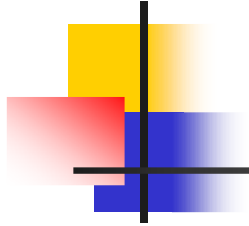
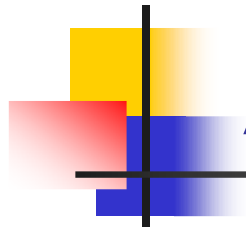


Le surentraînement : un concept qui nécessite la prise en compte de la variabilité intra-individuelle



Modéliser le changement : une tentative d'association des approches idiographiques et nomothétiques



Analyses exploratoires

Les données utilisées ici proviennent d'une étude publiée par Curran et Hussong (2002). Les évaluations ont eu lieu en 1986 (N=405), 1988 (N=374), 1990 (N=294) et 1992 (N=221)

Les mesures de lecture (READ) : reconnaissance de mots
prononciation de mots

Autres mesures (HOMECOG) : stimulations cognitives et
émotionnelles de la part de la
mère

(GENRE)

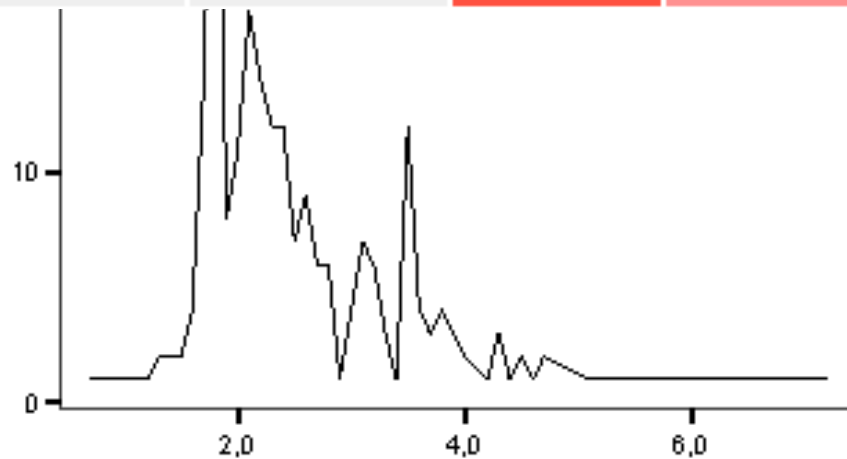
Statistiques descriptives des variables endogènes (SPSS)



Statistiques

	read1	read2	read3	read4
	221	221	221	221

Attribute	Mu ; Sigma	Shapiro-Wilk (p-value)	Lilliefors D = max[D-,D+] (p-value)	Anderson-Darling (p-value)	d'Agostino (p-value)
read1	0,2779 ; 0,8411	0,374708 (0,0000)	0,5190 = max[0,3705,0,5190] (p < 0.01)	596,903262 (p < 0.01)	$31,1340^2 + 19,2315^2 = 1339,1747$ (0,0000)



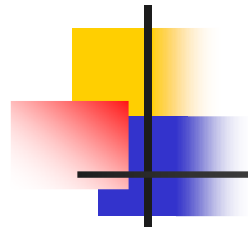
read1

	Std. Deviation	,8795
Most Extreme	Absolute	,154
Differences	Positive	,154
	Negative	-,122
Kolmogorov-Smirnov Z		2,295
Asymp. Sig. (2-tailed)		,000

a. Test distribution is Normal.

b. Calculated from data.

Statistiques descriptives des variables exogènes



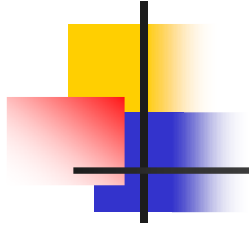
Statistiques

homecog

N	Valide	221
	Manquante	0
Moyenne		9,10
Médiane		9,00
Ecart-type		2,455
Asymétrie		-,376
Erreur std. d'asymétrie		,164
Aplatissement		-,392
Erreur std. d'aplatissement		,326
Centiles	25	7,50
	50	9,00
	75	11,00

