Testing different imputation methods on PUMS (MCAR)

```r
# load dataset: df
load('../../Datasets/ordinalPUMS.Rdata')

# take 2000 samples: df
set.seed(0)
n = 3000
sample <- sample(nrow(df), size = n)
df <- df[sample,]

# create MCAR scneario with 30% chance of missing: df_observed
missing_prob = 0.3
df_observed <- df
missing_col = c(1,3,7,9,10,11)
for (col in missing_col) {
  missing_ind <- rbernoulli(n,p = missing_prob)
  df_observed[missing_ind, col] <- NA
}
```

Ordinal bayesian nonparametric model

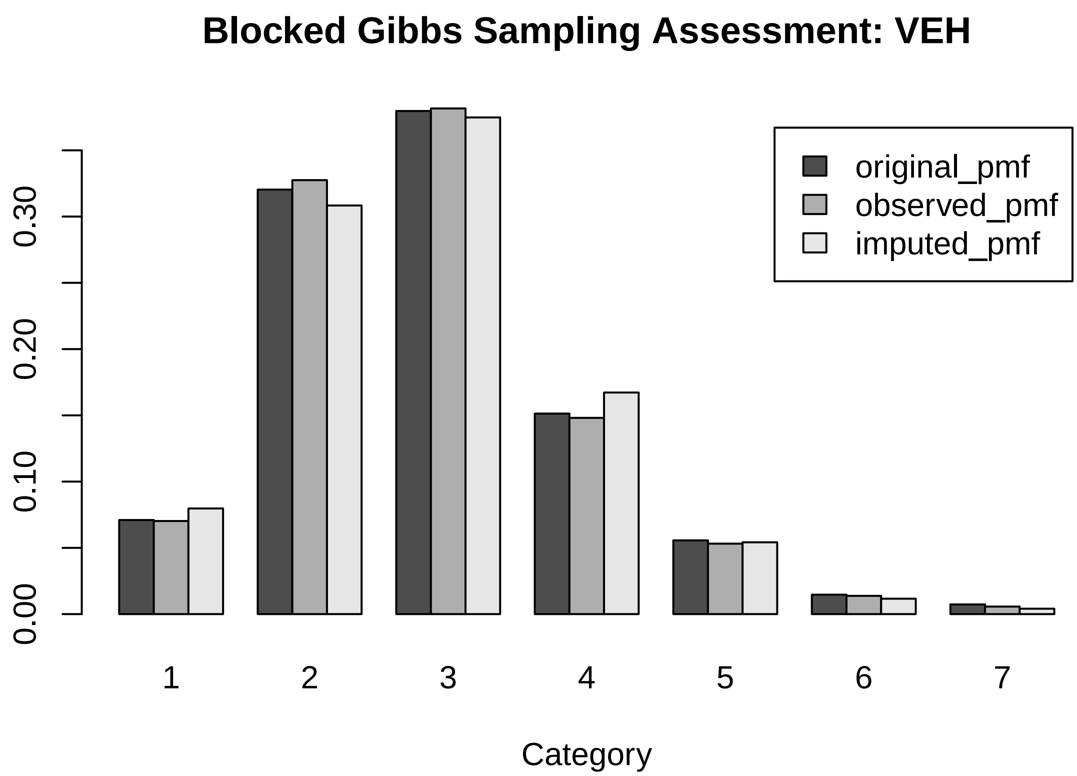
```r
source("../../probitBayes.R")
N = 40
Mon = 300
B = 300
thin.int = 1
# function(y, N = 40, Mon = 2000, B = 300, thin.int = 5, seed = 0)
output_list <- probitBayesImputation(df_observed, N, Mon, B, thin.int)
```

