Big data exploration with tabplot

Martijn Tennekes, Edwin de Jonge

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Tableplot

- Innovative data visualisation method
- One picture of a multivariate (big) data source
- Bottom up method:
  1. Sort records on a key variable
  2. Group records into equally sized bins
  3. Calculate per group:
     - numeric variable: mean value
     - categorical variable: category fractions
  4. Plot:
     - numeric variable: bar chart
     - categorical variable: stacked bar chart
- Implementation: R package tabplot

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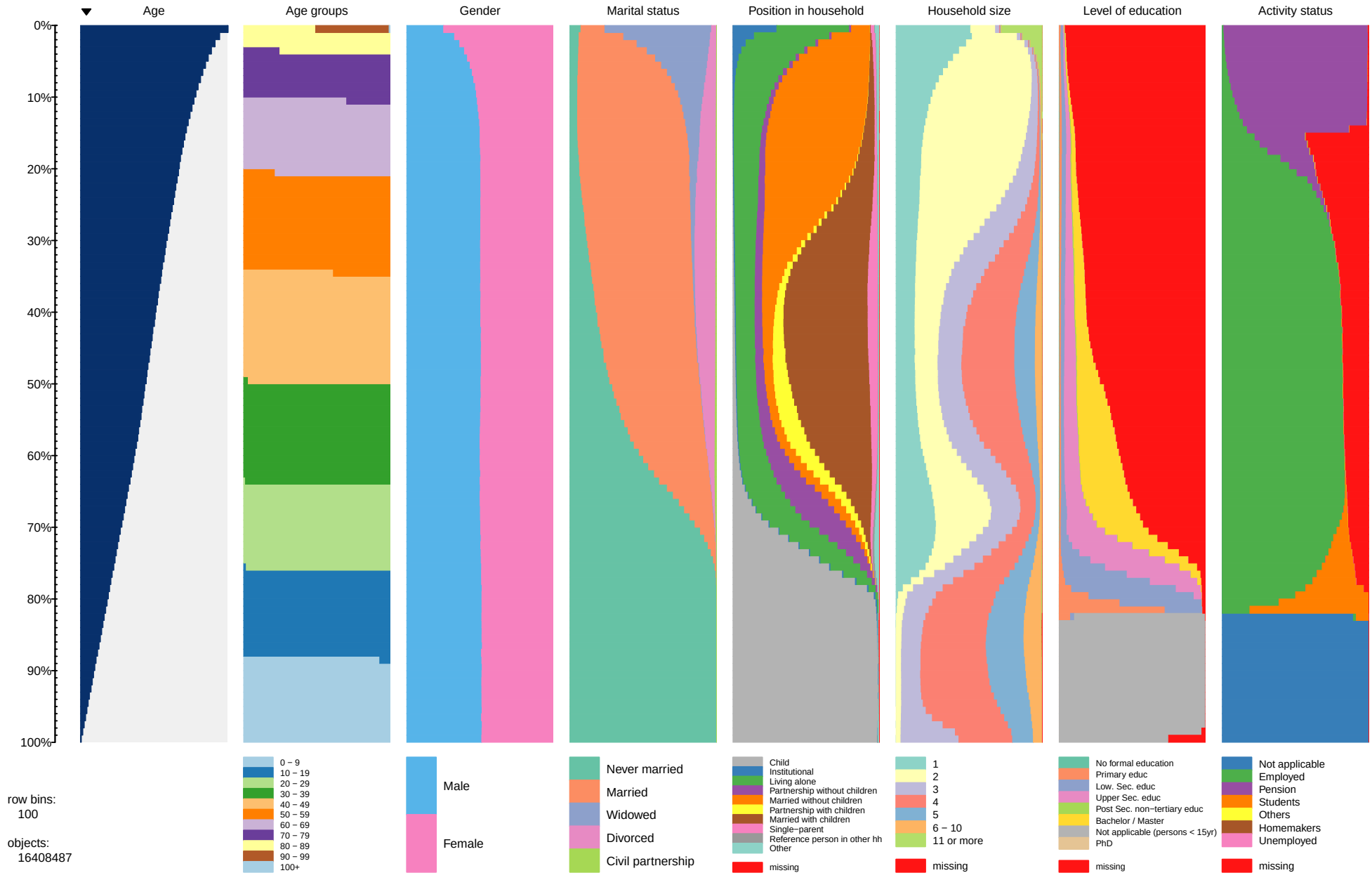
Tableplot: Virtual Census



row bins:
100

objects:
16408487

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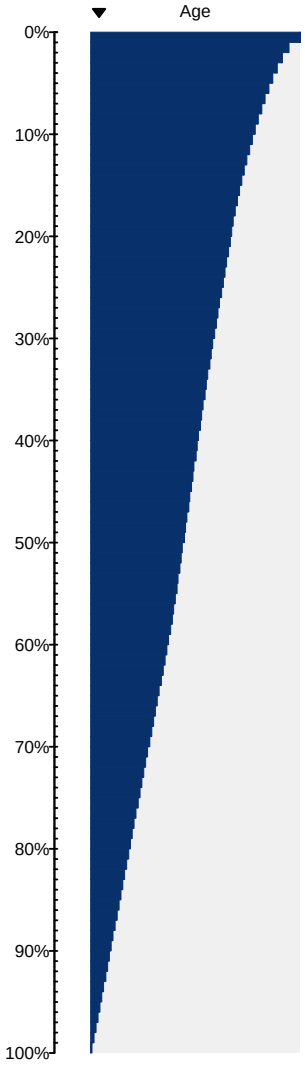

