heterogeneitytablesimulation

Heterogeneity Analysis: Shared Structured, Sharing by sign

```
data=readRDS("../../../Dropbox/formatthew/simdata.rds")
t=data$tstat;bhat=data$betahat;sebetahat=data$sebetahat;beta=data$beta;v.j=matrix(rep(1,ncol(t)*nrow(t)

mash.means=read.table("../../../Dropbox/formatthew/shared/sharedashcutoffomega2jun15posterior.means.txt"

bma.means=read.table("../../../Dropbox/formatthew/shared/noashsharedwithzerobmaallposterior.means.txt")

ash.means=read.table("../../../Dropbox/formatthew/shared/univariate.ash.pm.txt")


lfsr.mash=read.table("../../../Dropbox/formatthew/shared/sharedashcutoffomega2jun15lfsr.txt")[,-1]
lfsr.bma=read.table("../../../Dropbox/formatthew/shared/noashsharedwithzerobmaalllfsr.txt")[,-1]
lfsr.ash=read.table("../../../Dropbox/formatthew/shared/univariate.ash.lfsr.txt")



standard.error=data$sebetahat[1:20000,]

pm.mash.beta=mash.means*standard.error
pm.bma.beta=bma.means*standard.error
pm.ash.beta=ash.means*standard.error

thresh=0.05
```

Here, we show the Proportion of Sharing by Sign:

```
sigmat=(lfsr.mash<=thresh)
nsig= rowSums(sigmat)
#(signall=mean(het.norm(pm.mash.beta[nsig>0,])>0))
(signall.mash=mean(het.norm(pm.mash.beta[1:400,])>0))
```

```
## [1] 0.7284659
```

```
##BMA
sigmat=(lfsr.bma<=thresh)
nsig= rowSums(sigmat)
#(signall=mean(het.norm(pm.bma.beta[nsig>0,])>0))
(signall.bma=mean(het.norm(pm.bma.beta[1:400,])>0))
```

```
## [1] 0.7461364
```

```
##ASH
sigmat=(lfsr.ash<thresh)
nsig= rowSums(sigmat)
#(signall=mean(het.norm(pm.ash.beta[nsig>0,])>0))
(signall.ash=mean(het.norm(pm.ash.beta[1:400,])>0))
```

```
## [1] 0.7113636
```

####SHow that results are robust in specific analysis

```
(truth=(mean(het.norm(data$beta[1:400,])>0)))
```

```
## [1] 0.7269318
```

```
(standard=mean(het.norm(data$betahat[1:400,])>0))
```

```
## [1] 0.7111364
```

```
(RMLE=sqrt(mean((standard-truth)^2)))
```

```
## [1] 0.01579545
```

```
#RMLE=1
(RRMSE.mash=sqrt(mean((signall.mash-truth)^2))/RMLE)
```

```
## [1] 0.0971223
```

```
(RRMSE.bma=sqrt(mean((signall.bma-truth)^2))/RMLE)
```
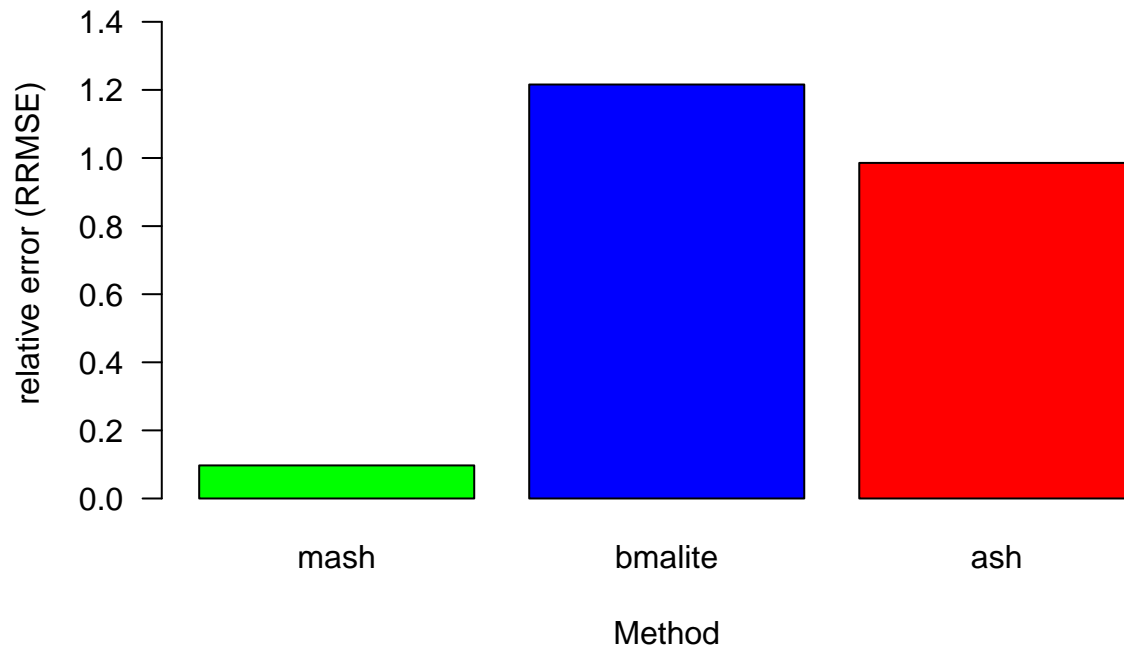
```
## [1] 1.215827
```

```
(RRMSE.ash=sqrt(mean((signall.ash-truth)^2))/RMLE)
```

```
## [1] 0.9856115
```

```
rmse.all.table=cbind(mash=RRMSE.mash,bmalite=RRMSE.bma,ash=RRMSE.ash)
barplot(as.numeric(rmse.all.table),main="Shared, Structured Effects: Sign heterogeneity",
        ylab="relative error (RRMSE)",xlab="Method",col=c("green","blue","red"),names=colnames(rmse.all
```

