

# GEOMETRIC DATA ANALYSIS

Application to a racism survey

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# Summary

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  - The target effect on axis 2
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# References

- Benzécri J.P. (1992). *Correspondence Analysis Handbook*, New York, Dekker.
- Bonnet P., Le Roux B., Lemaine G. (1996). Analyse géométrique des données: une enquête sur le racisme, *Math. Inf. Sc. Hum.*, n° 136, 5-28.
- Greenacre M. (1984). *Theory and Applications of Correspondence Analysis*, London, Academic Press.
- Lebart L., Morineau A., Warwick K.W. (1984). *Multivariate Descriptive Statistical Analysis*, Wiley.
- Le Roux B., Rouanet H. (2004) *Geometric Data Analysis*, Boston, Kluwer Academic Publishers.

# Introduction

The 1988 Euro-barometer Survey, with a specific questionnaire about minorities in four countries :

- France (2 targets): North-Africans (N.A.), Southeast Asians (As)
  - Great Britain (2 targets): Indian-Pakistanese, West Indians
  - Netherlands (2 targets): Turks, Surinamers
  - West Germany (1 target): Turks
- 
- Pettigrew T.F., Jackson J.S., Ben Brika J., Lemaine G., Meertens R.W., Wagner U., Zick A. - (1992). Outgroup prejudice in Western Europe, *European Review of Social Psychology*.

# The Data : the French sample

932 individuals randomly divided into two groups:

- N.A. target: 448 individuals
- As. target: 484 individuals



target as a structuring factor

29 target questions:

- 5 response modalities
  - 4 ordered modalities
    - strongly positive
    - somewhat positive
    - somewhat negative
    - strongly negative
  - NR (No Answer)



type of response factor

*see the handout*

# Brief Comments

- 29 one-way tables
  - NR rates: from 1.5 % [q30 Physical features] to 31 % [q31 Sexuality]
- $29 \times 28 / 2$  two-way tables
- ...Response patterns of 932 individuals.

GDA amounts to:

the synthesis of all two-way tables (modalities).

the representation of all response patterns (individuals).

# Constructing the Clouds

A first MCA of the data table:

