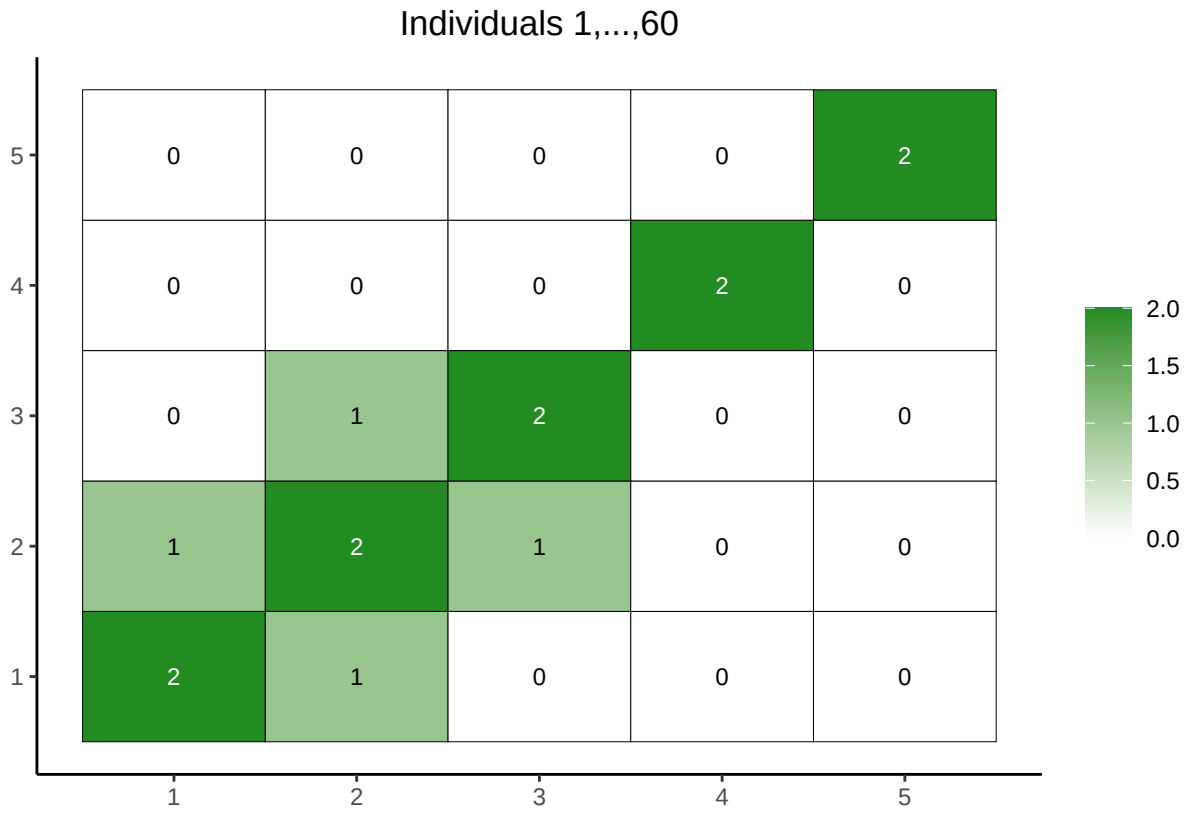
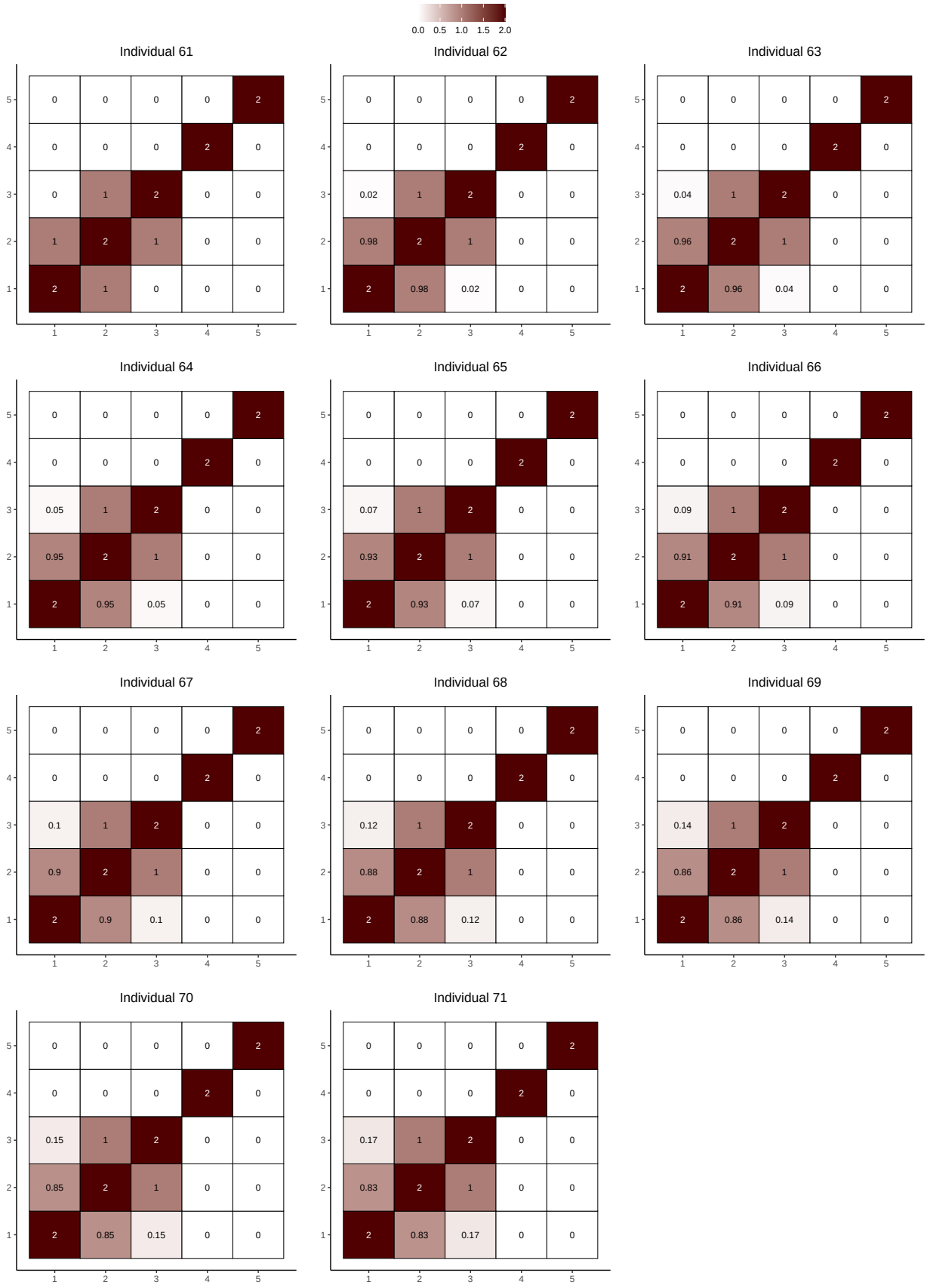
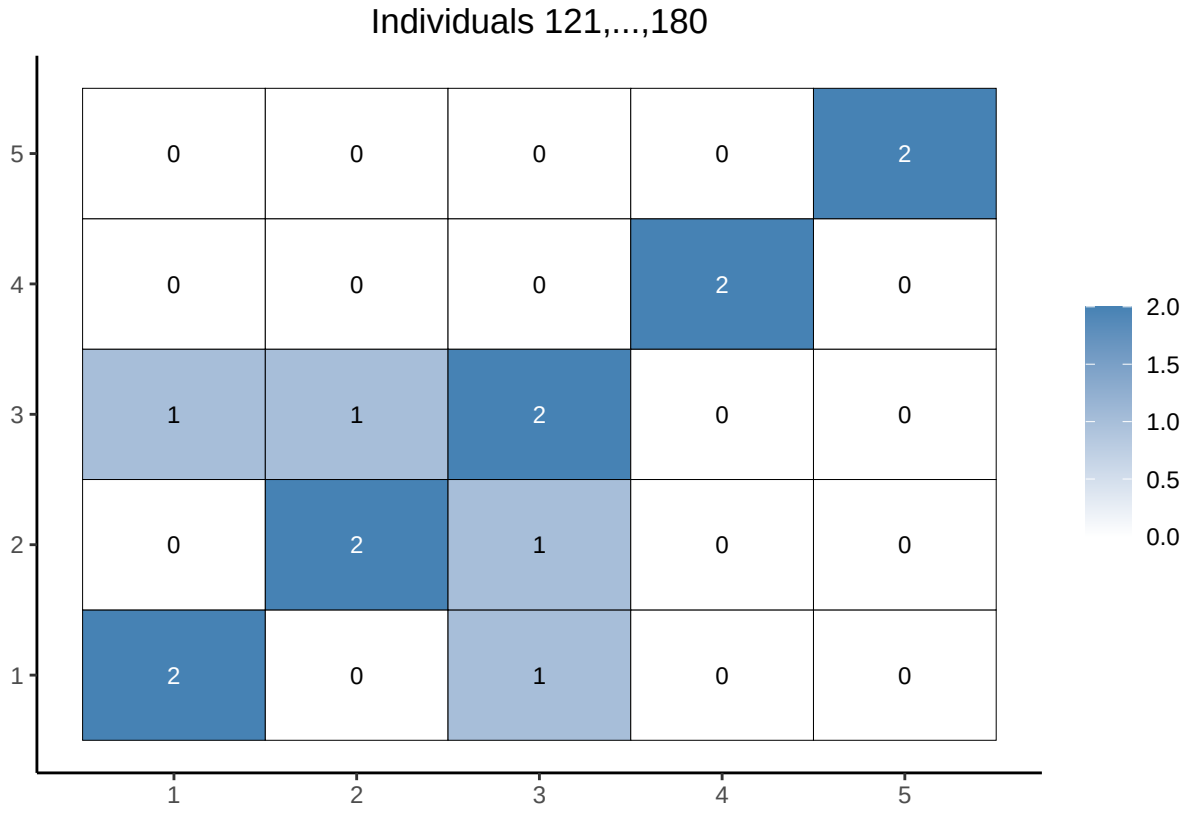
True Precision Matrices




0.0 0.5 1.0 1.5 2.0
Individual 61
0 0 0 0 2
0 0 0 2 0
0 1 2 0 0
1 2 1 0 0
2 1 0 0 0
Individual 62
0 0 0 0 2
0 0 0 2 0
0.02 1 2 0 0
0.98 2 1 0 0
2 0.98 0.02 0 0
Individual 63
0 0 0 0 2
0 0 0 2 0
0.04 1 2 0 0
0.96 2 1 0 0
2 0.96 0.04 0 0
