

## *g.princals*

This script provides a way to enhance the appearance of plots created with the PRINCALS function from the Gifi package in R (1) using source code of plot function in Gifi package. Since PRINCALS generates complex outputs that require additional processing for effective visualization. Script uses ggplot2 (2) to improve the aesthetic and clarity of the results.

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### Proposal

The `g.princals` function is specifically designed to improve the aesthetics of plots generated by the `plot.princals` function from the Gifi package, which by default relies on the base R graphics package for visualizations (3). By harnessing the powerful capabilities of ggplot2, a package renowned for producing high-quality, customizable graphics, `g.princals` offers a more polished and visually appealing experience. This function provides options to create various plots, including transformed plots, scree plots, loading plots, and biplots for hierarchical categorical variables (4).

### Instruction

The `g.princals` function overrides the default plot function in R to generate customized graphics for objects created by the `princals` function. Below are the available parameters and their default settings:

- `x`: An object generated by `princals(dataset)`.
- `plot.dim`: A numeric vector specifying the dimensions to be plotted. Default is `c(1, 2)`.
- `var.subset`: Specifies a subset of variables to include. Default is “all”.
- `max.plot.array`: Maximum number of plots per array. Default is 2.
- `stepvec`: A numeric vector indicating whether to include a step function in the plot (see `princals` documentation for details). Default is NA.
- `col.lines`: Color of the lines in the plot. Default is “black”.
- `main`: Title of the plot. By default, it uses the name of the `princals` object.
- `show`: Logical or numeric (TRUE/FALSE, T/F, 1/0) indicating whether to display the plots. Default is 1 (TRUE).
- `save`: Logical or numeric (TRUE/FALSE, T/F, 1/0) indicating whether to save the plots. Default is 1 (TRUE).
- `name`: A label or name for the `princals` object. Default is the name of the object.
- `units`: Units for width and height. Default is “mm”.
- `width`: Width of the output image. Default is 250mm.
- `height`: Height of the output image. Default is 250mm.
- `res`: Resolution of the image in pixels. Default is 300.
- `dispersion`: Controls the spread of scores in the load plot. Default is 3, which corresponds to mean  $\pm 3$  \* standard deviation.
- `point.size.loadplot`: Size of the points in the load plot. Default is 1.
- `point.alpha.loadplot`: Transparency level (alpha) of the points in the load plot. Default is 0.1.
- `language`: Language for the plot labels. Options are “English” or “Spanish”. Default is “English”.
- `legend.position`: Position of the legend. Options are “none”, “left”, “right”, “bottom”, and “top”. Default is “right”.
- `legend.group`: Logical or numeric (TRUE/FALSE, T/F, 1/0) indicating whether to display grouped legends. Default is 1 (TRUE).

