n_1, n_2$	$d = \pm \sqrt{\frac{F(n_1 + n_2)}{n_1 n_2}}, v = \frac{n_1 + n_2}{n_1 n_2} + \frac{d^2}{2(n_1 + n_2)}$
$p(\text{one-tailed}), n_1, n_2$	$d = \pm t^{-1}(p) \sqrt{\frac{n_1 + n_2}{n_1 n_2}}, v = \frac{n_1 + n_2}{n_1 n_2} + \frac{d^2}{2(n_1 + n_2)}$
$p(\text{two-tailed}), n_1, n_2$	$d = \pm t^{-1}\left(\frac{p}{2}\right) \sqrt{\frac{n_1 + n_2}{n_1 n_2}}, v = \frac{n_1 + n_2}{n_1 n_2} + \frac{d^2}{2(n_1 + n_2)}$

# Comparação de médias

## Diferença padronizada $d$ de Cohen

Table 11.2 Computing  $d$ , Matched Groups

Reported	Computation of Needed Quantities
$\bar{Y}_1, \bar{Y}_2, S_{\text{Difference}}, r, n$ (number of pairs)	$d = \left( \frac{\bar{Y}_1 - \bar{Y}_2}{S_{\text{Difference}}} \right) \sqrt{2(1-r)}, v = \left( \frac{1}{n} + \frac{d^2}{2n} \right) 2(1-r)$
$t$ (from paired $t$ -test), $r, n$	$d = t \sqrt{\frac{2(1-r)}{n}}, v = \left( \frac{1}{n} + \frac{d^2}{2n} \right) 2(1-r)$
$F$ (from repeated measures ANOVA), $r, n$	$d = \pm \sqrt{\frac{2F(1-r)}{n}}, v = \left( \frac{1}{n} + \frac{d^2}{2n} \right) 2(1-r)$
$p$ (one-tailed), $r, n$	$d = \pm t^{-1}(p) \sqrt{\frac{2(1-r)}{n}}, v = \left( \frac{1}{n} + \frac{d^2}{2n} \right) 2(1-r)$
$p$ (two-tailed), $r, n$	$d = \pm t^{-1}\left(\frac{p}{2}\right) \sqrt{\frac{2(1-r)}{n}}, v = \left( \frac{1}{n} + \frac{d^2}{2n} \right) 2(1-r)$

# Comparação de médias

Diferença padronizada  
 $g$  de Hedges

$$J(df) = 1 - \frac{3}{4df - 1}$$

$$g = J(df)d$$

$$V_g = [J(df)]^2 V_d$$

# Correlação

$$r, r_{pbis}$$

**Table 11.5 Computing  $r$**

Reported	Computation of Needed Quantities
$r, n$	$v_r = \frac{(1-r^2)^2}{n-1}, z = 0.5 \ln\left(\frac{1+r}{1-r}\right), v_z = \frac{1}{n-3}$
$t, n$	$r = \pm \sqrt{\frac{t^2}{t^2 + n - 2}}, v_r = \frac{(1-r^2)^2}{n-1}, z = 0.5 \ln\left(\frac{1+r}{1-r}\right), v_z = \frac{1}{n-3}$
$t, r$	$n = t^2 \left( \frac{1-r^2}{r^2} \right) - 2, v_r = \frac{(1-r^2)^2}{n-1}, z = 0.5 \ln\left(\frac{1+r}{1-r}\right), v_z = \frac{1}{n-3}$
$p(\text{one-tailed}), r$	$n = \left[ t^{-1}(p) \right]^2 \left( \frac{1-r^2}{r^2} \right) - 2, v_r = \frac{(1-r^2)^2}{n-1}, z = 0.5 \ln\left(\frac{1+r}{1-r}\right), v_z = \frac{1}{n-3}$
$p(\text{two-tailed}), r$	$n = \left[ t^{-1}\left(\frac{p}{2}\right) \right]^2 \left( \frac{1-r^2}{r^2} \right) - 2, v_r = \frac{(1-r^2)^2}{n-1}, z = 0.5 \ln\left(\frac{1+r}{1-r}\right), v_z = \frac{1}{n-3}$

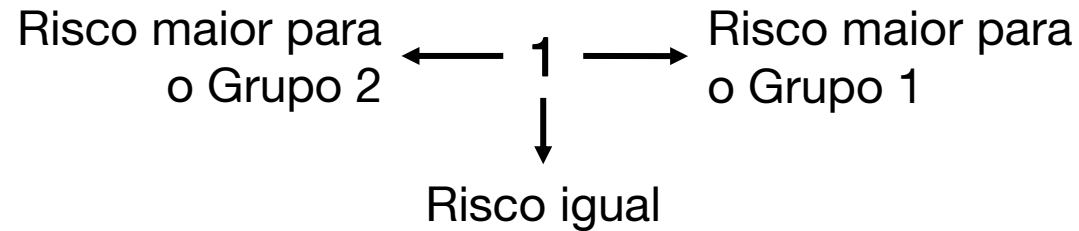
# Desfechos dicotômicos

## Risco Relativo

	Evento	Sem evento	Total
Grupo 1	A	B	A + B ( $n_1$ )
Grupo 2	C	D	C + D ( $n_2$ )

$$p_1 = A/n_1 \quad p_2 = C/n_2$$

$$RR = p_1/p_2 \rightarrow \ln(RR)$$



# Desfechos dicotômicos

## Risco Relativo

Table 11.9 Computing Risk Ratio, Independent Groups in Prospective Study

Reported	Computation of Needed Quantities
$A, B, C, D$	$RR = \frac{A/n_1}{C/n_2}, \ln RR = \ln(RR) V_{\ln RR} = \frac{1}{A} - \frac{1}{n_1} + \frac{1}{C} - \frac{1}{n_2}$
$p_1, p_2, n_1, n_2$	$RR = \frac{P_1}{P_2}, \ln RR = \ln(RR) V_{\ln RR} = \frac{1 - P_1}{n_1 P_1} + \frac{1 - P_2}{n_2 P_2}$
$RR, UD_{RD}, LL_{RD}, CI_{Level}$	$RR = \text{Given } \ln RR = \ln(RR) LL_{\ln RR} = \ln(LL_{RR}) UL_{\ln RR} = \ln(UL_{RR})$ $V_{\ln RR} = \left( \frac{UL_{\ln RR} - LL_{\ln RR}}{2Z} \right)^2 \text{ or } \left( \frac{UL_{\ln RR} - \ln RR}{Z} \right)^2 \text{ or } \left( \frac{\ln RR - LL_{\ln RR}}{Z} \right)^2$

# Desfechos dicotômicos

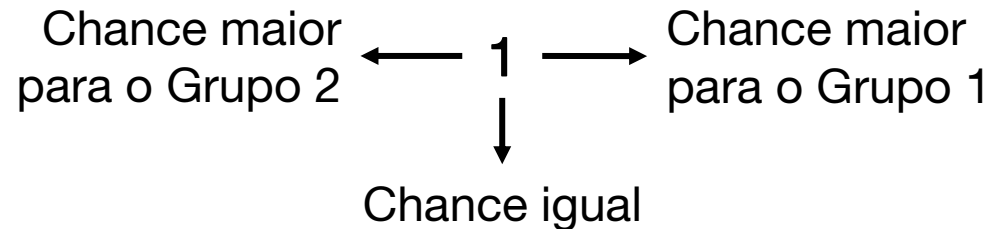
## Razão de chances (*odds ratio*)