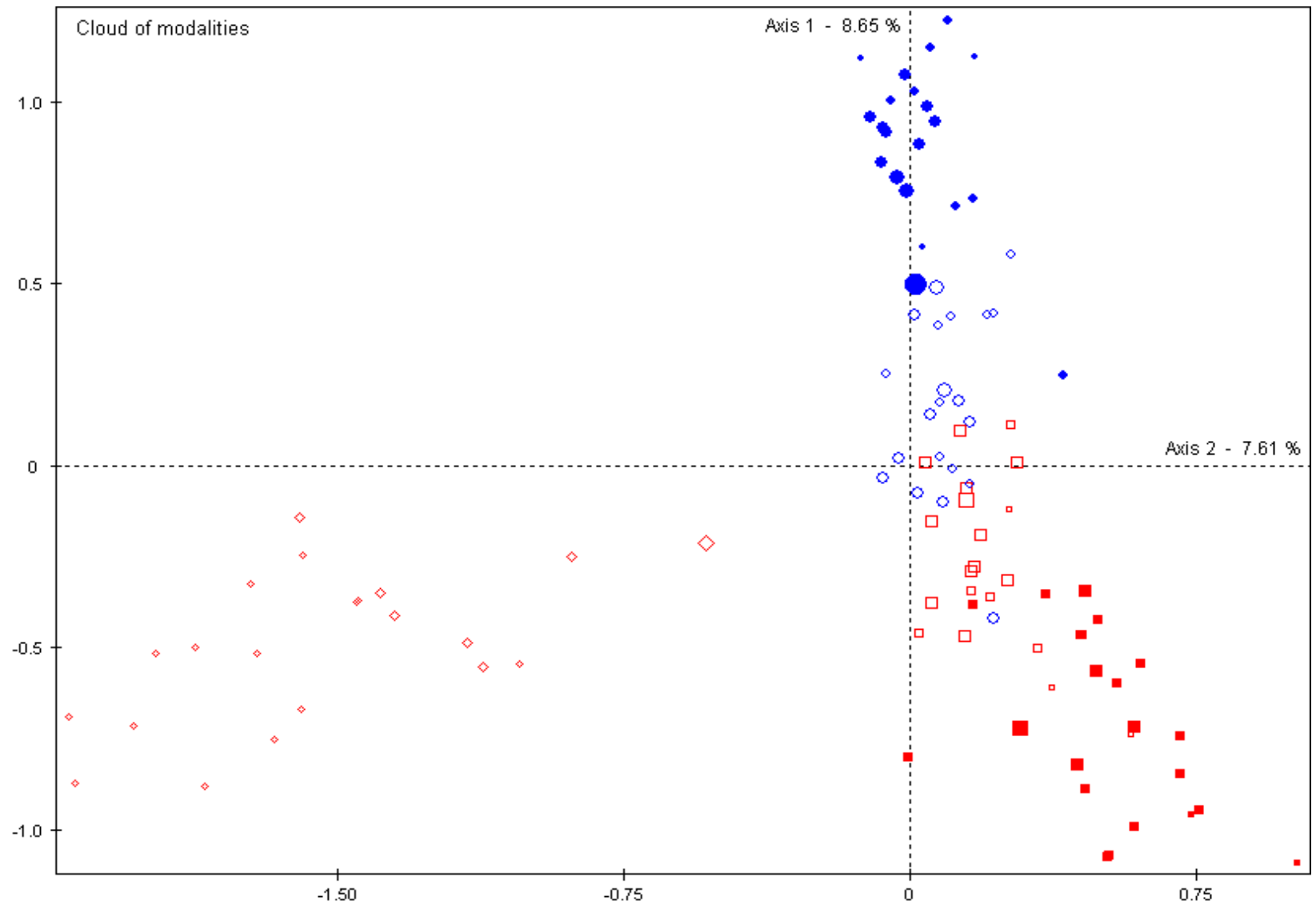
932 individuals and  $29 \times 5 = 145$  modalities

Because of the non homogeneity of 8 questions out of 29

A second MCA of 932 individuals and  $21 \times 5$  modalities with 5 supplementary individuals as landmark points