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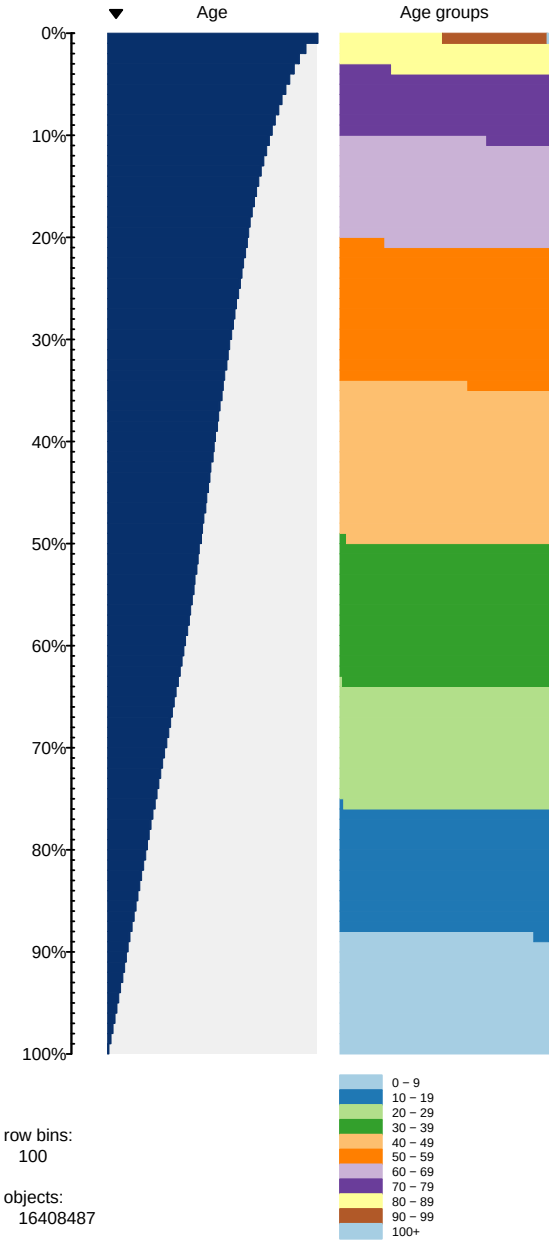

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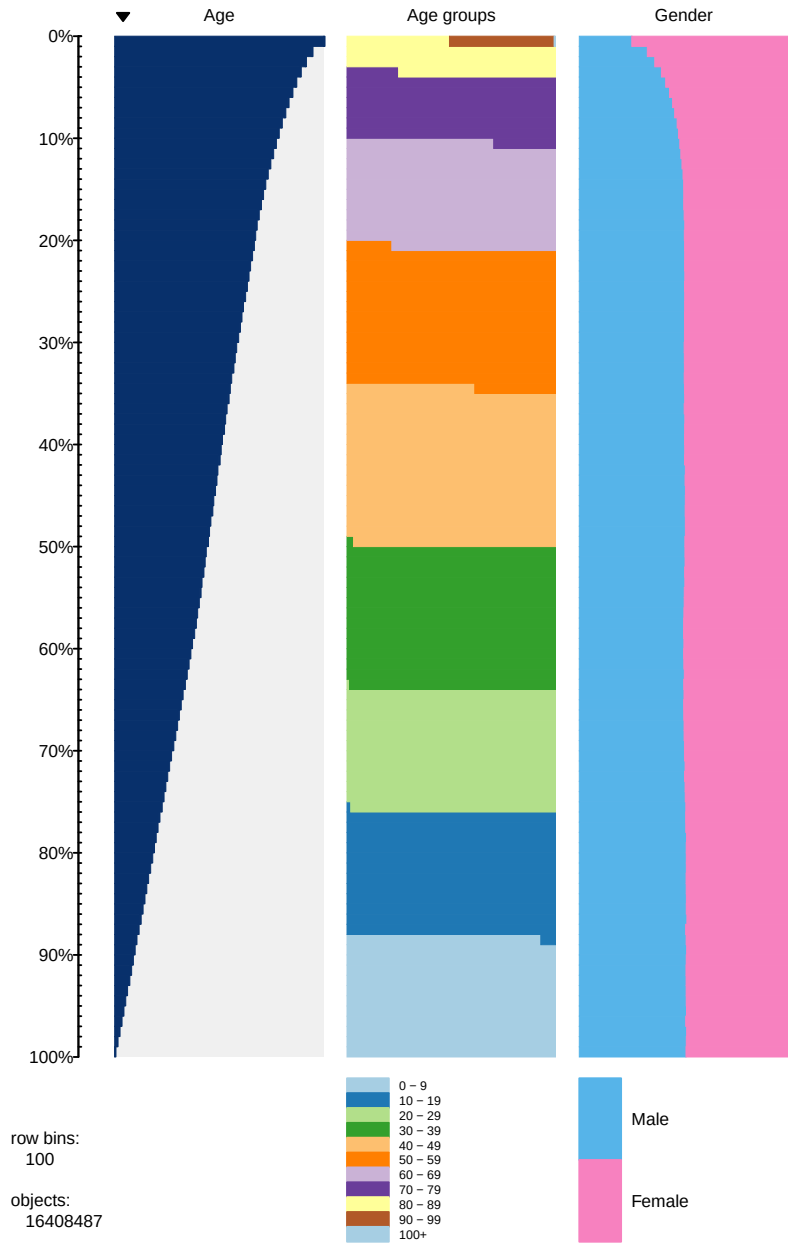

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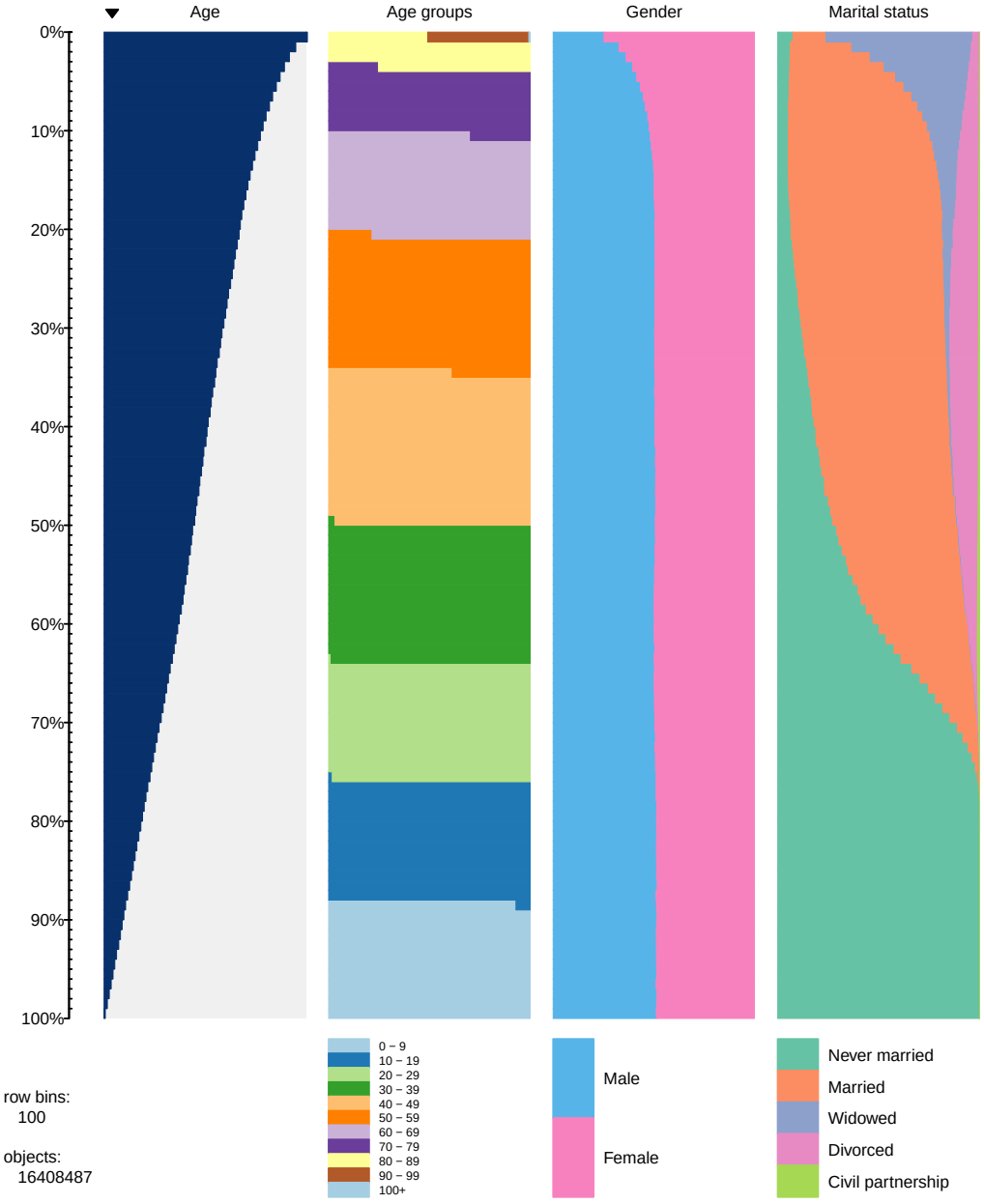

