

Supplement A: R Script for Brown (1974) Imputation Algorithm

```
fn.brown <- function(data){
# data object is an array
data.interp <-data
crit.val.mat <- matrix(NA,ncol=2)
for(j in 1:dim(data.interp)[3]){
  data.interp.mat <- data.interp[, ,j]
  val.missing <- is.na(data.interp.mat)
  data.interp.mat[val.missing] <- 0
  row.sum <- matrix(rowSums(data.interp.mat), ncol=ncol(data.interp.mat),
    nrow=nrow(data.interp.mat), byrow=FALSE)
  col.sum <- matrix(colSums(data.interp.mat), ncol=ncol(data.interp.mat),
    nrow=nrow(data.interp.mat), byrow=TRUE)
  mat.sum <- matrix(sum(data.interp.mat), ncol=ncol(data.interp.mat),
    nrow=nrow(data.interp.mat), byrow=TRUE)
  crit.val <- 1
  iteration <- 0
  while (crit.val > 0.01 & iteration < 100){
    iteration <- iteration + 1
    data.interp.mat[val.missing] <- ((row.sum[val.missing] -
      data.interp.mat[val.missing]) * (col.sum[val.missing] -
      data.interp.mat[val.missing])) / (mat.sum[val.missing] -
      row.sum[val.missing] - col.sum[val.missing] +
      data.interp.mat[val.missing])
    row.sum <- matrix(rowSums(data.interp.mat), ncol=ncol(data.interp.mat),
      nrow=nrow(data.interp.mat), byrow=FALSE)
    col.sum <- matrix(colSums(data.interp.mat), ncol=ncol(data.interp.mat),
      nrow=nrow(data.interp.mat), byrow=TRUE)
    mat.sum <- matrix(sum(data.interp.mat), ncol=ncol(data.interp.mat),
      nrow=nrow(data.interp.mat), byrow=TRUE)
    crit.val <- max(abs(data.interp.mat[val.missing] - ((row.sum[val.missing]
      * col.sum[val.missing]) / mat.sum[val.missing])))
    crit.val.mat <- rbind(crit.val.mat, cbind(iteration, crit.val))
  }# END while
  crit.val.mat <-<- crit.val.mat[-1,]
  data.interp[, ,j] <- data.interp.mat
}# END for(j
return(data.interp)
}
```

SUPPLEMENTAL REFERENCES

Brown, M. B. 1974. Identification of sources of significance in two-way contingency tables. *Applied Statistics* 23:405–413.