

# Pain score at postoperative late (18 to 24 hours) period

Boohwi Hong

## Package install

## Data Preparation

## Model Fitting

## Results of Model

```
##      Length      Class      Mode
##           25 character character

## Number of studies: k = 17
## Number of treatments: n = 5
## Number of pairwise comparisons: m = 23
## Number of designs: d = 9
##
## Random effects model
##
## Treatment estimate (sm = 'MD', comparison: other treatments vs 'Control'):
##           MD           95%-CI      z  p-value
## Control      .             .         .      .
## ESPB    -0.8822 [-1.2819; -0.4824] -4.33 < 0.0001
## INB     -0.8563 [-1.3801; -0.3324] -3.20  0.0014
## SPB     -0.1824 [-0.7175;  0.3527] -0.67  0.5042
## TPVB    -0.9683 [-1.3516; -0.5851] -4.95 < 0.0001
##
## Quantifying heterogeneity / inconsistency:
## tau^2 = 0.1928; tau = 0.4391; I^2 = 81.8% [71.9%; 88.2%]
##
## Tests of heterogeneity (within designs) and inconsistency (between designs):
##           Q d.f.  p-value
## Total           87.91  16 < 0.0001
## Within designs  52.74   9 < 0.0001
## Between designs 35.17   7 < 0.0001

## Original data (with adjusted standard errors for multi-arm studies):
##
##           treat1 treat2      TE  seTE seTE.adj narms multiarm
## Liu,2021      Control  ESPB  1.0000 0.1581  0.1581    2
## Hu,2021       Control  TPVB  1.0000 0.1329  0.1329    2
```

Study	Design	Comparison	MD	95%-CI	95%-CI	CI	Significance
## Zhao,2020	ESPB	TPVB	0.3000	0.2125	0.2125	2	
## Viti,2020	Control	SPB	1.7000	0.4578	0.4578	2	
## Turhan,2020	ESPB	TPVB	1.3000	0.7063	0.8269	3	*
## Turhan,2020	INB	TPVB	0.3000	0.4641	0.4876	3	*
## Turhan,2020	ESPB	INB	1.0000	0.7653	1.2678	3	*
## Finnerty,2020	ESPB	SPB	-2.0000	0.5624	0.5624	2	
## Ciftci,2020	ESPB	TPVB	-0.2000	0.1291	0.1581	3	*
## Ciftci,2020	Control	TPVB	1.3000	0.1291	0.1581	3	*
## Ciftci,2020	Control	ESPB	1.5000	0.1291	0.1581	3	*
## Ciftci, 2019	Control	ESPB	0.9000	0.2582	0.2582	2	
## Haichen Chu,2020,BMC	Control	TPVB	0.8000	0.2858	0.2858	2	
## Gaballah,2019	ESPB	SPB	-0.2000	0.1426	0.1426	2	
## Wu, 2018	INB	TPVB	0.2000	0.0985	0.0985	2	
## Okmen,2018	Control	SPB	-1.3000	0.2846	0.2846	2	
## Kim, 2018	Control	SPB	1.0000	0.4990	0.4990	2	
## Ahmed,2017	Control	INB	0.7000	0.1065	0.1065	2	
## Kaya,2006	Control	TPVB	0.5000	0.4344	0.4344	2	
## Vogt,2005	Control	TPVB	0.3000	0.5385	0.5385	2	
## Chen,2020	INB	TPVB	-0.0000	0.2309	0.3174	3	*
## Chen,2020	ESPB	INB	0.2000	0.2041	0.2380	3	*
## Chen,2020	ESPB	TPVB	0.2000	0.2041	0.2380	3	*

##  
## Number of treatment arms (by study):

Study	narms
## Liu,2021	2
## Hu,2021	2
## Zhao,2020	2
## Viti,2020	2
## Turhan,2020	3
## Finnerty,2020	2
## Ciftci,2020	3
## Ciftci, 2019	2
## Haichen Chu,2020,BMC	2
## Gaballah,2019	2
## Wu, 2018	2
## Okmen,2018	2
## Kim, 2018	2
## Ahmed,2017	2
## Kaya,2006	2
## Vogt,2005	2
## Chen,2020	3