	Evento	Sem evento	Total
Grupo 1	A	B	A + B ( $n_1$ )
Grupo 2	C	D	C + D ( $n_2$ )

$$p_1 = A/n_1 \quad p_2 = C/n_2$$

***Odds ratio***

$$OR = \frac{p_1/(1-p_1)}{p_2/(1-p_2)} \rightarrow \ln(OR)$$





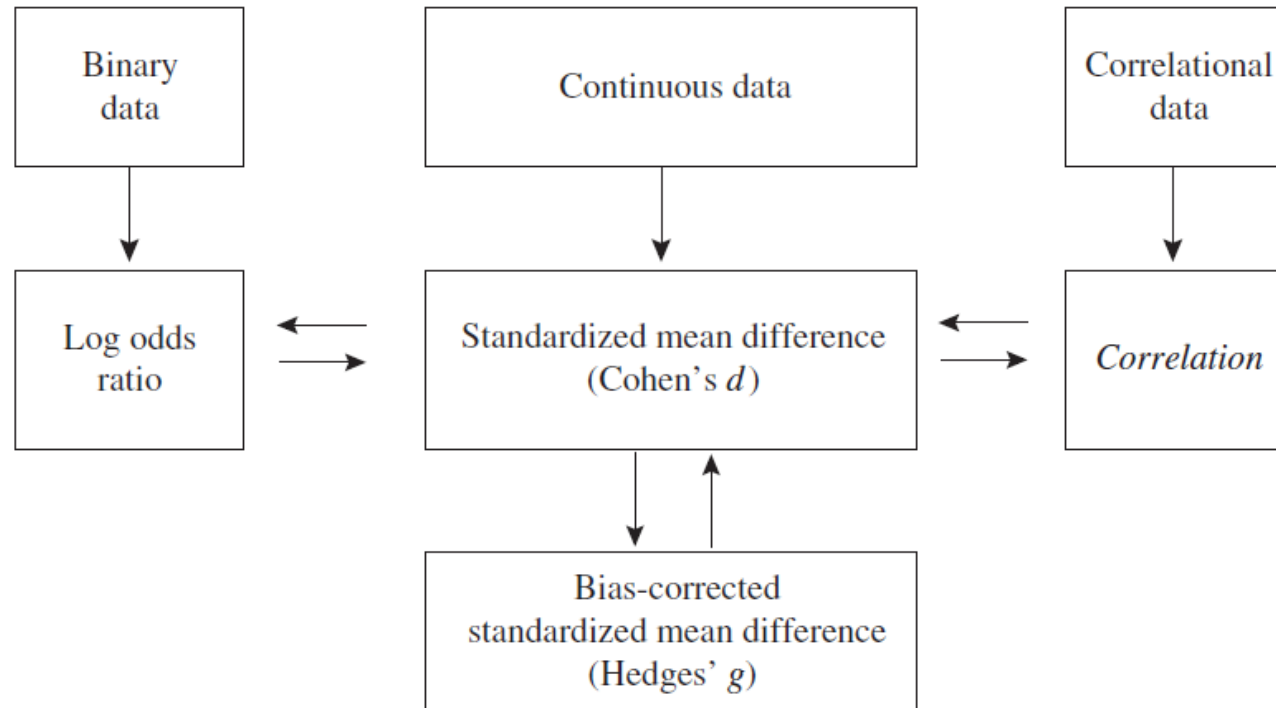
# Desfechos dicotômicos

## Razão de chances (*odds ratio*)

Table 11.10 Computing Odds Ratio, Independent Groups in a Prospective Study

Reported	Computation of Needed Quantities
$A, B, C, D$	$OR = \frac{AD}{BC}, \ln OR = \ln(OR) \quad V_{\ln OR} = \frac{1}{A} + \frac{1}{B} + \frac{1}{C} + \frac{1}{D}$
$p_1, p_2, n_1, n_2$	$OR = \frac{p_1(1-p_2)}{p_2(1-p_1)} \quad \ln OR = \ln(OR) \quad V_{\ln OR} = \frac{1}{n_1 p_1} + \frac{1}{n_1(1-p_1)} + \frac{1}{n_2 p_2} + \frac{1}{n_2(1-p_2)}$
$OR, UL_{OR}, LL_{OR}, CI_{Level}$	$OR = \text{Given} \quad \ln OR = \ln(OR) \quad LL_{\ln OR} = \ln(LL_{OR}) \quad UL_{\ln OR} = \ln(UL_{OR})$ $V_{\ln OR} = \left( \frac{UL_{\ln OR} - LL_{\ln OR}}{2Z} \right)^2 \quad \text{or} \quad \left( \frac{UL_{\ln OR} - \ln OR}{Z} \right)^2 \quad \text{or} \quad \left( \frac{\ln OR - LL_{\ln OR}}{Z} \right)^2$

# Conversão entre tamanhos de efeito



# Conversão entre tamanhos de efeito

$$d = \frac{\ln(OR)\sqrt{3}}{\pi} \Leftrightarrow \ln(OR) = \frac{\pi d}{\sqrt{3}}$$

$$V_d = \frac{3V_{\ln(OR)}}{\pi^2}$$

$$V_{\ln(OR)} = \frac{\pi^2 v_d}{3}$$

$$d = \frac{2r}{\sqrt{1-r^2}} \Leftrightarrow r = \frac{d}{\sqrt{d^2 + a}}$$

$$v_d = \frac{4v_r}{(1-r^2)^3}$$

$$v_r = \frac{a^2 v_d}{(d^2 + a)^3}$$

$$a = \frac{(n_1 + n_2)^2}{n_1 n_2}$$

PSYCHOLOGICAL SCIENCE

General Article

## CONTRASTS AND CORRELATIONS IN EFFECT-SIZE ESTIMATION

By Ralph L. Rosnow,<sup>1</sup> Robert Rosenthal,<sup>2</sup> and Donald B. Rubin<sup>3</sup>

<sup>1</sup>Department of Psychology, Temple University; <sup>2</sup>Department of Psychology, University of California, Riverside; and

<sup>3</sup>Department of Statistics, Harvard University

# E se alguma medida não for relatada no artigo?



■ ■ ■

Commentary | [Open Access](#) | Published: 09 July 2014

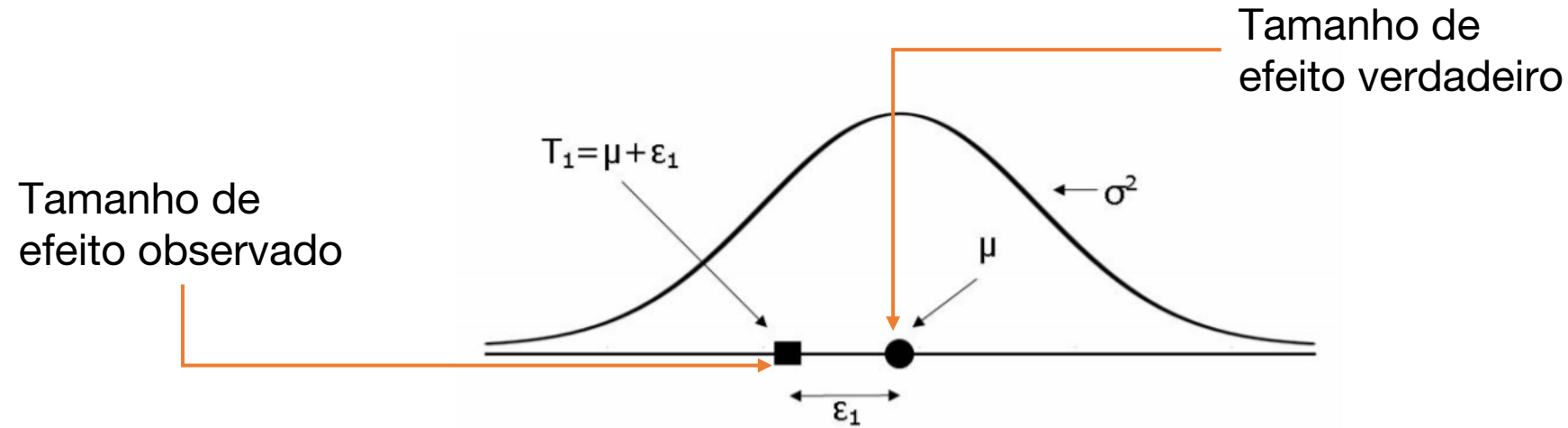
## Systematic review automation technologies

