Untitled

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```
library(MASS);
library(nlme);
source("D:/WPI/prediction/Lib_Prediction.R");
source("D:/WPI/prediction/Lib_simu_genetic_data.R");
```

```
## Rlab 2.15.1 attached.
```

```
##
## Attaching package: 'Rlab'
```

```
## The following object is masked from 'package:MASS':
##
##     michelson
```

```
## The following objects are masked from 'package:stats':
##
##     dexp, dgamma, dweibull, pexp, pgamma, pweibull, qexp, qgamma,
##     qweibull, rexp, rgamma, rweibull
```

```
## The following object is masked from 'package:datasets':
##
##     precip
```

```
source("D:/WPI/prediction/generate_response_formula.R");
```

```
###Parameter setting

###Parameters on the effects / coefficients
beta0 = -0.5;
#For binary trait, the risk at X=0 is 1/(1+exp(-beta0)). The average risk (prevalence) at given coeffic
# Y = array(NA, length(Xbeta));
#  for (i in 1:length(Y)) {
#    Py1x = 1/(1 + exp(-Xbeta[i]) - beta0); # P(y=1 | x) based on logistic model
#    Y[i] = ifelse(runif(1) < Py1x, 1, 0);
#  }
#  mean(Y); #prevalance of Y.

#beta0 = -7; # for binary trait. Risk when X=0 is 1/(1+exp(7))=0.0009110512. Also, at the given coeffic
#beta0 = -3; # for binary trait. Risk when X=0 is 1/(1+exp(3))=0.04742587. Also, at the given coefficie


raceN = 3; #Number of racial groups
```

```
sigma.race = 1; #pair-wise covariance among individuals in the same racial group
beta.race = 1; #treat the "coefficient" of the mix-effect b_i be 1.

beta.acup = log(4.9); #6; #Coeff of acupuncture
beta.mbsr = log(4.9); #6; #Coeff of mbsr
beta.sex = log(1.1); #1;
beta.age = log(1.25); #-1;
beta.edu = log(1.26); #1;
beta.len = log(1.13); #1;
beta.bas = log(0.80);#1;
beta.conc = log(0.77); #1;

markerN = 10; #The # of PainMarkers
beta.biom.v = 2; #=1; #The value of the coeff of the biomarkers
beta.biom = rep(beta.biom.v, markerN); #Coeff of the biomarkers
names.xbiom = paste("xbiom", 1:markerN, sep=""); #variable names for biomarkers

mdfN.acup = 4; #The # of modifiers for acupuncture
beta.mdf.acup.v=2; #The value of the coeff of accupunctur's modifiers
beta.mdf.acup = rep(beta.mdf.acup.v, mdfN.acup); #Vector of coeffs of accupunctur's modifiers
gama.acup.v = 2; #The value of the coeff of the modifier*acupucture interaction terms.
gama.acup = rep(gama.acup.v, mdfN.acup); #Vector of coeffs of the modifier*acupucture interaction terms

names.mdf.acup = paste("zmdfAcup", 1:mdfN.acup, sep=""); #variable names of the modifiers for acupunctu

mdfN.mbsr = 4; #The # of modifiers for MBSR
beta.mdf.mbsr.v=2; #The value of the coeff of MBSR's modifiers
beta.mdf.mbsr = rep(beta.mdf.mbsr.v, mdfN.mbsr); #Vector of coeffs of accupunctur's modifiers
gama.mbsr.v = 2; #The value of the coeff of the modifier*MBSR interaction terms.
gama.mbsr = rep(gama.mbsr.v, mdfN.mbsr); #Vector of coeffs of the modifier*MBSR interaction terms.

names.mdf.mbsr = paste("zmdfMBSR", 1:mdfN.mbsr, sep=""); #variable names of the modifiers for MBSR

errSD=1; #The SD of error term

###Parameters on prodiction process
isRandomCV=T; #Random cross-validation in prediction
nfold=5; #The number of folds in cross-validation
nrepeat=2; #number of repeats of cross-validation

###Parameters on simulations
simuN = 100; #The number of simulations.

###Data simulation and prediction outcomes
predProp = c(0, 0.25, 0.5, 0.75, 1); #Proportion of true predictors besides names.basic that are includ
models = vector(mode = "list", length(predProp)); #prediction models .
outputs = vector(mode = "list", length(predProp)); #prediction outputs .

###Parameters on data
groupSampleSizes = seq(20, 400, by=20);
#groupSampleSizes = seq(500, 2000, by=100);
#groupSampleSizes = seq(150, 500, by=50);
AUC = array(NA, dim=c(length(groupSampleSizes), length(predProp)));
```

```r
#Store AUC over sample sizes and proportions of predictors used.
for(gi in 1:length(groupSampleSizes))
{
  groupSampleSize = groupSampleSizes[gi];
  #sample size for each of the three groups: control, mbsr, and acupuncture.

  ###Looping through simulations
  R2.controls = array(NA, simuN); #Store the R2 of the controlling predictors.
  for(i in 1:simuN)
  {
    ###Generate data
    x0 = rep(1, groupSampleSize*3);

    #The mixed-effect term for racial group
    xrace = sample(1:raceN, size=groupSampleSize*3, replace=T, prob=rep(1/raceN, raceN));
    #Assume equal chance for each racial group to be sampled.

    b.xrace = array(NA, dim=groupSampleSize*3); #b.xrace is the vector of b_i values.
    for (racei in 1:raceN)
    {
      b.xrace[which(xrace==racei)] = rnorm(1, sd=sigma.race);
    }
    #assign the same b_i value for the all in the ith racial group.