##  
## Results (random effects model):

Study	treat1	treat2	MD	95%-CI	95%-CI
## Liu,2021	Control	ESPB	0.8822	[ 0.4824;	1.2819]
## Hu,2021	Control	TPVB	0.9683	[ 0.5851;	1.3516]
## Zhao,2020	ESPB	TPVB	0.0861	[-0.3330;	0.5053]
## Viti,2020	Control	SPB	0.1824	[-0.3527;	0.7175]
## Turhan,2020	ESPB	TPVB	0.0861	[-0.3330;	0.5053]
## Turhan,2020	INB	TPVB	0.1120	[-0.3769;	0.6010]
## Turhan,2020	ESPB	INB	-0.0259	[-0.5755;	0.5237]
## Finnerty,2020	ESPB	SPB	-0.6998	[-1.2520;	-0.1477]
## Ciftci,2020	ESPB	TPVB	0.0861	[-0.3330;	0.5053]

```

## Ciftci,2020          Control  TPVB  0.9683 [ 0.5851;  1.3516]
## Ciftci,2020          Control  ESPB  0.8822 [ 0.4824;  1.2819]
## Ciftci, 2019         Control  ESPB  0.8822 [ 0.4824;  1.2819]
## Haichen Chu,2020,BMC Control  TPVB  0.9683 [ 0.5851;  1.3516]
## Gaballah,2019       ESPB     SPB  -0.6998 [-1.2520; -0.1477]
## Wu, 2018             INB     TPVB  0.1120 [-0.3769;  0.6010]
## Okmen,2018          Control  SPB  0.1824 [-0.3527;  0.7175]
## Kim, 2018           Control  SPB  0.1824 [-0.3527;  0.7175]
## Ahmed,2017          Control  INB  0.8563 [ 0.3324;  1.3801]
## Kaya,2006           Control  TPVB  0.9683 [ 0.5851;  1.3516]
## Vogt,2005           Control  TPVB  0.9683 [ 0.5851;  1.3516]
## Chen,2020           INB     TPVB  0.1120 [-0.3769;  0.6010]
## Chen,2020           ESPB     INB  -0.0259 [-0.5755;  0.5237]
## Chen,2020           ESPB     TPVB  0.0861 [-0.3330;  0.5053]
##
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## Quantifying heterogeneity / inconsistency:
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##
## Tests of heterogeneity (within designs) and inconsistency (between designs):
##           Q d.f.  p-value
## Total           87.91  16 < 0.0001
## Within designs  52.74   9 < 0.0001
## Between designs 35.17   7 < 0.0001
##
## Q statistics to assess homogeneity / consistency
##
##           Q df  p-value
## Total           87.91 16 < 0.0001
## Within designs  52.74  9 < 0.0001
## Between designs 35.17  7 < 0.0001
##
## Design-specific decomposition of within-designs Q statistic
##
##           Design      Q df  p-value
## Control vs ESPB  0.11  1  0.7412
## Control vs SPB  37.94  2 < 0.0001
## Control vs TPVB  2.78  3  0.4273
## ESPB vs SPB     9.62  1  0.0019
## ESPB vs INB vs TPVB 2.29  2  0.3181

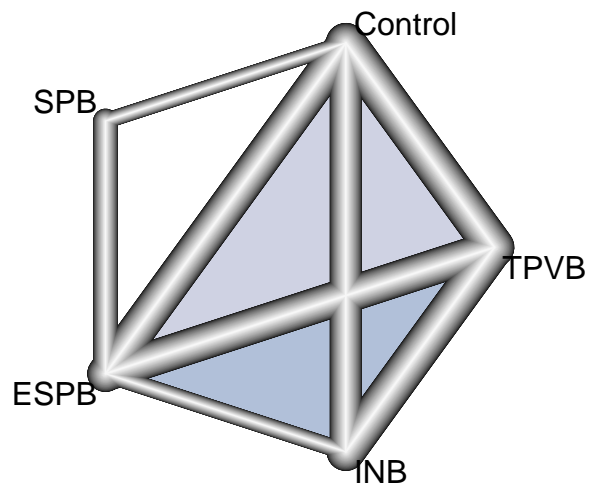
```

```

##
## Between-designs Q statistic after detaching of single designs
##
##      Detached design      Q df  p-value
##      Control vs ESPB 35.16  6 < 0.0001
##      Control vs INB  32.86  6 < 0.0001
##      Control vs SPB  23.15  6  0.0007
##      Control vs TPVB 33.49  6 < 0.0001
##      ESPB vs SPB    23.15  6  0.0007
##      ESPB vs TPVB  33.47  6 < 0.0001
##      INB vs TPVB   35.15  6 < 0.0001
## Control vs ESPB vs TPVB 10.25  5  0.0685
##   ESPB vs INB vs TPVB 29.75  5 < 0.0001
##
## Q statistic to assess consistency under the assumption of
## a full design-by-treatment interaction random effects model
##
##      Q df p-value tau.within tau2.within
## Between designs 2.39  7  0.9351    0.7208    0.5196