[Guy Tsafnat](#) , [Paul Glasziou](#), [Miew Keen Choong](#), [Adam Dunn](#), [Filippo Galgani](#) & [Enrico Coiera](#)

[Systematic Reviews](#) 3, Article number: 74 (2014) | [Cite this article](#)

COMBINANDO TE

# Combinando TE



$$\bar{T}_{\bullet} = \frac{\sum_{i=1}^k w_i T_i}{\sum_{i=1}^k w_i}$$

$$w_i = \frac{1}{v_i}$$

$$v_{\bullet} = \frac{1}{\sum_{i=1}^k (1/v_i)}$$

$$\bar{T}_{\bullet} - C_{\alpha} \leq \theta \leq \bar{T}_{\bullet} + C_{\alpha}$$

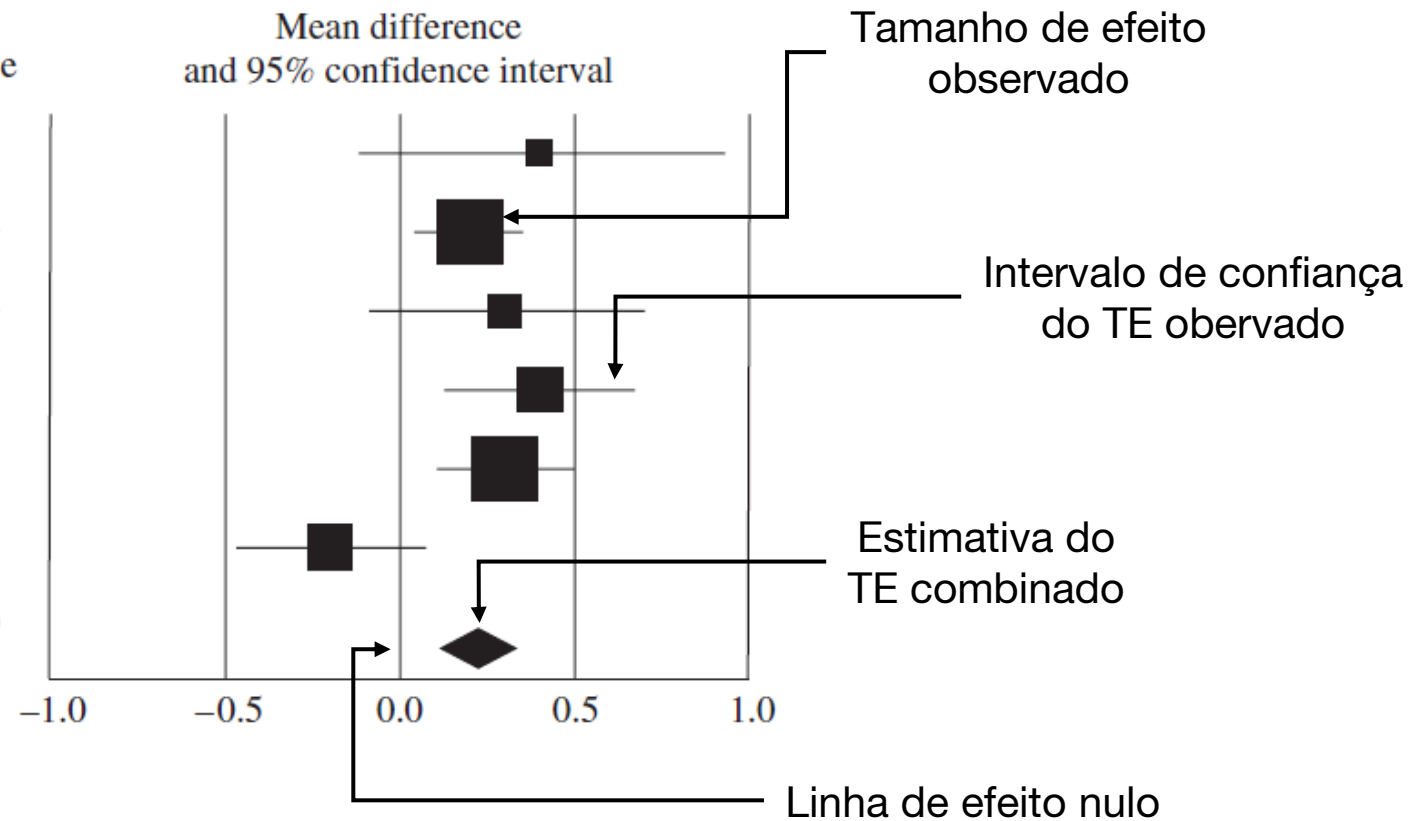
$$Z = \frac{|\bar{T}_{\bullet}|}{\sqrt{v_{\bullet}}}$$

$$[0.56, 1.23]$$

$$[-0.15, 0.35]$$

# Forest plot

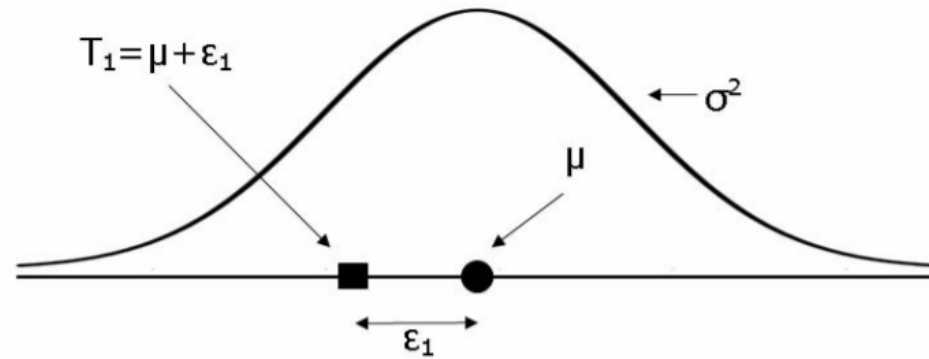
Study	Mean Difference	Sample Size	Variance	Standard Error	<i>p</i> -Value
A	0.400	60	0.067	0.258	0.121
B	0.200	600	0.007	0.082	0.014
C	0.300	100	0.040	0.201	0.134
D	0.400	200	0.020	0.141	0.005
E	0.300	400	0.010	0.100	0.003
F	-0.200	200	0.020	0.141	0.157
Combined	0.213		0.003	0.051	0.000