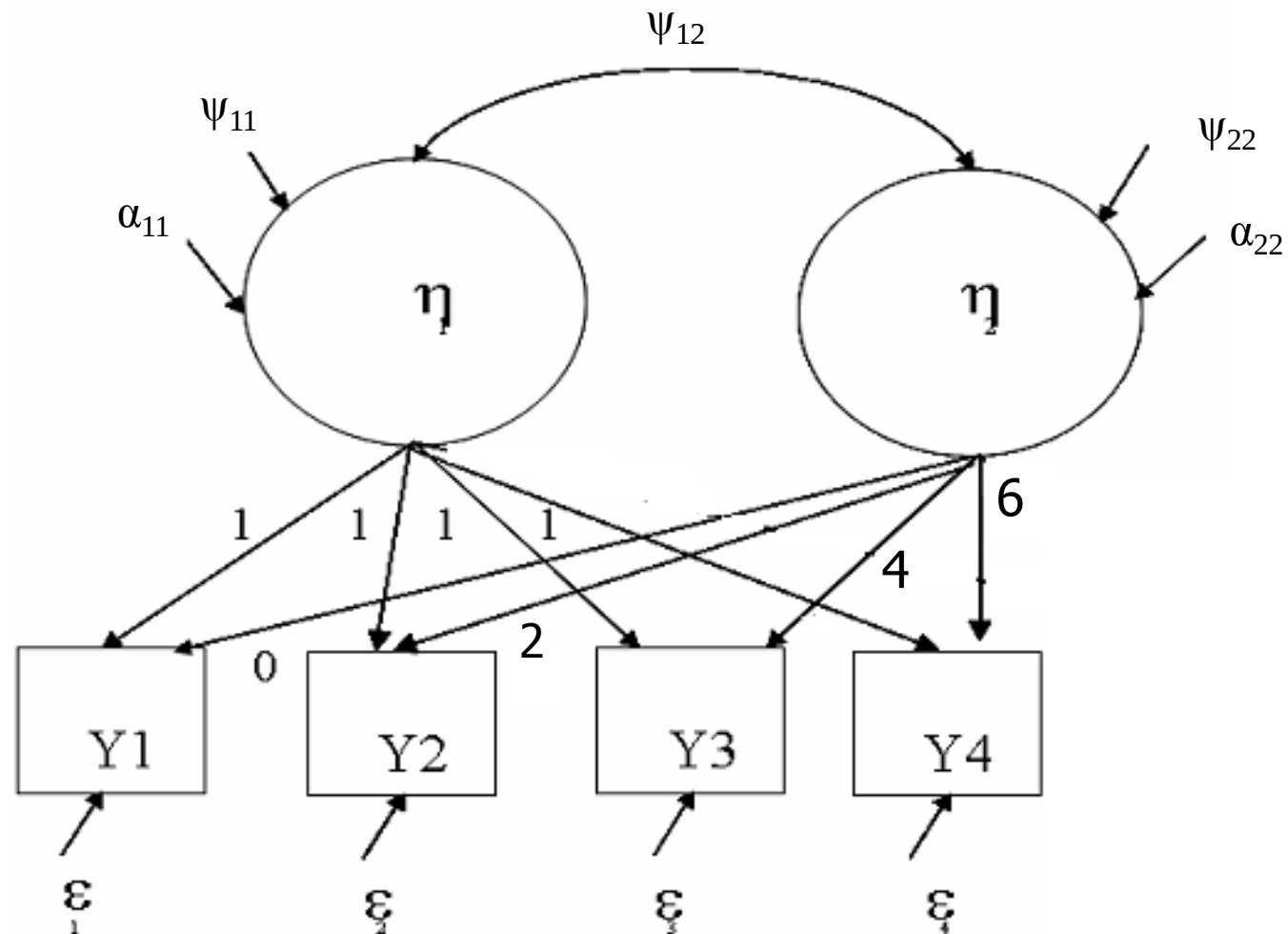
genre

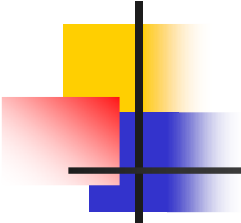
		Fréquence	Pour cent	Pourcentage valide	Pourcentage cumulé
Valide	0	105	47,5	47,5	47,5
	1	116	52,5	52,5	100,0
	Total	221	100,0	100,0	



Approche nomothétique « classique »