```

## Network Graph



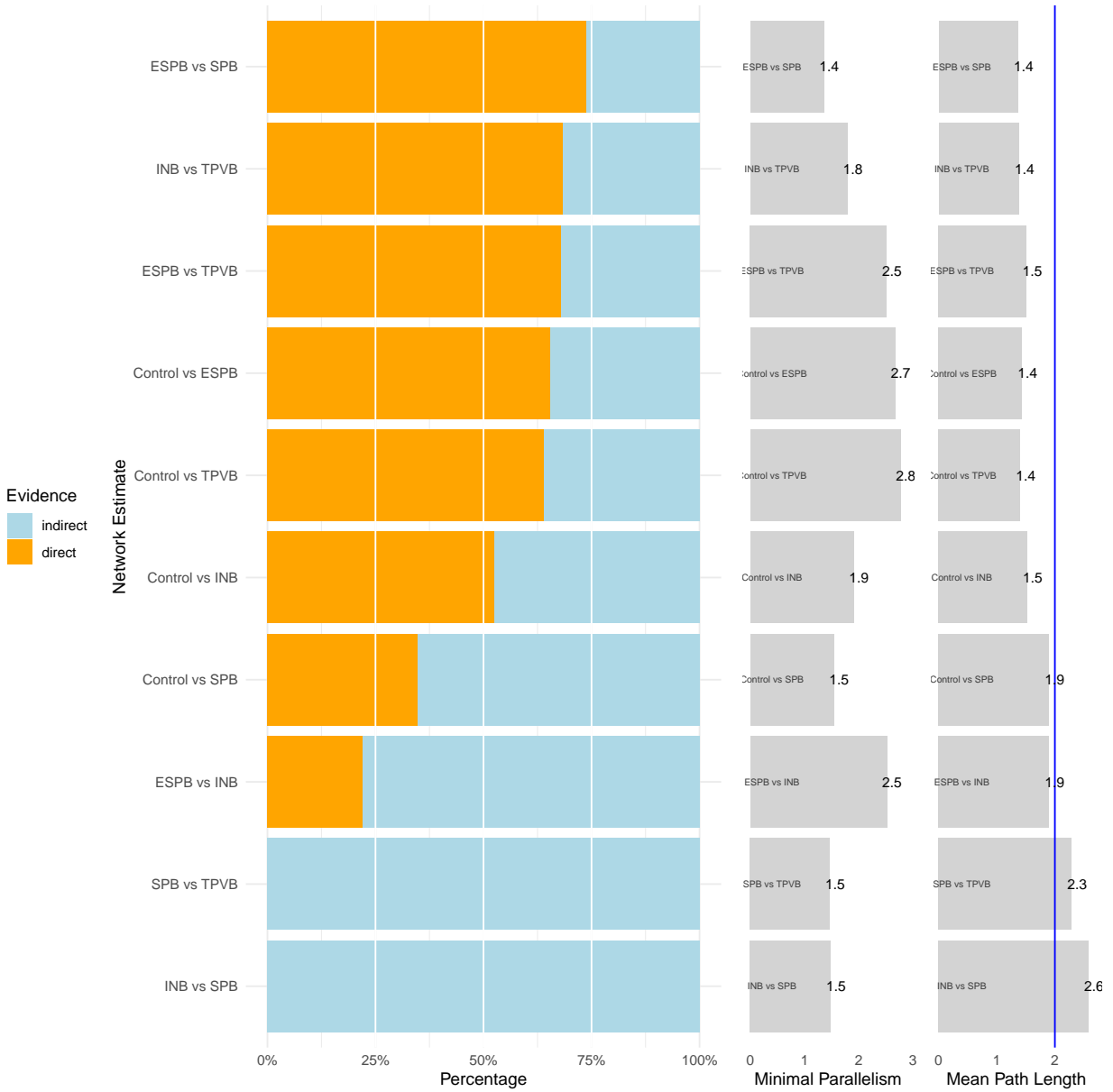
## Visualizing Direct and Indirect Evidence