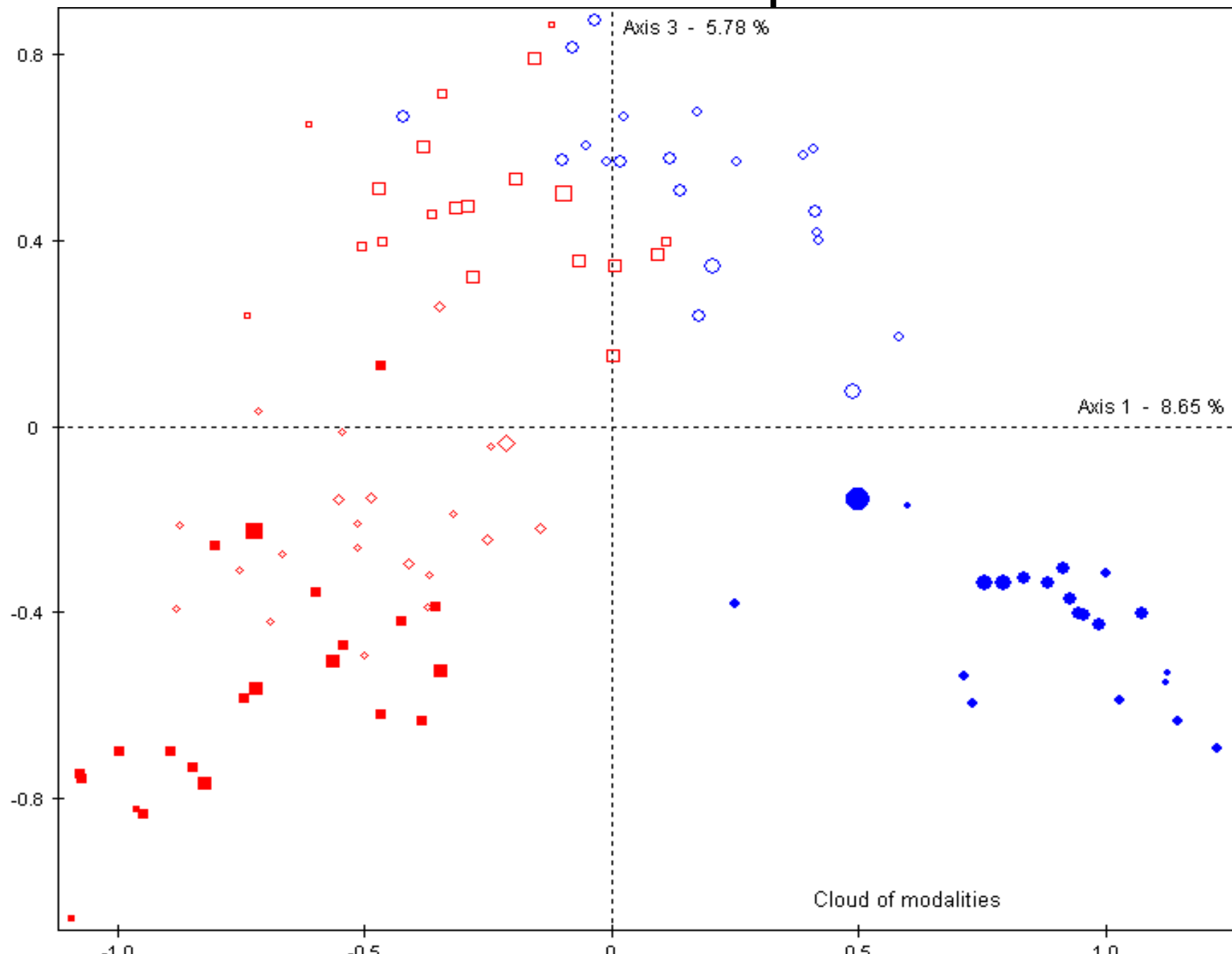
Modified rates : 45%, 33% and 17% (95%)

