

Additional visualizations for *variancePartition*

Gabriel Hoffman

Icahn Institute for Genomics and Multiscale Biology
Department of Genetics and Genomic Sciences
Icahn School of Medicine at Mount Sinai

September 26, 2016

The correlation structure between samples in complex study designs can be decomposed into the contribution of multiple dimensions of variation. *variancePartition* provides a statistical and visualization framework to interpret sources of variation. Here I describe a visualization of the correlation structure between samples for a single gene. In the example dataset described in the main vignette, samples are correlated because they can come from the same individual or the same tissue. The function `plotCorrStructure` shows the correlation structure caused by each variable as well and the joint correlation structure. Figure 1a,b shows the correlation between samples from the same individual where (a) shows the samples sorted based on clustering of the correlation matrix and (b) shows the original order. Figure 1c,d shows the same type of plot except demonstrating the effect of tissue. The total correlation structure from summing individual and tissue correlation matrices is shown in 2a,b. The code to generate these plots is shown below.

```
# Fit linear mixed model and examine correlation structure  
# for one gene  
data(varPartData)
```

```
form <- ~ Age + (1|Individual) + (1|Tissue)
```

```
fitList <- fitVarPartModel( geneExpr[1:2,], form, info )
```

```
Projected memory usage: > 83.2 Kb
```

```
# focus on one gene  
fit = fitList[[1]]
```

```
# Figure 1a  
# correlation structure based on similarity within Individual  
# reorder samples based on clustering  
plotCorrStructure( fit, "Individual" )
```

```
# Figure 1b  
# use original order of samples  
plotCorrStructure( fit, "Individual", reorder=FALSE )
```

```
# Figure 1c  
# correlation structure based on similarity within Tissue  
# reorder samples based on clustering  
plotCorrStructure( fit, "Tissue" )
```

```
# Figure 1d  
# use original order of samples  
plotCorrStructure( fit, "Tissue", reorder=FALSE )
```

```
# Figure 2a  
# correlation structure based on similarity within Individual *and* Tissue  
# reorder samples based on clustering  
plotCorrStructure( fit )
```

```
# Figure 2b  
# use original order of samples  
plotCorrStructure( fit, reorder=FALSE )
```

Figure 1: Visualizing correlation structure caused by variables modeled as random effects

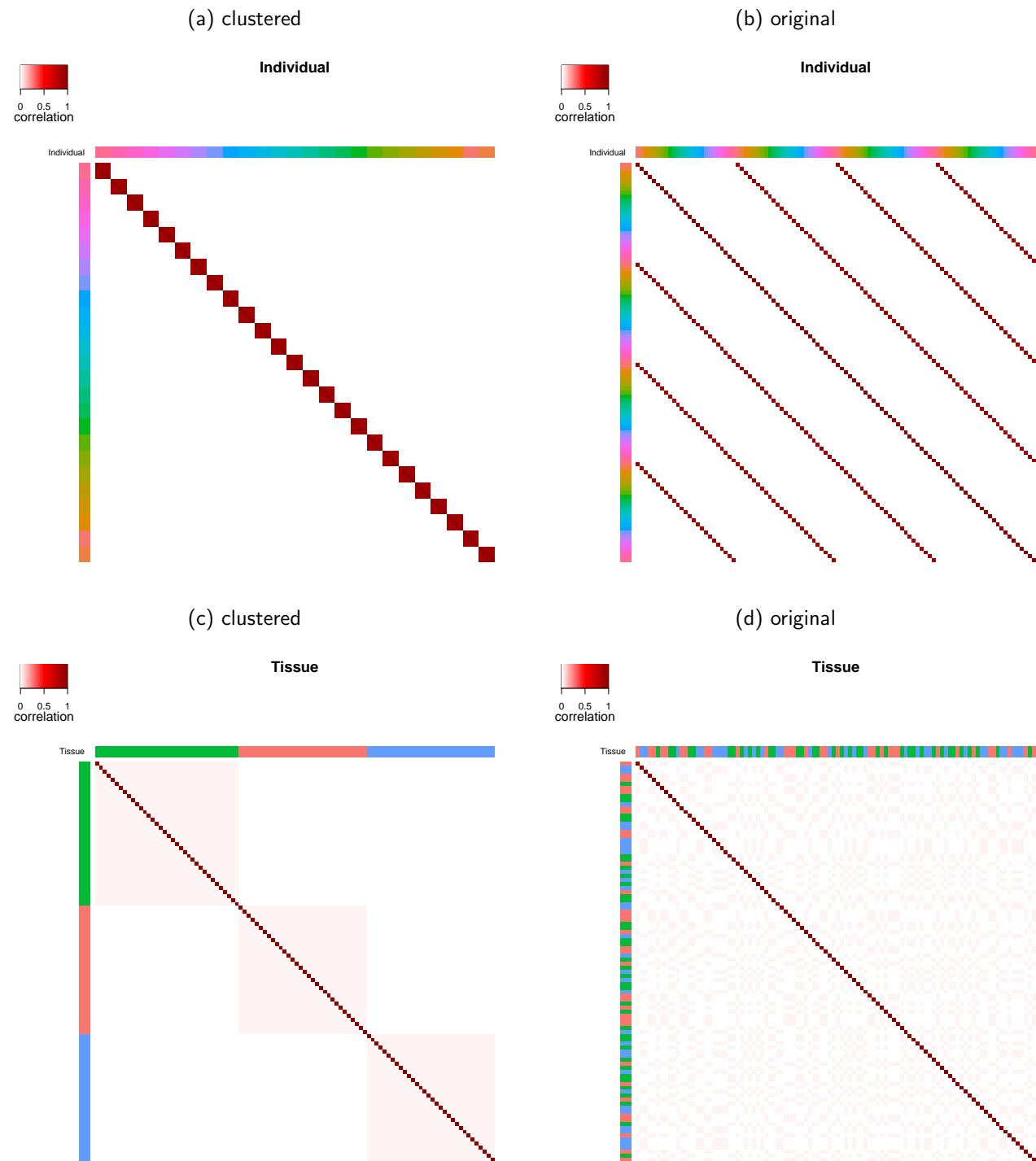


Figure 2: Visualizing correlation structure caused by multiple variables