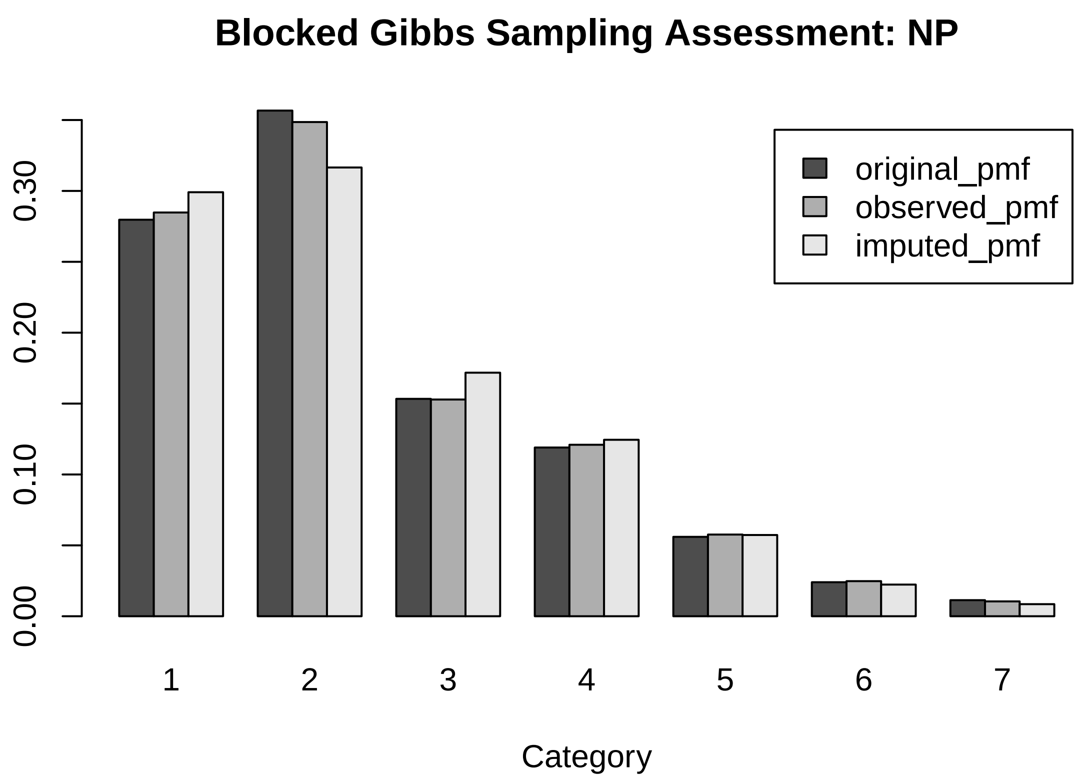
```r
sampled_y <- output_list[['sampled_y']]
sampled_z <- output_list[['sampled_z']]
```

