

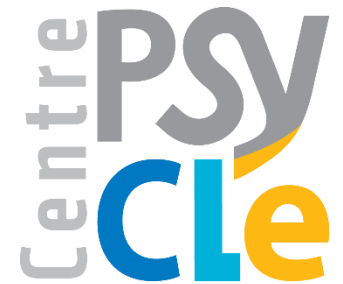


## 6<sup>e</sup> ATELIER MODEVAIAA, 10 ans déjà!

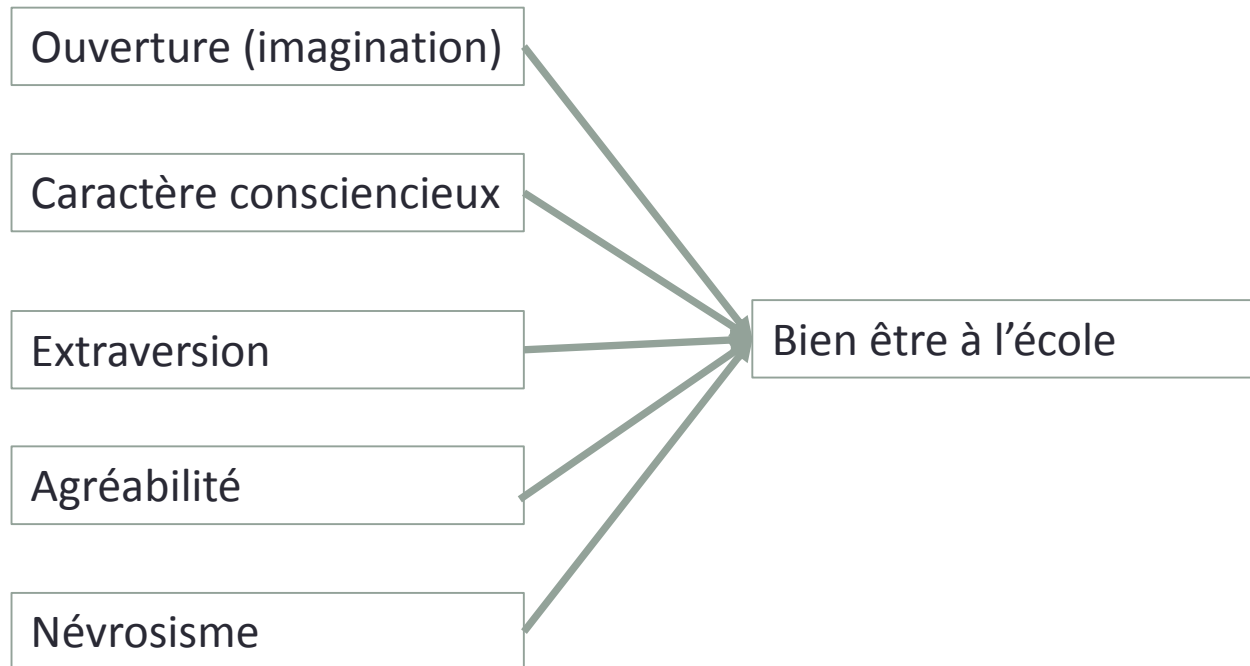
# IDENTIFICATION DE PROFILS INDIVIDUELS OPTIMAUX PAR MODÈLES ADDITIFS GÉNÉRALISÉS ET ANALYSE EN CLASSES LATENTES

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Bruno Dauvier, Jean-Baptiste Pavani, Anne Congard

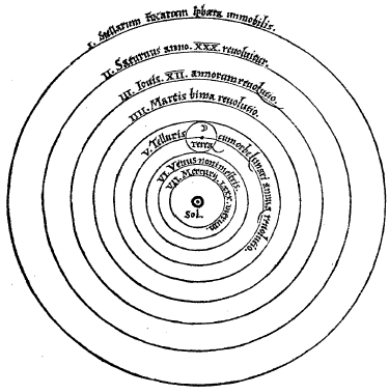


# Régression multiple?



# Principe de la modélisation

Représentation théorique

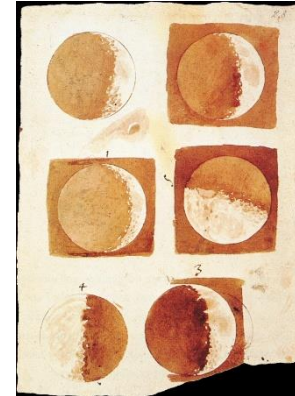


Modèle Formel

A diagram of a planet's elliptical orbit. It shows a sphere representing the planet with a horizontal line through its center. A dashed line represents the semi-major axis 'a'. A red dot represents the focus, and a yellow dot represents the planet. The distance from the focus to the planet is 'r'. The angle between the semi-major axis and the line connecting the focus to the planet is 'θ'.