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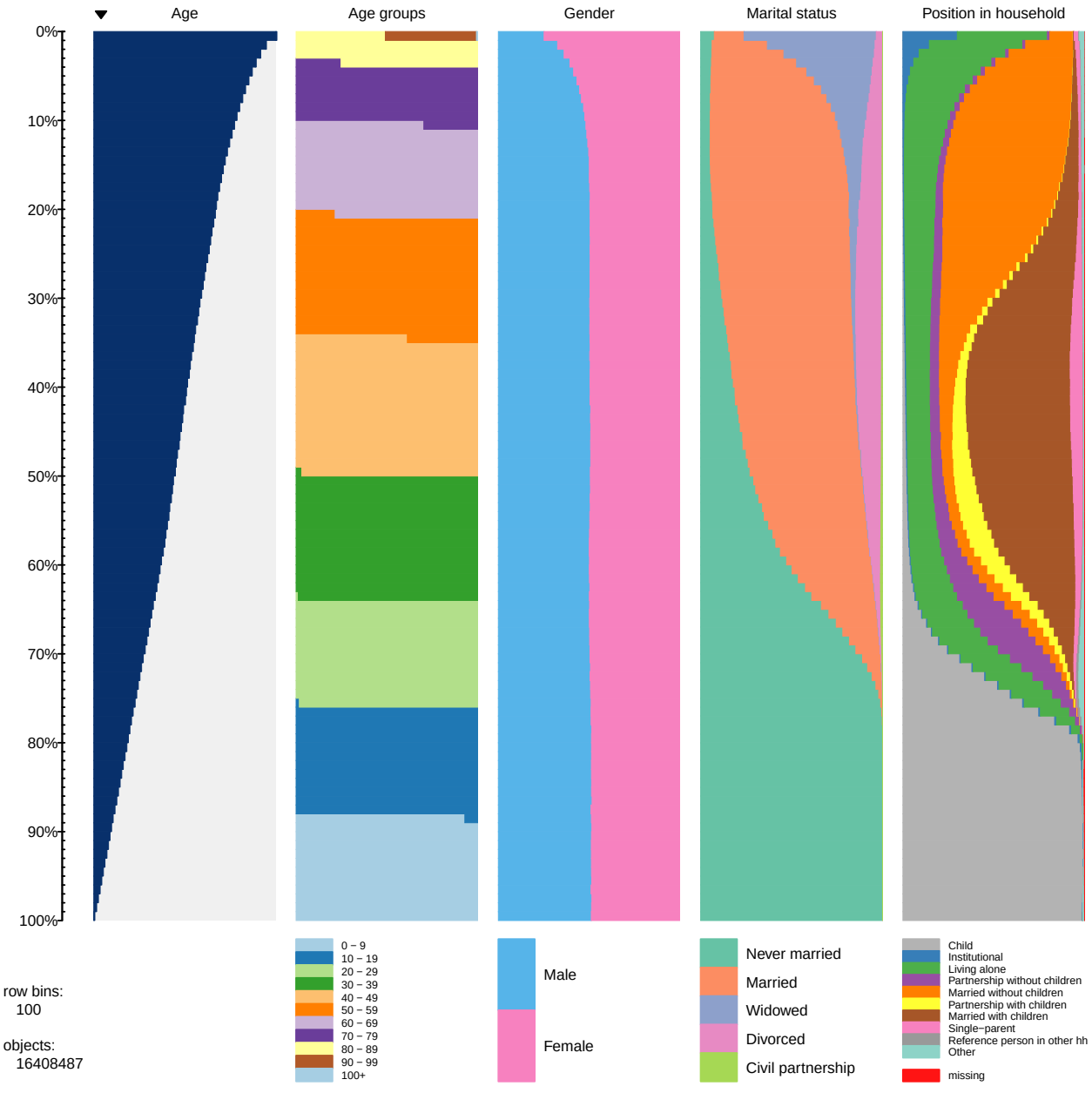