# MODELO FIXO VS ALEATÓRIO



# MODELO FIXO VS ALEATÓRIO



$$\bar{T}_{\bullet} = \frac{\sum_{i=1}^k w_i T_i}{\sum_{i=1}^k w_i}$$

$$w_i = \frac{1}{v_i}$$

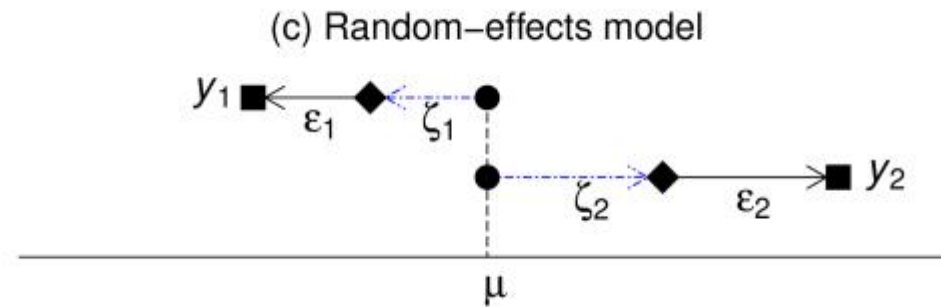
$$v_{\bullet} = \frac{1}{\sum_{i=1}^k (1/v_i)}$$

$$\bar{T}_{\bullet} - C_{\alpha} \leq \theta \leq \bar{T}_{\bullet} + C_{\alpha}$$

$$Z = \frac{|\bar{T}_{\bullet}|}{\sqrt{v_{\bullet}}}$$

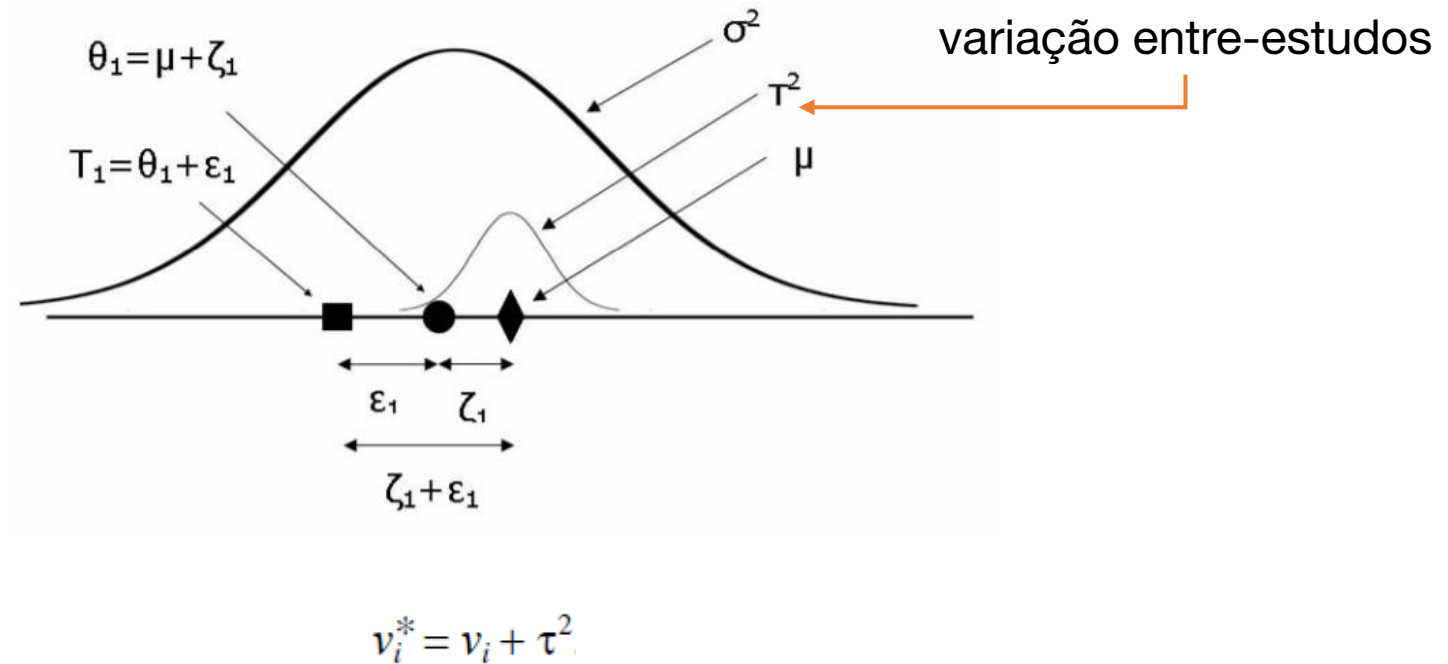
**Modelo fixo:** os estudos compartilham o mesmo tamanho de efeito verdadeiro

# MODELO FIXO VS ALEATÓRIO



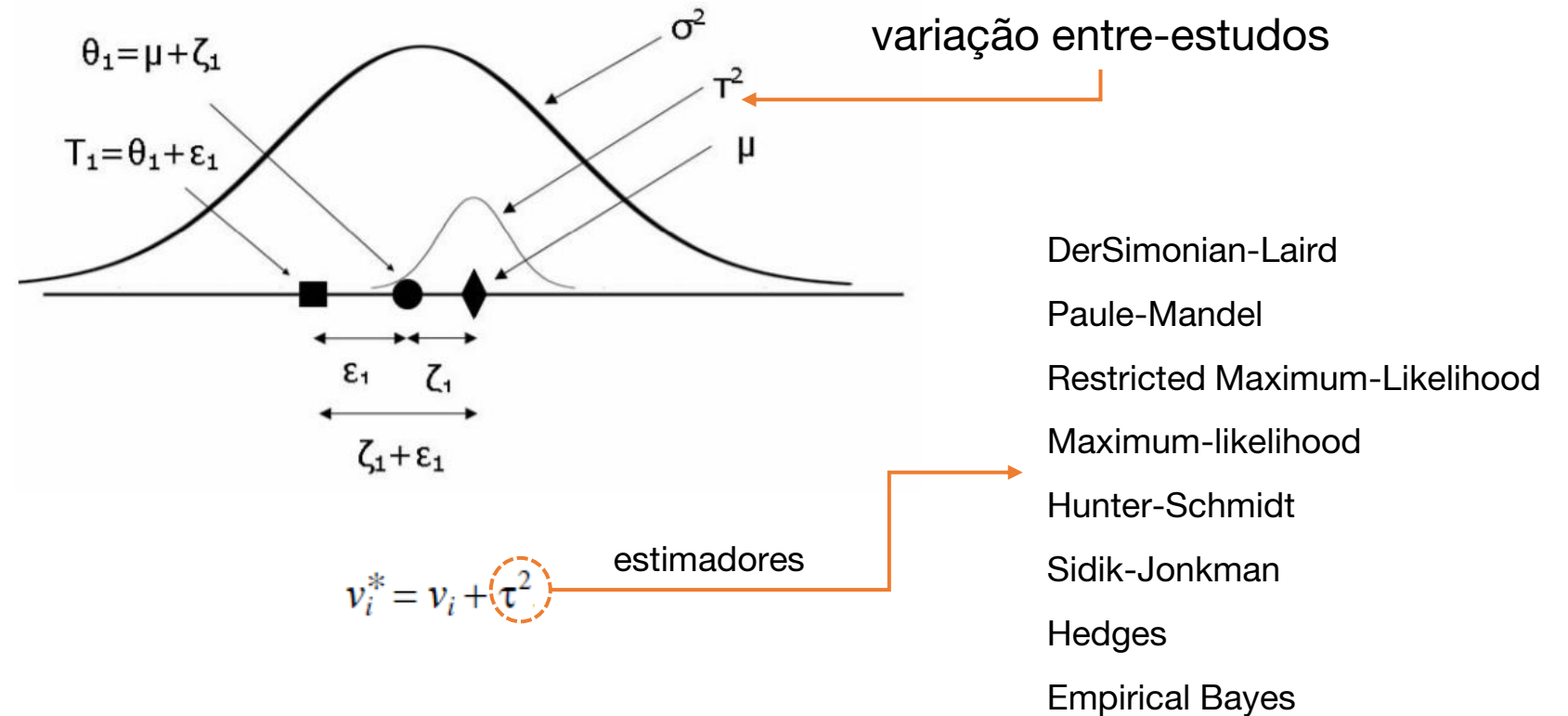
**Modelo aleatório:** existe uma distribuição de tamanhos de efeito verdadeiros