$$r = \frac{p}{1 + \varepsilon \cos \theta}$$

Observables



Héliocentrisme - Copernic

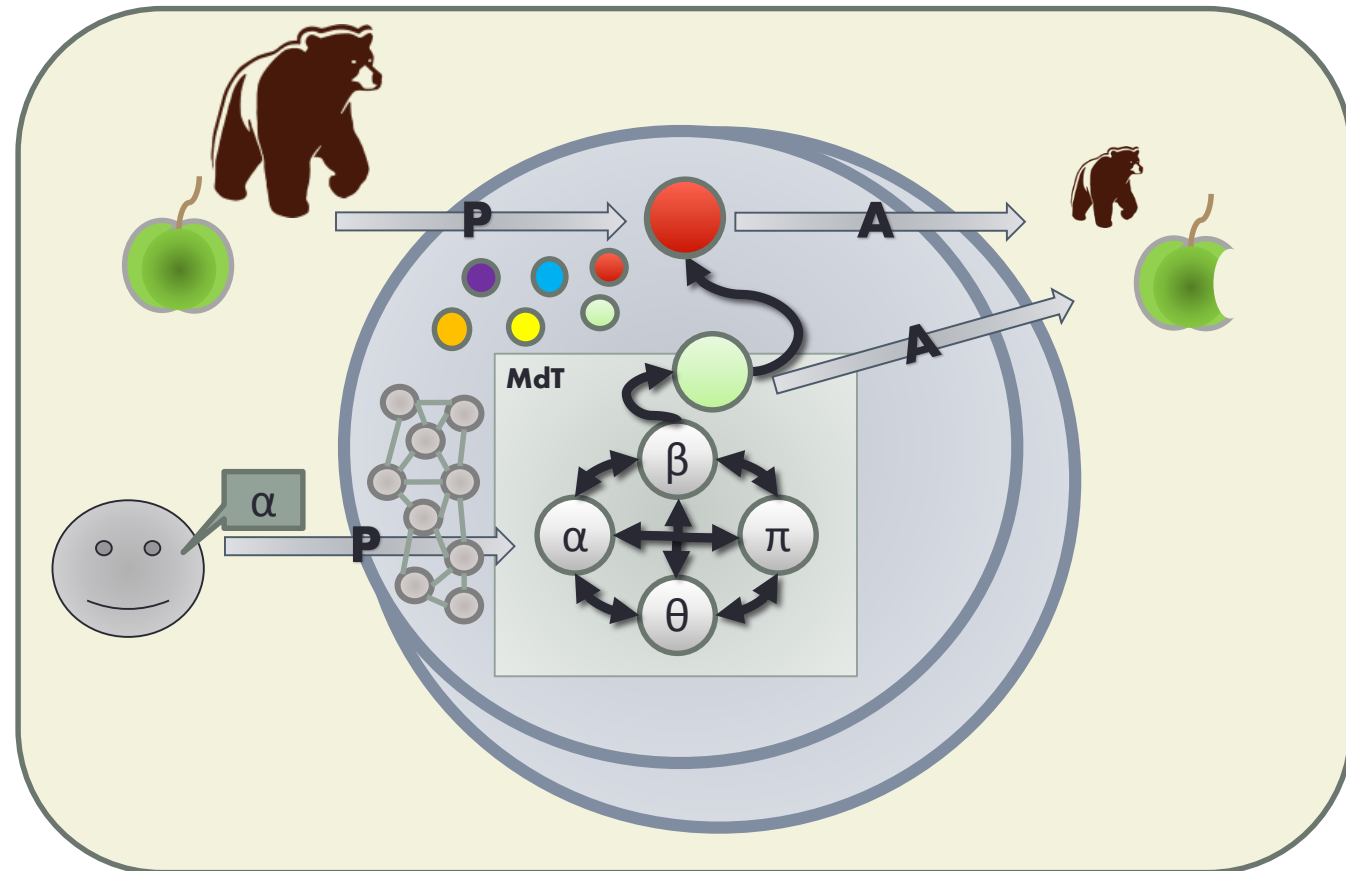
Equation orbite - Kepler

Observations astronomiques - Galilée

# Modèle psychologique intégratif minimal

Unités transactionnelles

- Interprétation de l'environnement
  - associatives
  - symboliques
- Permettent l'action sur l'environnement
  - motivationnelles
  - émotionnelles
- Interconnectées
- Structurées en Mdt
- En évolution



## Modèle interactionniste - processuel - dynamique

« *Why, in a given momentary situation, that is, with a given person (P) in a certain state and in a certain environment (E), does precisely this behaviour (B) result? The problem is thus to represent the behaviour (event) as a function of the momentary total situation (B=f(PE)).* »

K. Lewin (1935, p.241)

$$p(U_k) = f(P_t E)$$

**Processus vicariants de Reuchlin (1978)**

**Modèle probabiliste et processuel**

$p()$ : évocabilités

$U_k$ : processus vicariants

**Dynamique (Lautrey, 1990)**

$P_t$ : changement individuel

→ **Détermination de P**

- Quelle caractéristique individuelle?
- Une ou plusieurs caractéristiques?

# Traitement relationnel et raisonnement inductif

Bailleux, Dauvier & Perret (2015)

## ■ Raisonnement inductif

→ construction de nouvelles représentations d'une situation, en mémoire de travail

## ■ 2 caractéristiques individuelles engagées

→ capacité de traitement relationnel

→ capacité d'induction, génération d'hypothèses

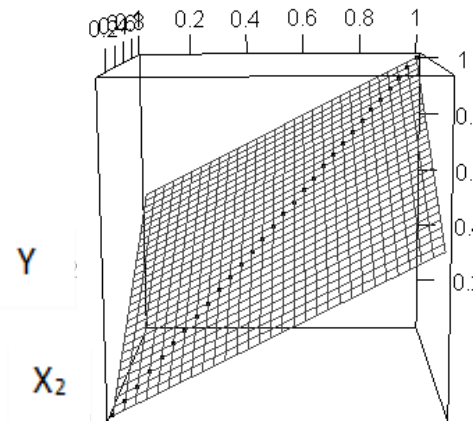
→ Capacité intégration relationnelle est une condition nécessaire mais non suffisante au raisonnement