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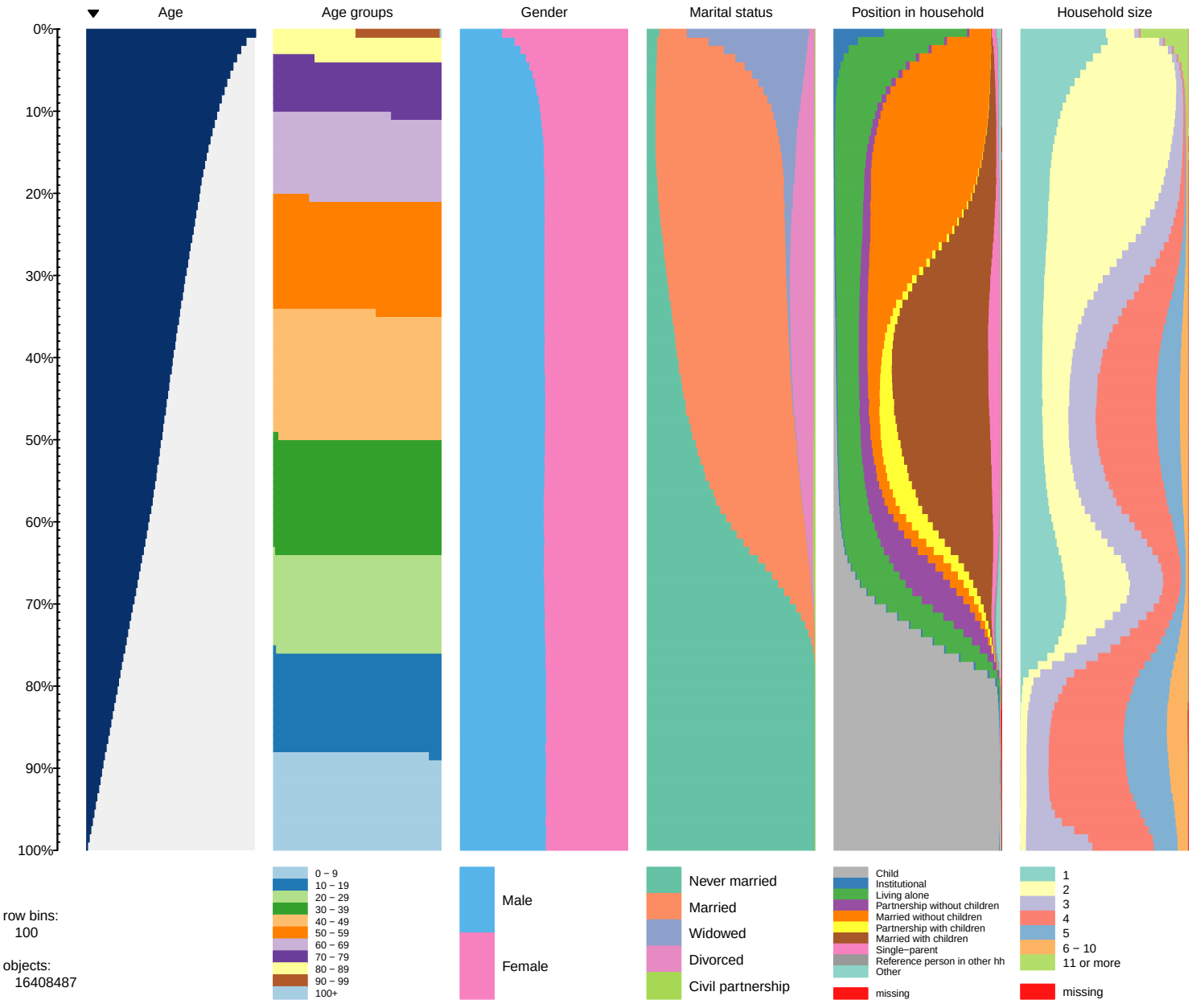

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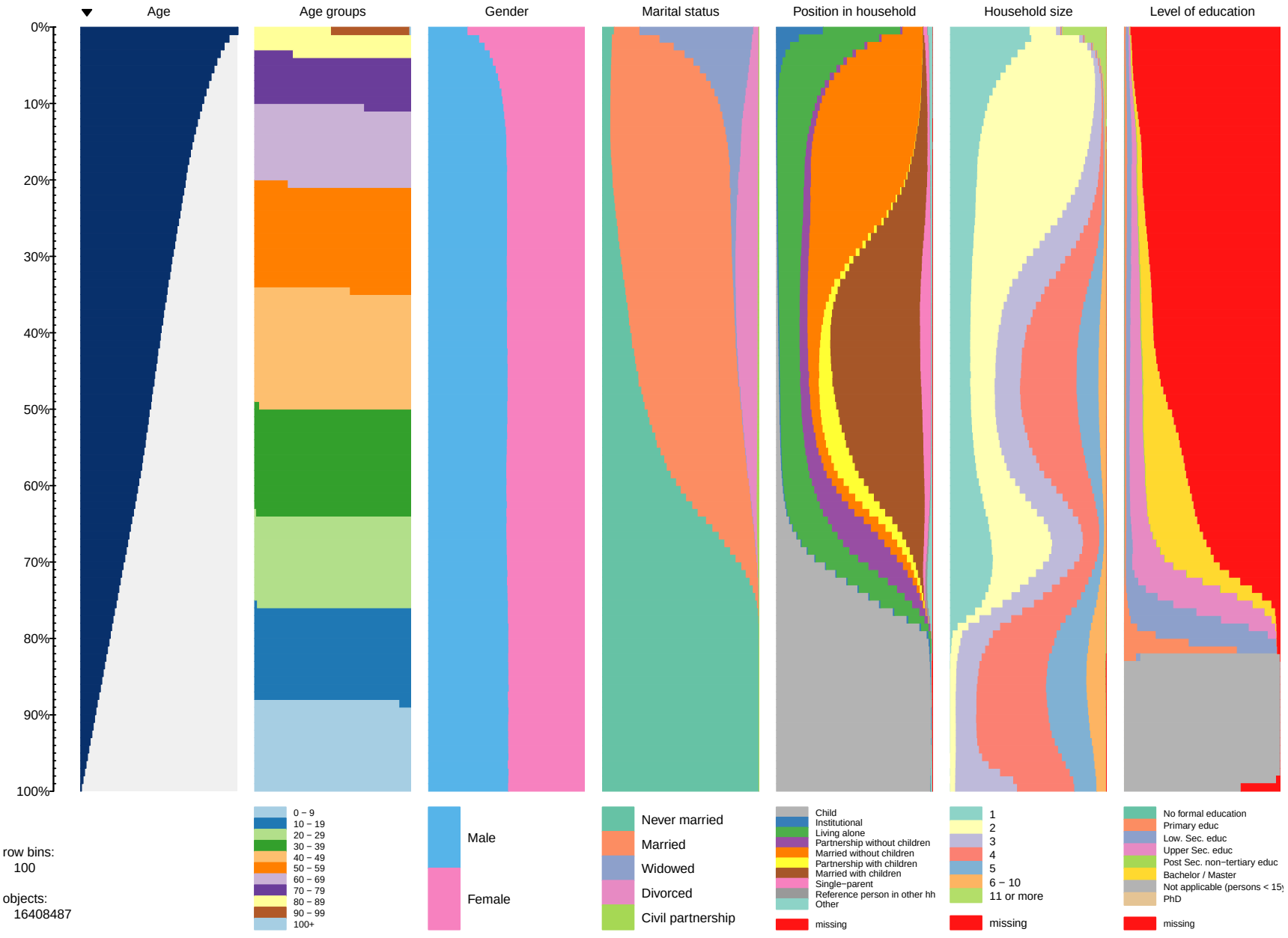