Individual 64
0 0 0 0 2
0 0 0 2 0
0.05 1 2 0 0
0.95 2 1 0 0
2 0.95 0.05 0 0
Individual 65
0 0 0 0 2
0 0 0 2 0
0.07 1 2 0 0
0.93 2 1 0 0
2 0.93 0.07 0 0
Individual 66
0 0 0 0 2
0 0 0 2 0
0.09 1 2 0 0
0.91 2 1 0 0
2 0.91 0.09 0 0
Individual 67
0 0 0 0 2
0 0 0 2 0
0.1 1 2 0 0
0.9 2 1 0 0
2 0.9 0.1 0 0
Individual 68
0 0 0 0 2
0 0 0 2 0
0.12 1 2 0 0
0.88 2 1 0 0
2 0.88 0.12 0 0
Individual 69
0 0 0 0 2
0 0 0 2 0
0.14 1 2 0 0
0.86 2 1 0 0
2 0.86 0.14 0 0
Individual 70
0 0 0 0 2
0 0 0 2 0
0.15 1 2 0 0
0.85 2 1 0 0
2 0.85 0.15 0 0
Individual 71
0 0 0 0 2
0 0 0 2 0
0.17 1 2 0 0
0.83 2 1 0 0
2 0.83 0.17 0 0
1 2 3 4 5



Bandwidth Analysis

The bandwidths for individuals 61,...,71 are listed below, along with summary statistics and visualizations for all of the estimated bandwidths.