    #The "basic" factors
    xacup = c(rep(0, groupSampleSize*2), rep(1, groupSampleSize));
    #acupuncture group indicator
    xmbsr = c(rep(0, groupSampleSize), rep(1, groupSampleSize), rep(0, groupSampleSize)); #MBSR group i
    xsex = rbinom(n=groupSampleSize*3, size=1, prob=0.5); #50% recruited are males??
    xage = rnorm(n=groupSampleSize*3, mean=0, sd=1); #standardized age.
    xedu = rbinom(n=groupSampleSize*3, size=1, prob=0.5);
    xlen = rbinom(n=groupSampleSize*3, size=1, prob=0.5);
    xbas = rnorm(n=groupSampleSize*3, mean=0, sd=1);
    xconc = rbinom(n=groupSampleSize*3, size=1, prob=0.5);

    #PainMarker data
    xbiom = data.frame(matrix(rnorm(n=groupSampleSize*3*markerN), ncol=markerN)); #Assume biomarker val
    names(xbiom) = names.xbiom;

    #acupuncture-modifier data
    zmdfAcup = data.frame(matrix(rnorm(n=groupSampleSize*3*mdfN.acup), ncol=mdfN.acup));
    #Assume acupuncture-modifier values are N(0,1);
    names(zmdfAcup) = names.mdf.acup;

    #mbsr-modifier data
    zmdfMBSR = data.frame(matrix(rnorm(n=groupSampleSize*3*mdfN.mbsr), ncol=mdfN.mbsr)); #Assume acupun
    names(zmdfMBSR) = names.mdf.mbsr;

    Xmatrix = cbind(x0, b.xrace, xacup, xmbsr, xsex, xage, xedu, xlen, xbas, xconc, xbiom, zmdfAcup, zm

    #### Generate response
    names.mainEff  = c("x0", "b.xrace", "xacup", "xmbsr", "xsex", "xage", "xedu", "xlen", "xbas", "xcon
    coeffs.mainEff = c(beta0, beta.race, beta.acup, beta.mbsr, beta.sex, beta.age, beta.edu, beta.len,
```

```
names.trt = c("xacup", "xmbsr"); #variable names of the treatments
names.mdf = list(names.mdf.acup, names.mdf.mbsr); #variable names of the modifiers corresponding to
coeffs.interaction = list(gama.acup, gama.mbsr); #coefficients of the treatment-modifier interactio


# ####----Quantitative Response-----
resp = get.Y.reg(XData=Xmatrix, names.mainEff, coeffs.mainEff, names.trt, names.mdf, coeffs.interac
#print(resp$R2); #proportion of variation explained by all predictors
#
# Calculate the R^2 of the controlling predictors
vars.control = c(varBeta0=0, varRace=sigma.race^2, varAcup=(1/3)*(1-1/3), varMbsr=(1/3)*(1-1/3), va
betas.control = c(beta0, beta.race, beta.acup, beta.mbsr, beta.sex, beta.age, beta.edu, beta.len, be
R2.controls[i] = sum(vars.control*betas.control^2)/var(resp$Y);

####----Binary Response-----
#resp = get.Y.logit(XData=Xmatrix, names.mainEff, coeffs.mainEff, names.trt, names.mdf, coeffs.inte

####Combine data for analysis
xrace = as.factor(xrace); #Convert race into factor variable, which is used in data analysis.
dat = data.frame(Y=resp$Y, Xmatrix, xrace);


####Predictive analysis
names.control = c("xrace", "xacup", "xmbsr", "xsex", "xage", "xedu", "xlen", "xbas", "xconc"); #Con
names.trt.all =  c("xacup", "xmbsr"); #All possible treatments that could have interaction effects.
for (mi in 1:length(predProp)){
  ##Create model formula based on proportion of predictors used.
  xbiom.used    = round(length(names.xbiom)*predProp[mi]);
  mdf.acup.used = round(length(names.mdf.acup)*predProp[mi]);
  mdf.mbsr.used = round(length(names.mdf.mbsr)*predProp[mi]);
  names.main=c(names.control, names.xbiom[0:xbiom.used], names.mdf.acup[0:mdf.acup.used], names.mdf
  if (predProp[mi]==0)
  {
    names.trt = NULL;
  }
  else{
    names.trt = names.trt.all;
    names.mdf = list(names.mdf.acup[0:mdf.acup.used], names.mdf.mbsr[0:mdf.mbsr.used]);
  }
  models[[mi]]= formula.f.r(names.main=names.main, names.trt=names.trt, names.mdf=names.mdf, names.

  # ### ---- Predict quantitative outcome ----
  out = meanPredEvaluCV.lme(fixed=models[[mi]]$fixed, dat=dat, randomf=models[[mi]]$random, model_R=
  #out = meanPredEvaluCV.lme(fixed=models[[mi]]$fixed, dat=dat, randomf=NULL, model_R='lm', loopn=n
  outputs[[mi]] = rbind(outputs[[mi]], t(c(MSE=out[1], L2normRatio=out[2], L1normRatio=out[3], corr


  ### ---- Predict binary outcome ----
  #out = predEvaluCV.glm(formula=models[[mi]]$fixed, dat=dat, nfold=nfold, nrepeat=nrepeat, isRando
  #outputs[[mi]] = rbind(outputs[[mi]], t(c(prob=out[1], sensi=out[2], speci=out[3], AUC=out[4])));
  #outputs[[mi]] = rbind(outputs[[mi]], t(unlist(out)));