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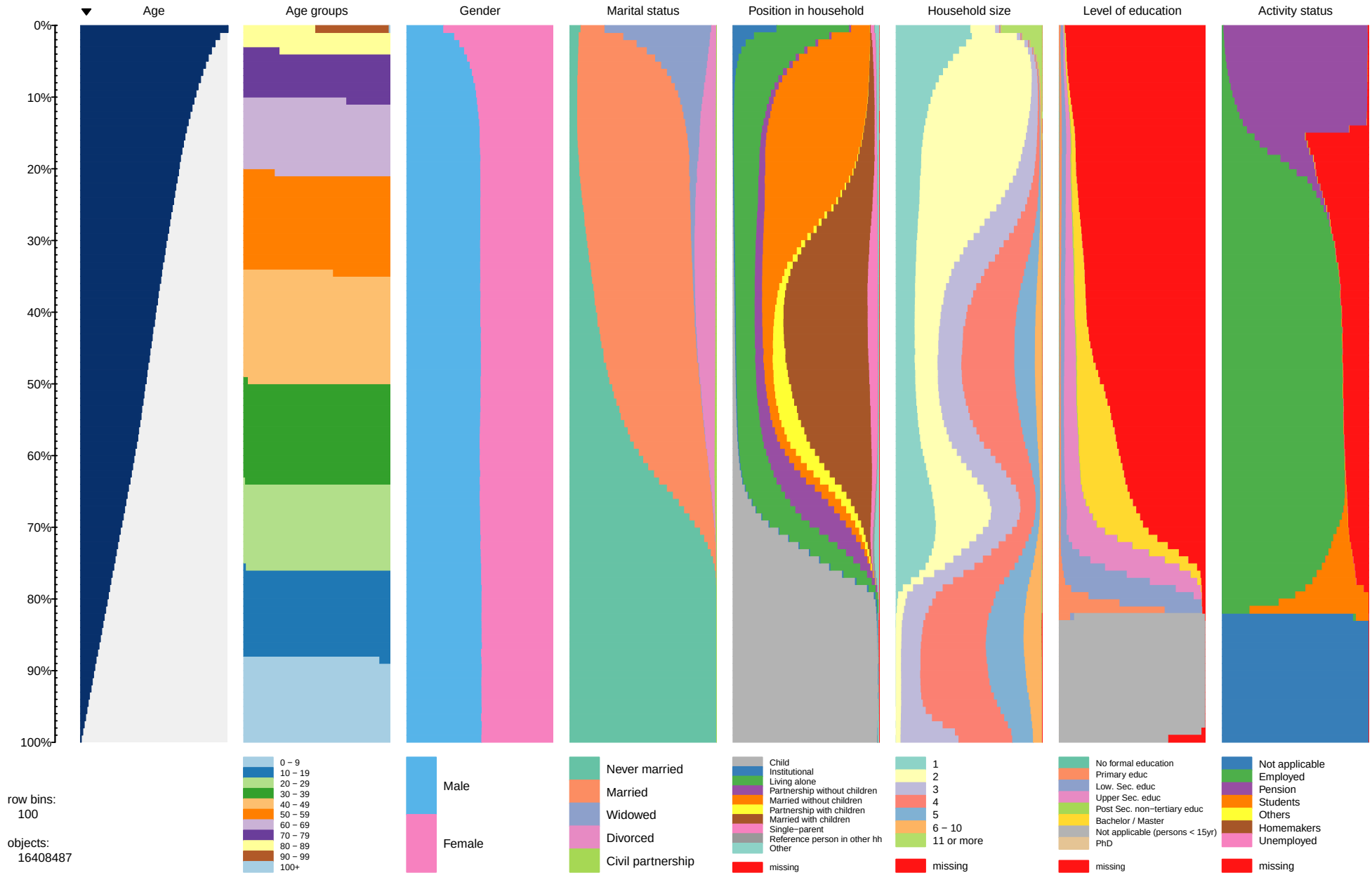

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R package tabplot

- Core function: tableplot

  Main arguments:

dat	data.frame
select	columns
sortCol	sorted column
nBins	number of bins

- Shiny interface: itableplot

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Performance

- Under the engine: ffbase
- Data preprocessing (only once):
  - per column, the rank order is determined
  - prepared ← tablePrepare(dat)
- Interactive tableplotting:
  - tableplot(prepared)
  - tableplot(prepared, sortCol=x, nBins=200)
  - Still too slow? Sample with argument maxN

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Scales and layout options

- tableplot(dat, ...)
- ...: arguments regarding scales and palettes
- tab $\leftarrow$ tableplot(dat)
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- ...: arguments regarding fontsize, size of legend, title, etc.

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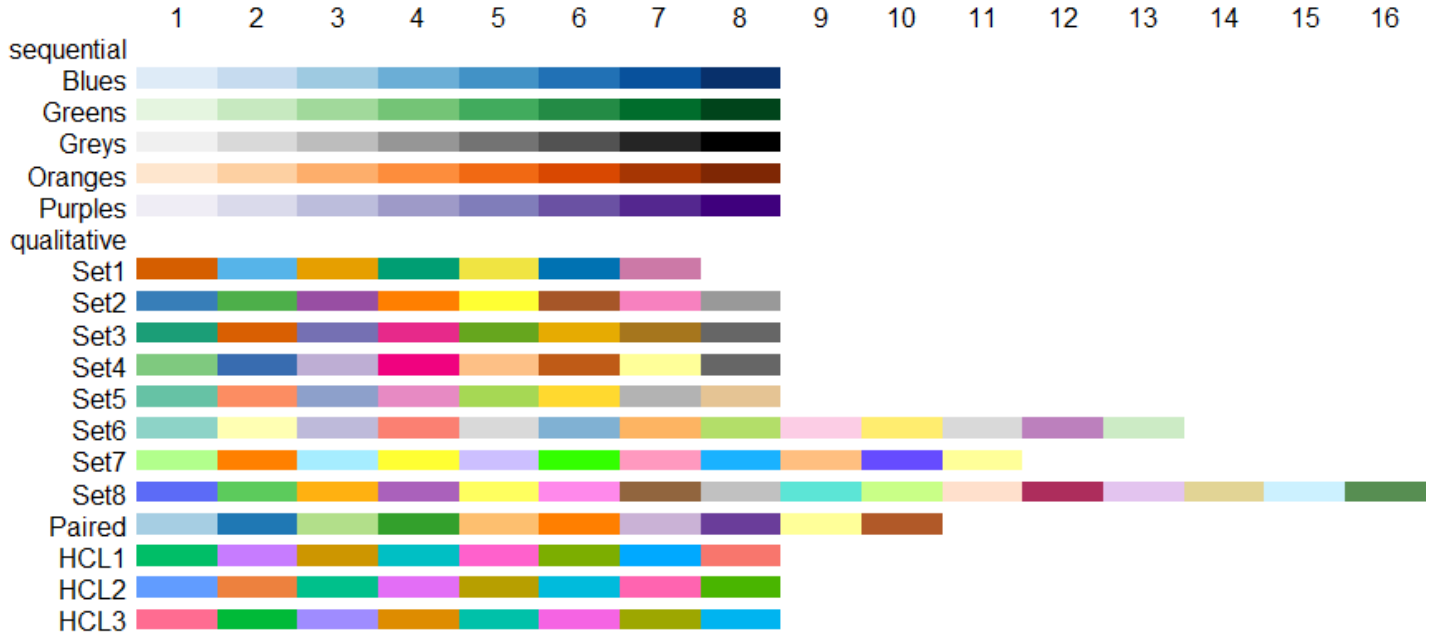
Categorical data



