

```

Loading required package: Matrix
Loading required package: lattice
Attaching package: 'Matrix'
The following object(s) are masked from 'package:base':
  det
Attaching package: 'lme4'
The following object(s) are masked from 'package:stats':
  AIC

> library(MEMSS)
Attaching package: 'MEMSS'
The following object(s) are masked from 'package:datasets':
  CO2, Orange, Theoph

  Redo all the data manips from Lab2 (see those for commentary)
> data(MathAchieve)
> MathAchieve[1:10,]
  School Minority Sex SES MathAch MEANSEs
1 1224 No Female -1.528 5.876 -0.428
2 1224 No Female -0.588 19.708 -0.428
3 1224 No Male -0.528 20.349 -0.428
4 1224 No Male -0.668 8.781 -0.428
5 1224 No Male -0.158 17.898 -0.428
6 1224 No Male 0.022 4.583 -0.428
7 1224 No Female -0.618 -2.832 -0.428
8 1224 No Male -0.998 0.523 -0.428
9 1224 No Female -0.888 1.527 -0.428
10 1224 No Male -0.458 21.521 -0.428
> dim(MathAchieve)
[1] 7185 6
> data(MathAchSchool)
> MathAchSchool[1:10,]
  School Size Sector PRACAD DISCLIM HIMINTY MEANSEs
1224 1224 842 Public 0.35 1.597 0 -0.428
1288 1288 1855 Public 0.27 0.174 0 0.128
1296 1296 1719 Public 0.32 -0.137 1 -0.420
1308 1308 716 Catholic 0.96 -0.622 0 0.534
1317 1317 455 Catholic 0.95 -1.694 1 0.351
1358 1358 1430 Public 0.25 1.535 0 -0.014
1374 1374 2400 Public 0.50 2.016 0 -0.007
1433 1433 899 Catholic 0.96 -0.321 0 0.718
1436 1436 185 Catholic 1.00 -1.141 0 0.569
1461 1461 1672 Public 0.78 2.096 0 0.683
> dim(MathAchSchool)
[1] 160 7
> attach(MathAchieve)
> mses = tapply(SES, School, mean) # mean of SES for each school
> detach(MathAchieve)
> dim(mses)
[1] 160
> mses[1:10]
 1224 1288 1296 1308 1317 1358 1374 1433 1436 1461
-0.43438298 0.12160000 -0.42550000 0.52800000 0.34533333 -0.01966667 -0.01264286 0.71200000 0.56290909 0.67745455
> Bryk = as.data.frame(MathAchieve[, c("School", "SES", "MathAch" )])
> names(Bryk) = c("school", "ses", "mathach")
> Bryk[1:10,]
  school ses mathach
1 1224 -1.528 5.876
2 1224 -0.588 19.708
3 1224 -0.528 20.349
4 1224 -0.668 8.781
5 1224 -0.158 17.898
6 1224 0.022 4.583
7 1224 -0.618 -2.832
8 1224 -0.998 0.523
9 1224 -0.888 1.527
10 1224 -0.458 21.521
> Bryk$meanses = mses[as.character(Bryk$school)] #cute trick for linking school and meanses
>
> Bryk[1:10,]
  school ses mathach meanses
1 1224 -1.528 5.876 -0.434383
2 1224 -0.588 19.708 -0.434383
3 1224 -0.528 20.349 -0.434383
4 1224 -0.668 8.781 -0.434383
5 1224 -0.158 17.898 -0.434383
6 1224 0.022 4.583 -0.434383
7 1224 -0.618 -2.832 -0.434383
8 1224 -0.998 0.523 -0.434383
9 1224 -0.888 1.527 -0.434383
10 1224 -0.458 21.521 -0.434383
> Bryk$cses = Bryk$ses - Bryk$meanses
> # the centered individual ses, relative standing on the ses measure for a student within school
> # we need this so that intercept in Level I model is mean achievement for school
>
> Bryk[1:10,]
  school ses mathach meanses cses
1 1224 -1.528 5.876 -0.434383 -1.09361702
2 1224 -0.588 19.708 -0.434383 -0.15361702
3 1224 -0.528 20.349 -0.434383 -0.09361702
4 1224 -0.668 8.781 -0.434383 -0.23361702
5 1224 -0.158 17.898 -0.434383 0.27638298
6 1224 0.022 4.583 -0.434383 0.45638298
7 1224 -0.618 -2.832 -0.434383 -0.28361702

```

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3  1224 -0.528  20.349 -0.434383 -0.09361702
4  1224 -0.668   8.781 -0.434383 -0.23361702
5  1224 -0.158  17.898 -0.434383  0.27638298
6  1224  0.022   4.583 -0.434383  0.45638298
7  1224 -0.618  -2.832 -0.434383 -0.18361702
8  1224 -0.998   0.523 -0.434383 -0.56361702
9  1224 -0.888   1.527 -0.434383 -0.45361702
10 1224 -0.458  21.521 -0.434383 -0.02361702
> sector = MathAchSchool$Sector
> names(sector) = row.names(MathAchSchool)
> Bryk$sector = sector[as.character(Bryk$school)]
> Bryk[1:10,]
  school    ses mathach  meansas      cses sector
1  1224 -1.528   5.876 -0.434383 -1.09361702 Public
2  1224 -0.588  19.708 -0.434383 -0.15361702 Public
3  1224 -0.528  20.349 -0.434383 -0.09361702 Public
4  1224 -0.668   8.781 -0.434383 -0.23361702 Public
5  1224 -0.158  17.898 -0.434383  0.27638298 Public
6  1224  0.022   4.583 -0.434383  0.45638298 Public
7  1224 -0.618  -2.832 -0.434383 -0.18361702 Public
8  1224 -0.998   0.523 -0.434383 -0.56361702 Public
9  1224 -0.888   1.527 -0.434383 -0.45361702 Public
10 1224 -0.458  21.521 -0.434383 -0.02361702 Public

> dim(Bryk)
[1] 7185  6
> remove(sector) #clean up variable (use it within Bryk dataset)
> attach(Bryk) #we can refer to variables by simple name
> table(sector) #get the student breakdown
sector
Public Catholic
 3642      3543

```