}
```

```
  }

  # #True underlying model
  print(c(sampleSize=groupSampleSize*3, raceN=raceN, sigma.race = sigma.race,  beta.acup = beta.acup,
          beta.mbsr = beta.mbsr, beta.sex = beta.sex, beta.age = beta.age, beta.edu=beta.edu, beta.len=
          mdfN.acup=mdfN.acup, beta.mdf.acup.v=beta.mdf.acup.v, gama.acup.v=gama.acup.v,
          mdfN.mbsr=mdfN.mbsr, beta.mdf.mbsr.v=beta.mdf.mbsr.v, gama.mbsr.v=gama.mbsr.v));

  # #R2 of controlling predictors
   mean(R2.controls);

  #Prediction accuracies
  for (mi in 1:length(predProp)){
    print(predProp[mi]);
    print(models[[mi]]$fixed);
    print(apply(outputs[[mi]], 2, mean));
    print(apply(outputs[[mi]], 2, quantile, probs=c(0.05, 0.95)));

    AUC[gi, mi] = apply(outputs[[mi]], 2, mean)[4];
  }
}
```

```
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##     60.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x00000000212b1878>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  136.54566192    1.14642420    1.15632582    0.01292311    1.37450210
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   91.96583    1.054085    1.053518  -0.2490554      1.104876
## 95% 189.05535    1.240469    1.280388   0.2546717      1.666102
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x000000002150ca50>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##   126.7743004     1.1230934     1.1292502     0.2902731     1.3512454
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   87.33891   0.9489917   0.9500355  0.03936745      0.965194
## 95% 166.11695   1.2947249   1.3054324  0.49846641      1.752660
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
```

```
## <environment: 0x00000000214fac48>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##   105.9666183     1.0365428     1.0383108     0.4989935     1.1929161
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   70.04285   0.8116581   0.8120248   0.2886566     0.7066068
## 95% 157.36826   1.2895822   1.2996542   0.7101413     1.7793186
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x0000000021149858>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    73.6503324     0.8572437     0.8598638     0.6867223     0.8352344
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   38.47027    0.603905   0.5786745   0.5413456     0.3880001
## 95% 115.78980    1.068846   1.0792554   0.8283352     1.3588999
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x00000000130a3920>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    4.74210565    0.21628644    0.21762518    0.97658990    0.05444491
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  2.422776   0.1531011   0.1523401   0.9571292    0.02558233
## 95% 7.926379   0.2852162   0.2939072   0.9885314    0.09628849
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    120.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000021756a28>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  128.69272176    1.10155958    1.10832479    0.01793359    1.25424422
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   95.57048    1.009412    1.006838  -0.2231301      1.044707
## 95% 169.44238    1.229048    1.245699   0.2499454      1.589165
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
```

```
## <environment: 0x00000000216f7bd0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##   113.6774627     1.0466775     1.0522049     0.3299756     1.1600114
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   79.80428   0.8888998   0.8869343   0.0795105     0.8169517
## 95% 160.38497   1.2476467   1.2625942   0.5193088     1.6581825
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x000000002218d9e8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    88.8194203     0.9300289     0.9332456     0.5551843     0.9501085
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   57.81135   0.7337457   0.7320315   0.3272781     0.5745168
## 95% 141.93207   1.2472225   1.2331401   0.7100326     1.6594624
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x0000000021a13660>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    55.6089780     0.7280071     0.7317077     0.7505058     0.6069440
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   29.28022   0.5306355   0.5312196   0.5681458     0.2985309
## 95% 103.31903   1.0235771   1.0377748   0.8596700     1.2200916
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x0000000012fb4a38>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    3.19389560    0.17117253    0.17276090    0.98430021    0.03568463
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  1.299669   0.1057920   0.1093468   0.9641423    0.01222983
## 95% 6.609331   0.2717204   0.2711917   0.9942733    0.08490755
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    180.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
```

```
##     xconc
## <environment: 0x0000000021cba310>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  123.94964275    1.07727004    1.08337149    0.03079011    1.19276145
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   94.30026    1.001264    0.992818  -0.1974337      1.011933
## 95% 161.80516    1.217442    1.231317   0.2388405      1.558790
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x00000000221494a0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##   106.5728726     1.0071074     1.0119565     0.3593132     1.0655087
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   78.29164   0.8744335   0.8794402   0.1198600     0.7789709
## 95% 153.21413   1.2262239   1.2379232   0.5229105     1.5912633
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x00000000121ed7b8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    80.7296358     0.8796100     0.8831715     0.5855331     0.8410189
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   55.96547   0.7188839   0.7211196   0.3562986     0.5334663
## 95% 132.54699   1.1809567   1.1641421   0.7154732     1.5645450
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x0000000022191600>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    47.7772252     0.6687295     0.6725551     0.7803190     0.5087151
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   27.42875   0.4998923   0.5041949   0.5864327     0.2571254
## 95% 100.64732   1.0140227   0.9996541   0.8722298     1.1553164
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x0000000013060790>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    2.58324792    0.15211553    0.15354913    0.98736209    0.02829394
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  1.178284   0.1013397   0.1024842   0.9669743    0.01087165
```