## R code

Finally, it were showed a picture which generated by “g.princals”. If the label names are lengthy, it’s advisable to shorten them into acronyms.

```
#to begin

library("Gifi")
setwd("~/file")
source(
  "https://github.com/jasb3110/g.princals/blob/f286b26f79da57600c3e7f207a6f653f24028a76/g.princals.R"
)

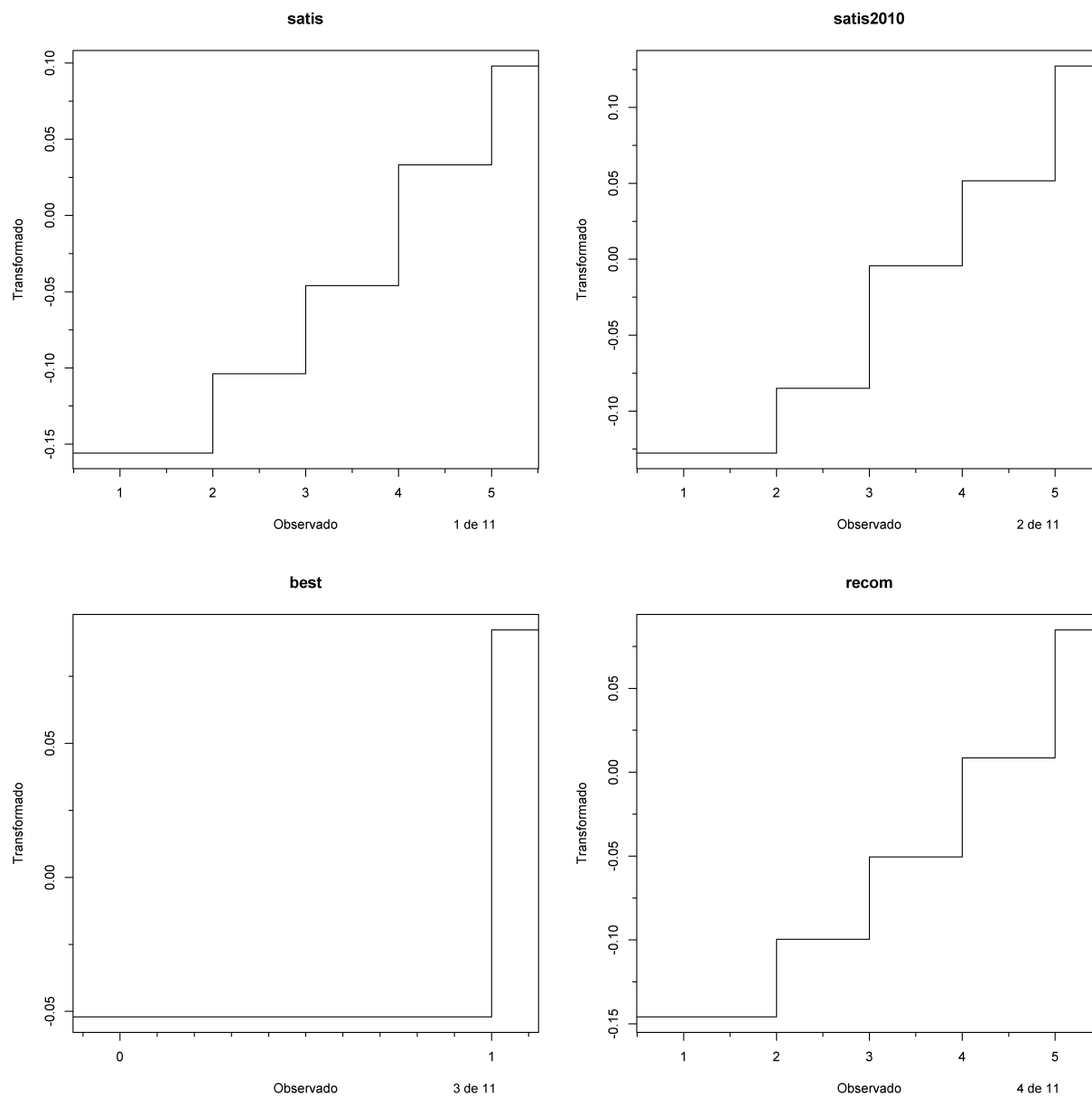
# ordinal PCA
fitord <- princals(ABC, ndim = 2)## ordinal PCA
g.princals(fitord, save=0, show=1,
           dispersion = 3,
           legend.group = 0)#show plots

g.princals(fitord, save=0, show=1,
           dispersion = 3,
           colour.group = c(rep("A", 5), rep("B", 6)),
           legend.group = 1,
           language = "spanish")#show plots

g.princals(fitord, save=1, show=1,
           dispersion = 3, legend.group = 0)#save plots in PNG format
g.princals(fitord, save=1, show=0,
           dispersion = 3, colour.group = c(rep("A", 5), rep("B", 6)),
           legend.group = 1, language = "spanish")#save plots in PNG format
```