Shared, Structured Effects: Sign heterogeneity

Heterogeneity Analysis: Independent SSimulation by Sign

```
data=readRDS("../../../Dropbox/formatthew/independentsim.rds")
t=data$tstat;bhat=data$betahat;sebetahat=data$sebetahat;beta=data$beta;v.j=matrix(rep(1,ncol(t)*nrow(t)


mash.means=read.table("../../../Dropbox/formatthew/independentsim_all/independentsimashcutoffomega2jun15
ash.means=read.table("../../../Dropbox/formatthew/independentsim_all/univariate.ash.pmind.txt")

bma.means=read.table("../../../Dropbox/formatthew/independentsim_all/noashindependentwithzerobmaallposte



lfsr.mash=read.table("../../../Dropbox/formatthew/independentsim_all/independentsimashcutoffomega2jun15]
lfsr.bma=read.table("../../../Dropbox/formatthew/independentsim_all/noashindependentwithzerobmaalllfsr.
lfsr.ash=read.table("../../../Dropbox/formatthew/independentsim_all/univariate.ashind.lfsr.txt")



standard.error=data$sebetahat[1:20000,]

pm.mash.beta=mash.means*standard.error
pm.bma.beta=bma.means*standard.error
pm.ash.beta=ash.means*standard.error

thresh=0.05
```