```
## 95% 6.304024   0.2597652   0.2683676   0.9947940    0.07537719
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    240.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000004d2f100>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  120.93248090    1.06327967    1.06795018    0.03531787    1.15742273
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   94.72979   0.9961337    0.992818  -0.1698643      1.006925
## 95% 158.30786   1.2017580    1.211115   0.2197862      1.515562
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x000000002164a080>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##   102.1642922     0.9833754     0.9875855     0.3774975     1.0096487
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   75.21338    0.863949   0.8648351   0.1531471     0.7608891
## 95% 149.30516    1.214998   1.2120889   0.5276432     1.5379377
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x0000000021c0c678>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    75.6137608     0.8479126     0.8515320     0.6056587     0.7752872
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   53.55757   0.7136841   0.7057709   0.3867494     0.5158598
## 95% 126.85443   1.1680998   1.1430165   0.7186331     1.4572362
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x0000000021f44c10>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    43.2774320     0.6342540     0.6378611     0.7978682     0.4536856
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  26.13820   0.4894472   0.4954767   0.6066871     0.2451666
## 95% 91.92657   0.9842721   0.9794394   0.8758392     1.0683940
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
```

```
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x000000001ae6f030>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    2.24994824    0.14131436    0.14247567    0.98904404    0.02426175
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  1.118394   0.1003227   0.1006063   0.9702935    0.01037084
## 95% 5.954362   0.2513181   0.2648494   0.9950368    0.07056757
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    300.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000013508388>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  118.76044652    1.05384289    1.05791592    0.03561046    1.13400266
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   94.31835   0.9934304    0.991697  -0.1546277     0.9984578
## 95% 153.54214   1.1971796    1.195285   0.2123922     1.4798751
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x000000002192d6a0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    99.0237070     0.9670847     0.9704792     0.3909426     0.9723542
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   74.64659   0.8604633   0.8586869   0.1636685     0.7544239
## 95% 145.07737   1.1964952   1.1878465   0.5288133     1.5227434
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x0000000020e4f868>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    72.1895953     0.8271039     0.8296586     0.6190605     0.7325088
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   51.82047    0.701045   0.6994593   0.4194947     0.5008501
## 95% 121.58712    1.133552   1.1269051   0.7211866     1.4055370
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
```

```
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x00000000217279c0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    40.3986966     0.6121273     0.6150316     0.8090522     0.4188456
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  25.52711   0.4865269   0.4876445   0.6197787     0.2403093
## 95% 86.51238   0.9618673   0.9586943   0.8767488     1.0127461
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x0000000016bf68d0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##     2.0380459     0.1343669     0.1353302     0.9900972     0.0217352
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  1.087068  0.09974947  0.09983171   0.9716956    0.01018413
## 95% 5.600268  0.24498279  0.24753684   0.9950832    0.06651975
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    360.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000021774670>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  117.20075180    1.04604684    1.04976180    0.04217519    1.11569354
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   94.7840    0.991942   0.9885276  -0.1441941     0.9930453
## 95% 152.2625    1.186478   1.1864756   0.2091505     1.4586896
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x0000000016725bd8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    96.9898739     0.9558098     0.9585683     0.4000611     0.9468545
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   74.64659    0.859705   0.8554358   0.1859726     0.7514403
## 95% 140.47270    1.186728   1.1765112   0.5268071     1.4716820
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
```

```
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x0000000012e942c0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    69.6704343     0.8109898     0.8128921     0.6301047     0.7008779
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   51.00415   0.6930274   0.6919083   0.4302787     0.4903502
## 95% 119.16888   1.1155268   1.1027852   0.7252534     1.3339920
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x0000000015cbe7f0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    38.3120927     0.5953272     0.5976710     0.8175253     0.3935707
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  25.28955   0.4809833   0.4807411   0.6298229     0.2360761
## 95% 84.73013   0.9360496   0.9483609   0.8791120     0.9954052
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x0000000021f2b268>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##     1.8903709     0.1293195     0.1302659     0.9908401     0.0199612
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  1.065605  0.09801175  0.09848996   0.9731320   0.009809009
## 95% 5.442072  0.23727017  0.23654921   0.9952117   0.059800640
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    420.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x00000000130af530>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  115.76167388    1.04053682    1.04384564    0.04419673    1.10227298
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   94.86596   0.9913769   0.9890882  -0.1374240     0.9922454
## 95% 149.77630   1.1703603   1.1689170   0.2027249     1.4308225
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
```

```
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x000000000498f960>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    95.0947272     0.9466857     0.9491626     0.4081965     0.9263409
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   74.30626   0.8573784    0.855231   0.2143425     0.7450967
## 95% 136.25072   1.1628483    1.170385   0.5268071     1.4467234
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x00000000051f2280>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    67.8144608     0.8001491     0.8019099     0.6372417     0.6789808
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   50.97243   0.6892703   0.6898185   0.4389945     0.4884077
## 95% 115.15323   1.0907749   1.0880531   0.7266161     1.3137785
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x00000000131268d8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    36.7423225     0.5833330     0.5854477     0.8235877     0.3752849
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.84593   0.4793657   0.4802803   0.6386113     0.2331463
## 95% 81.66066   0.9286796   0.9310946   0.8795203     0.9373414
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x00000000051e3ea8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    1.77990837    0.12561685    0.12651886    0.99138330    0.01866406
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  1.040534  0.09721199  0.09787781   0.9754821   0.009671658
## 95% 5.260327  0.23130662  0.22777204   0.9952732   0.058246012
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    480.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
```