→ Relation d'implication

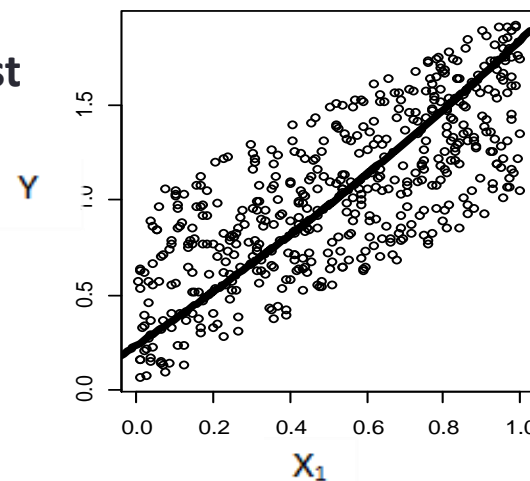
→  $f(P_1, P_2)$  serait multiplicative

Modèle additif

$$p(Uk) = \beta_1 X_i + \beta_2 X_2$$

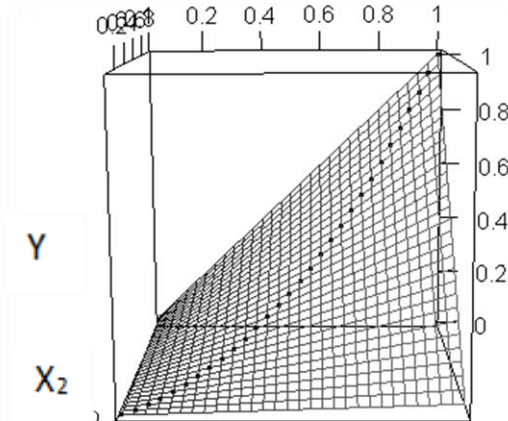


X<sub>1</sub>

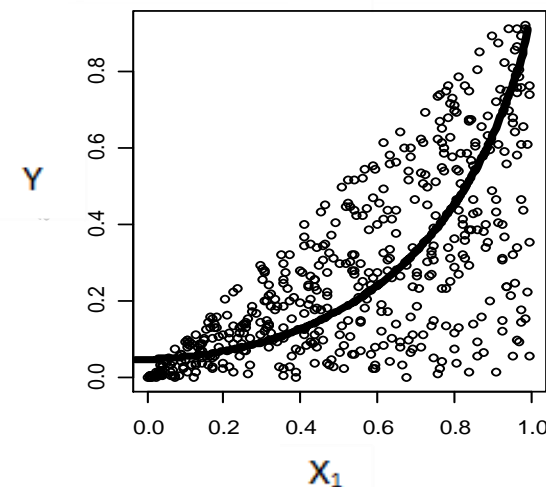


Modèle multiplicatif

$$p(Uk) = X_1^{\beta_1} X_2^{\beta_2}$$

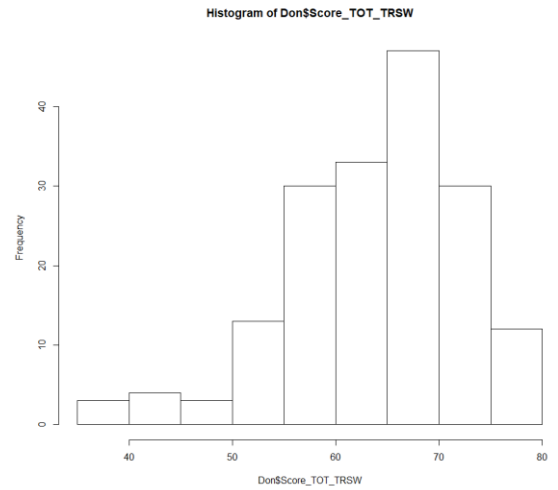
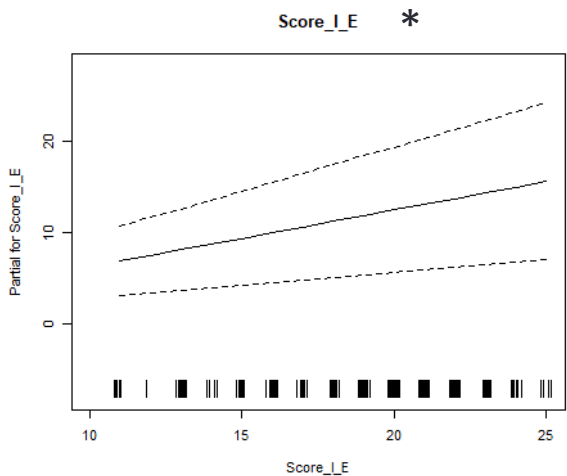
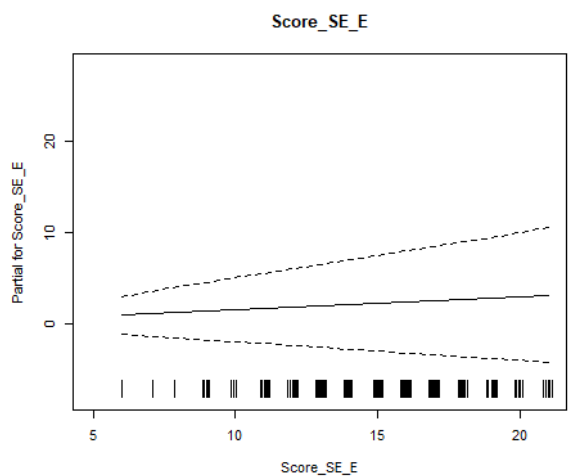
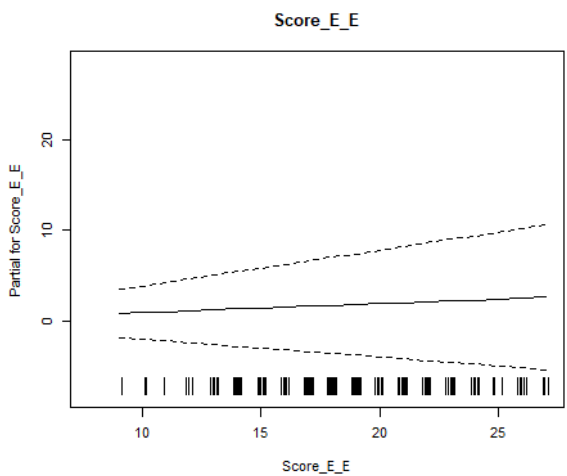
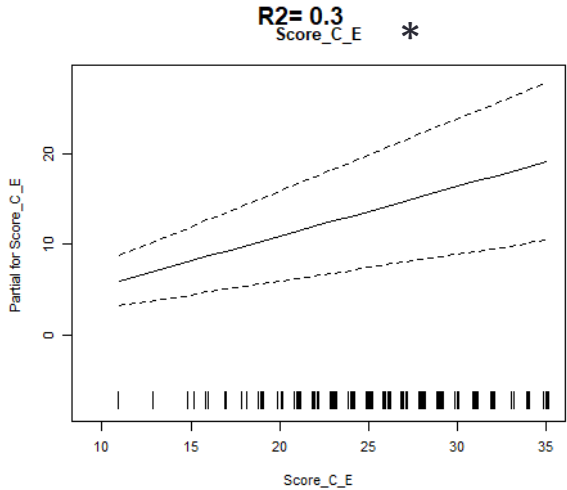
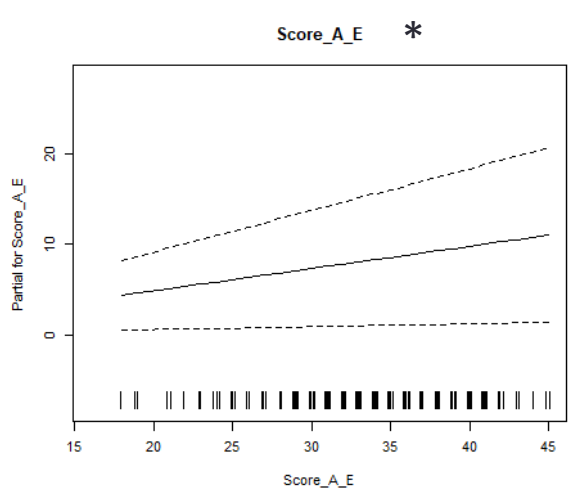


X<sub>1</sub>



# Régression multiple

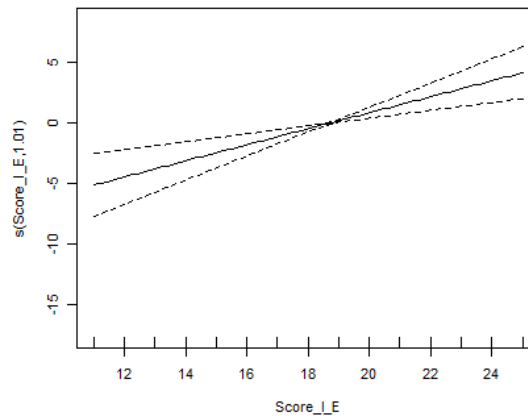
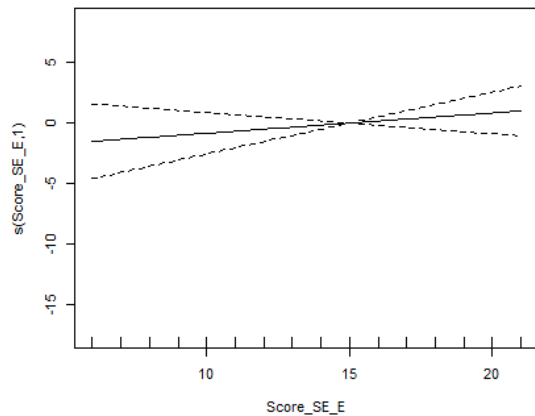
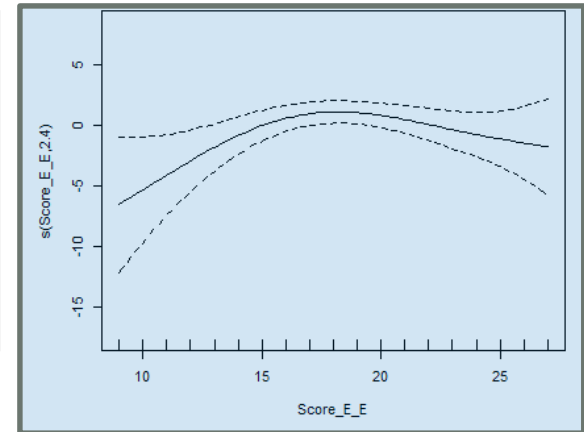
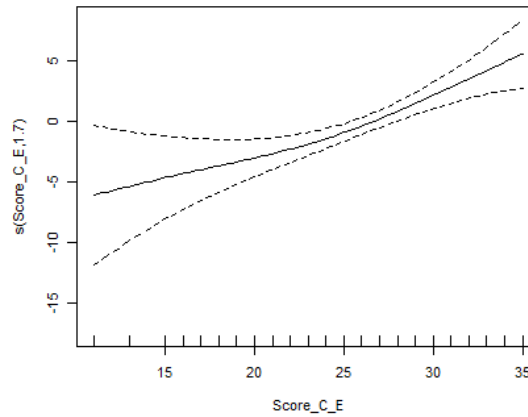
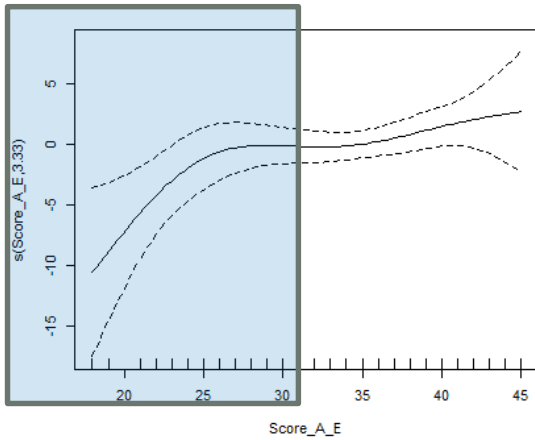
```
ModBE1_E=gam(Score_TOT_TRSW~Score_A_E+Score_C_E+Score_E_E+Score_SE_E+Score_I_E,  
data=Don)
```