Here, we show the Proportion of Sharing by Sign:

```
sigmat=(lfsr.mash<=thresh)
nsig= rowSums(sigmat)
#(signall=mean(het.norm(pm.mash.beta[nsig>0,])>0))
(signall.mash=mean(het.norm(pm.mash.beta[1:400,])>0))
```

```
## [1] 0.5111364
```

```
##BMA
sigmat=(lfsr.bma<=thresh)
nsig= rowSums(sigmat)
#(signall=mean(het.norm(pm.bma.beta[nsig>0,])>0))
(signall.bma=mean(het.norm(pm.bma.beta[1:400,])>0))
```

```
## [1] 0.5107386
```

```
##ASH
sigmat=(lfsr.ash<thresh)
nsig= rowSums(sigmat)
#(signall=mean(het.norm(pm.ash.beta[nsig>0,])>0))
(signall.ash=mean(het.norm(pm.ash.beta[1:400,])>0))
```

```
## [1] 0.5107386
```

```
(truth=(mean(het.norm(data$beta[1:400,])>0)))
```

```
## [1] 0.5127841
```

```
(standard=mean(het.norm(data$betahat[1:400,])>0))
```

```
## [1] 0.5107386
```

```
(RMLE=sqrt(mean((standard-truth)^2)))
```

```
## [1] 0.002045455
```

```
(RRMSE.mash=sqrt(mean((signall.mash-truth)^2))/RMLE)
```

```
## [1] 0.8055556
```

```
(RRMSE.bma=sqrt(mean((signall.bma-truth)^2))/RMLE)
```
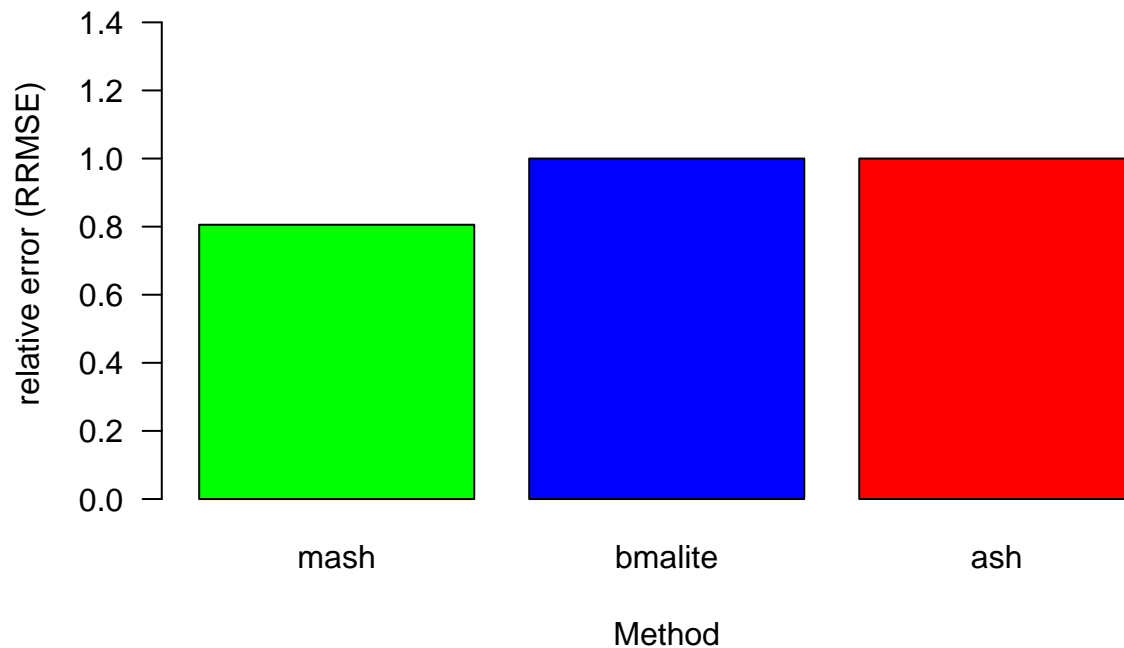
```
## [1] 1
```

```
(RRMSE.ash=sqrt(mean((signall.ash-truth)^2))/RMLE)
```

```
## [1] 1
```

```
rmse.all.table=cbind(mash=RRMSE.mash,bmalite=RRMSE.bma,ash=RRMSE.ash)
barplot(as.numeric(rmse.all.table),main="Shared, Unstructured Effects: Sign heterogeneity",
        ylab="relative error (RRMSE)",xlab="Method",col=c("green","blue","red"),names=colnames(rmse.all
```

Shared, Unstructured Effects: Sign heterogeneity

Heterogeneity Analysis: Shared,Structured by magnitude

```
data=readRDS("../../../Dropbox/formatthew/simdata.rds")
t=data$tstat;bhat=data$betahat;sebetahat=data$sebetahat;beta=data$beta;v.j=matrix(rep(1,ncol(t)*nrow(t)

mash.means=read.table("../../../Dropbox/formatthew/shared/sharedashcutoffomega2jun15posterior.means.txt
ash.means=read.table("../../../Dropbox/formatthew/shared/univariate.ash.pm.txt")
bma.means=read.table("../../../Dropbox/formatthew/shared/noashsharedwithzerobmaallposterior.means.txt")



lfsr.mash=read.table("../../../Dropbox/formatthew/shared/sharedashcutoffomega2jun15lfsr.txt")[,-1]
lfsr.bma=read.table("../../../Dropbox/formatthew/shared/noashsharedwithzerobmaalllfsr.txt")[,-1]
lfsr.ash=read.table("../../../Dropbox/formatthew/shared/univariate.ash.lfsr.txt")



standard.error=data$sebetahat[1:20000,]

pm.mash.beta=mash.means*standard.error
pm.bma.beta=bma.means*standard.error
pm.ash.beta=ash.means*standard.error
```

```
thresh=0.05
```