```
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x000000002205f2f8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  114.96915732    1.03601602    1.03889654    0.04699353    1.09159700
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   95.02079   0.9909023   0.9884135  -0.1337960      0.991539
## 95% 146.44366   1.1583908   1.1642086   0.1986798      1.404463
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x0000000012f4c248>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    93.8690656     0.9393479     0.9416579     0.4148566     0.9101706
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   74.93277   0.8567774    0.853729   0.2199774     0.7411693
## 95% 131.49955   1.1429676    1.162212   0.5268071     1.4031188
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x0000000012fd4038>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    66.4117617     0.7905939     0.7922178     0.6439486     0.6604330
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   50.84033   0.6879751   0.6884102   0.4536217     0.4833912
## 95% 112.30262   1.0651559   1.0656885   0.7277258     1.2434861
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x0000000004bcb350>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    35.5111162     0.5728515     0.5746031     0.8289088     0.3600467
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.50829   0.4768962   0.4727782   0.6582759     0.2315870
## 95% 77.10680   0.9017274   0.9138840   0.8807591     0.8757602
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x0000000021c70f10>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    1.69590801    0.12261832    0.12349666    0.99181196    0.01764601
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
```

```
## 5%  1.022026  0.09661797  0.09692946   0.9759925   0.009546699
## 95% 4.933305  0.21973004  0.22439389   0.9953313   0.056958956
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    540.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000020ee8f10>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  114.08831399    1.03219790    1.03471416    0.04964828    1.08284607
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   95.07655   0.9890429   0.9864975  -0.1264213     0.9896632
## 95% 143.20298   1.1507220   1.1593284   0.1944839     1.3712246
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x000000000494b8c8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    92.7886261     0.9337271     0.9356459     0.4196217     0.8978008
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   74.82615   0.8561248   0.8526013   0.2274564     0.7408537
## 95% 129.53638   1.1387568   1.1510655   0.5267839     1.3889970
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x000000000489f288>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    65.2275369     0.7832130     0.7846551     0.6489627     0.6460758
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   50.47343   0.6873736   0.6852668   0.4704411     0.4826305
## 95% 105.56177   1.0525822   1.0541508   0.7279976     1.2047296
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x00000000047ec478>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    34.5544843     0.5651836     0.5666881     0.8327286     0.3487291
##         MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.4511   0.4740906   0.4715606   0.6861312     0.2291115
## 95% 75.8100   0.8789601   0.8879304   0.8810797     0.8213100
## [1] 1
```

```
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x000000001ac46660>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    1.62976018    0.12033101    0.12119416    0.99213999    0.01686274
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  1.012343  0.09627202  0.09642401   0.9774709   0.009402423
## 95% 4.629851  0.21624868  0.21645206   0.9953636   0.054147886
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    600.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x00000000131532f0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##   113.3625420     1.0292873     1.0316238     0.0508404     1.0758753
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   95.22892   0.9889425   0.9862177  -0.1176213     0.9899214
## 95% 141.46913   1.1470003   1.1513490   0.1896817     1.3543267
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x0000000012ee4340>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    91.8690537     0.9291401     0.9308613     0.4237590     0.8875006
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   74.83237   0.8567774   0.8526013   0.2375858     0.7415471
## 95% 127.61156   1.1238107   1.1408225   0.5243251     1.3553958
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x00000000130cf000>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    64.2952163     0.7775845     0.7789362     0.6528310     0.6348191
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   50.42017   0.6888514   0.6856537   0.4805887     0.4833916
## 95% 102.59978   1.0407695   1.0358405   0.7265507     1.1589678
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
```

```
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x000000001698e4a0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    33.7849044     0.5591299     0.5604081     0.8357743     0.3396745
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.41772   0.4740906   0.4715655   0.7010415     0.2291115
## 95% 74.54924   0.8622082   0.8747674   0.8809952     0.8133414
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x0000000021a52058>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    1.57501804    0.11844000    0.11927565    0.99240921    0.01622073
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  1.008075  0.09603563   0.0962184   0.9782126   0.009379423
## 95% 4.352296  0.21239783   0.2116662   0.9953875   0.052359557
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    660.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000013c84628>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  112.77444917    1.02649788    1.02854690    0.05291181    1.06957850
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   95.59263   0.9869918   0.9852865  -0.1145384      0.988670
## 95% 140.34774   1.1401253   1.1446893   0.1882218      1.335186
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x0000000012fd70a0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    91.1007323     0.9249603     0.9265222     0.4276213     0.8785615
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   74.96176   0.8561248   0.8514937   0.2501457     0.7411693
## 95% 127.03303   1.1148952   1.1378827   0.5239596     1.3005086
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
```

```
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x0000000012fe85b0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    63.4961162     0.7724320     0.7736942     0.6563837     0.6250280
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  50.40528   0.6879901   0.6856537   0.4991268     0.4832254
## 95% 97.52841   1.0132550   1.0203655   0.7265507     1.1218433
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x00000000050f69d8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    33.1110295     0.5535139     0.5547563     0.8386099     0.3316218
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.41289   0.4733328   0.4715655   0.7100058     0.2268638
## 95% 70.52752   0.8452747   0.8627123   0.8810163     0.7614605
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x0000000012f66f78>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    1.52933521    0.11680285    0.11763011    0.99263656    0.01568021
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  1.002658  0.09551907  0.09562391   0.9797304   0.009265568
## 95% 4.244901  0.20917163  0.20830466   0.9954425   0.048452011
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    720.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000021923080>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  112.22331388    1.02417532    1.02607945    0.05462993    1.06428805
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   95.59263   0.9857676   0.9844618  -0.1068859     0.9876282
## 95% 139.65868   1.1258990   1.1383467   0.1862391     1.3220761
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
```