# Cloud of modalities : the plane 1 - 2





# Cloud of modalities : plane 1 - 3





# Cloud of Modalities : contributions

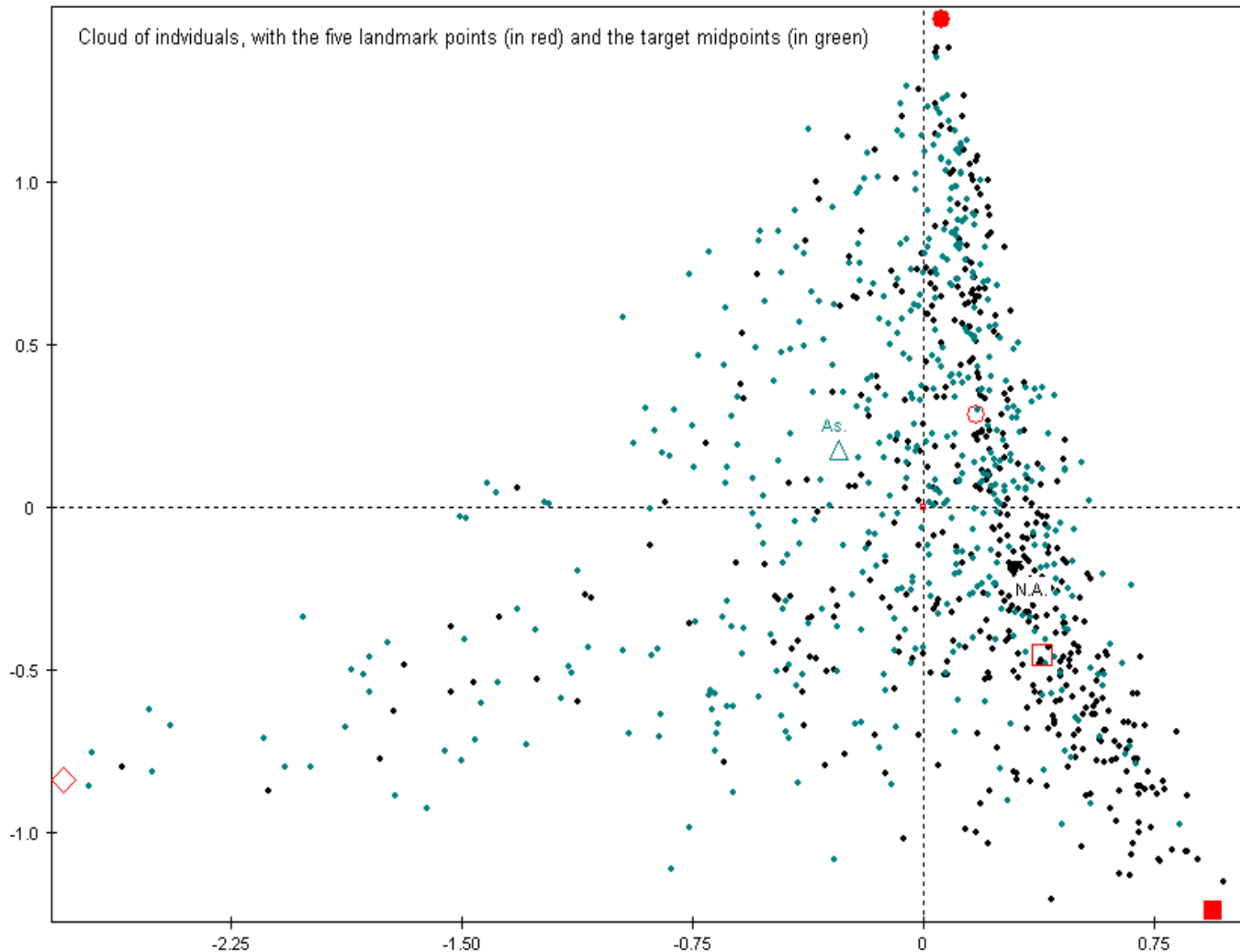
	Axis 1	Axis 2	Axis 3
Axes variance	0.346	0.304	0.231
subcloud NR	0.026	<b>0.237</b>	0.007
subcloud + +	<b>0.177</b>	0.003	<b>0.037</b>
subcloud +	0.019	0.003	<b>0.069</b>
subcloud -	0.020	0.010	<b>0.051</b>
subcloud - -	<b>0.104</b>	0.051	<b>0.067</b>

# The space of individuals

- Helps for exploring data
  - supplementary individuals as landmark points
  - groups of extreme individuals (largest ctr)
  - correlations between explicative variables and principal variables
- Structuring the cloud of individuals
  - the target factor (experimental factor)
  - response type factor