# GAM sans interaction

```
ModBE2_E=gam(Score_TOT_TRSW~s(Score_A_E,k=5)+s(Score_C_E,k=5)+s(Score_E_E,k=5)  
+s(Score_SE_E,k=5)+s(Score_I_E,k=5),data=Don)
```

R2= 0.35



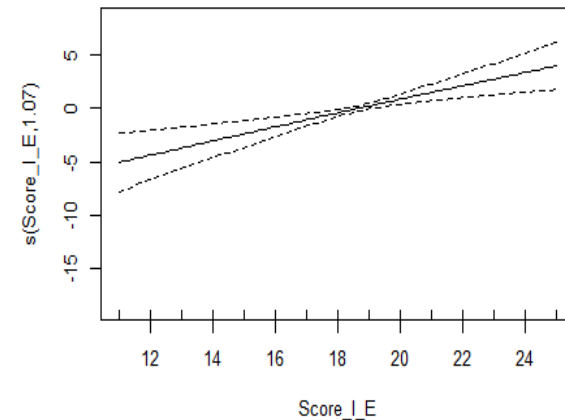
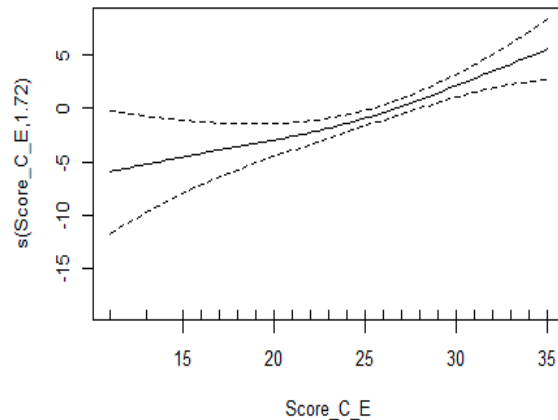
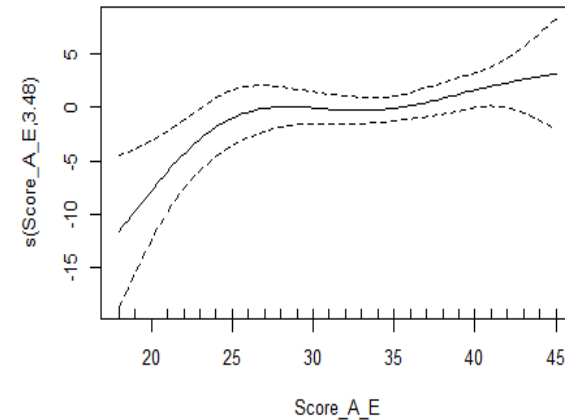
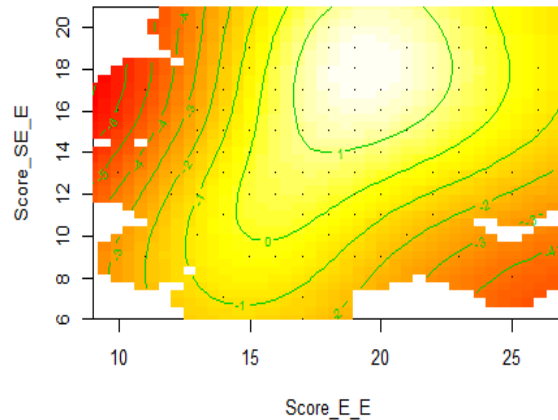


# GAM avec une interaction entre deux variable

```
ModBE3_E=gam(Score_TOT_TRSW~s(Score_E_E,Score_SE_E,k=11)+s(Score_A_E,k=5)  
+s(Score_C_E,k=5)+s(Score_I_E,k=5),data=Don)
```