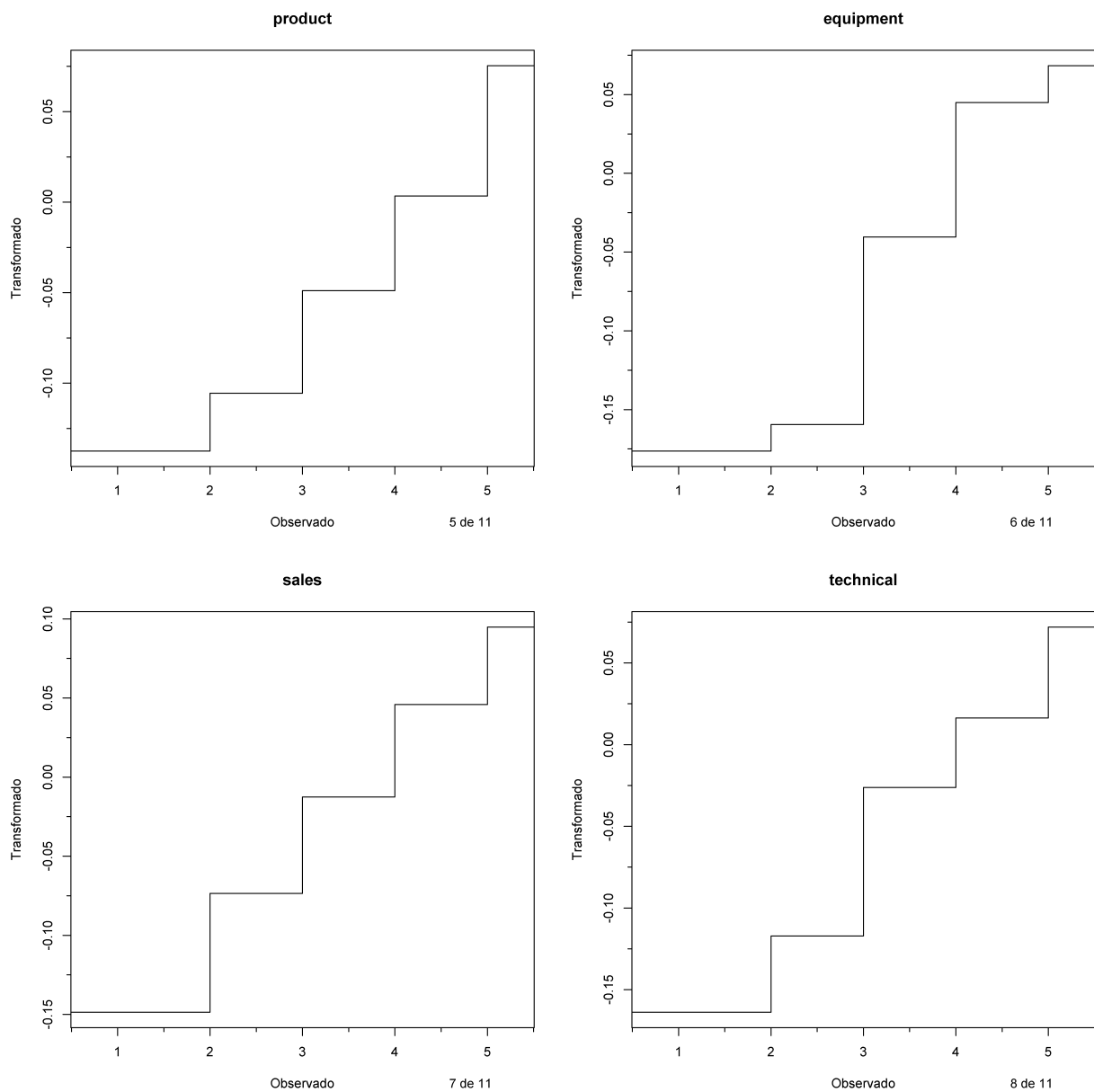
## Output

In this section, an R script and corresponding plots created using the g.princals function are presented in Spanish, and group of variables.