# MODELO FIXO VS ALEATÓRIO



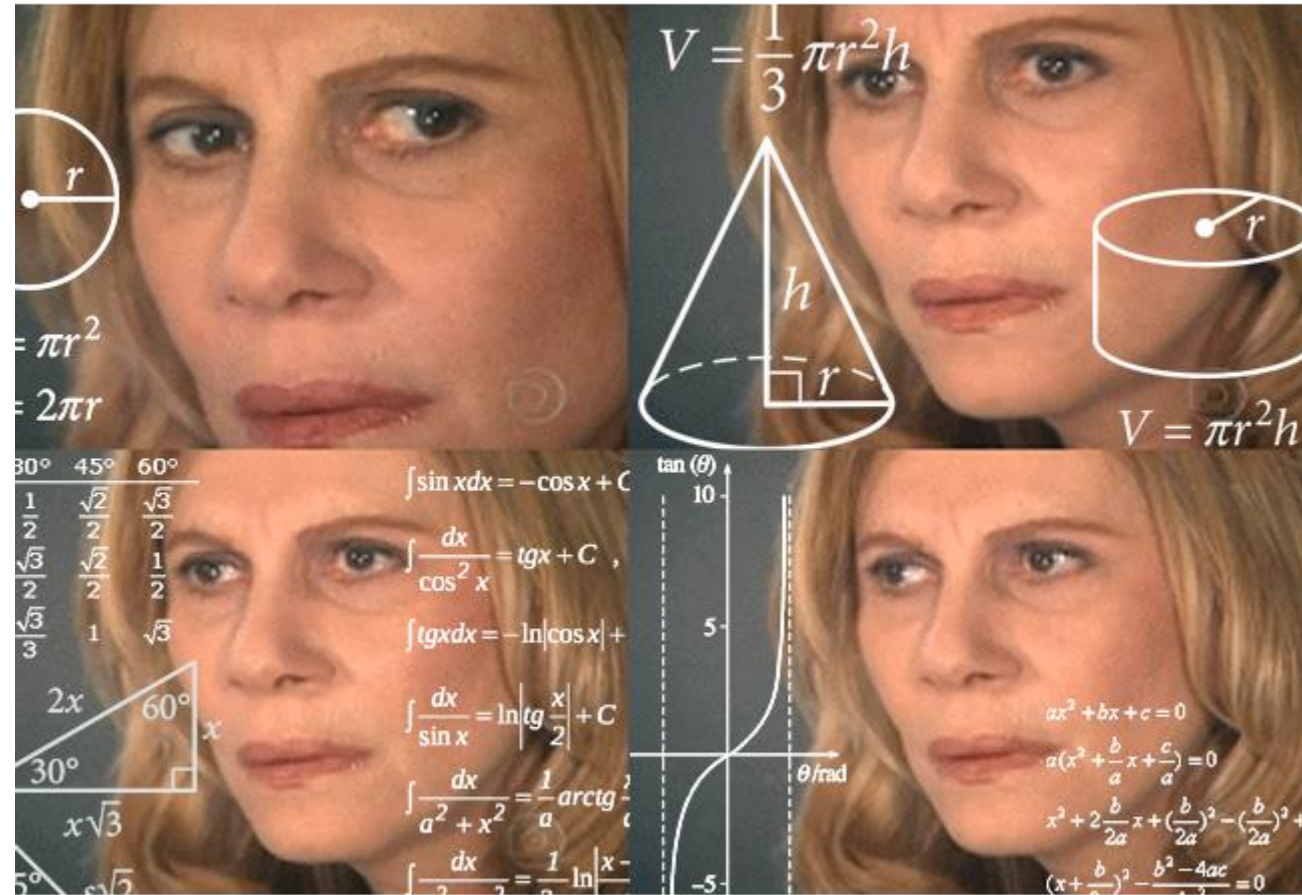
**Modelo aleatório:** existe uma distribuição de tamanhos de efeito verdadeiros

# MODELO FIXO VS ALEATÓRIO



**Modelo aleatório:** existe uma distribuição de tamanhos de efeito verdadeiros

# QUAL ESCOLHER?



# Heterogeneidade

- Metodológica – desenho experimental (randomização, cegamento, perda...)
- Clínica – características dos participantes e da intervenção
- Desfecho – instrumento de mensuração

Q de Cochran

$$Q = \sum_{i=1}^k [(T_i - \bar{T})^2 / v_i] = \sum_{i=1}^k w_i (T_i - \bar{T})^2$$