R2= 0.362

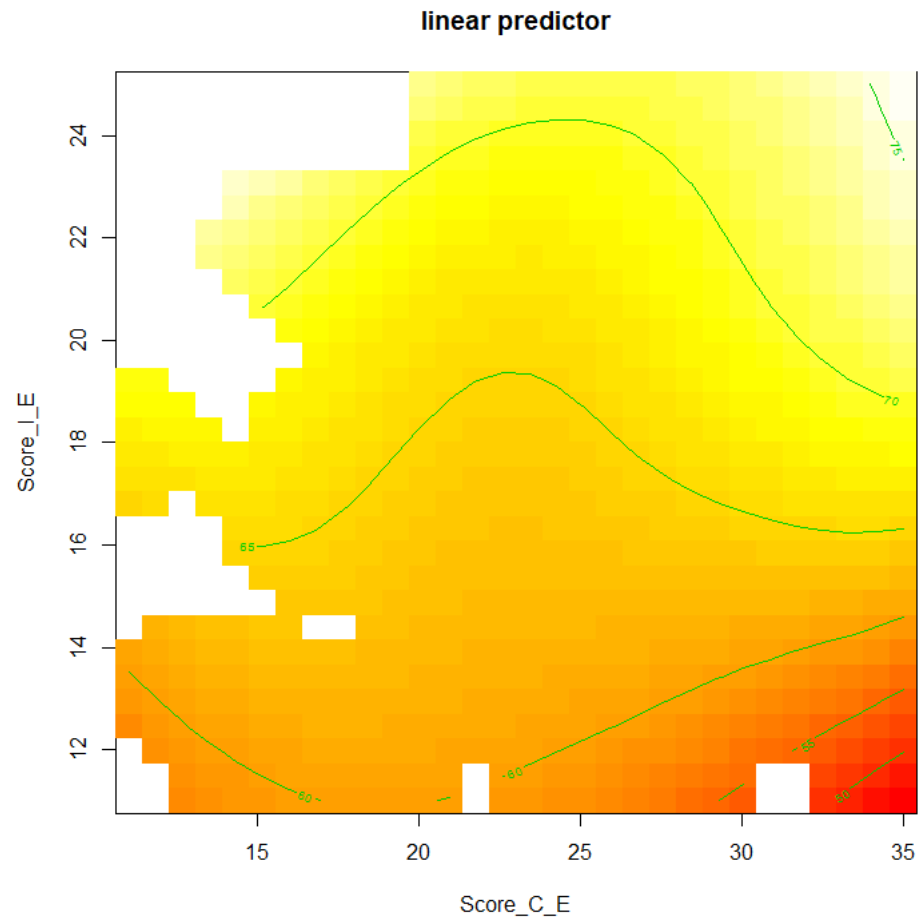
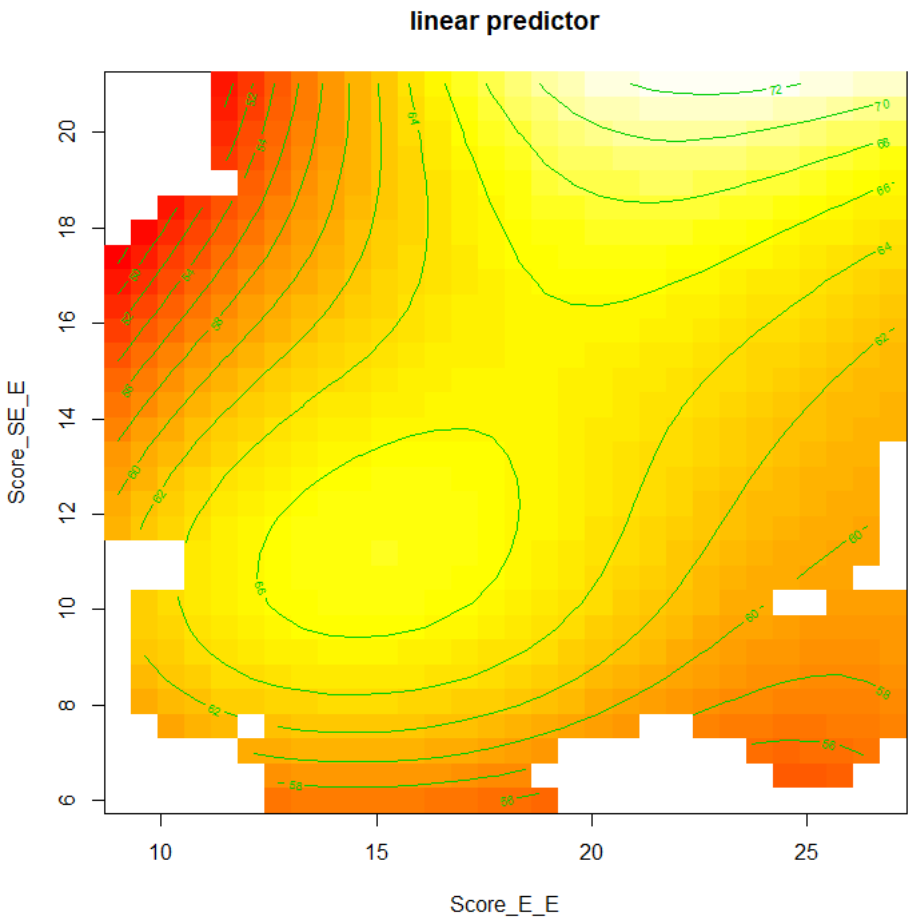
s(Score\_E\_E,Score\_SE\_E,5.8)



# GAM avec interaction entre toutes les variables

```
ModBE4_E=gam(Score_TOT_TRSW~s(Score_E_E,Score_SE_E,Score_A_E,Score_C_E,Score_I_E),  
data=Don)
```

R2= 0.518



# Classes latentes sur un sous échantillon

```
Happy=scale(Don[scale(fitted(ModBE4_E))[,1]>0.5,c("E","SE","C","I","A"))])
```

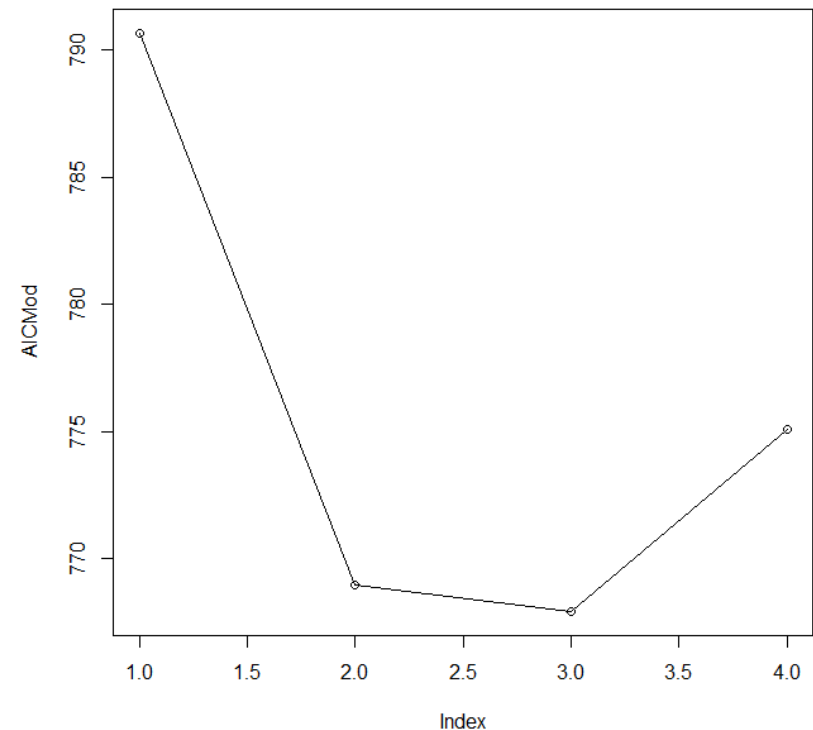
```
M1 = Mclust(Happy, modelNames="VVV", G=1)
```

```
M2 = Mclust(Happy, modelNames="VEE", G=2)
```

```
M3 = Mclust(Happy, modelNames="VEE", G=3)
```