```
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x00000000164f9580>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    90.4281279     0.9215387     0.9229639     0.4307361     0.8711577
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   74.99955   0.8561248   0.8513607   0.2651877     0.7415526
## 95% 125.41868   1.1076274   1.1247445   0.5227542     1.2949138
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x0000000012db95e0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    62.7852018     0.7680529     0.7692112     0.6594334     0.6166716
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  50.47343   0.6888790   0.6863932   0.5066570     0.4832254
## 95% 95.38926   0.9778694   0.9959889   0.7257605     1.0427246
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x00000000146b3b38>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    32.5673217     0.5491435     0.5502100     0.8407926     0.3252211
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.44142   0.4735505   0.4711119   0.7192610     0.2277301
## 95% 67.22976   0.8139767   0.8024255   0.8809787     0.7201790
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x000000000504f678>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    1.49112643    0.11545180    0.11627524    0.99282541    0.01523041
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  0.9964019  0.09531349  0.09545183   0.9804827   0.009225161
## 95% 4.0775060  0.20002113  0.20247510   0.9954523   0.045207014
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    780.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
```

```
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000013e52870>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##   111.8573575     1.0222949     1.0240499     0.0556047     1.0598573
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   95.80323   0.9849914   0.9842386 -0.09827819     0.9875528
## 95% 137.20717   1.1190667   1.1321349  0.18563726     1.3038038
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x000000001312ee28>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    89.8737676     0.9183715     0.9197457     0.4339877     0.8642849
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   75.06494   0.8560122   0.8513607   0.2778590     0.7408537
## 95% 123.05508   1.0965709   1.1105987   0.5222558     1.2733867
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x0000000021a19fa0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    62.1939834     0.7641338     0.7651710     0.6622521     0.6092026
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  50.56267   0.6888790   0.6853587   0.5164674     0.4826567
## 95% 93.65305   0.9702537   0.9802467   0.7256592     0.9946195
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x000000001ae7b1d0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    32.0890364     0.5450749     0.5460972     0.8428745     0.3193725
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.39335   0.4733328   0.4704420   0.7253116     0.2266166
## 95% 63.22196   0.8045203   0.7914044   0.8811286     0.6744573
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x0000000021f698f8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    1.45884326    0.11427474    0.11508539    0.99298915    0.01484087
```

```
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  0.993315  0.09520359  0.09529691   0.9818166   0.009185678
## 95% 3.935210  0.19112440  0.19831706   0.9954576   0.041094050
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    840.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x000000000488b1b0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  111.50996956    1.02069264    1.02240410    0.05635232    1.05603024
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   96.17706   0.9853087   0.9847934 -0.09542643     0.9876282
## 95% 136.46720   1.1117186   1.1234896  0.18214018     1.2817498
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x00000000050aee78>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    89.3780307     0.9157012     0.9169984     0.4366861     0.8584330
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   75.25397    0.855487   0.8513607   0.2885776     0.7394918
## 95% 121.56247    1.082645   1.0907204   0.5222699     1.2404727
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x0000000021da2b28>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    61.6652217     0.7607350     0.7617716     0.6647317     0.6027027
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  50.73544   0.6891826   0.6859347   0.5278237     0.4824997
## 95% 91.00982   0.9619501   0.9727103   0.7251923     0.9639861
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x00000000134435c8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    31.6495394     0.5413818     0.5423408     0.8447693     0.3141439
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.29510   0.4723799   0.4699223   0.7386903     0.2260033
## 95% 57.92987   0.7778325   0.7776614   0.8815523     0.6577517
```

```
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x0000000013c93a58>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    1.42981672    0.11321622    0.11402638    0.99313393    0.01449664
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  0.9872754   0.0948139  0.09507398   0.9834732   0.009142014
## 95% 3.7441018   0.1895341  0.18917562   0.9954905   0.037330785
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    900.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000012eebfc0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  111.20606953    1.01922998    1.02082428    0.05767138    1.05252218
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   96.40281   0.9857676   0.9849672 -0.08871843     0.9872153
## 95% 135.27595   1.1081946   1.1163650  0.17507879     1.2689355
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x0000000021299d80>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    88.9523199     0.9133442     0.9145950     0.4391333     0.8532330
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   75.46271   0.8553168   0.8514778   0.2934114     0.7388885
## 95% 119.19542   1.0756663   1.0783783   0.5220513     1.2156088
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x0000000006139870>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    61.2227859     0.7578459     0.7588613     0.6668305     0.5971227
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  50.75103   0.6891894   0.6859347   0.5347799     0.4815856
## 95% 89.31894   0.9415892   0.9532571   0.7253369     0.9497742
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
```

```
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x0000000021294ec8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    31.2856652     0.5383313     0.5391806     0.8463244     0.3097497
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.27470   0.4722308   0.4698055   0.7455128     0.2255632
## 95% 54.03879   0.7609081   0.7670783   0.8815819     0.6126453
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x000000002103e710>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    1.40485778    0.11230409    0.11309475    0.99325935    0.01419871
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  0.9855819  0.09458935  0.09489052   0.9842186   0.009079441
## 95% 3.5108300  0.18524200  0.18106207   0.9955066   0.035956490
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##    960.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000021e3c878>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  110.92002563    1.01780539    1.01933788    0.05914792    1.04929919
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   96.72355   0.9853107   0.9845353 -0.07969608     0.9865221
## 95% 134.35571   1.1034775   1.1130489  0.17475051     1.2543716
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x000000000d120068>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    88.5628423     0.9111443     0.9124272     0.4414224     0.8485433
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   75.56413   0.8549717   0.8515476   0.3002882     0.7388396
## 95% 118.50722   1.0591407   1.0602862   0.5217325     1.1704144
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
```