Here, we show the Proportion of Sharing by Sign:

```
sigmat=(lfsr.mash<=thresh)
nsig= rowSums(sigmat)
(signall=mean(het.norm(pm.mash.beta[nsig>0,])>0.5))
```

```
## [1] 0.2852998
```

```
(signall.mash=mean(het.norm(pm.mash.beta[1:400,])>0.5))
```

```
## [1] 0.244375
```

```
##BMA
sigmat=(lfsr.bma<=thresh)
nsig= rowSums(sigmat)
(signall=mean(het.norm(pm.bma.beta[nsig>0,])>0.5))
```

```
## [1] 0.3696412
```

```
(signall.bma=mean(het.norm(pm.bma.beta[1:400,])>0.5))
```

```
## [1] 0.2940909
```

```
##ASH
sigmat=(lfsr.ash<thresh)
nsig= rowSums(sigmat)
(signall=mean(het.norm(pm.ash.beta[nsig>0,])>0.5))
```

```
## [1] 0.1688995
```

```
(signall.ash=mean(het.norm(pm.ash.beta[1:400,])>0.5))
```

```
## [1] 0.1320455
```

```
####SHow that results are robust in specific analysis
```

```
(truth=(mean(het.norm(data$beta[1:400,])>0.5)))
```

```
## [1] 0.2479545
```

```
(standard=mean(het.norm(data$betahat[1:400,])>0.5))
```

```
## [1] 0.2152273
```

```
(RMLE=sqrt(mean((standard-truth)^2)))
```

```
## [1] 0.03272727
```

```
(RRMSE.mash=sqrt(mean((signall.mash-truth)^2))/RMLE)
```

```
## [1] 0.109375
```

```
(RRMSE.bma=sqrt(mean((signall.bma-truth)^2))/RMLE)
```
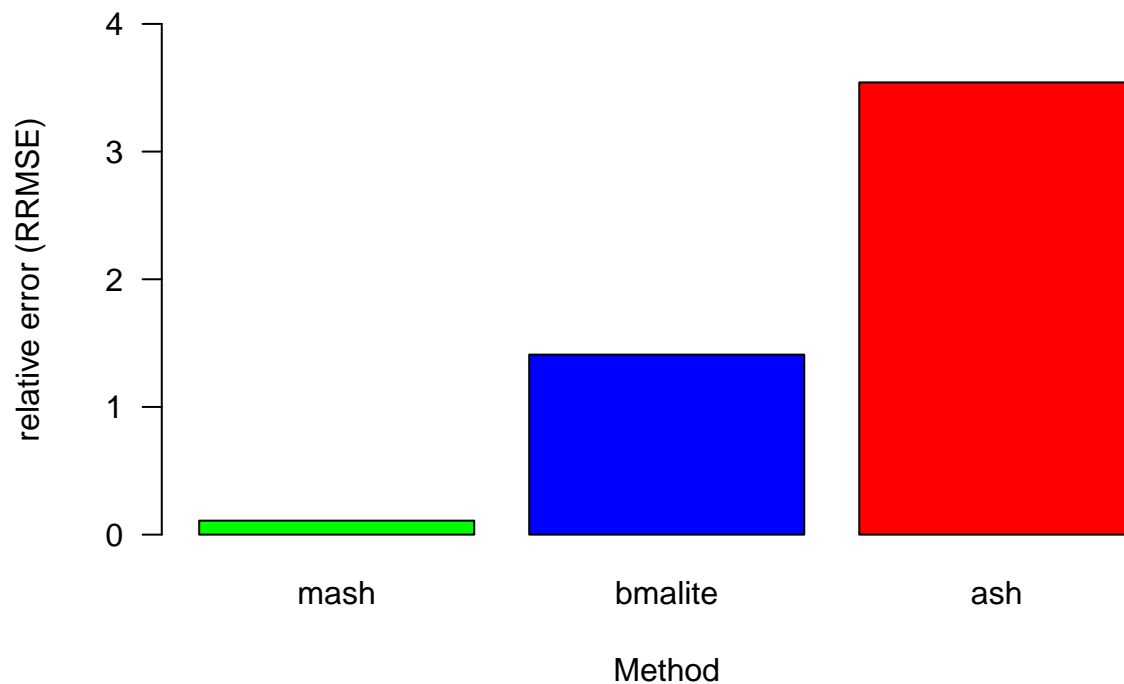
```
## [1] 1.409722
```

```
(RRMSE.ash=sqrt(mean((signall.ash-truth)^2))/RMLE)
```

```
## [1] 3.541667
```

```
rmse.all.table=cbind(mash=RRMSE.mash,bmalite=RRMSE.bma,ash=RRMSE.ash)
barplot(as.numeric(rmse.all.table),main="Shared, Structured Effects: Magnitude heterogeneity",
        ylab="relative error (RRMSE)",xlab="Method",col=c("green","blue","red"),names=colnames(rmse.all
```