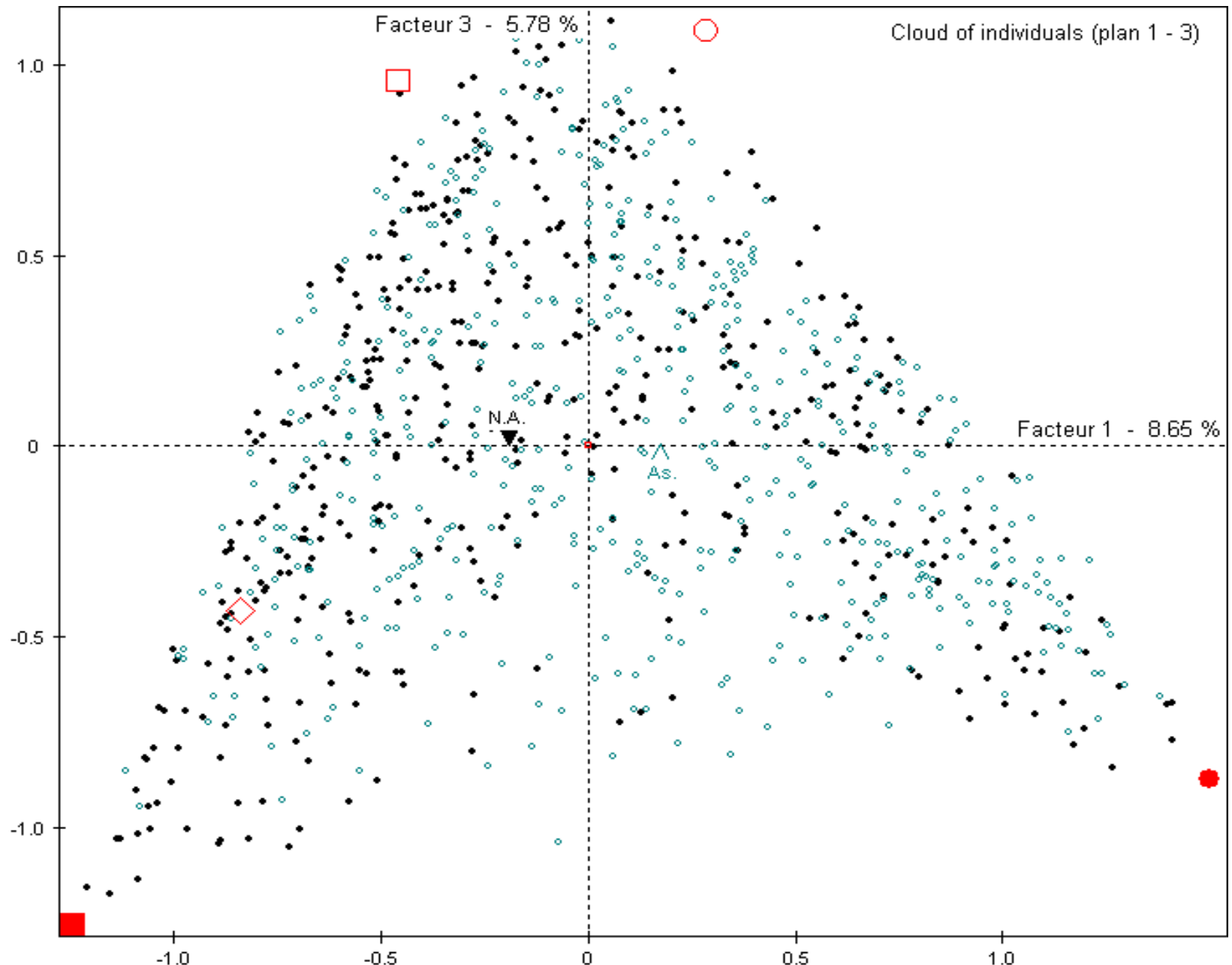
# Cloud of individuals : axes 1 and 2

Facteur 1 - 8.65 %

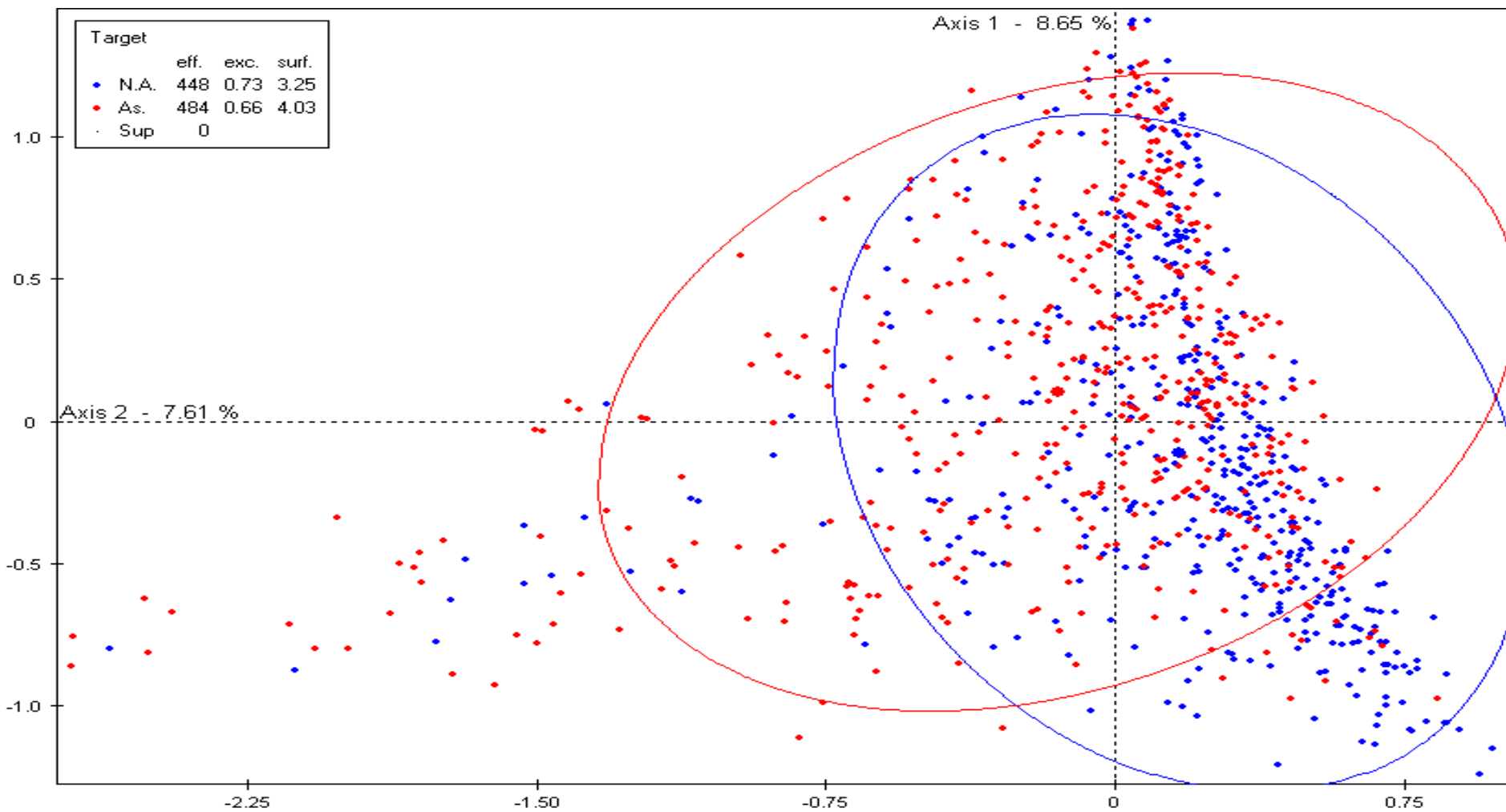


Facteur 2 - 7.61 %

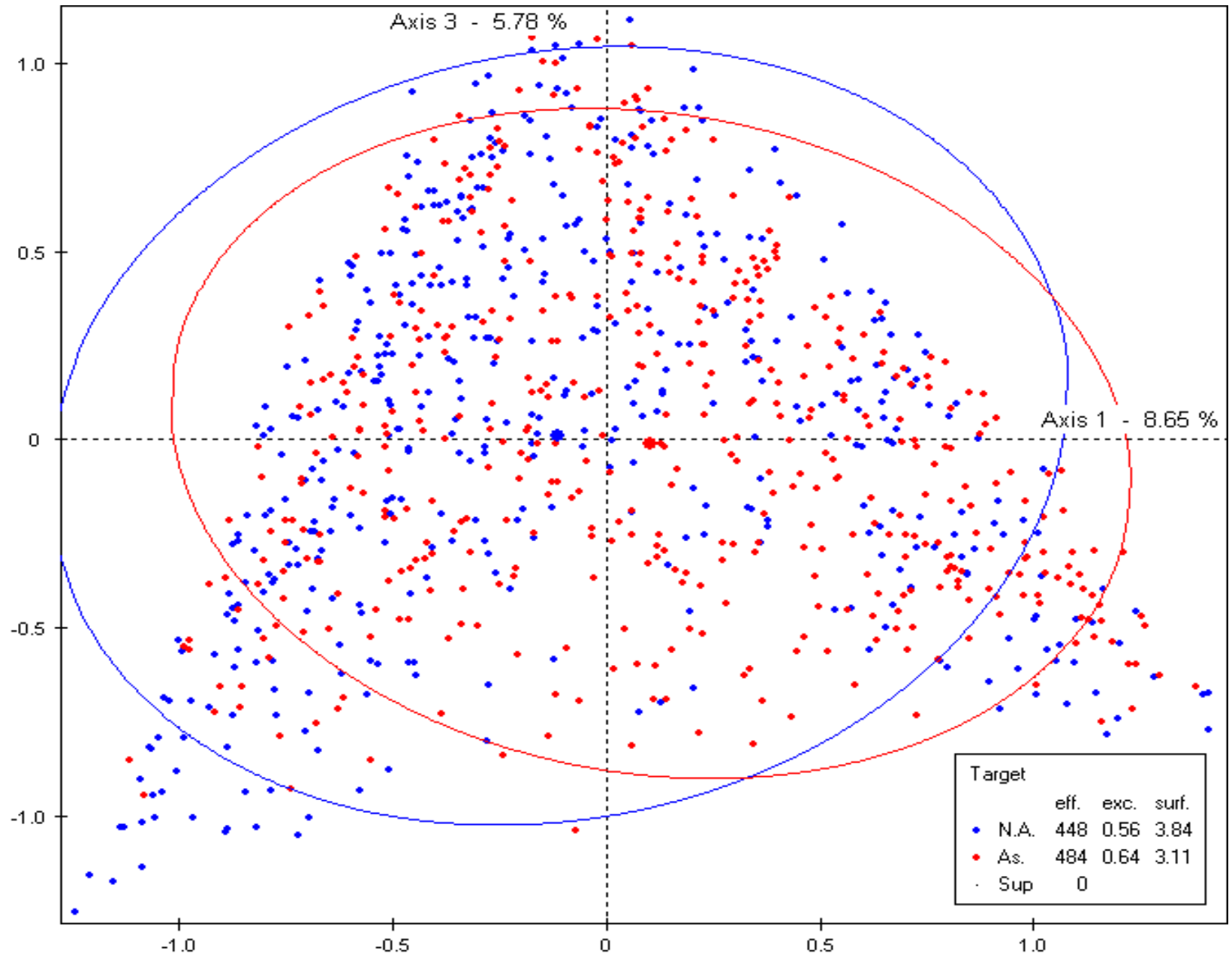
# Cloud of individuals : axes 1 and 3



# Cloud of