- Over 16 categories?
- Rainbow colour palette:

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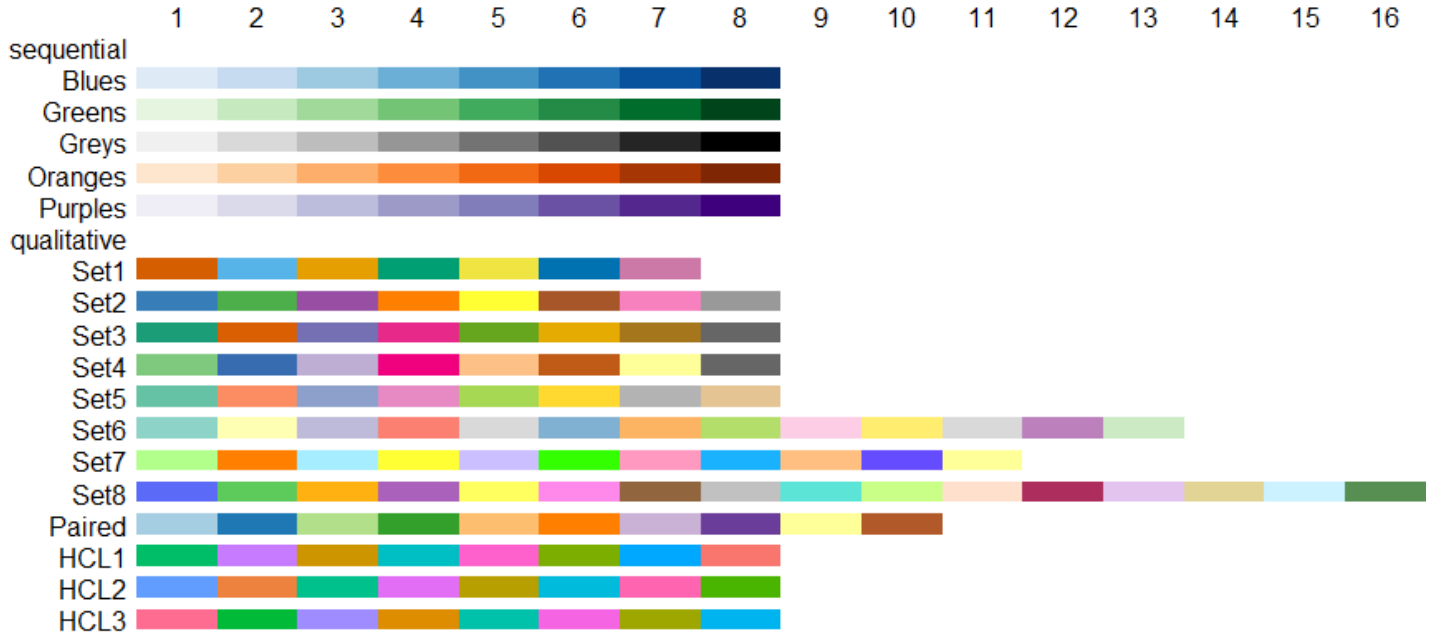

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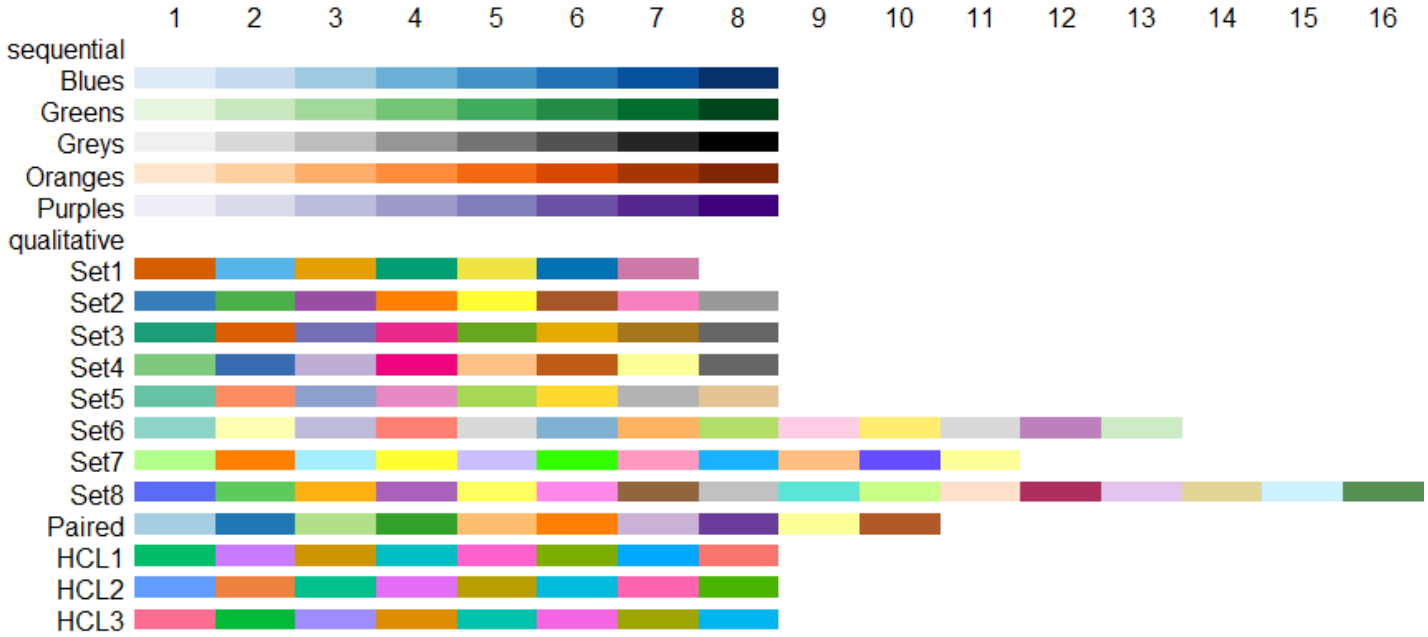