```
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x00000000216f53c0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    60.8133794     0.7551356     0.7561515     0.6687775     0.5920401
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  50.71563   0.6889495   0.6853587   0.5398605     0.4813296
## 95% 88.05612   0.9351168   0.9386240   0.7255506     0.9234208
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x000000000616a600>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    30.9684443     0.5356155     0.5364356     0.8477086     0.3058790
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.27166   0.4722308   0.4699223   0.7525350     0.2255411
## 95% 52.12567   0.7365354   0.7389937   0.8817498     0.5748757
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x0000000012f289b8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##     1.3831468     0.1115025     0.1122772     0.9933693     0.0139376
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  0.9828191  0.09448588  0.09479721   0.9850075   0.009059877
## 95% 3.2552178  0.17722921  0.17756736   0.9955124   0.034505533
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##   1020.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000005032360>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  110.68460491    1.01661292    1.01807686    0.06035145    1.04644936
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   96.72355   0.9850179   0.9844315 -0.07547824     0.9859939
## 95% 132.86467   1.1006093   1.1093391  0.17407379     1.2418824
## [1] 0.25
```

```
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x0000000022261138>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    88.2325069     0.9092659     0.9104222     0.4433866     0.8444328
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   75.67444   0.8549717   0.8516864   0.3027217     0.7385903
## 95% 116.03598   1.0428678   1.0432800   0.5216589     1.1375727
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x0000000005702258>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    60.4576326     0.7527715     0.7536822     0.6705185     0.5875400
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  50.73544   0.6883231   0.6852984   0.5467236     0.4799444
## 95% 86.28021   0.9192270   0.9246445   0.7258170     0.9014126
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x0000000004950e18>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    30.6825667     0.5331558     0.5338796     0.8489662     0.3023705
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.26471   0.4719607   0.4696097   0.7577779     0.2253459
## 95% 51.24125   0.7043478   0.7116643   0.8818429     0.5358712
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x0000000012fe0b60>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    1.36294684    0.11074721    0.11151101    0.99347154    0.01369659
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  0.9806561  0.09441193  0.09479695   0.9856790    0.00903264
## 95% 3.0821079  0.17128419  0.16817498   0.9955181    0.03210787
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##   1080.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
```

```
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000013ca0900>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  110.45938620    1.01550030    1.01690115    0.06141977    1.04388708
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   96.96092   0.9849798   0.9841101 -0.07224594     0.9855105
## 95% 131.98358   1.0971424   1.1048420  0.17247017     1.2234657
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x0000000004cc1260>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    87.9224419     0.9075299     0.9086653     0.4451890     0.8407002
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   75.77675   0.8549499    0.851754   0.3092697     0.7383961
## 95% 113.63847   1.0300064    1.037196   0.5214448     1.1152295
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x0000000020e098f0>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    60.1412990     0.7506784     0.7515494     0.6720166     0.5835825
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  50.72764   0.6879930   0.6853587   0.5570864     0.4796532
## 95% 84.91559   0.9138958   0.9117110   0.7258170     0.8664344
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x0000000021256a48>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    30.4206478     0.5309047     0.5315929     0.8501087     0.2992091
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.24103   0.4716447   0.4694695   0.7636376     0.2246247
## 95% 48.30941   0.6962780   0.7004694   0.8819791     0.4987612
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x000000001ae99e70>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
```

```
##    1.34473391    0.11006426    0.11082053    0.99356285    0.01348053
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  0.9773481  0.09432475  0.09473636   0.9871409   0.009008581
## 95% 2.7711936  0.16344856  0.16423025   0.9955293   0.029936107
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##   1140.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x0000000015b49f58>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  110.21625985    1.01448709    1.01583461    0.06264865    1.04152398
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   96.96092   0.9849215   0.9842386 -0.07013254     0.9851682
## 95% 131.19767   1.0920259   1.0985514  0.17247017     1.2170126
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x0000000013047948>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    87.6426203     0.9061179     0.9072673     0.4465725     0.8375847
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   75.88986   0.8551324   0.8526405   0.3113864     0.7385903
## 95% 112.35757   1.0251833   1.0293764   0.5209742     1.0874460
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x000000001346f840>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    59.8302683     0.7487650     0.7496153     0.6734212     0.5799581
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  50.73596   0.6877737   0.6853587   0.5599805     0.4789185
## 95% 83.52957   0.8994547   0.9061743   0.7258170     0.8540360
## [1] 0.75
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x0000000012e48fa8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    30.1779903     0.5289003     0.5295492     0.8511352     0.2963680
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.22747   0.4713831   0.4694262   0.7723189     0.2246247
```