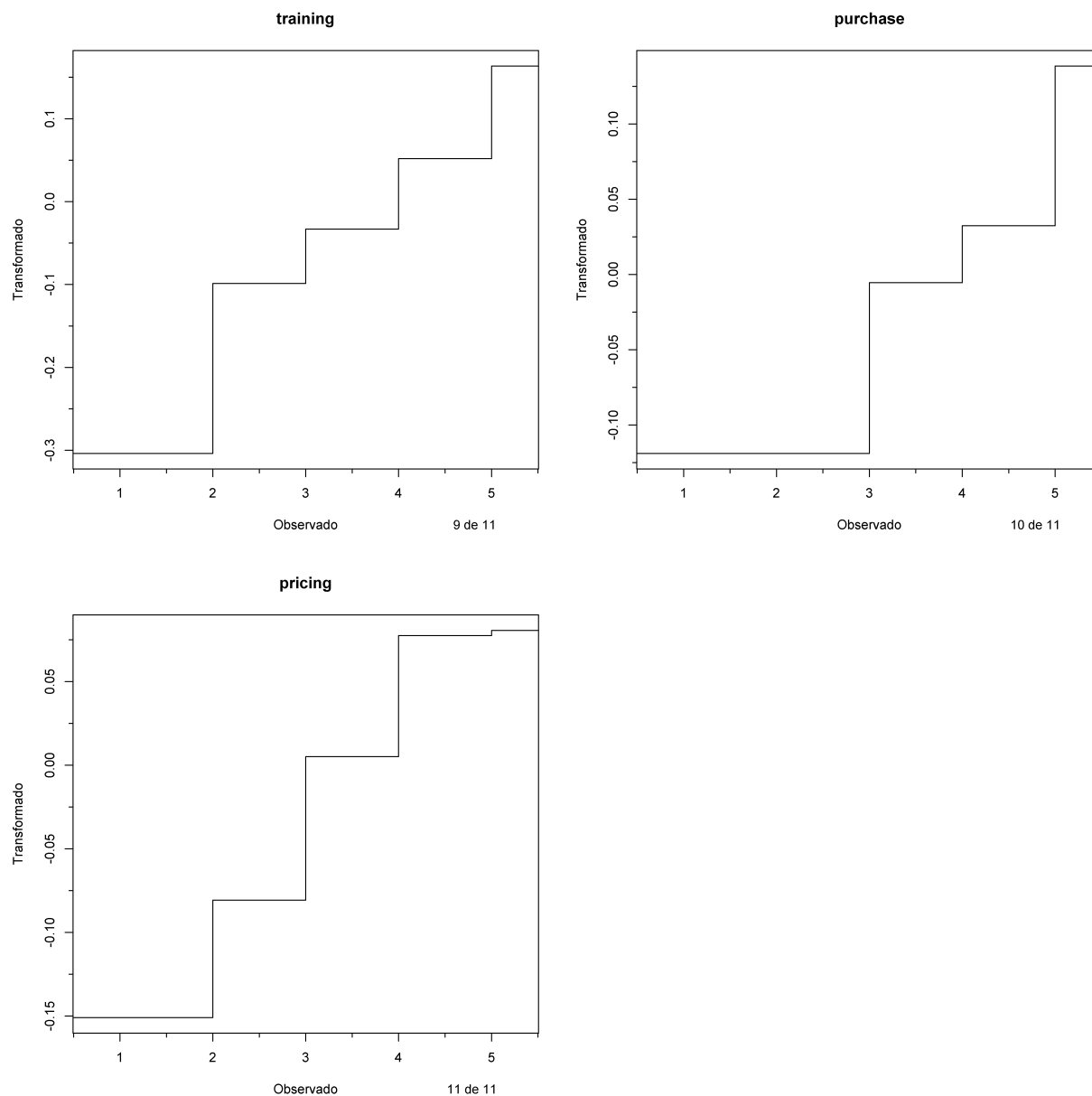
*Picture. Transplots of ABC dataset, just 1 to 4 variables*