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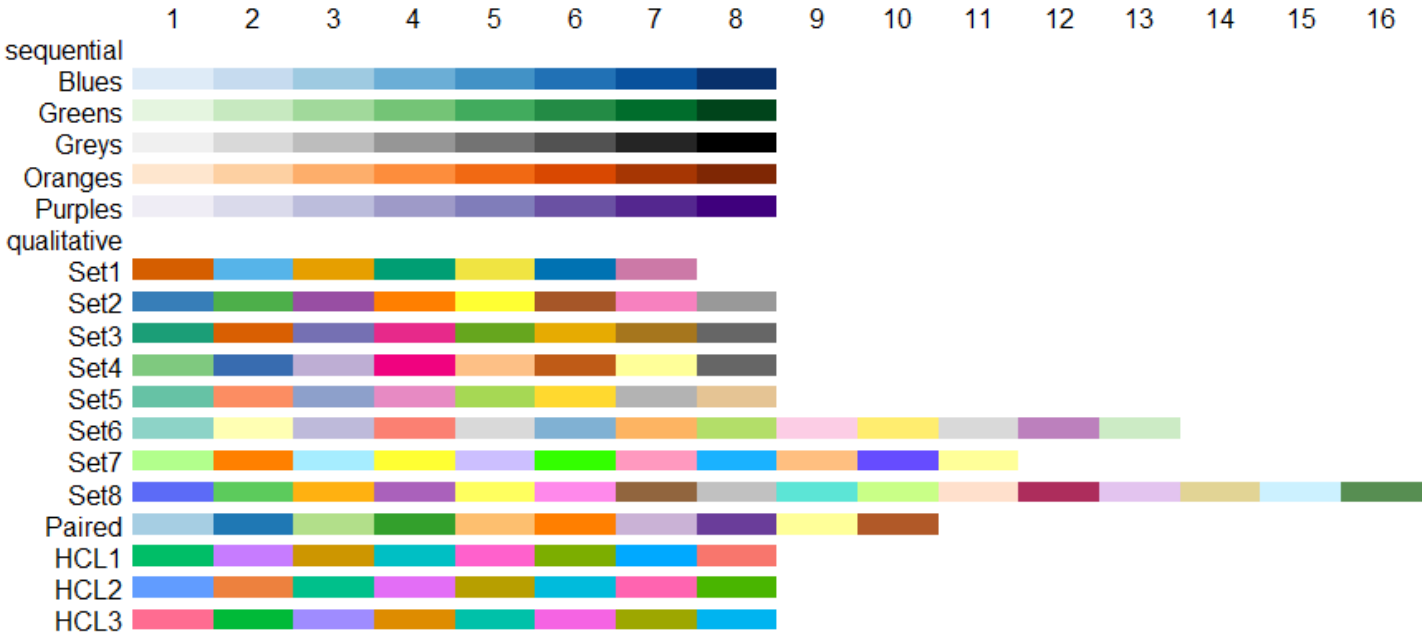

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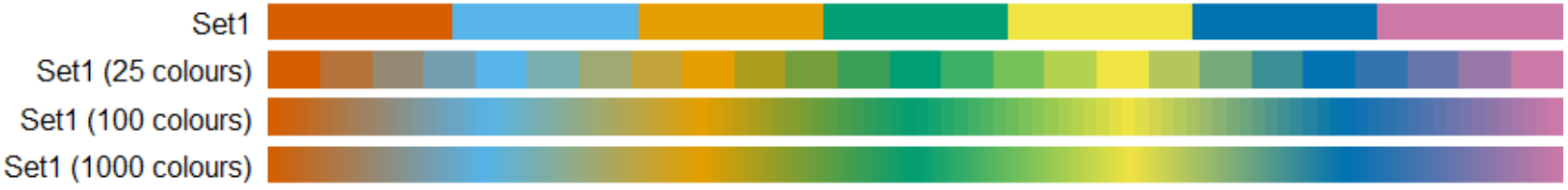
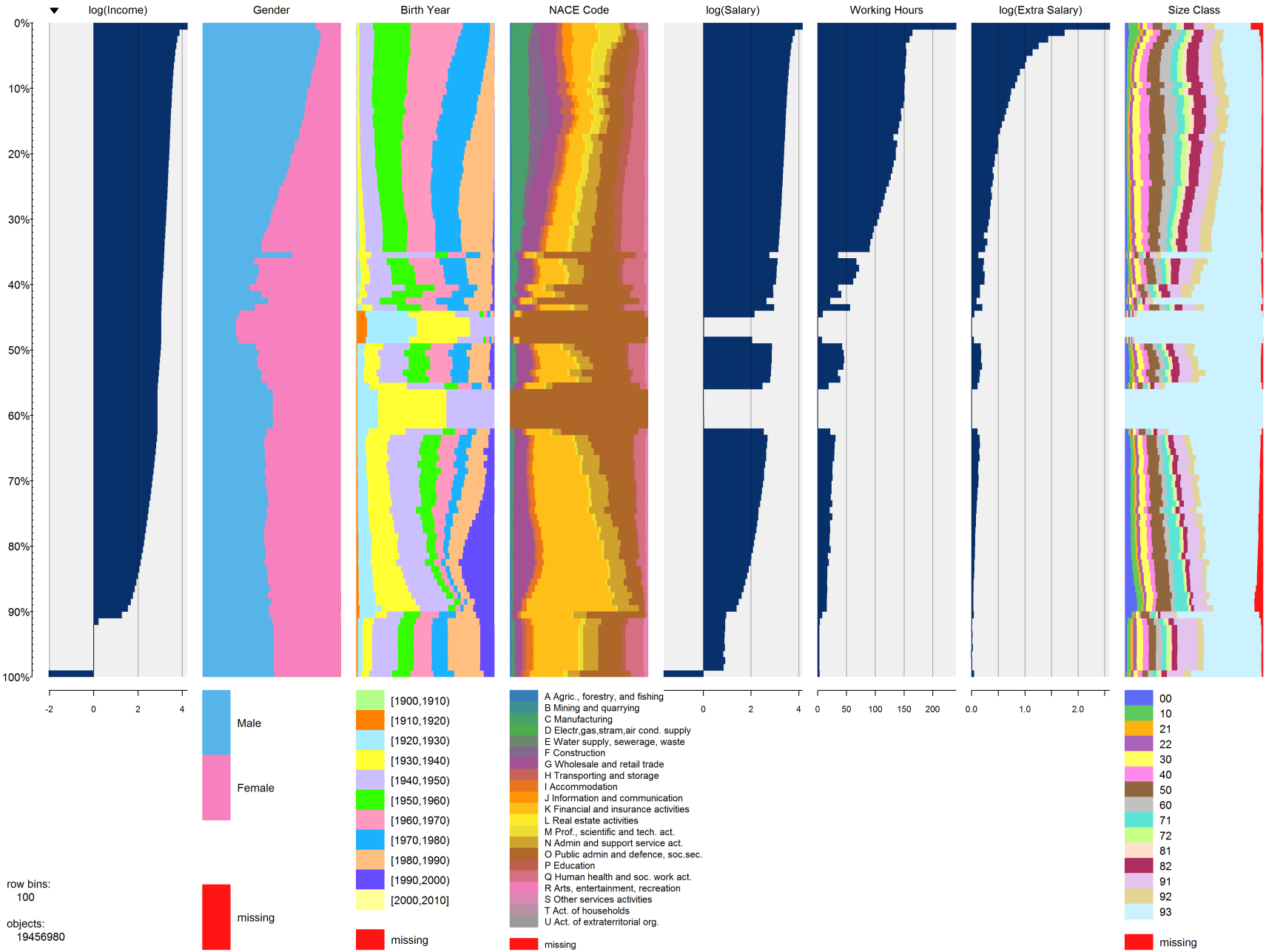