## Extensive documentation for the dmetar package can be found at:  
## [www.bookdown.org/MathiasHarrer/Doing\\_Meta\\_Analysis\\_in\\_R/](http://www.bookdown.org/MathiasHarrer/Doing_Meta_Analysis_in_R/)

## Direct Evidence Proportion for each Network Estimate

```
## -----  
##           Direct Indirect meanpath  minpar  
## ESPB vs SPB    0.7370   0.2630 1.361958 1.356827  
## INB vs TPVB    0.6834   0.3166 1.379810 1.795521  
## ESPB vs TPVB   0.6795   0.3205 1.512666 2.514024  
## Control vs ESPB 0.6546   0.3454 1.429779 2.672841  
## Control vs TPVB 0.6400   0.3600 1.402395 2.770725  
## Control vs INB  0.5258   0.4742 1.521009 1.901922  
## Control vs SPB  0.3487   0.6513 1.896440 1.535336  
## ESPB vs INB    0.2209   0.7791 1.895540 2.515479  
## INB vs SPB     0.0000   1.0000 2.576422 1.482947  
## SPB vs TPVB    0.0000   1.0000 2.285619 1.466518
```

Direct evidence proportion for each network estimate (fixed-effect model)



## Effect Estimate Table

```

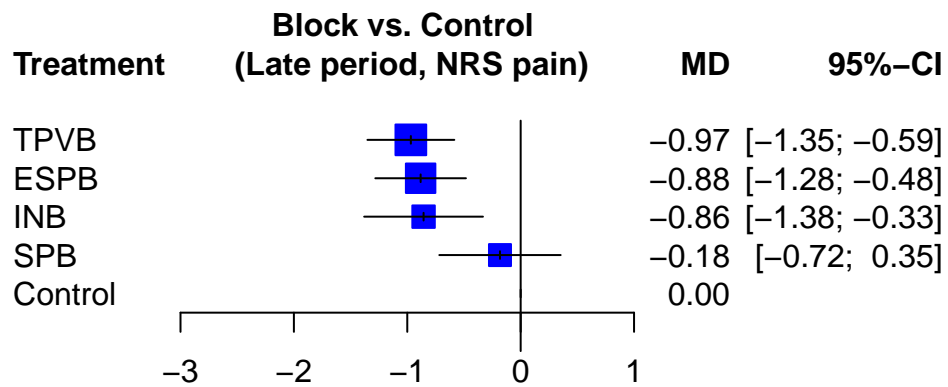
##           Control  ESPB    INB    SPB  TPVB
## Control          NA 0.882 0.856 0.182 0.968
## ESPB             NA  NA -0.026 -0.700 0.086
## INB              NA  NA  NA -0.674 0.112
## SPB              NA  NA  NA  NA 0.786
## TPVB             NA  NA  NA  NA  NA

## League table (random effects model):
##
##           Control  1.15 ( 0.61;  1.69)  0.70 (-0.19;  1.59)
## 0.88 ( 0.48;  1.28)                    ESPB 0.39 (-0.45;  1.22)
## 0.86 ( 0.33;  1.38) -0.03 (-0.58;  0.52)                    INB
## 0.18 (-0.35;  0.72) -0.70 (-1.25; -0.15) -0.67 (-1.38;  0.03)
## 0.97 ( 0.59;  1.35) 0.09 (-0.33;  0.51) 0.11 (-0.38;  0.60)
##
## 0.21 (-0.47;  0.88) 0.88 ( 0.42;  1.35)
## -0.73 (-1.49;  0.03) 0.21 (-0.30;  0.72)
## . 0.15 (-0.43;  0.73)
##           SPB
## 0.79 ( 0.17;  1.40)                    TPVB