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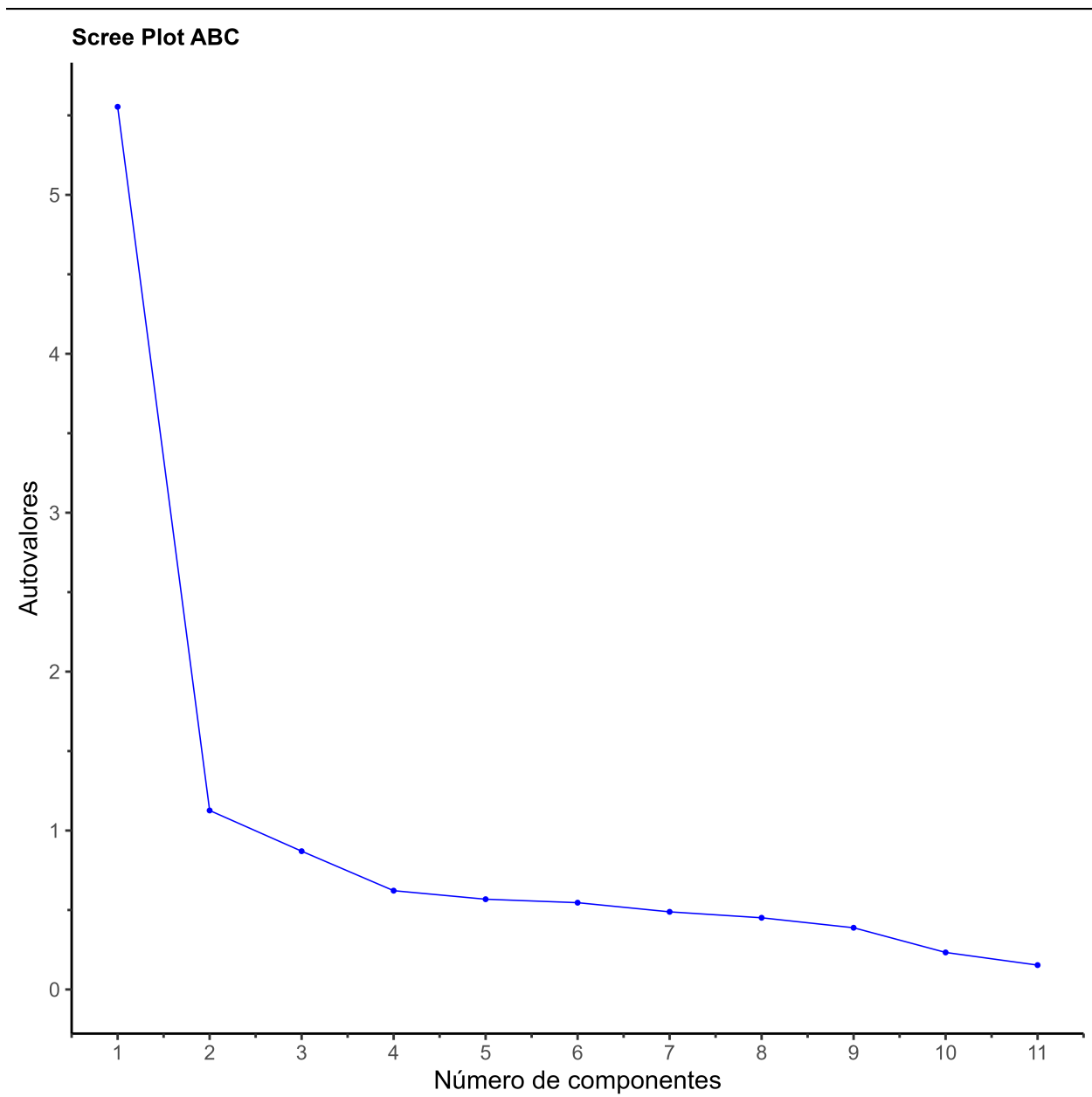
*Picture. Transplots of ABC dataset, just 5 to 8 variables*