Dutch Labour and Benefits Database



row bins:
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objects:
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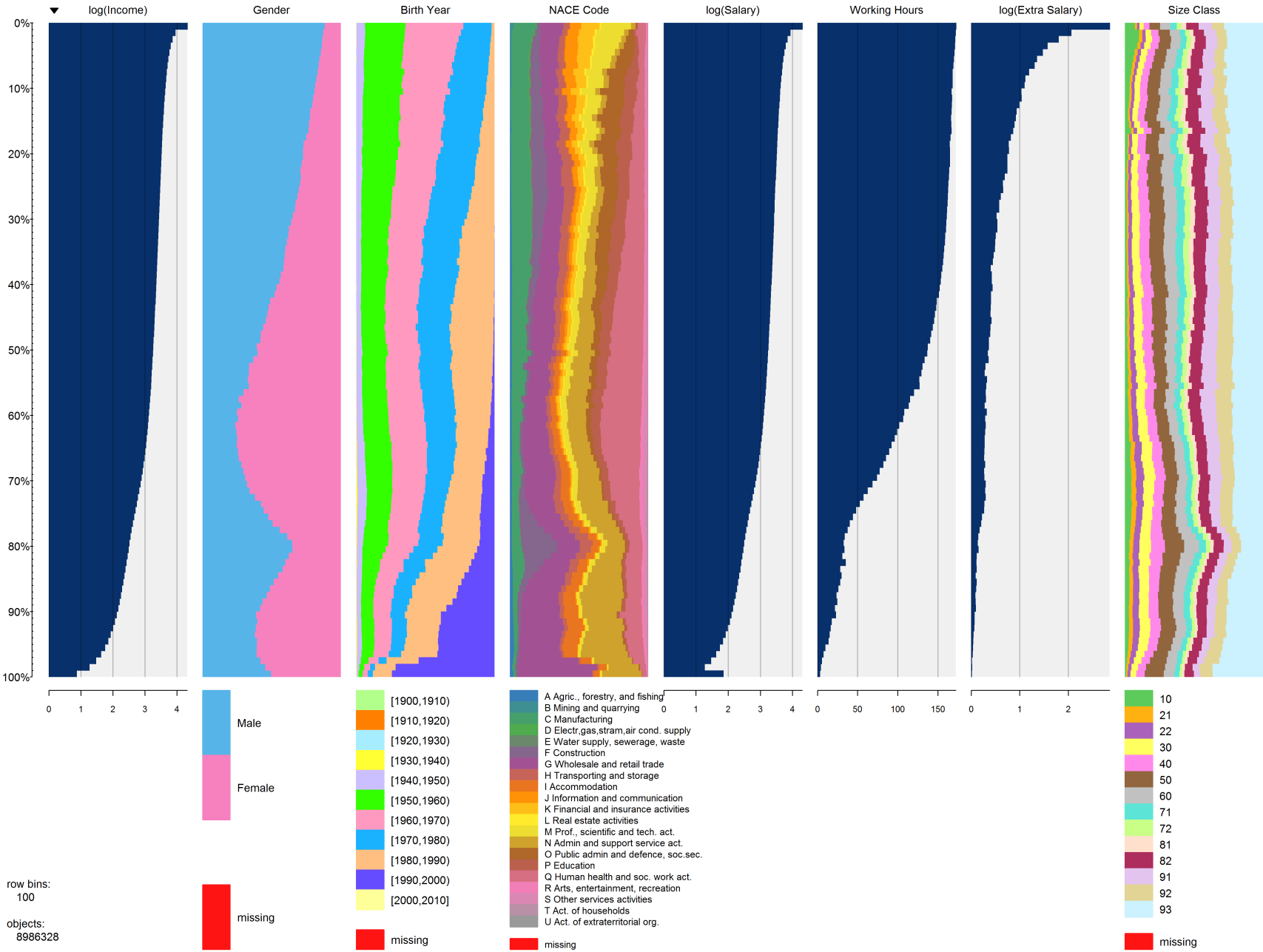

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8986328

Future plans

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- Speed up performance even more
- Numeric variable alternatives (e.g. boxplots)
- Hierarchical color palettes (already implemented in treemap)

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- Tennekes, M., Jonge, E. de, Daas, P.J.H. (2011) Visual profiling of large statistical datasets. Paper presented at the NTTS 2011
- Tennekes, M., Jonge, E. de, Daas, P.J.H. (2013) Visualizing and Inspecting Large Datasets with Tableplots, Journal of Data Science 11 (1), 43-58.
- Tennekes, M., Jonge, E. de (2013) On the exploration of high cardinality categorical data. Paper presented at the NTTS 2013
- R package *tabplot* 1.0 is available on CRAN. Development site: https://github.com/mtennekes/tabplot. Version 1.1 (unstable) can be installed from here.