Heterogeneity Analysis: Independent by magnitude

```
data=readRDS("../../../Dropbox/formatthew/independentsim.rds")
t=data$tstat;bhat=data$betahat;sebetahat=data$sebetahat;beta=data$beta;v.j=matrix(rep(1,ncol(t)*nrow(t)
```

```
mash.means=read.table("../../../Dropbox/formatthew/independentsim_all/independentsimashcutoffomega2jun15
ash.means=read.table("../../../Dropbox/formatthew/independentsim_all/univariate.ash.pmind.txt")
```

```
bma.means=read.table("../../../Dropbox/formatthew/independentsim_all/noashindependentwithzerobmaallposto
```

```
lfsr.mash=read.table("../../../Dropbox/formatthew/independentsim_all/independentsimashcutoffomega2jun15]
lfsr.bma=read.table("../../../Dropbox/formatthew/independentsim_all/noashindependentwithzerobmaalllfsr.t
lfsr.ash=read.table("../../../Dropbox/formatthew/independentsim_all/univariate.ashind.lfsr.txt")
```

```
standard.error=data$sebetahat[1:20000,]
```

```
pm.mash.beta=mash.means*standard.error
pm.bma.beta=bma.means*standard.error
pm.ash.beta=ash.means*standard.error
```

```
thresh=0.05
```

Here, we show the Proportion of Sharing by Sign:

```
sigmat=(lfsr.mash<=thresh)
nsig= rowSums(sigmat)
(signall=mean(het.norm(pm.mash.beta[nsig>0,])>0.5))
```

```
## [1] 0.1290909
```

```
(signall.mash=mean(het.norm(pm.mash.beta[1:400,])>0.5))
```

```
## [1] 0.1290909
```

```
##BMA
sigmat=(lfsr.bma<=thresh)
nsig= rowSums(sigmat)
(signall=mean(het.norm(pm.bma.beta[nsig>0,])>0.5))
```

```
## [1] 0.1286932
```

```
(signall.bma=mean(het.norm(pm.bma.beta[1:400,])>0.5))
```

```
## [1] 0.1286932
```

```
##ASH
sigmat=(lfsr.ash<thresh)
nsig= rowSums(sigmat)
(signall=mean(het.norm(pm.ash.beta[nsig>0,])>0.5))
```

```
## [1] 0.1232684
```

```r
(signall.ash=mean(het.norm(pm.ash.beta[1:400,])>0.5))
```

```
## [1] 0.1282955
```

```r
####SHow that results are robust in specific analysis

(truth=(mean(het.norm(data$beta[1:400,])>0.5)))
```

```
## [1] 0.1277841
```

```r
(standard=mean(het.norm(data$betahat[1:400,])>0.5))
```

```
## [1] 0.1286932
```

```r
(RMLE=sqrt(mean((standard-truth)^2)))
```

```
## [1] 0.0009090909
```

```r
(RRMSE.mash=sqrt(mean((signall.mash-truth)^2))/RMLE)
```

```
## [1] 1.4375
```

```r
(RRMSE.bma=sqrt(mean((signall.bma-truth)^2))/RMLE)
```

```
## [1] 1
```

```r
(RRMSE.ash=sqrt(mean((signall.ash-truth)^2))/RMLE)
```

```
## [1] 0.5625
```

```r
rmse.all.table=cbind(mash=RRMSE.mash,bmalite=RRMSE.bma,ash=RRMSE.ash)
barplot(as.numeric(rmse.all.table),main="Shared, Unstructured Effects: Magnitude heterogeneity",
        ylab="relative error (RRMSE)",xlab="Method",col=c("green","blue","red"),names=colnames(rmse.all
```

Shared, Unstructured Effects: Magnitude heterogenei