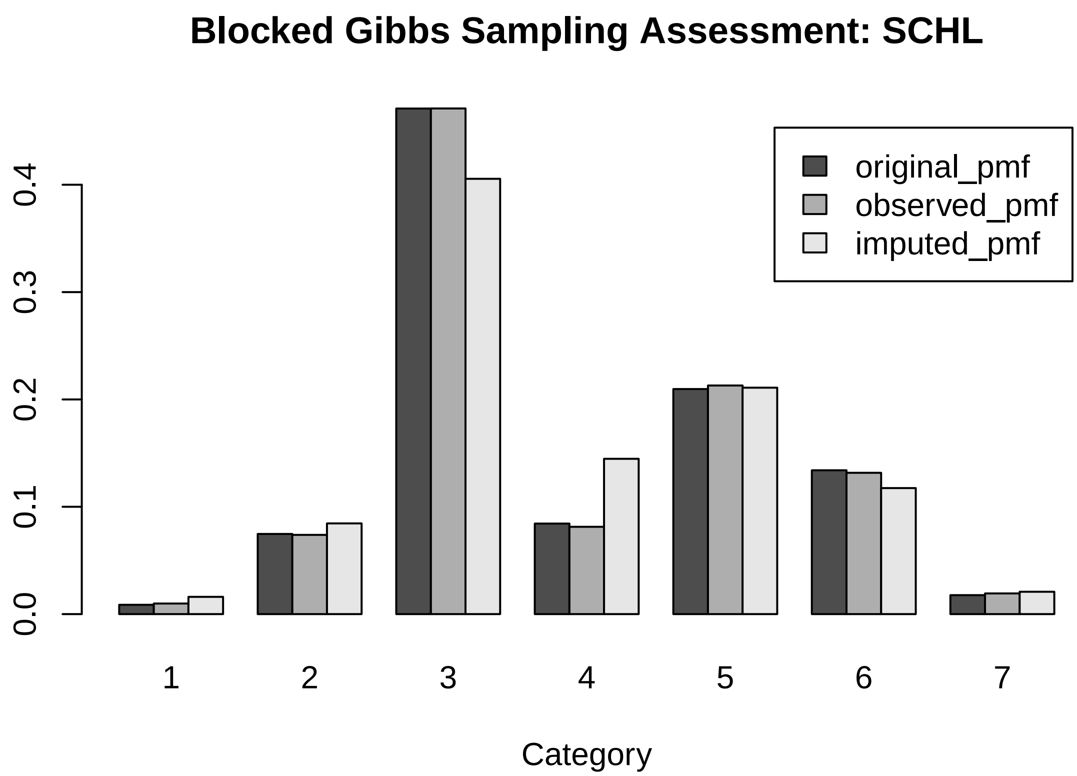
Diagnostics

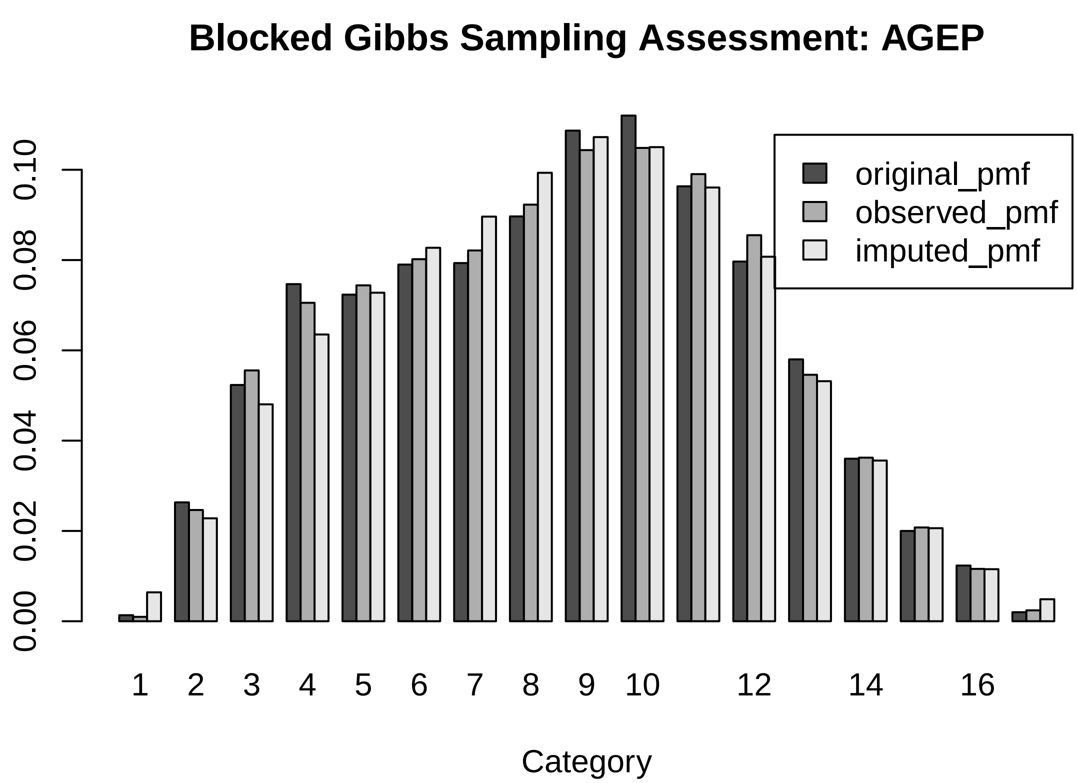
Assess bivariate joint distribution

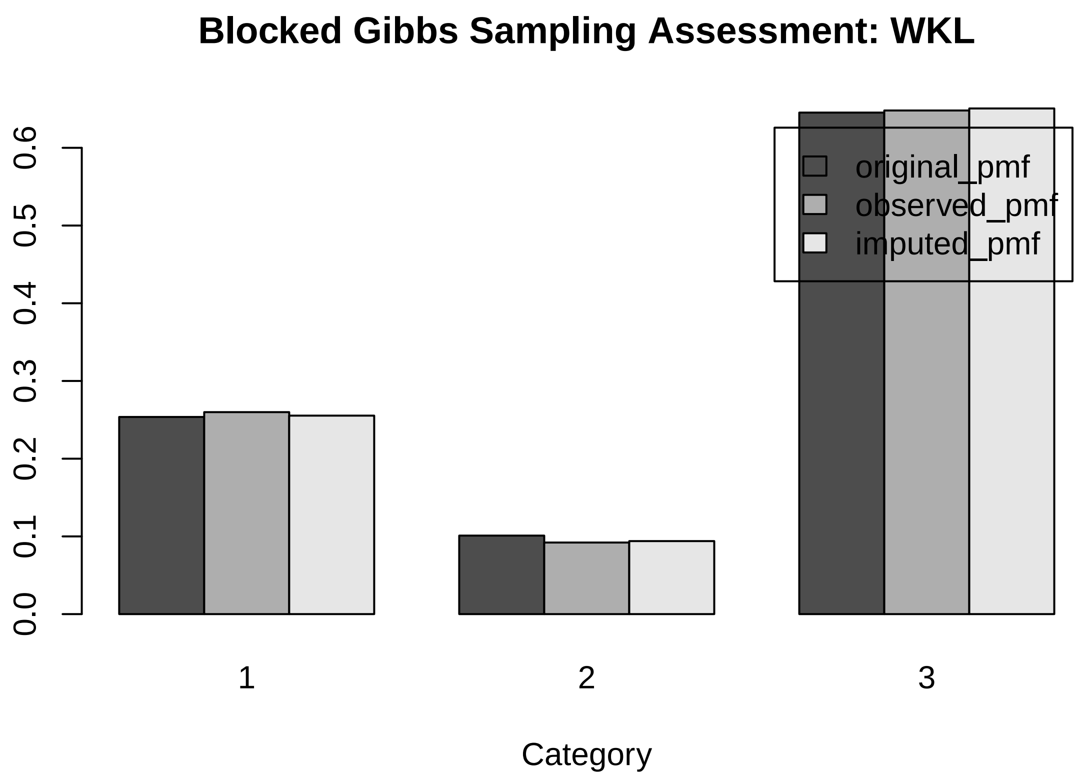