```

## Ranking and Forest plot

##	P-score
## TPVB	0.8310
## ESPB	0.7185
## INB	0.6895
## SPB	0.1979
## Control	0.0632



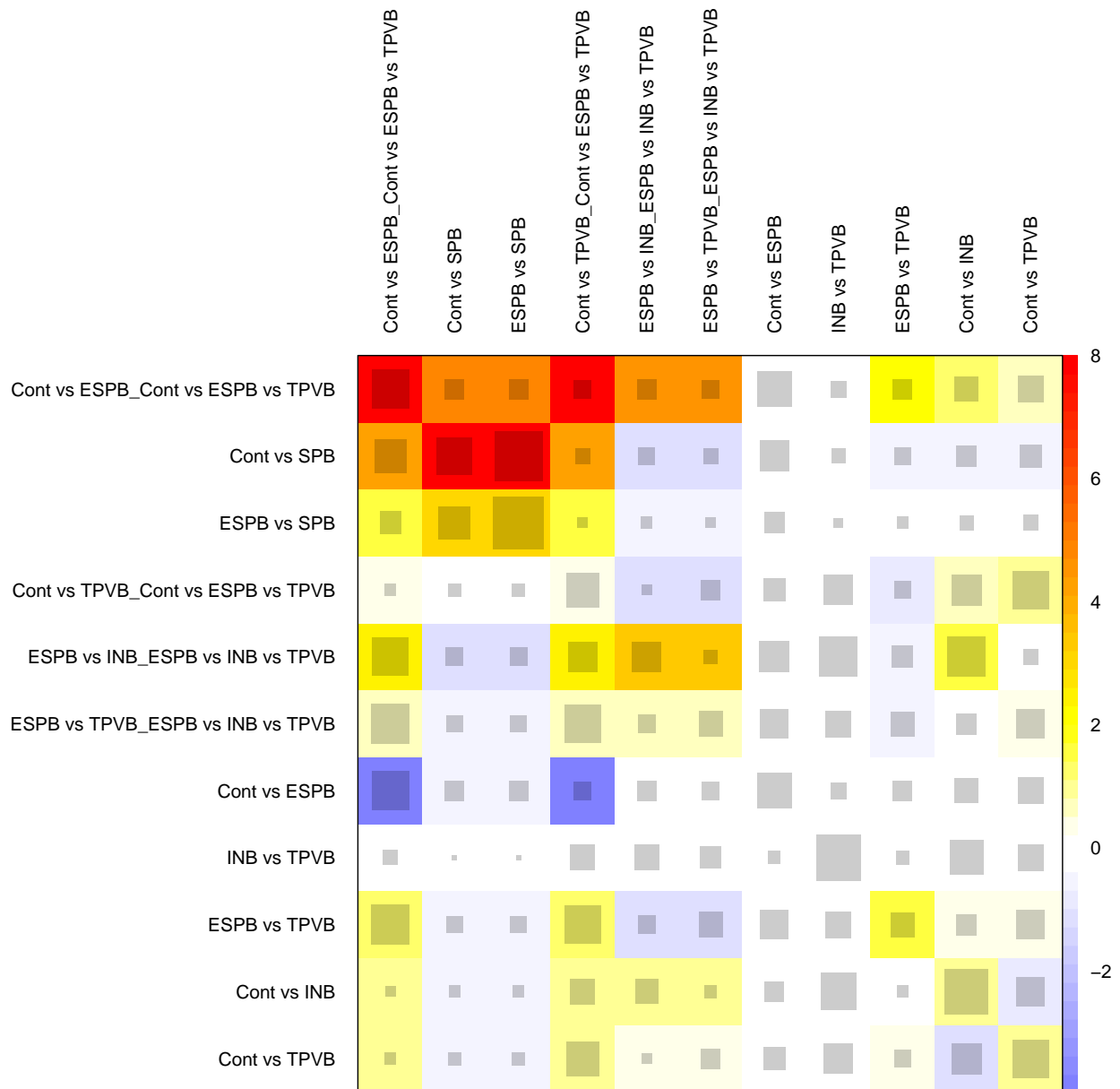


# Net Heat Plot for evaluating the validity of the results

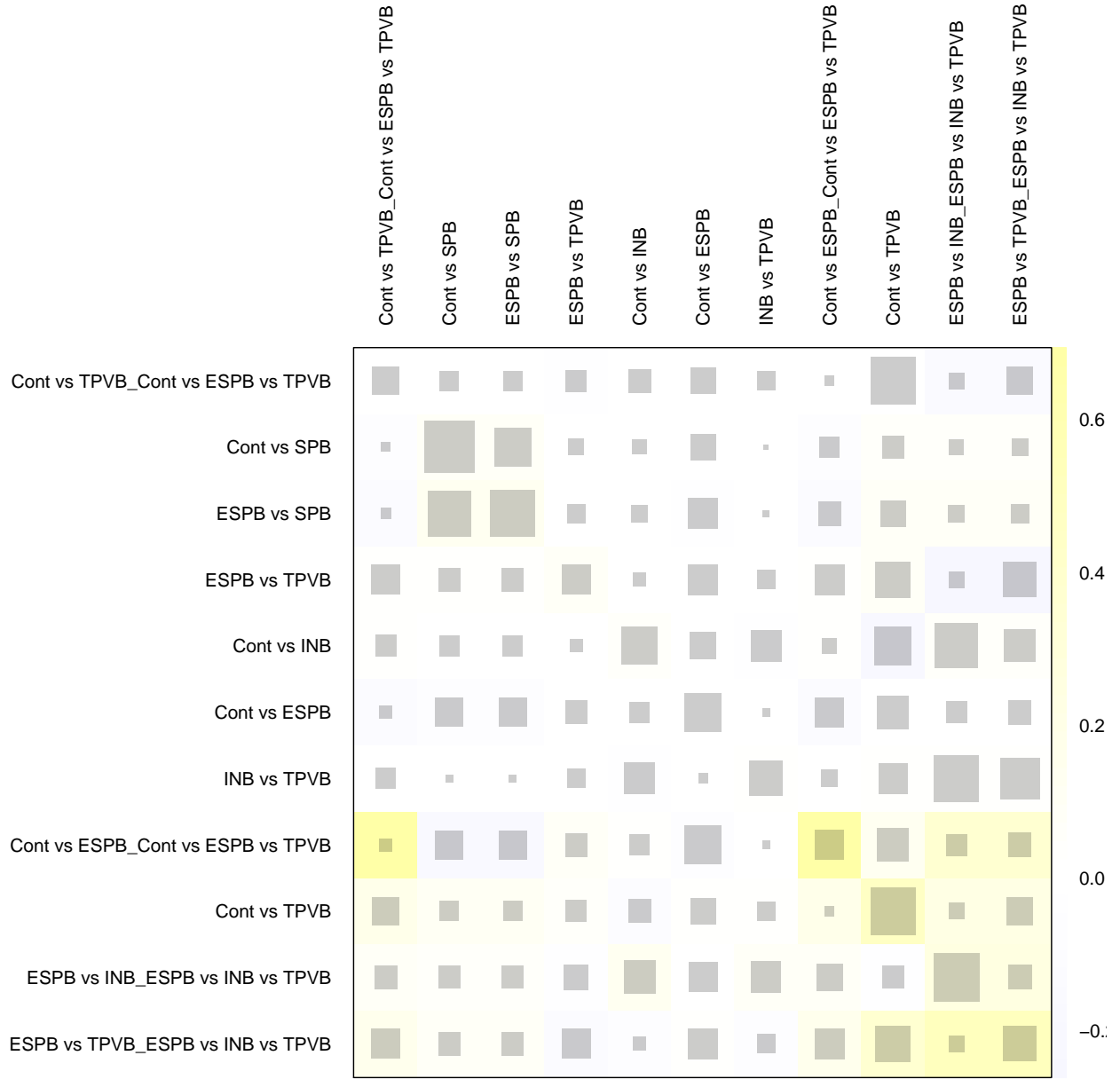
The gray boxes signify how important a treatment comparison is for the estimation of another treatment comparison. The bigger the box, the more important the comparison.

The colored backgrounds signify the amount of inconsistency of the design in a row that can be attributed to the design in a column. Field colors can range from a deep red (which indicates strong inconsistency) to blue (which indicates that evidence from this design supports evidence in the row).