individuals : plane 1 - 2



# Cloud of individuals : plane 1 -3





# Conclusions about racism data

Axis 1 : Attitude

Axis 3 : Intensity

Axis 2 : Non-response

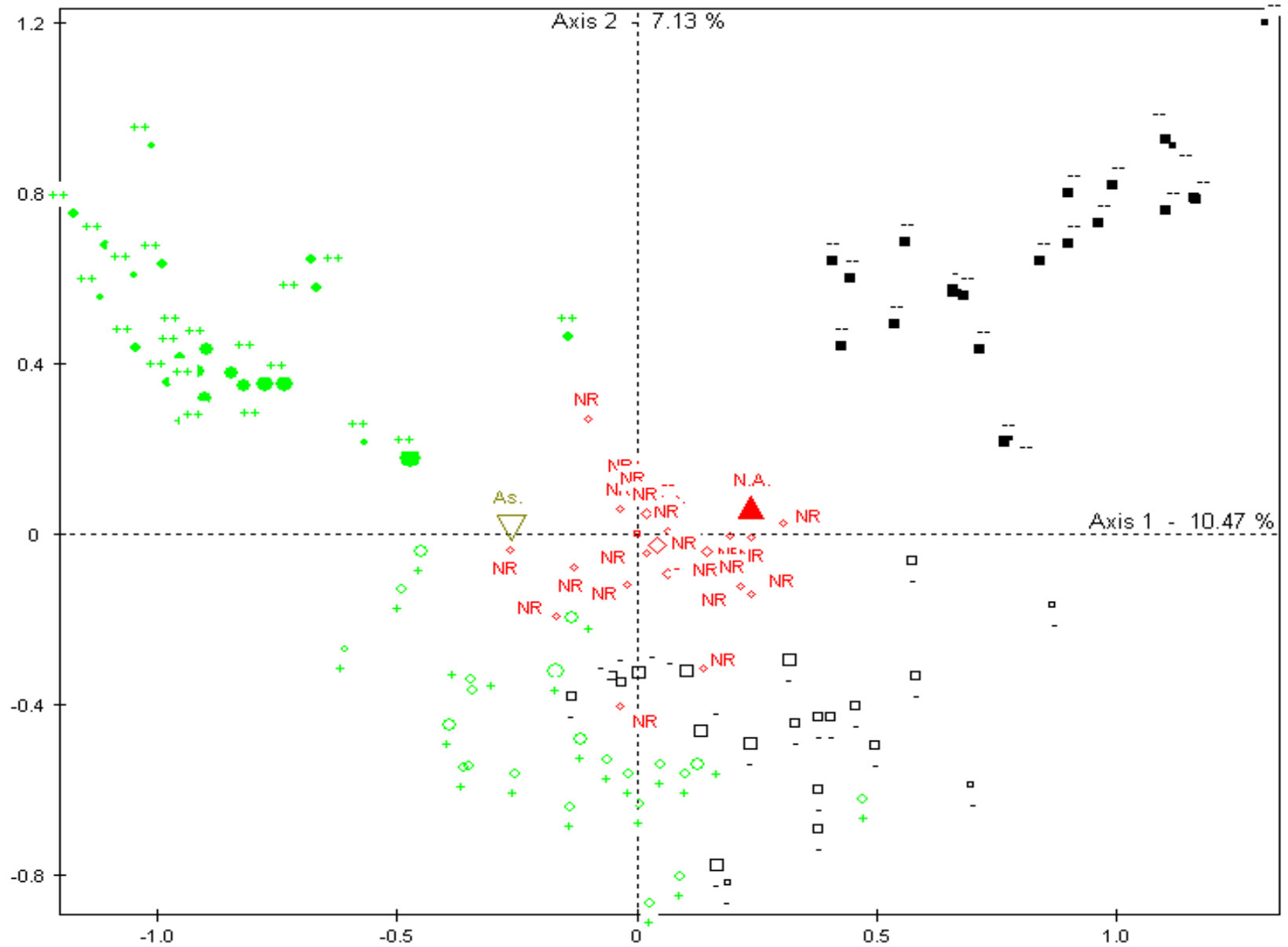
NR is between -- and -

- Numerical representation of modalities ++, +, -, --:  
1,3,4,6 rather than 1,2,3,4 or 1,2,4,5
- Shifting between the two targets unfavorable to  
N.A.

# Concluding comments on GDA

- If there is a strong structure in the data, it is immediately revealed by GDA.  
[Heterogeneous questions]
- Aids to interpretation
  - Supplementary elements
  - Supplementary questions
  - supplementary individuals (landmark points)
  - Calculus of contributions: part of variances accounted by sources of variation.

# Racism:specific MCA



# Racism:specific MCA