```
## 95% 46.65794   0.6709327   0.6809703   0.8819791     0.4769606
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x000000002172c218>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    1.32860157    0.10947715    0.11022840    0.99364242    0.01329152
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  0.9773481  0.09426938  0.09461809   0.9879516   0.009007546
## 95% 2.4428944  0.15712207  0.15662860   0.9955293   0.026557993
##      sampleSize           raceN      sigma.race       beta.acup       beta.mbsr
##   1200.00000000      3.00000000      1.00000000      1.58923521      1.58923521
##        beta.sex        beta.age        beta.edu        beta.len        beta.bas
##      0.09531018      0.22314355      0.23111172      0.12221763     -0.22314355
##       beta.conc         markerN     beta.biom.v       mdfN.acup beta.mdf.acup.v
##     -0.26136476     10.00000000      2.00000000      4.00000000      2.00000000
##     gama.acup.v       mdfN.mbsr beta.mdf.mbsr.v     gama.mbsr.v
##      2.00000000      4.00000000      2.00000000      2.00000000
## [1] 0
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc
## <environment: 0x00000000050ce1b8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##  110.03756973    1.01355890    1.01485873    0.06342896    1.03942630
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   97.06425   0.9844857   0.9841667 -0.06639098     0.9848646
## 95% 130.57298   1.0867805   1.0925213  0.17215250     1.2070592
## [1] 0.25
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + zmdfAcup1 + zmdfMBSR1 + xacup *
##     zmdfAcup1 + xmbsr * zmdfMBSR1
## <environment: 0x000000000d0284c8>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    87.4043302     0.9047315     0.9058993     0.4479553     0.8346220
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%   75.92762   0.8549499   0.8526405   0.3192320     0.7384262
## 95% 110.90563   1.0225634   1.0211042   0.5209399     1.0758728
## [1] 0.5
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + zmdfAcup1 +
##     zmdfAcup2 + zmdfMBSR1 + zmdfMBSR2 + xacup * zmdfAcup1 + xacup *
##     zmdfAcup2 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2
## <environment: 0x0000000006b38290>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    59.5612270     0.7469393     0.7477983     0.6747622     0.5765728
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  50.73596   0.6877153   0.6850565   0.5647692     0.4785674
## 95% 82.31456   0.8868399   0.8958081   0.7260486     0.8245268
## [1] 0.75
```

```
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + zmdfAcup1 + zmdfAcup2 + zmdfAcup3 + zmdfMBSR1 +
##     zmdfMBSR2 + zmdfMBSR3 + xacup * zmdfAcup1 + xacup * zmdfAcup2 +
##     xacup * zmdfAcup3 + xmbsr * zmdfMBSR1 + xmbsr * zmdfMBSR2 +
##     xmbsr * zmdfMBSR3
## <environment: 0x00000000213be098>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    29.9607656     0.5269985     0.5276466     0.8521039     0.2937285
##          MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  24.22162   0.4710245   0.4690547   0.7813860     0.2243183
## 95% 45.62316   0.6585545   0.6668161   0.8820633     0.4530929
## [1] 1
## Y ~ xrace + xacup + xmbsr + xsex + xage + xedu + xlen + xbas +
##     xconc + xbiom1 + xbiom2 + xbiom3 + xbiom4 + xbiom5 + xbiom6 +
##     xbiom7 + xbiom8 + xbiom9 + xbiom10 + zmdfAcup1 + zmdfAcup2 +
##     zmdfAcup3 + zmdfAcup4 + zmdfMBSR1 + zmdfMBSR2 + zmdfMBSR3 +
##     zmdfMBSR4 + xacup * zmdfAcup1 + xacup * zmdfAcup2 + xacup *
##     zmdfAcup3 + xacup * zmdfAcup4 + xmbsr * zmdfMBSR1 + xmbsr *
##     zmdfMBSR2 + xmbsr * zmdfMBSR3 + xmbsr * zmdfMBSR4
## <environment: 0x00000000216df940>
##           MSE   L2normRatio   L1normRatio   correlation MSEoverObsVar
##    1.31430665    0.10893719    0.10969078    0.99371489    0.01311959
##           MSE L2normRatio L1normRatio correlation MSEoverObsVar
## 5%  0.9773289  0.09430026  0.09463756   0.9889092   0.009007546
## 95% 2.1871619  0.15067731  0.15132287   0.9955271   0.023950812
```

```
cbind(groupSampleSizes*3, AUC);
```

```
##       [,1]       [,2]      [,3]      [,4]      [,5]      [,6]
##  [1,]   60 0.01292311 0.2902731 0.4989935 0.6867223 0.9765899
##  [2,]  120 0.01793359 0.3299756 0.5551843 0.7505058 0.9843002
##  [3,]  180 0.03079011 0.3593132 0.5855331 0.7803190 0.9873621
##  [4,]  240 0.03531787 0.3774975 0.6056587 0.7978682 0.9890440
##  [5,]  300 0.03561046 0.3909426 0.6190605 0.8090522 0.9900972
##  [6,]  360 0.04217519 0.4000611 0.6301047 0.8175253 0.9908401
##  [7,]  420 0.04419673 0.4081965 0.6372417 0.8235877 0.9913833
##  [8,]  480 0.04699353 0.4148566 0.6439486 0.8289088 0.9918120
##  [9,]  540 0.04964828 0.4196217 0.6489627 0.8327286 0.9921400
## [10,]  600 0.05084040 0.4237590 0.6528310 0.8357743 0.9924092
## [11,]  660 0.05291181 0.4276213 0.6563837 0.8386099 0.9926366
## [12,]  720 0.05462993 0.4307361 0.6594334 0.8407926 0.9928254
## [13,]  780 0.05560470 0.4339877 0.6622521 0.8428745 0.9929891
## [14,]  840 0.05635232 0.4366861 0.6647317 0.8447693 0.9931339
## [15,]  900 0.05767138 0.4391333 0.6668305 0.8463244 0.9932593
## [16,]  960 0.05914792 0.4414224 0.6687775 0.8477086 0.9933693
## [17,] 1020 0.06035145 0.4433866 0.6705185 0.8489662 0.9934715
## [18,] 1080 0.06141977 0.4451890 0.6720166 0.8501087 0.9935629
## [19,] 1140 0.06264865 0.4465725 0.6734212 0.8511352 0.9936424
## [20,] 1200 0.06342896 0.4479553 0.6747622 0.8521039 0.9937149
```