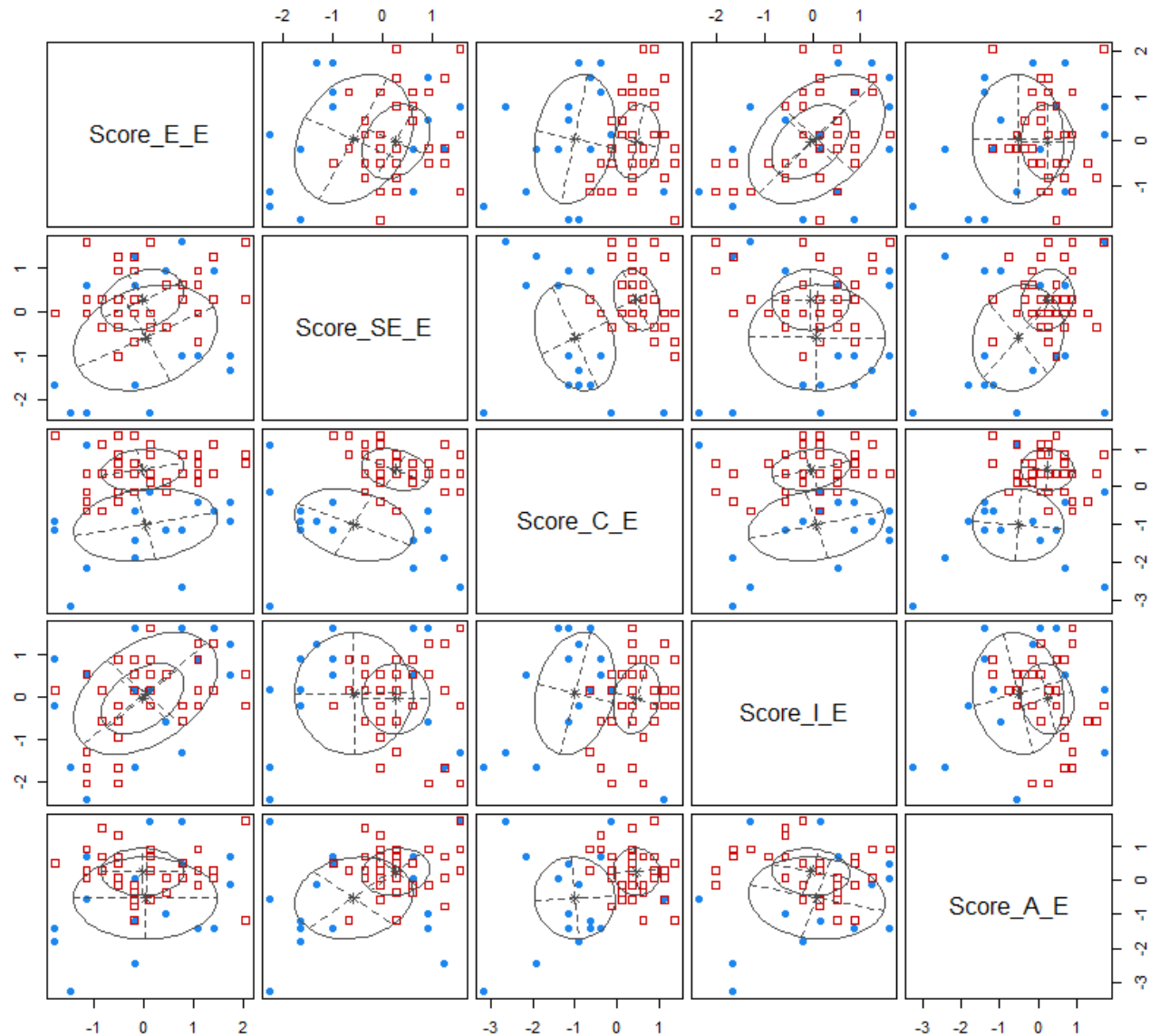
```
M4 = Mclust(Happy, modelNames="VEE", G=4)
```

```
AICMod = c(AIC(M1), AIC(M2), AIC(M3), AIC(M4))
```



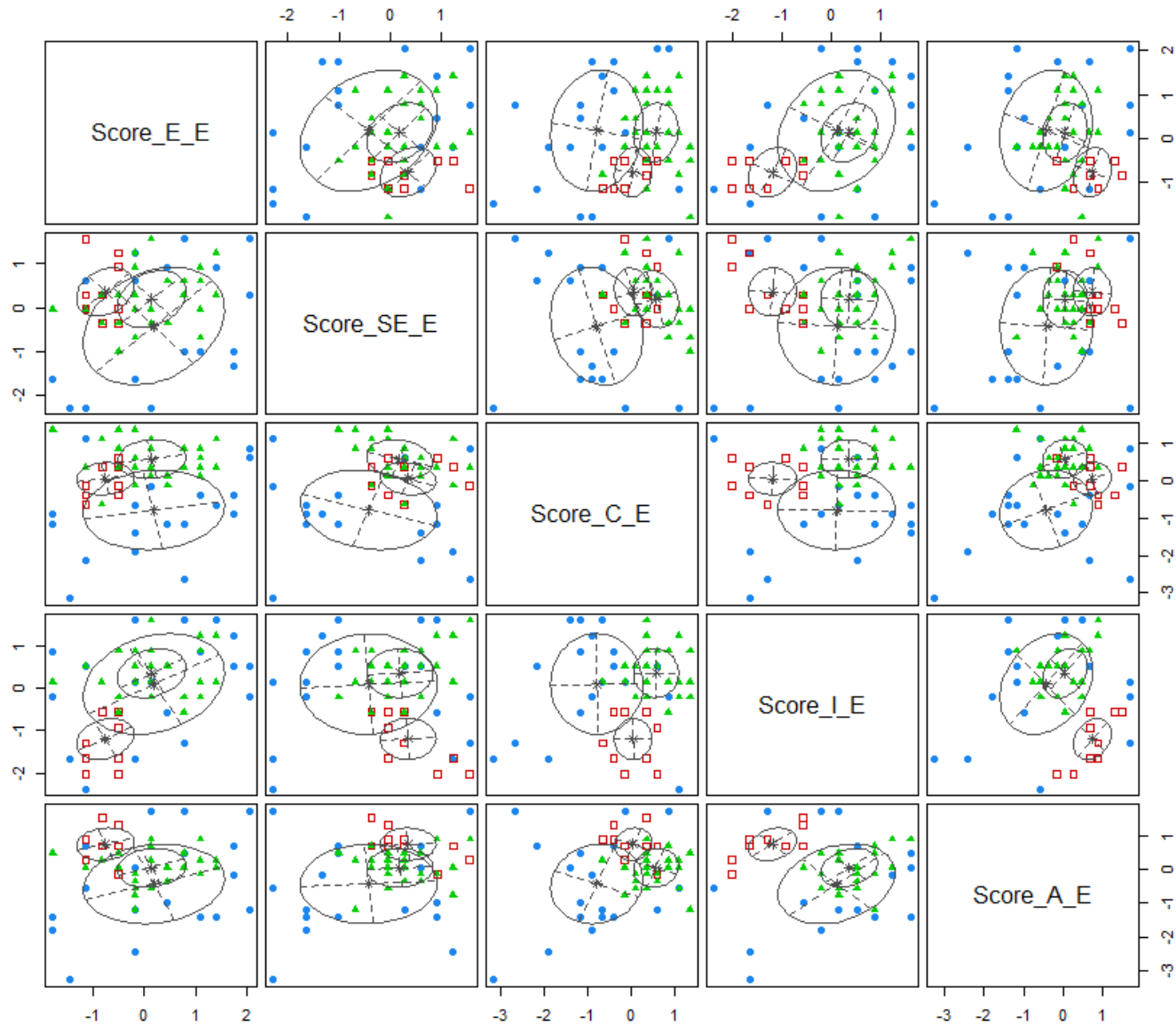
# Classes latentes sur un sous échantillon