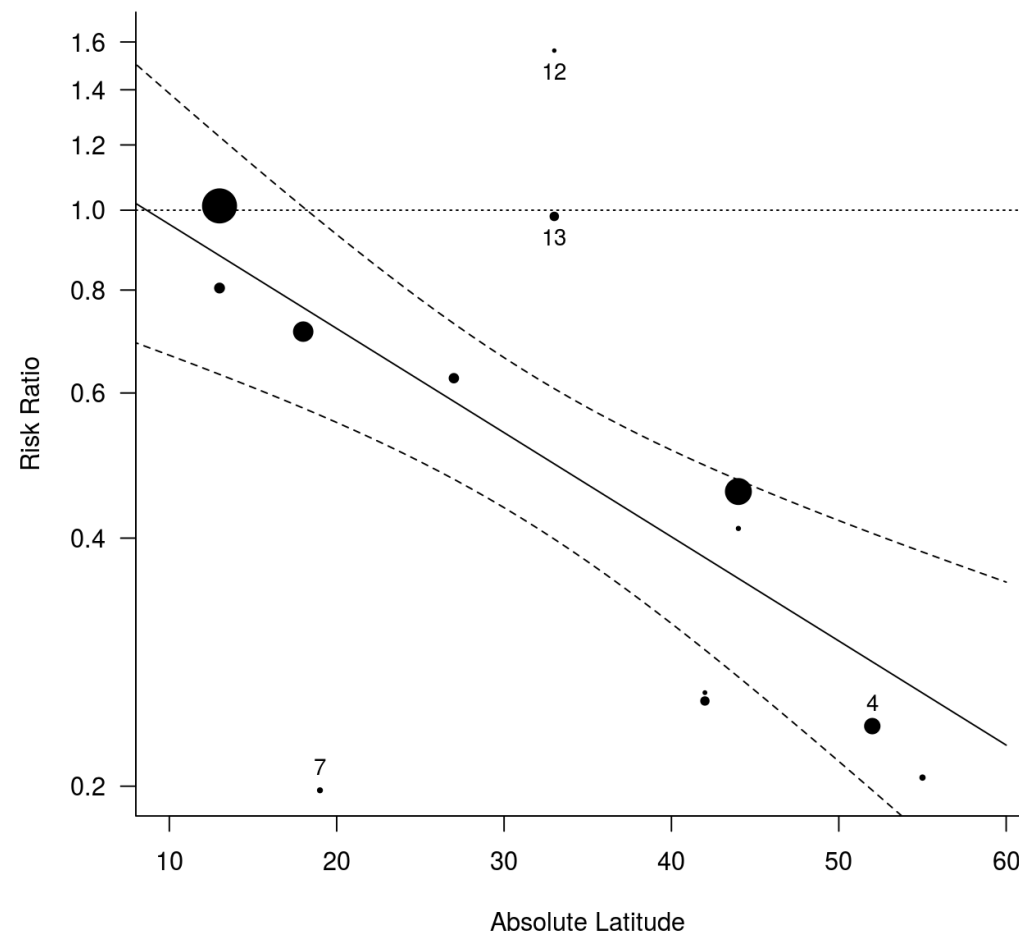
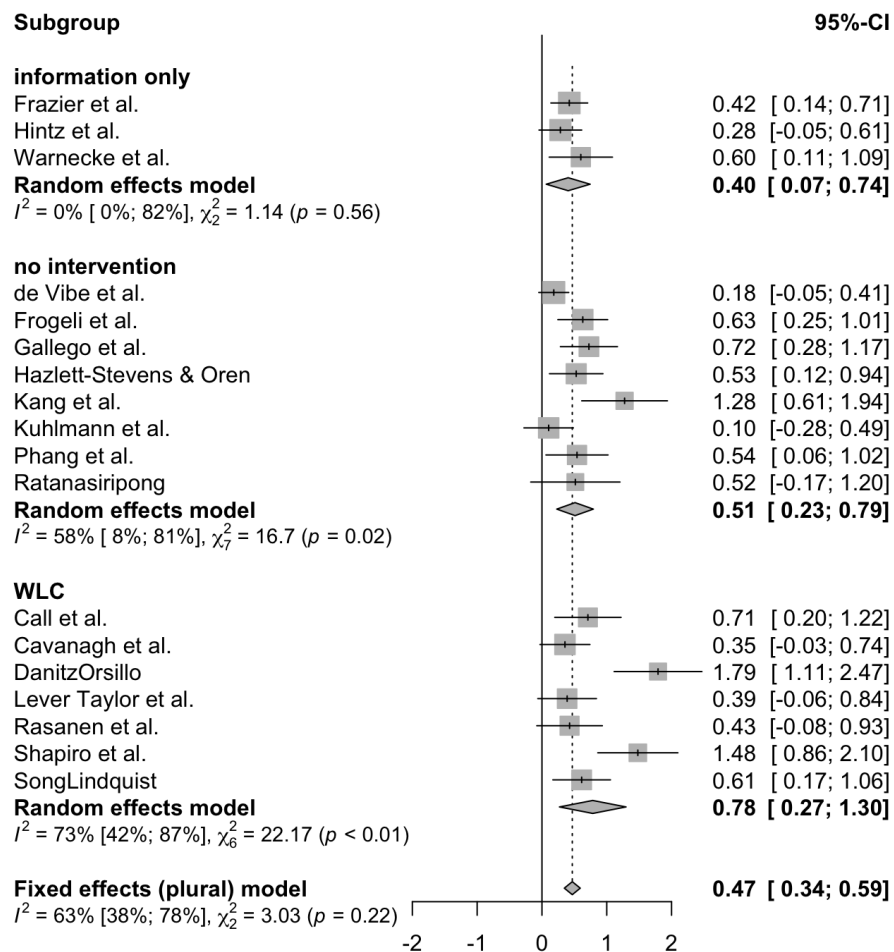
$\chi^2$ ;  $p < 0,10$

Proporção de variação que não é devido  
ao erro de amostragem

$$I^2 = 100\% * \left( \frac{Q - (k - 1)}{Q} \right)$$

- 25% - pouca heterogeneidade
- 50% - heterogeneidade moderada
- 75% - alta heterogeneidade

# Análise de subgrupo e metarregressão

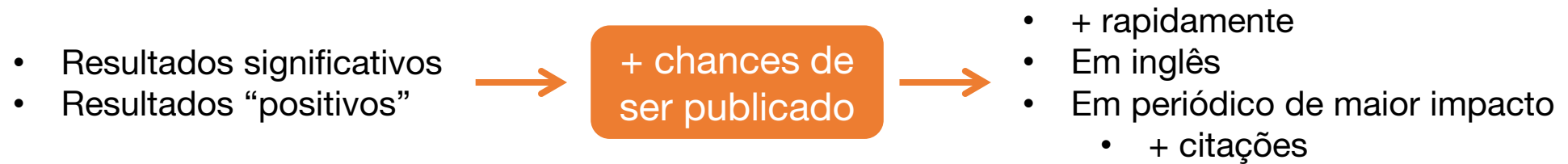




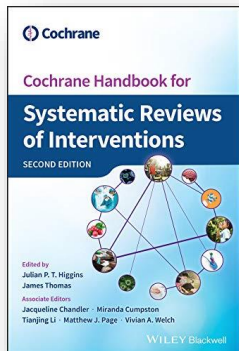
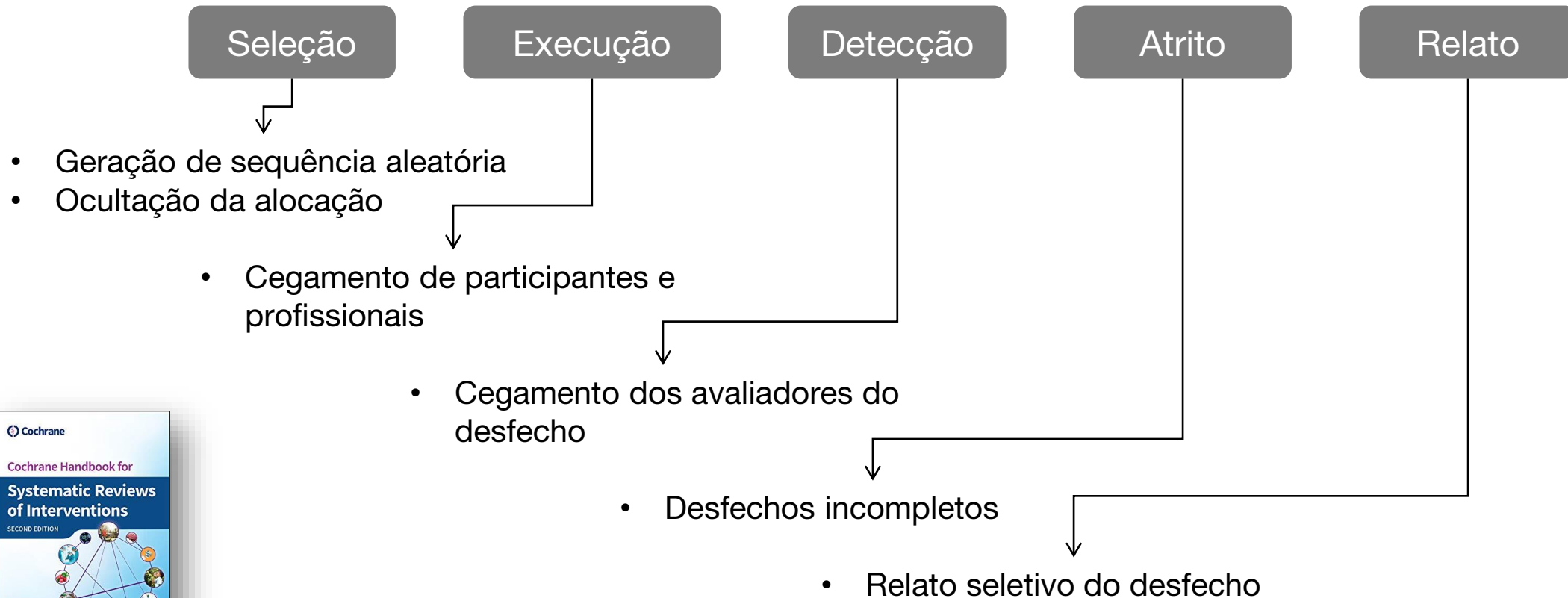
# **DIAGNÓSTICO E APRESENTAÇÃO DOS RESULTADOS**