Assess trivariate joint distribution

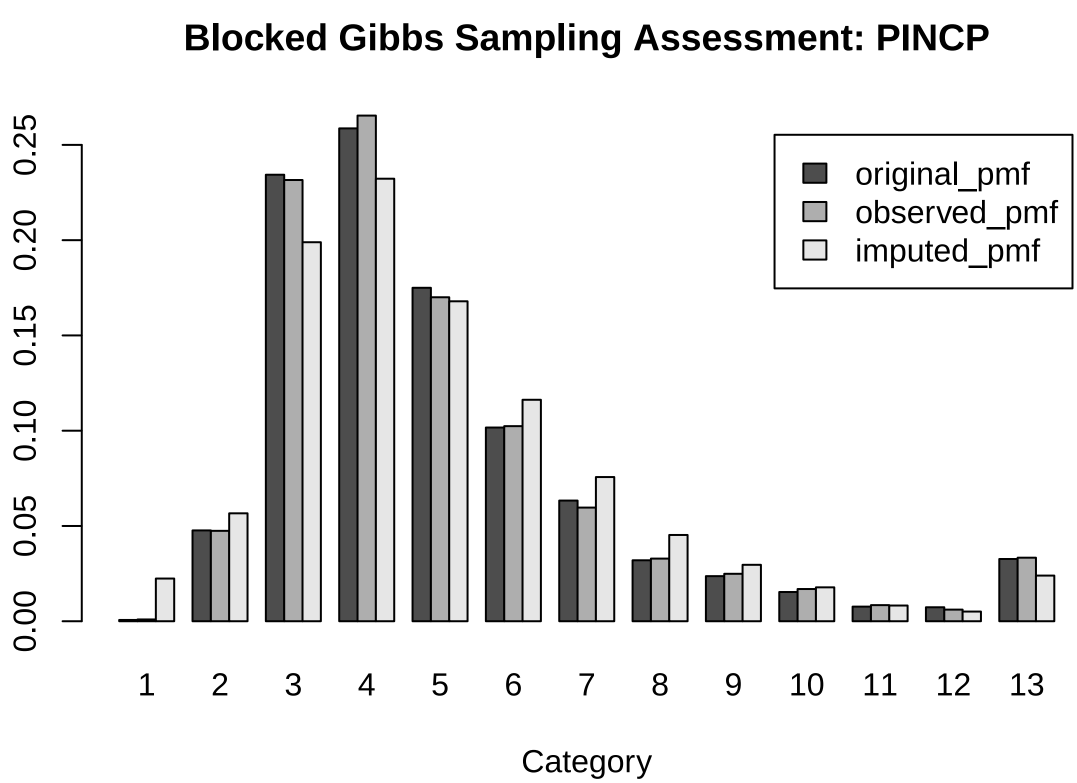

Blocked Gibbs Sampling Assessment: VEH
original_pmf
observed_pmf
imputed_pmf
0.00
0.10
0.20
0.30
1
2
3
4
5
6
7
Category

