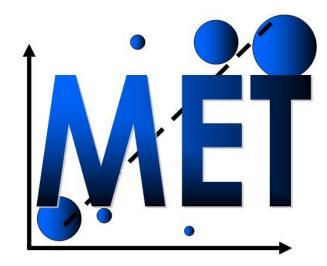
Tips and tricks for performing

standard meta-regression

analysis with SPSS

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Some bare facts

- A meta-regression analysis is a type of statistical analysis exploiting datasets build during systematic reviews
- It quantitatively explores interactions between a given effect (eg the risk of an event in patients treated with A vs B, as expressed with odds ratios) and a moderator or covariate of interest (eg prevalence of diabetes mellitus in each study)
- The key aspect of meta-regression is that each single study is given a specific weight which corresponds to its precision and/or size (to performed a weighted least squares [WLS] linear regression)

Building your dataset

- To perform a standard (fixed-effect) metaregression analysis with SPSS, it is crucial to compute and extract from each individual study:
 - Natural log of odds ratios (OR): In OR
 - Standard error (SE) of OR (or $\sqrt{variance}$)
 - Variance of OR (or SE²)
 - Inverse of variance: 1/variance
 - Sample size: N
 - Moderators (ie covariates or independent variables) of interest (eg prevalence [in %] of diabetes mellitus [DM] in each study)

Building your dataset

Ln OR

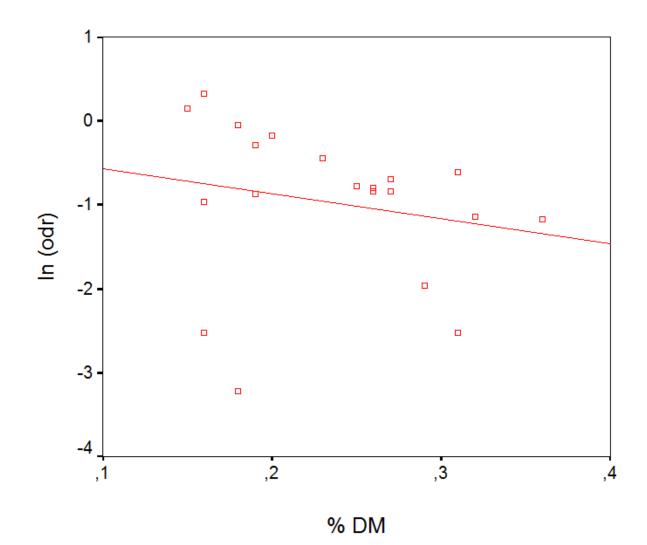
Moderator or covariate (eg DM)

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2	sekiguch	1,16	,15	# 75,00	,01	,07	,26	3,78	,56	,15	14,29
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7	han	,54	-,62	71,00	,01	,24	,49	2,04	-1,26	,31	4,17
8	kozuma	,50	-,69	119,00	,01	,12	,35	2,89	-2,00	,27	8,33
9	sekiya	,46	-,78	165,00	,01	,14	,37	2,67	-2,08	,25	7,14
10	tsuchik1	,45	-,80	252,00	,00	,05	,22	4,47	-3,57	,26	20,00
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12	kamishir	,43	-,84	111,00	,01	,17	,41	2,43	-2,05	,27	5,88
13	take	,42	-,87	82,00	,01	,16	,40	2,50	-2,17	,19	6,25
14	inoue	,38	-,97	66,00	,02	,29	,54	1,86	-1,80	,16	3,45
15	kunishim	,32	-1,14	76,00	,01	,37	,61	1,64	-1,87	,32	2,70
16	mizoguch	,31	-1,17	130,00	,01	,30	,55	1,83	-2,14	,36	3,33
17	yamasaki	,14	-1,97	35,00	,03	2,18	1,48	,68	-1,33	,29	,46
18	tsuchik2	,08	-2,53	37,00	,03	2,08	1,44	,69	-1,75	,31	,48
19	ochiai	,08	-2,53	44,00	,02	2,09	1,45	,69	-1,75	,16	,48
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Sample size

Inverse of variance

Scatterplot



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Analysis with SPSS

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	mizoguch	,31		130,00		,30	,55	1,83	-2,14	,36	3,33		
	yamasaki	,14		35,00		2,18	1,48	,68	-1,33	,29	,46		
	tsuchik2	,08		37,00		2,08	1,44	,69	-1,75	,31	,48		
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Analysis with SPSS

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21							
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Inverse of variance

Results with SPSS

			Model Sum	mary				
	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate			
	1	,742ª	,551	,526	1,01899			
	a. Pr	edictors: (Cor		, , , , , , , , , , , , , , , , , , ,				
				ANOV	Ąb,c			
			Quere of			1]	
	Model		Sum of Squares	df	Mean Square	F	Sig.	
	1	Regression				22,109	,000ª	
		Residual	18,690					
		Total	41,647	19				
Beta (meta-	a. Pr	P value for						
-	b. De	interaction						
regression	c. We							
coefficient)								
	\sim	_		dardized icients	Standardized Coefficients			
	Model		B	Std. Error	Beta	1 t	Sig.	,
	1	(Constant)	1,110	,310		3,575	,002	
		DM	-6,906	1,469	-,742	-4,702	,000	
	a. De	ependent Vari	able: In (odr)					

b. Weighted Least Squares Regression - Weighted by INVVAR

Reporting results

- In our example, we can conclude that we found a significant interaction between the treatment of interest vs the comparator (expressed as In OR) and the prevalence of diabetes (beta=-6,9, p<0.001).
- Thus treatment A becomes significantly more beneficial than treatment B with an increasing prevalence of diabetes

Further details

- Any SPSS version can be used (eg 11.0 [the version used in these examples] to 16.0)
- In selected cases, sample size can be used instead of the inverse of variance as weight for the regression analysis (yielding in this example beta=-6.1, p=0.018)
- This type of meta-regression is based on a fixedeffect method, but other approaches are needed for a random-effect meta-regression (eg GLM)
- Examples of similar meta-regression analyses:
 - Biondi-Zoccai et al, American Heart Journal 2005;149:504-11
 - Biondi-Zoccai et al, American Heart Journal 2007;153:587-93
 - Biondi-Zoccai et al, American Heart Journal 2008;155:1081-9

For further slides on meta-analysis, evidence-based medicine or similar topics please feel free to visit:

http://www.metcardio.org/slides.html http://www.imcsc-group.com