# Viés de publicação



# Fontes de Viés

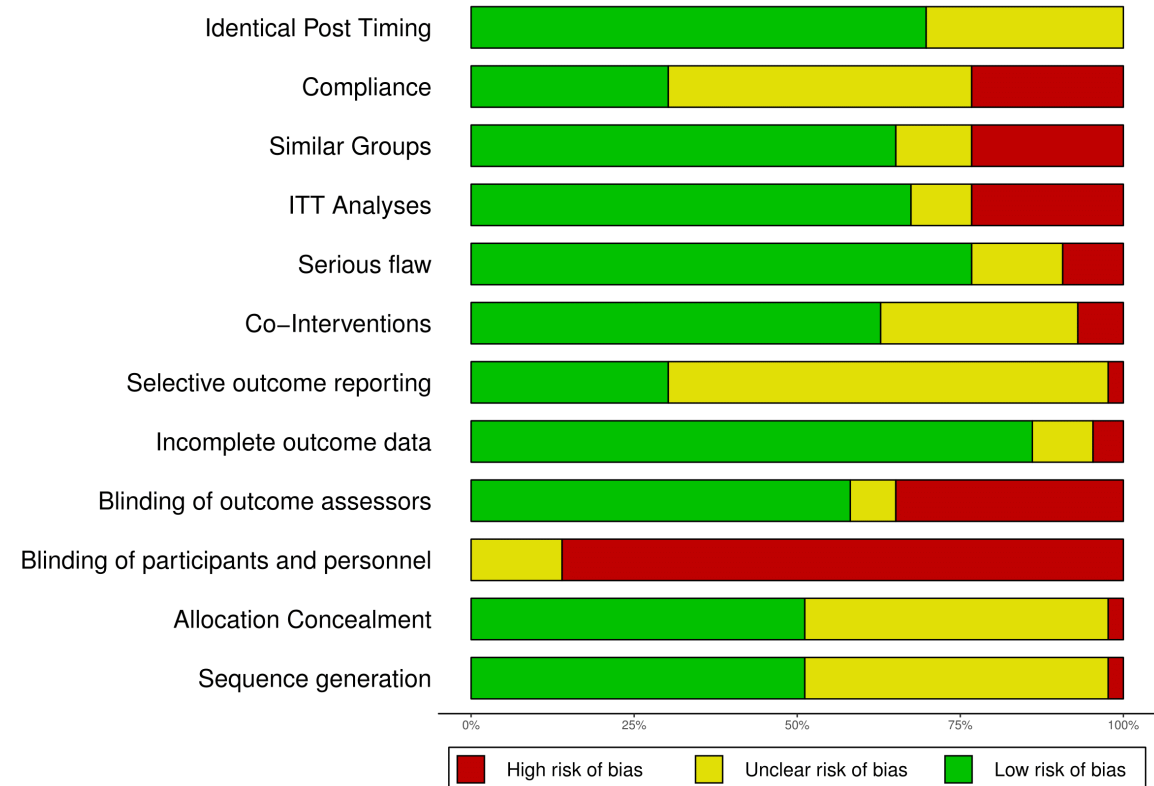


# Risco de viés

RevMan

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance)	Blinding of outcome assessment (detection bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Amore-Coffea 2000	?	?	?	+		?	-	+
Deliciozza 2004	+	?	?	?	+	?	-	+
Kahve-Paradiso 2002	-	-	?	+	+	+	+	+
Mama-Kaffa 1999	-	-	?	+	+	-	-	+
Morrocona 1998	+	?	?	+	+	+	+	+
Norscafe 1998	?	?	+	+	+	?	-	-
Oohlahlazza 1998	+	+	+	+		+	+	+
Piazza-Allerta 2003	?	?	?	?	+	+	+	+

RevMan  
R (dmetaR)

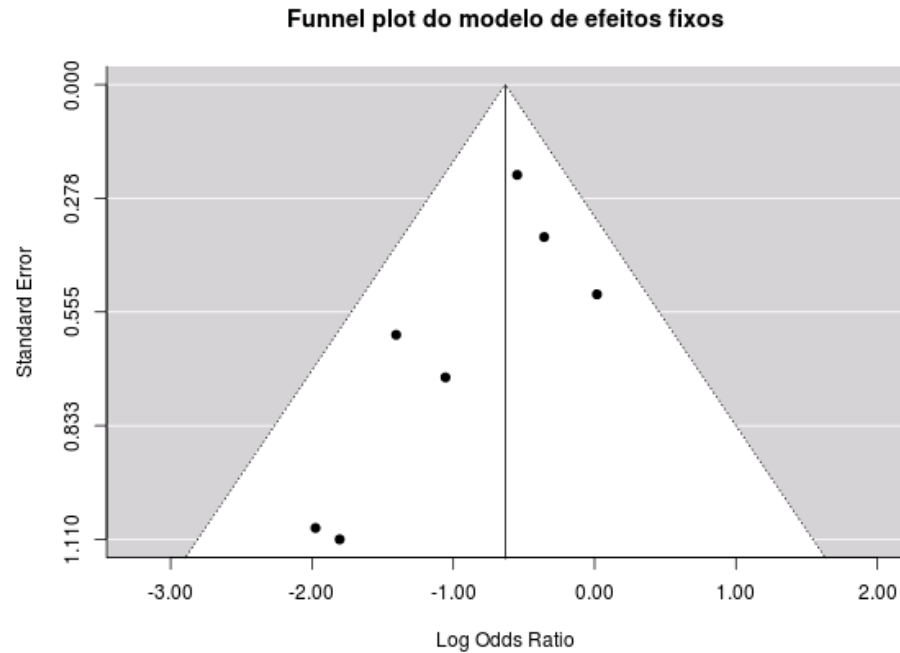


# Avaliação do viés

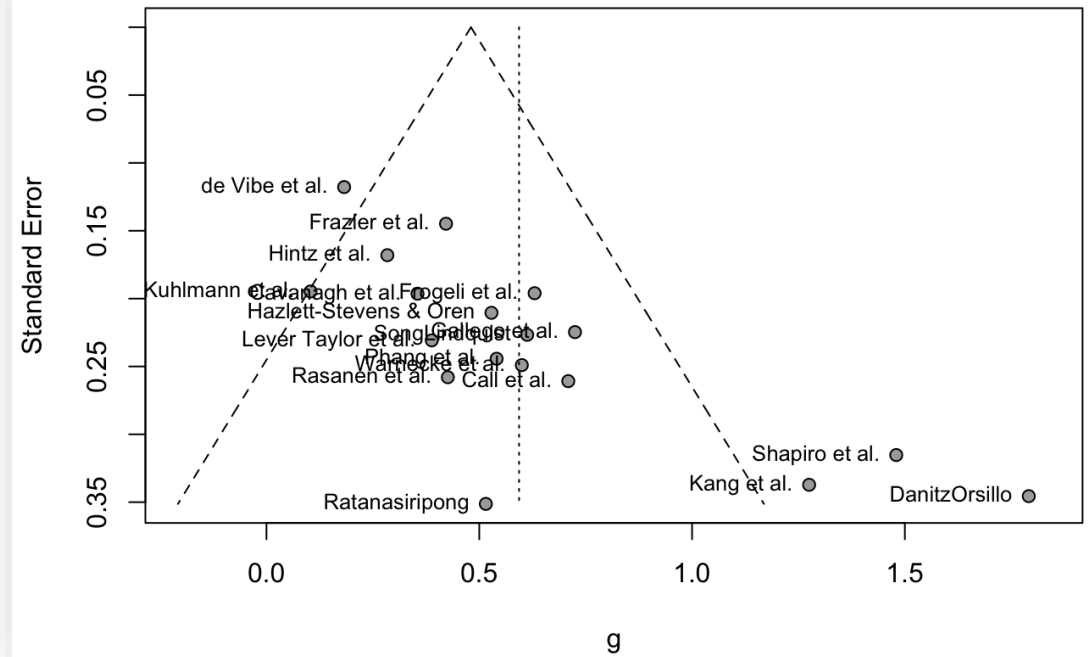
- Funnel plot
- Egger's regression
- p-Curve e p-Uniform
- Trim and fill
- ...