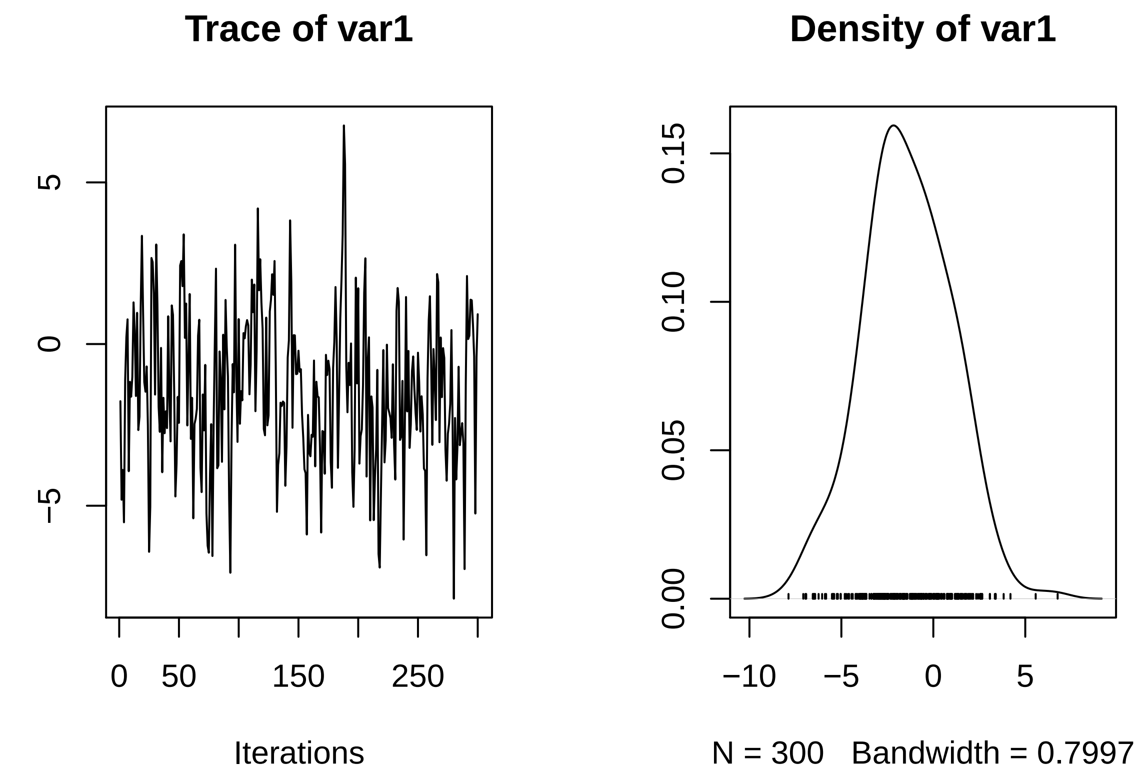

Blocked Gibbs Sampling Assessment: NP
original_pmf
observed_pmf
imputed_pmf
0.00
0.10
0.20
0.30
1
2
3
4
5
6
7
Category