2 classes

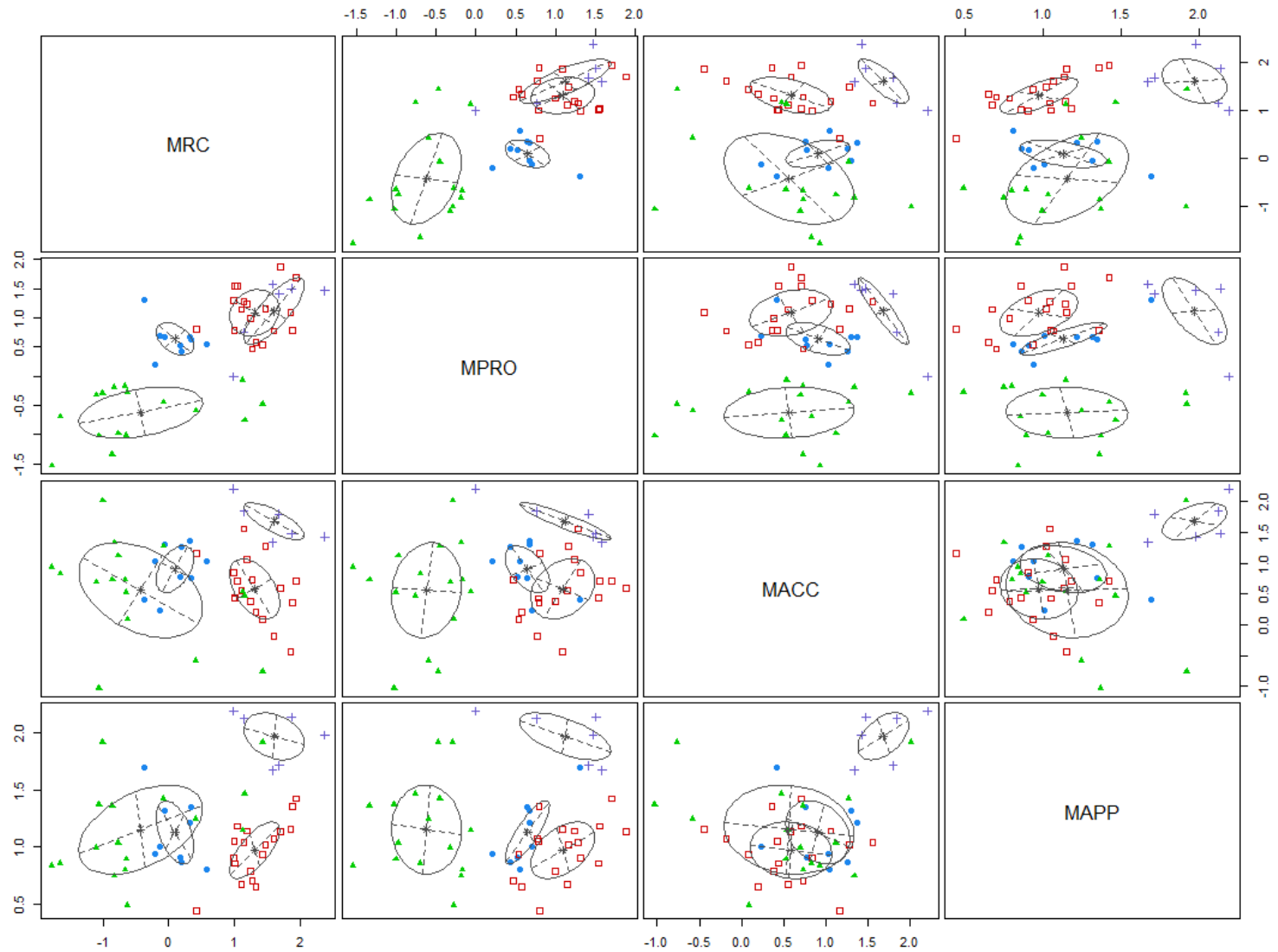


# Classes latentes sur un sous échantillon

3 classes



# Profils AP en fonction des stratégies de régulation



# Modèle multiplicatif et indice implicatif

Bailleux, Dauvier & Perret (2015)

- Recherche d'un indice implicatif pour variables continues

- Indice de propension (Lagrange, 1998)

- $$\tilde{q}(a, \bar{b}) = \frac{\frac{\sum a_i(1-b_i)}{n} - m_a(1-m_b)}{\sqrt{\frac{(s_a + m_a^2)(s_b + (1-m_b)^2)}{n}}}$$

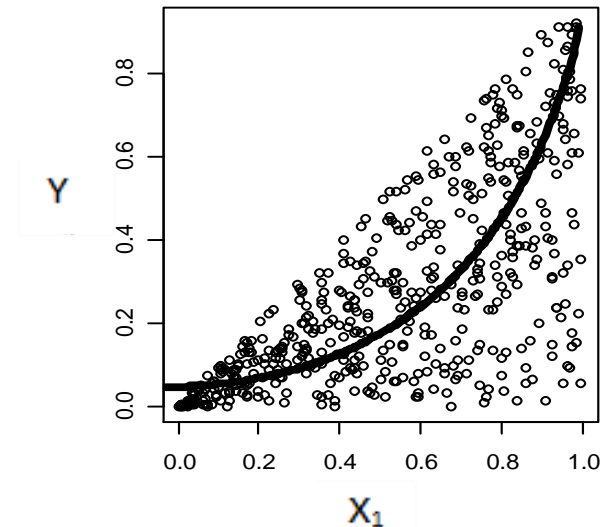
- Standardisé et orienté

- $$\tilde{q}'(a, \bar{b}) = \frac{\tilde{q}(a, \bar{b})}{\min[\tilde{q}(r(a), r(b)), \tilde{q}(r(b), r(a))]}$$

- $$\tilde{q}''(a, \bar{b}) = \tilde{q}'(a, \bar{b}) - \tilde{q}'(b, \bar{a})$$

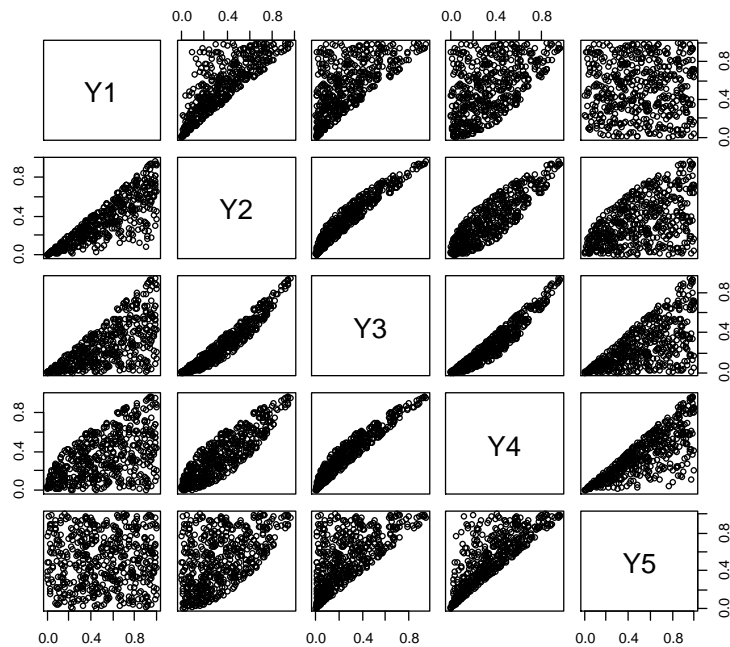
Modèle multiplicatif

$$p(Uk) = X_1^{\beta_1} X_2^{\beta_2}$$



Relation implication ( $\tilde{q}'' = 0.3$ )