## Fixed effect model

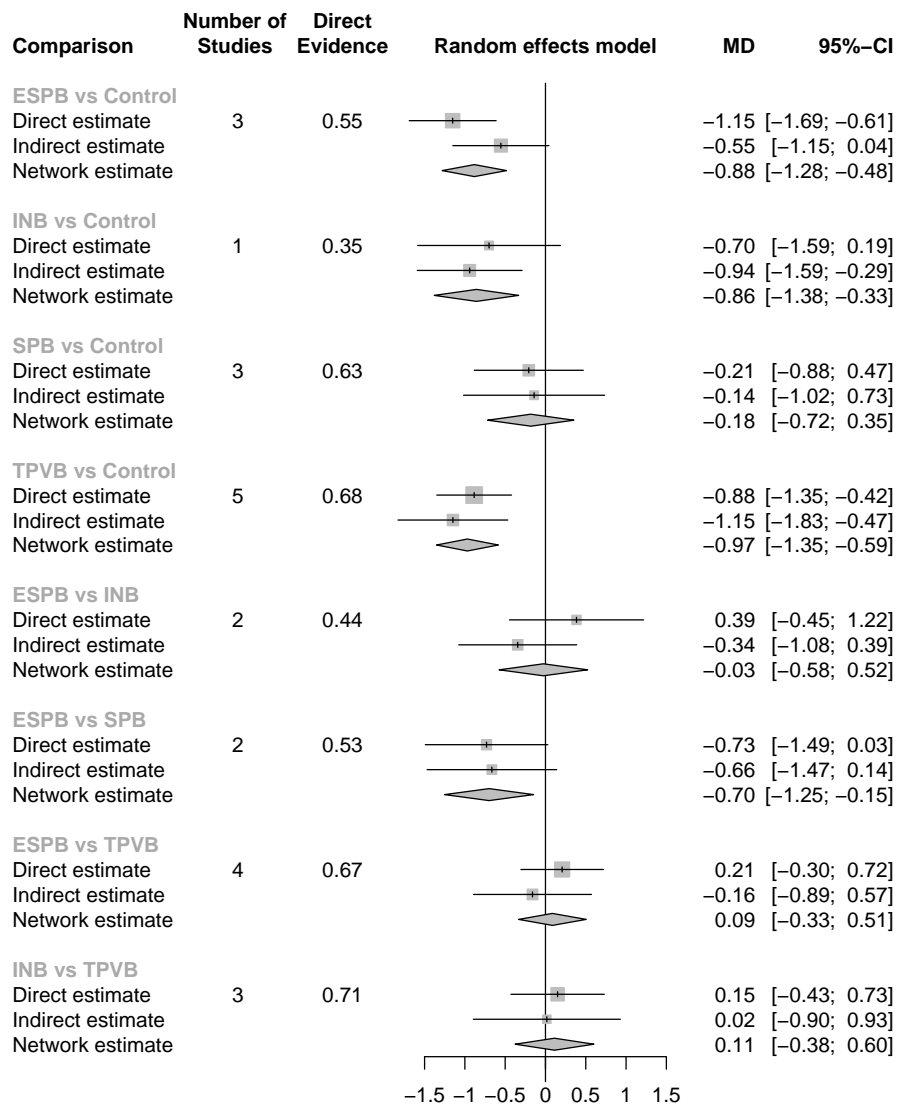


# Random effect model



## Net Splitting to check for consistency

```
## Separate indirect from direct evidence (SIDE) using back-calculation method
##
## Random effects model:
##
##      comparison k prop      nma direct indir.   Diff      z p-value
## ESPB vs Control 3 0.55 -0.8822 -1.1514 -0.5532 -0.5982 -1.46 0.1445
## INB vs Control 1 0.35 -0.8563 -0.7000 -0.9404 0.2404 0.43 0.6679
## SPB vs Control 3 0.63 -0.1824 -0.2072 -0.1408 -0.0664 -0.12 0.9063
## TPVB vs Control 5 0.68 -0.9683 -0.8848 -1.1482 0.2633 0.63 0.5309
## ESPB vs INB 2 0.44 -0.0259 0.3852 -0.3441 0.7293 1.29 0.1971
## ESPB vs SPB 2 0.53 -0.6998 -0.7312 -0.6647 -0.0664 -0.12 0.9063
## ESPB vs TPVB 4 0.67 0.0861 0.2069 -0.1609 0.3678 0.81 0.4193
## INB vs SPB 0 0 -0.6739 . -0.6739 . . .
## INB vs TPVB 3 0.71 0.1120 0.1504 0.0169 0.1336 0.24 0.8085
## SPB vs TPVB 0 0 0.7859 . 0.7859 . . .
##
## Legend:
## comparison - Treatment comparison
## k - Number of studies providing direct evidence
## prop - Direct evidence proportion
## nma - Estimated treatment effect (MD) in network meta-analysis
## direct - Estimated treatment effect (MD) derived from direct evidence
## indir. - Estimated treatment effect (MD) derived from indirect evidence
## Diff - Difference between direct and indirect treatment estimates
## z - z-value of test for disagreement (direct versus indirect)
## p-value - p-value of test for disagreement (direct versus indirect)
```



# Comparison-Adjusted Funnel Plots