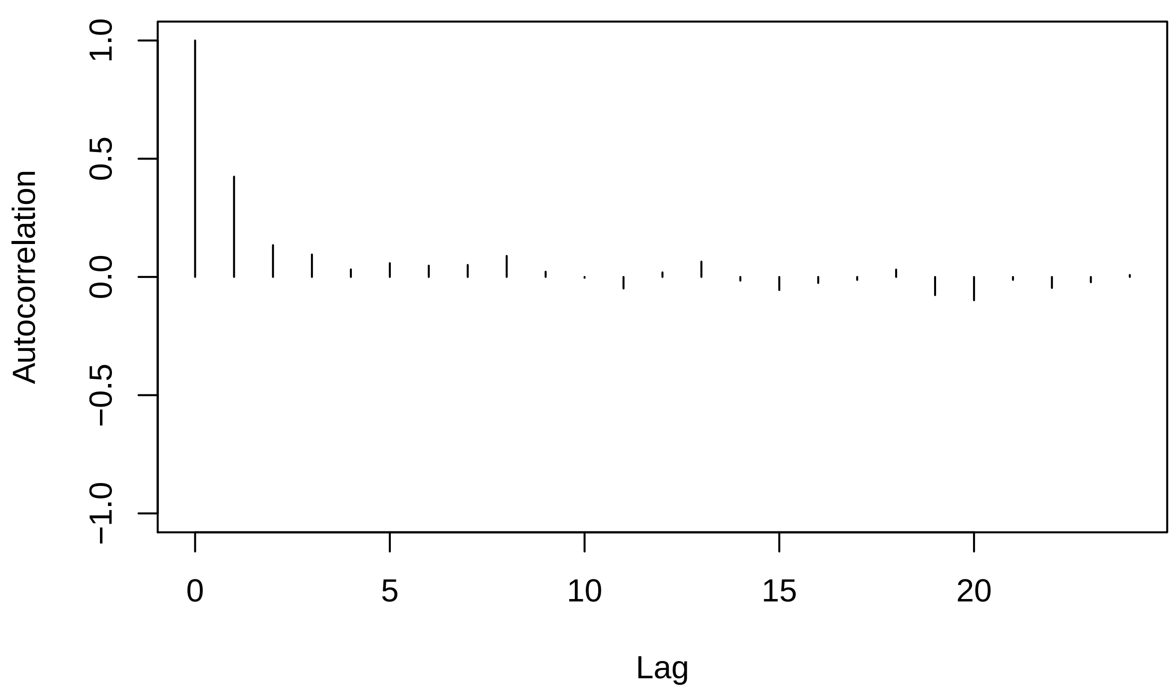

Blocked Gibbs Sampling Assessment: SCHL
original_pmf
observed_pmf
imputed_pmf
0.0
0.1
0.2
0.3
0.4
1
2
3
4
5
6
7
Category

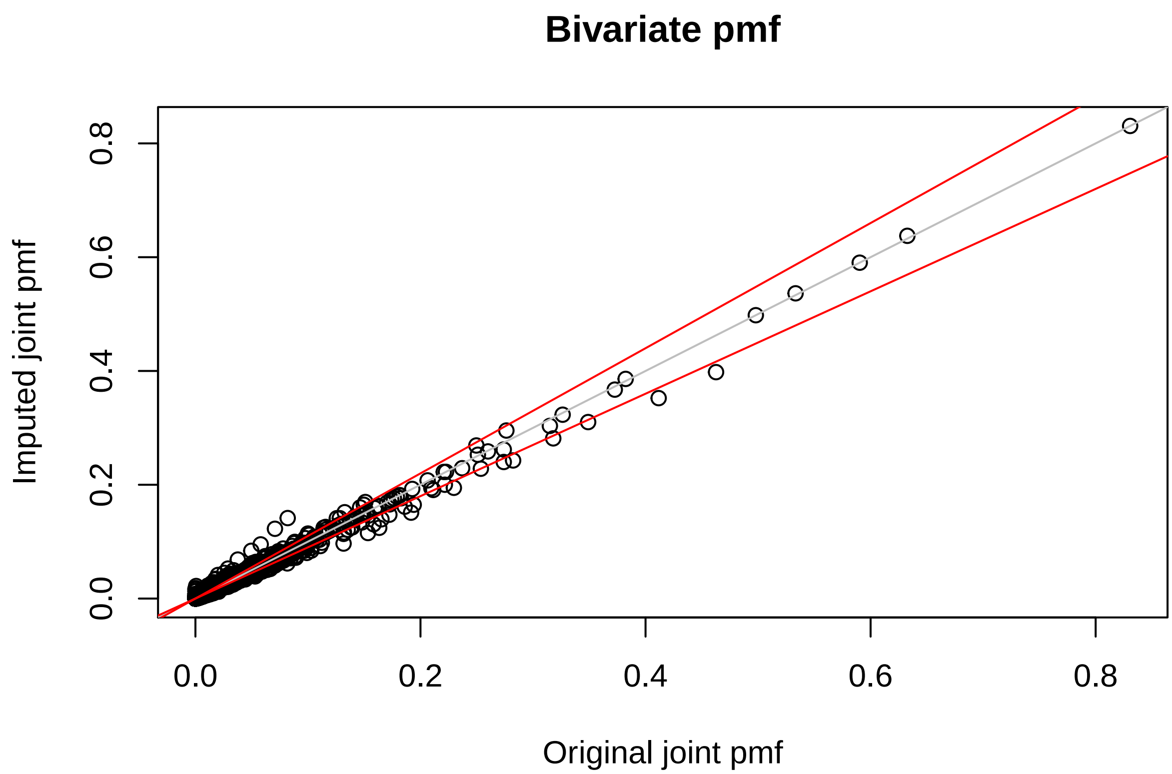

Blocked Gibbs Sampling Assessment: AGEP
original_pmf
observed_pmf
imputed_pmf
0.00
0.02
0.04
0.06
0.08
0.10
1
2
3
4
5
6
7
8
9
10
12
14
16
Category