# Funnel plot

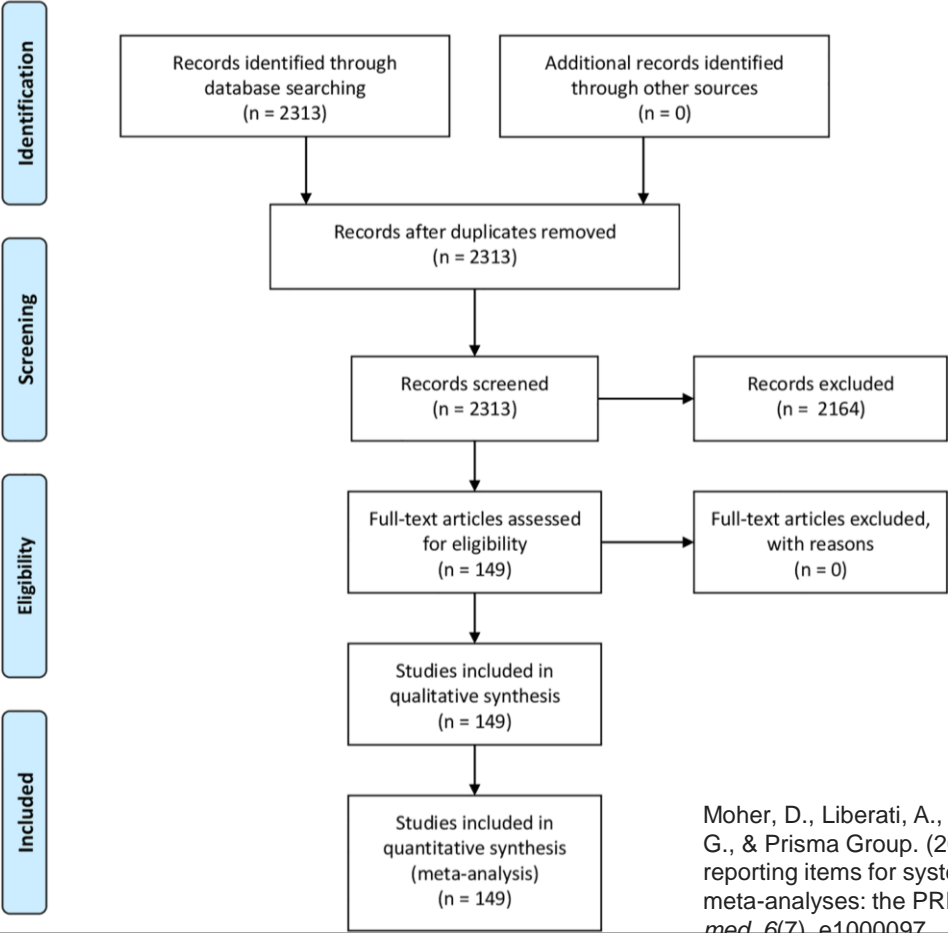
sem viés



com viés



# PRISMA flow diagram & checklist



Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Prisma Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS med*, 6(7), e1000097.

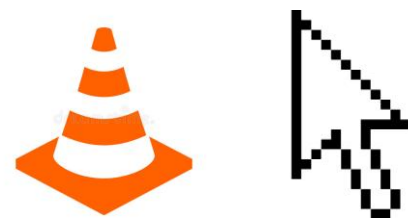
<http://www.prisma-statement.org/>

PRISMA 2009 Checklist			
Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	1-2
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	none
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	2
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	2-3
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	2
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	2
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	2-3
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	3
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	3
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	3
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	3-4
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., $I^2$ ) for each meta-analysis.	3
Page 1 of 2			
PRISMA 2009 Checklist			
Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	3
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	none
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	4
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	4
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	6
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	4-6
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	6
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	4
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	none
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	6-8
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	8
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	8
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	none
From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097			
For more information, visit: <a href="http://www.prisma-statement.org">www.prisma-statement.org</a> .			
Page 2 of 2			

# SOFTWARES



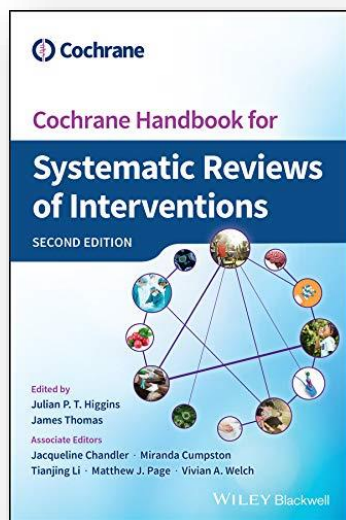
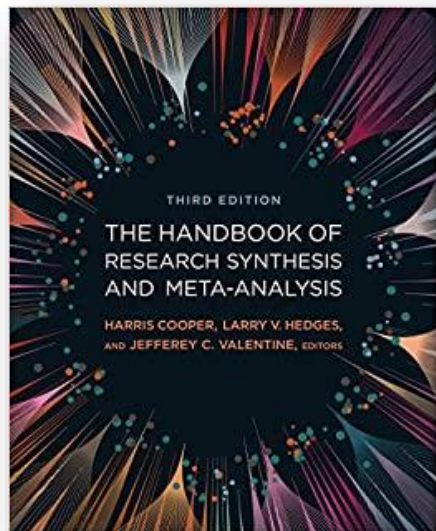
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DEMONSTRAÇÃO



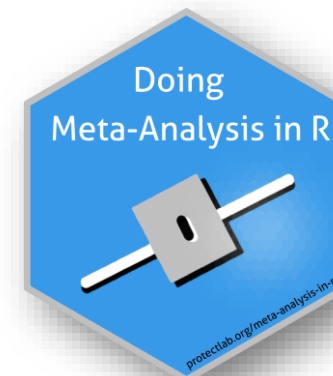
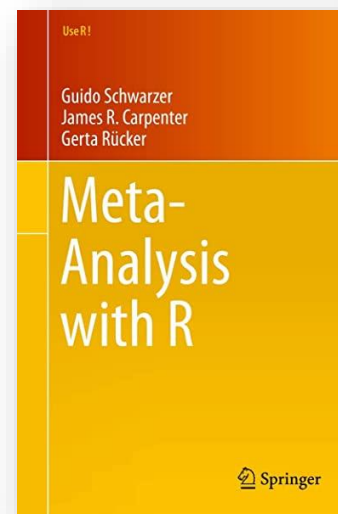
# Referências consultadas/sugeridas



<http://handbook-5-1.cochrane.org/>



[https://www.meta-analysis.com/pages/cma\\_manual.php?cart=B84V4905491](https://www.meta-analysis.com/pages/cma_manual.php?cart=B84V4905491)



Harrer, M., Cuijpers, P., Furukawa, T.A., & Ebert, D. D. (2019). Doing Meta-Analysis in R: A Hands-on Guide. [https://bookdown.org/MathiasHarrer/Doing\\_Meta\\_Analysis\\_in\\_R/](https://bookdown.org/MathiasHarrer/Doing_Meta_Analysis_in_R/).

dmeter

# Como elaborar uma metanálise?

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