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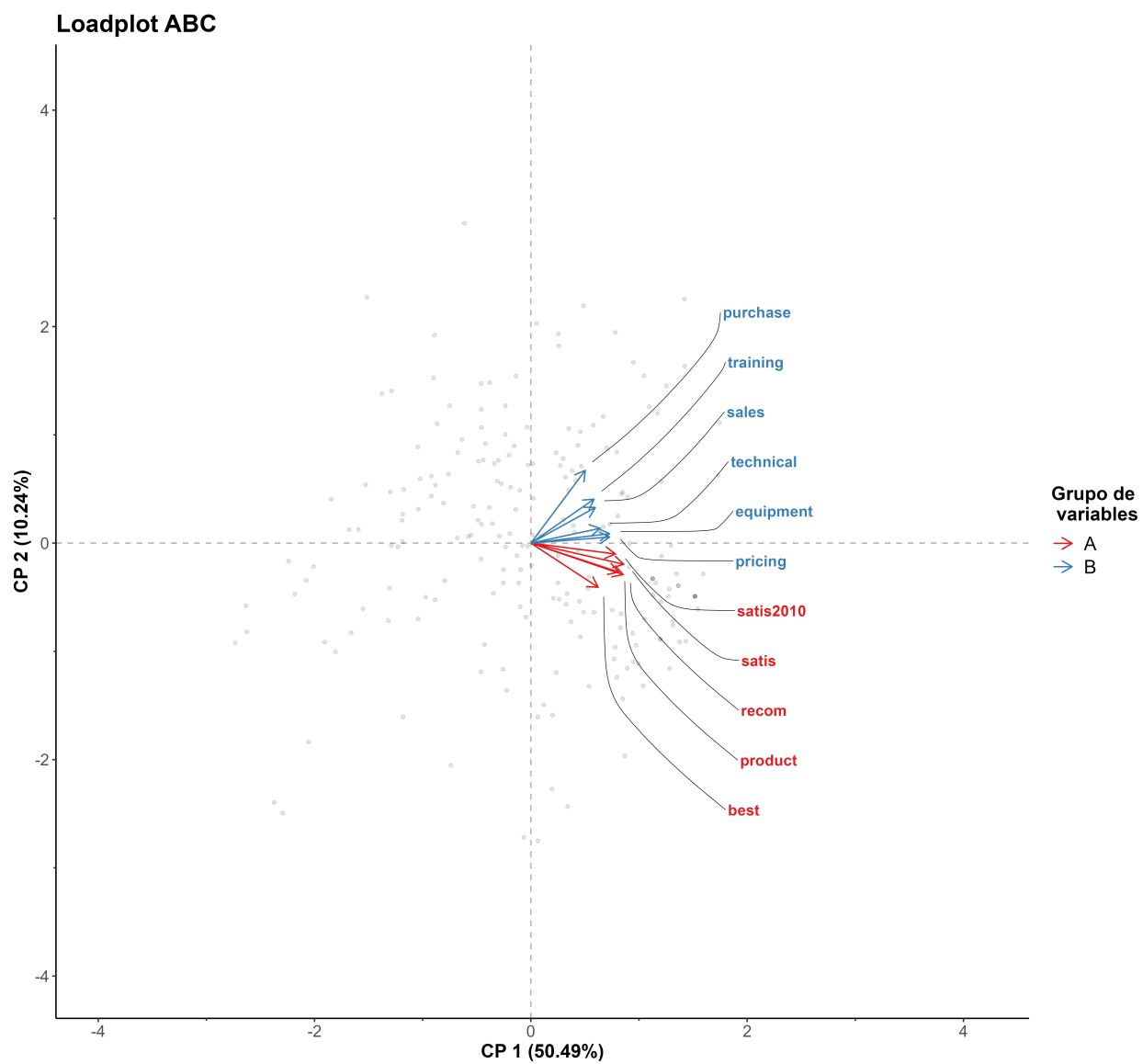
*Picture. Transplots of ABC dataset, just 9 to 11 variables*