Blocked Gibbs Sampling Assessment: WKL
0.0
0.1
0.2
0.3
0.4
0.5
0.6
original_pmf
observed_pmf
imputed_pmf
1
2
3
Category

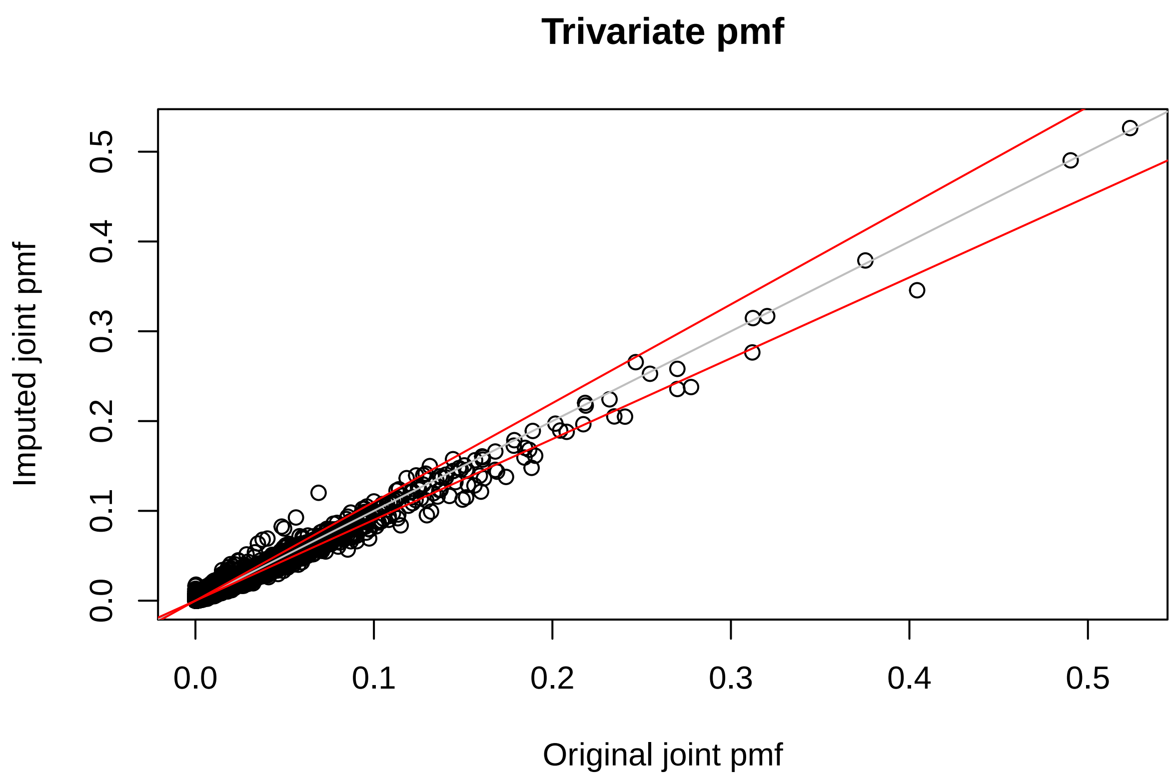

Blocked Gibbs Sampling Assessment: PINCP
0.00
0.05
0.10
0.15
0.20
0.25
original_pmf
observed_pmf
imputed_pmf
1
2
3
4
5
6
7
8
9
10
11
12
13
Category


Trace of var1
Iterations
Density of var1
N = 300   Bandwidth = 0.7997


Autocorrelation
Lag



Bivariate pmf
Imputed joint pmf
0.0
0.2
0.4
0.6
0.8
Original joint pmf



Trivariate pmf
Imputed joint pmf
0.0
0.1
0.2
0.3
0.4
0.5
Original joint pmf