```
out <- covdepGE(data_mat, Z, n_sigma = 200, parallel = T, num_workers = 6)
```

```
## Warning in covdepGE(data_mat, Z, n_sigma = 200, parallel = T, num_workers = 6):
## No registered workers detected; registering doParallel with 6 workers
```

```
out
```

```
##                       Covariate Dependent Graphical Model
##
## Model ELBO: -90084.92               Unique conditional dependence structures: 4
## n: 180, variables: 5                       Hyperparameter grid size: 200 points
## CAVI converged for 5/5 variables
##
## Model fit completed in 13.234 secs
```

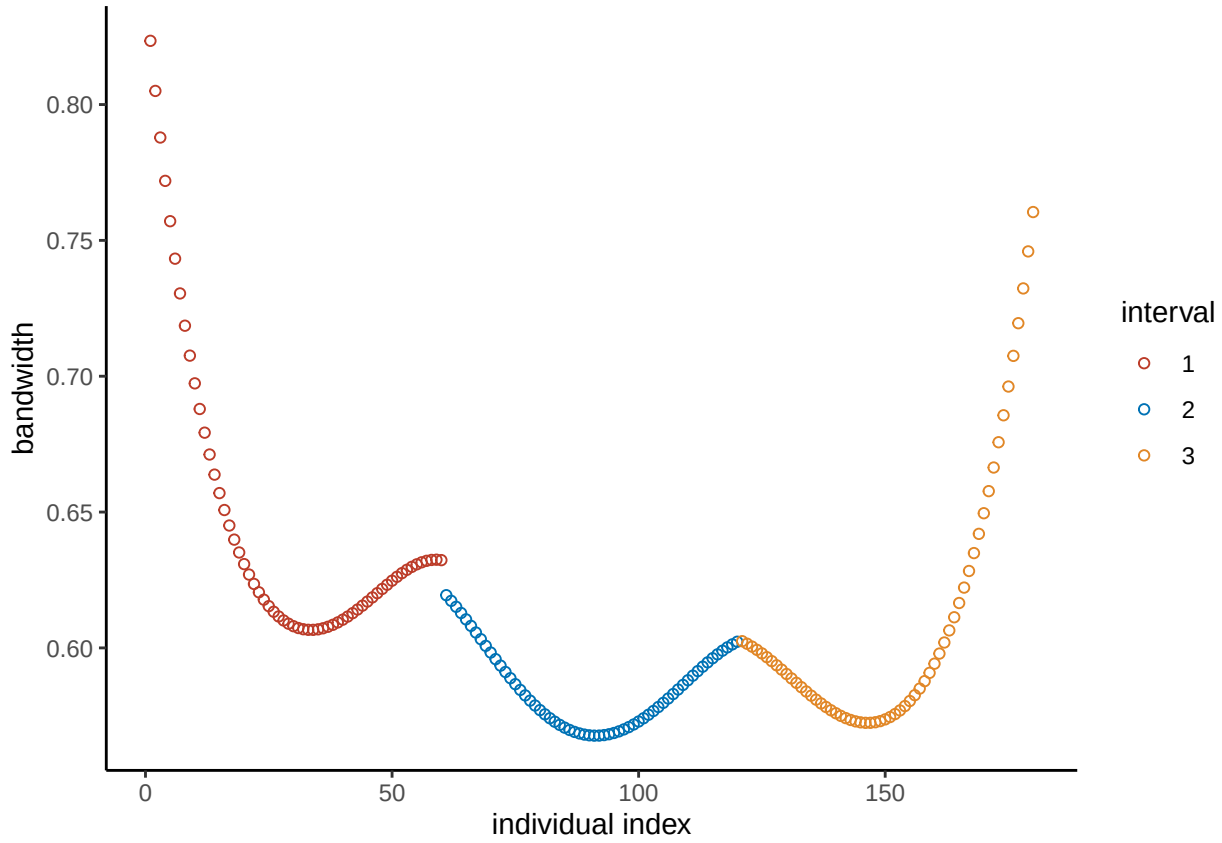
```
round(out$bandwidths[61:71], 4)
```

```
##  [1] 0.6194 0.6173 0.6151 0.6129 0.6105 0.6081 0.6057 0.6032 0.6008 0.5983
## [11] 0.5959
```