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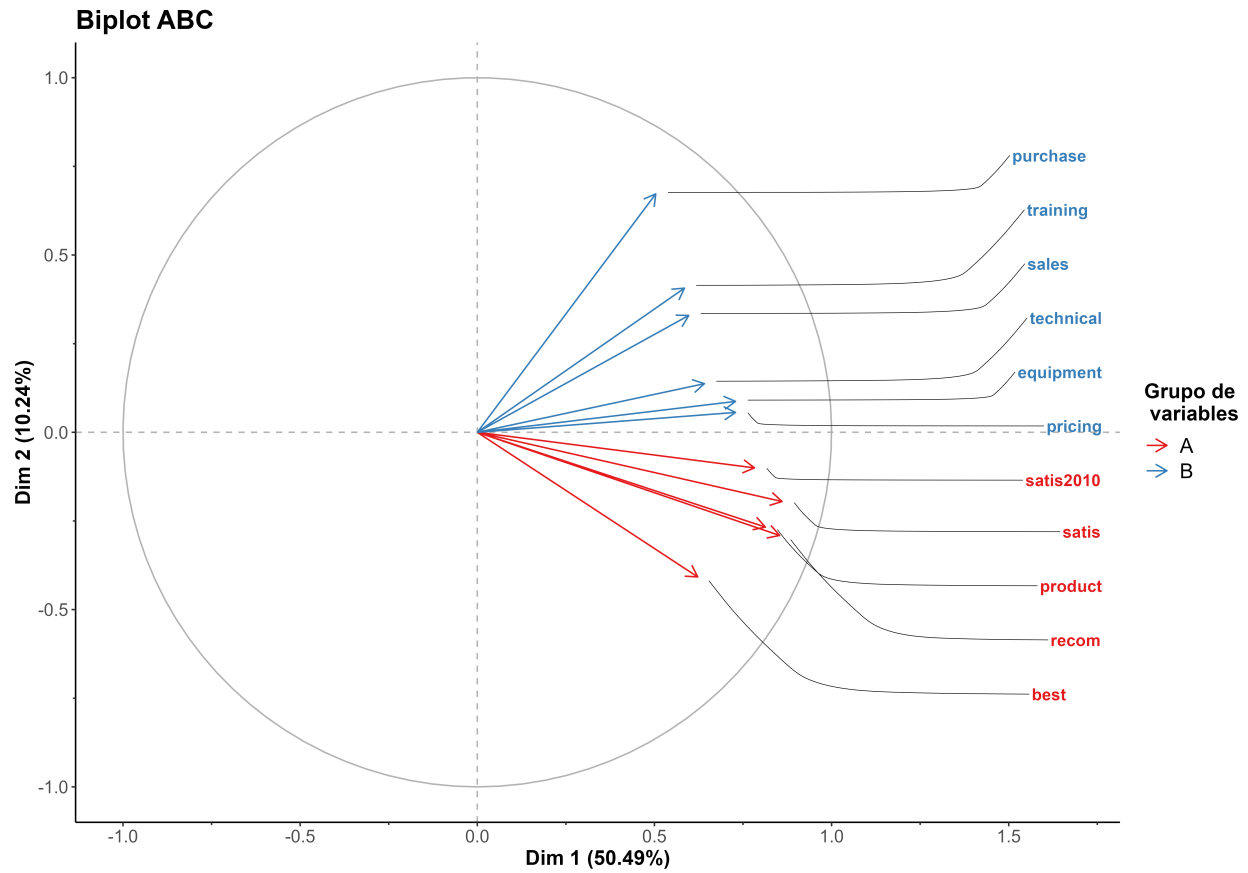


*Picture. Screeplot of ABC dataset*

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*Picture. Loadplot of ABC dataset*



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*Picture. Biplot of ABC dataset*

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## References

- (1) <https://cran.r-project.org/web/packages/Gifi/index.html>
- (2) <https://ggplot2.tidyverse.org/>
- (3) <https://rdrr.io/rforge/Gifi/src/R/plot.princals.R>
- (4) <https://github.com/jasb3110/g.princals/blob/0ed7b04adcb1039de5f9cafca0c6315a36a37e09/g.princals.R>