# indice implicatif pour données numériques

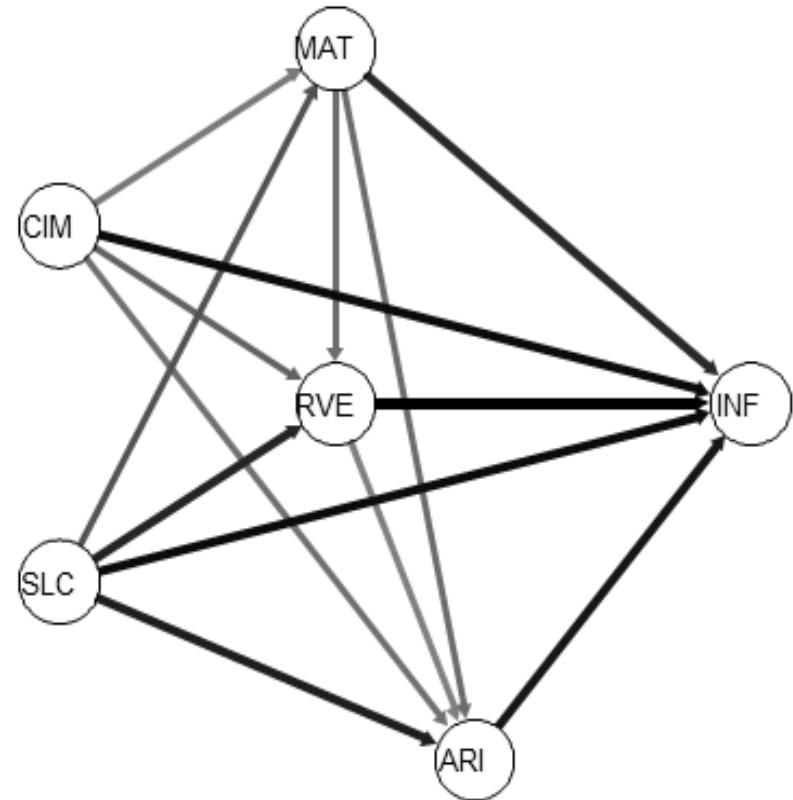
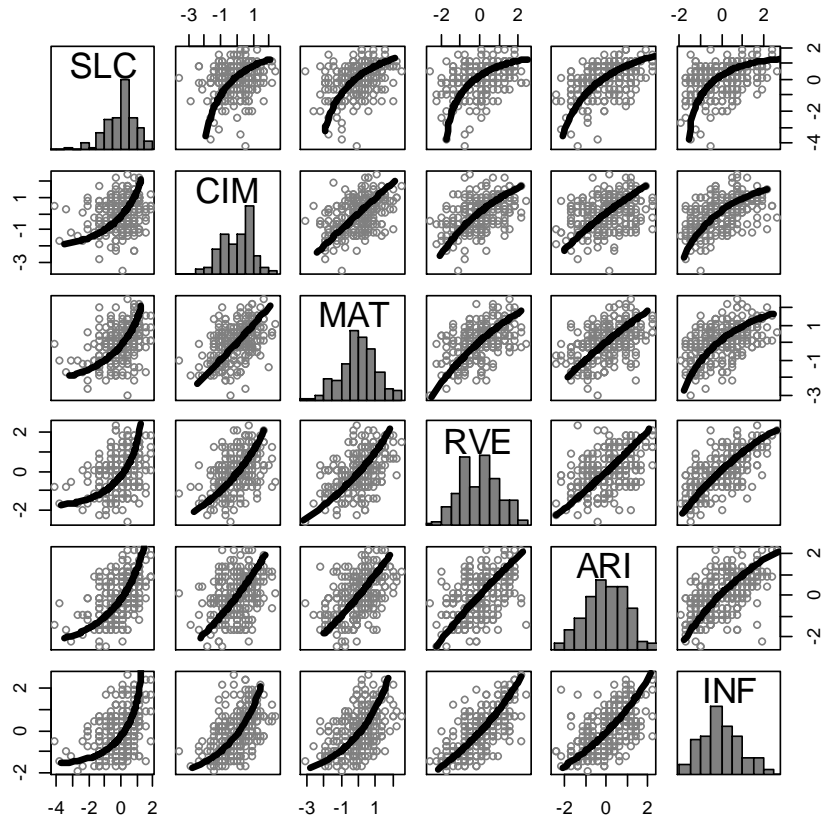


	Y1	Y2	Y3	Y4	Y5
Y1	0,00	-0,33	-0,38	-0,21	0,00
Y2	0,33	0,00	-0,24	0,00	0,19
Y3	0,38	0,24	0,00	0,24	0,36
Y4	0,21	0,00	-0,24	0,00	0,32
Y5	0,00	-0,19	-0,36	-0,32	0,00



# Réseau implicatif sur les subtest de la WISC

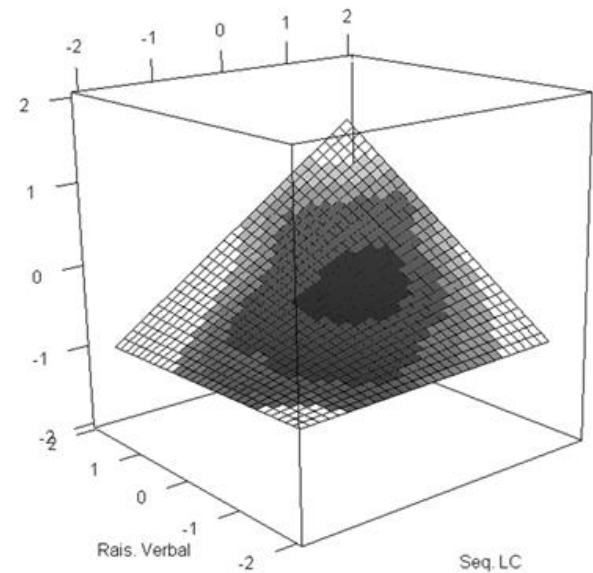
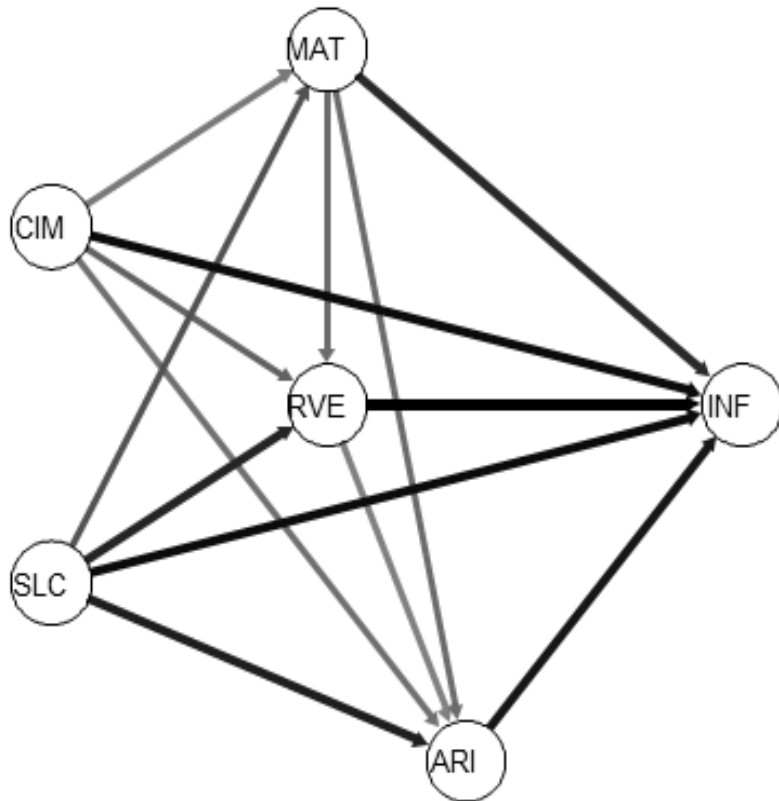
Bailleux, Dauvier & Perret (2015)



$\rightarrow$  SLC apparaît comme une condition nécessaire à la réussite dans les autres épreuves

# Réseau implicatif sur les subtest de la WISC

Bailleux, Dauvier & Perret (2015)



a. Complètement d'images moyen à faible

-> Si complètement d'images faible, effet multiplicatif Rais Verbal \* SLC sur raisonnement (Matrices)