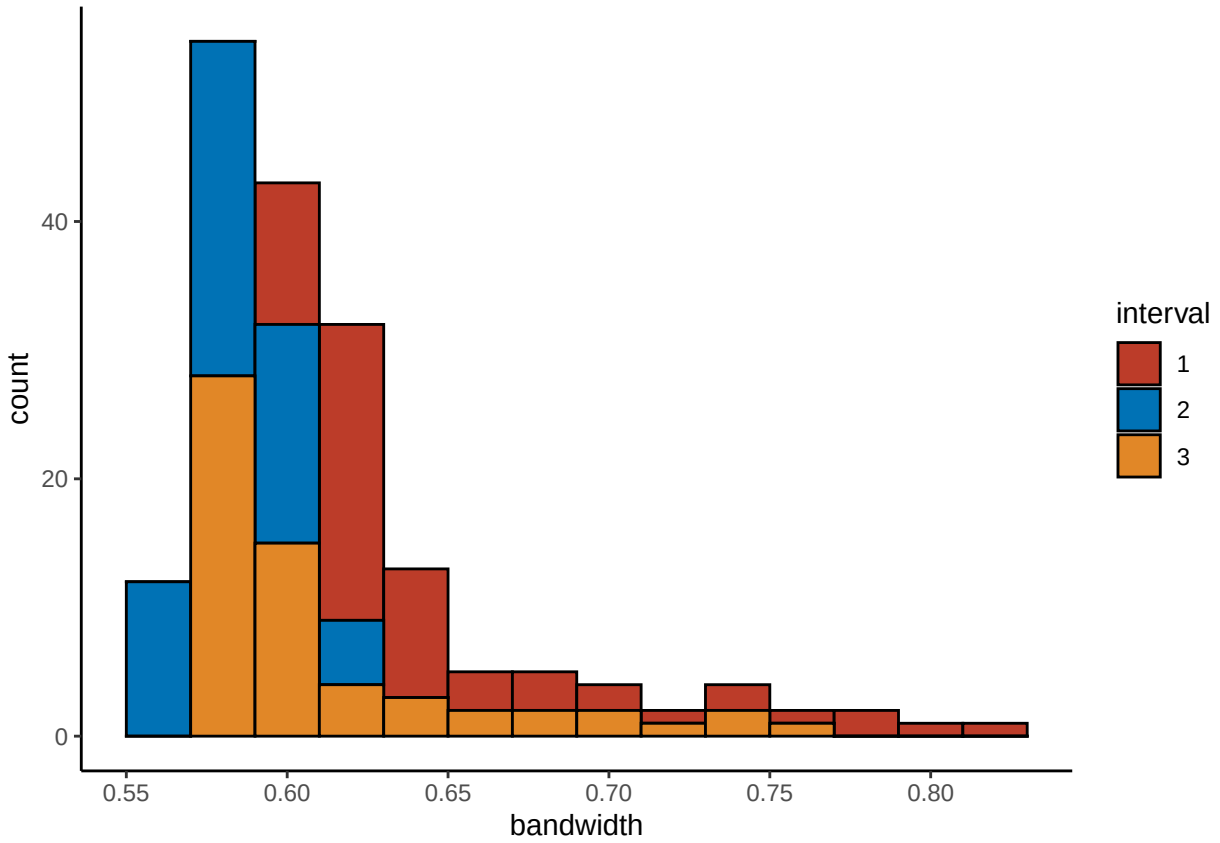
```
summary(out$bandwidths)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.5677  0.5803  0.6014  0.6142  0.6251  0.8235
```

```
bw_tb <- tibble::tibble("individual index" = 1:n, bandwidth = out$bandwidths,
                        interval = factor(rep(1:3, each = 60)))
ggplot(bw_tb, aes(`individual index`, bandwidth, color = interval)) +
  geom_point(shape = 21) + theme_classic() + ggsci::scale_color_nejm()
```




```
ggplot(bw_tb, aes(bandwidth, fill = interval)) +
  geom_histogram(color = "black", binwidth = 0.02) + theme_classic() + ggsci::scale_fill_nejm()
```


count
40
20
0
0.55
0.60
0.65
0.70
0.75
0.80
bandwidth
interval
1
2
3