Représentation graphique du modèle linéaire





Indices d'ajustement des modèles estimés

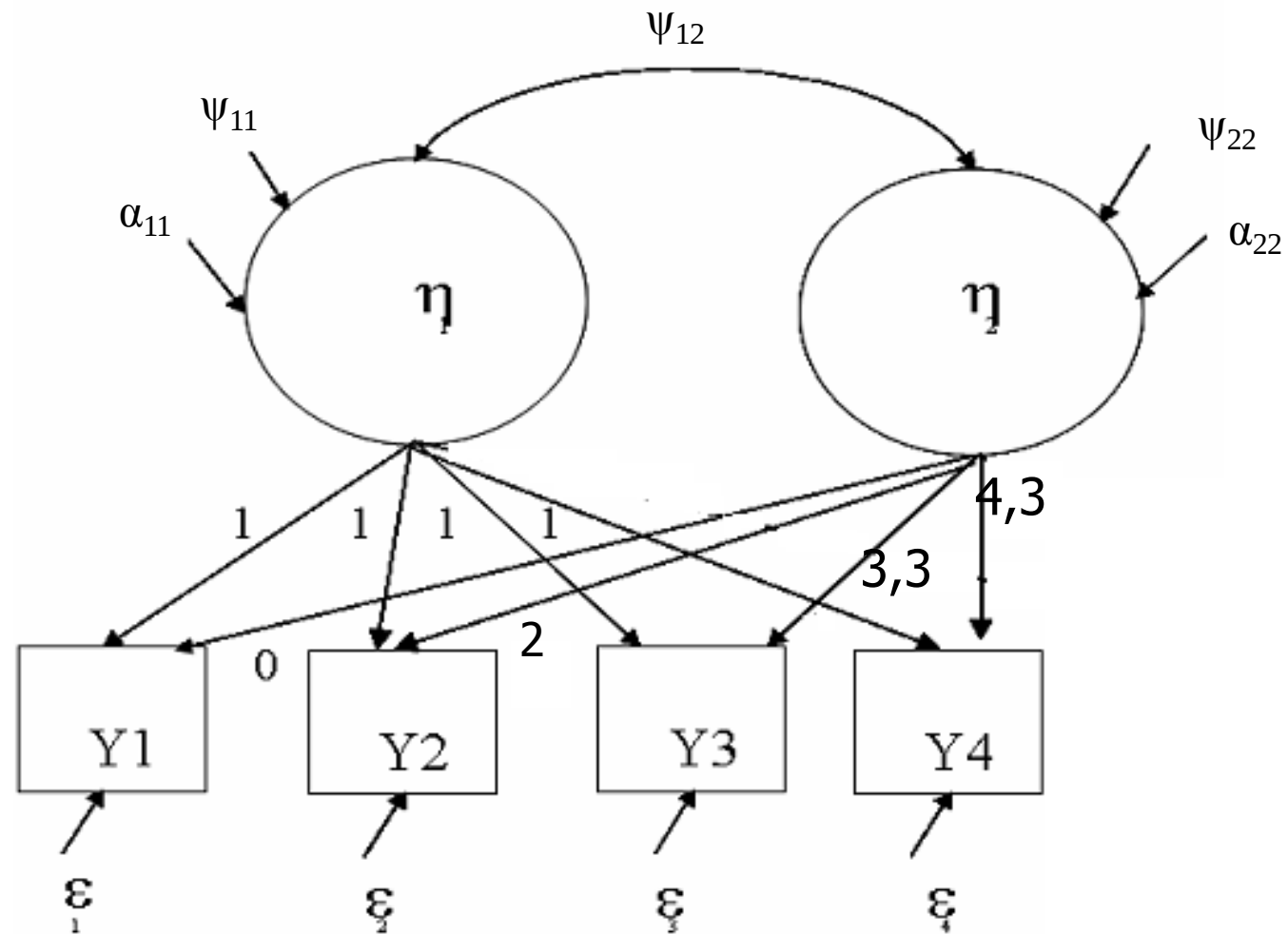
M1	M2	M3
MODELE LINEAIRE	MODELE QUADRATIQUE	MODELE NON LINEAIRE
$\chi^2(5) = 123,14, p=0.0$	Pas de convergence	$\chi^2(9) = 6,39, p=0.09$
AIC = 131,46		AIC = 20,00
RMRS = 0,10		RMRS = 0,05
NNFI = 0.79		NNFI = 0,99
GFI = 0.93		GFI = 0, 95

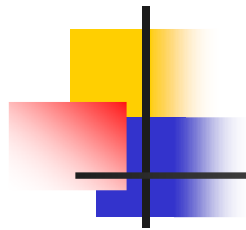
M0 : $\chi^2(6) = 598,89$

$\Delta\chi^2$ M1/M0 = 475,75, $p = 0,0$ à ddl = 1

$\Delta\chi^2$ M3/M1 = 116,75 $p = 0,0$ à ddl = 4

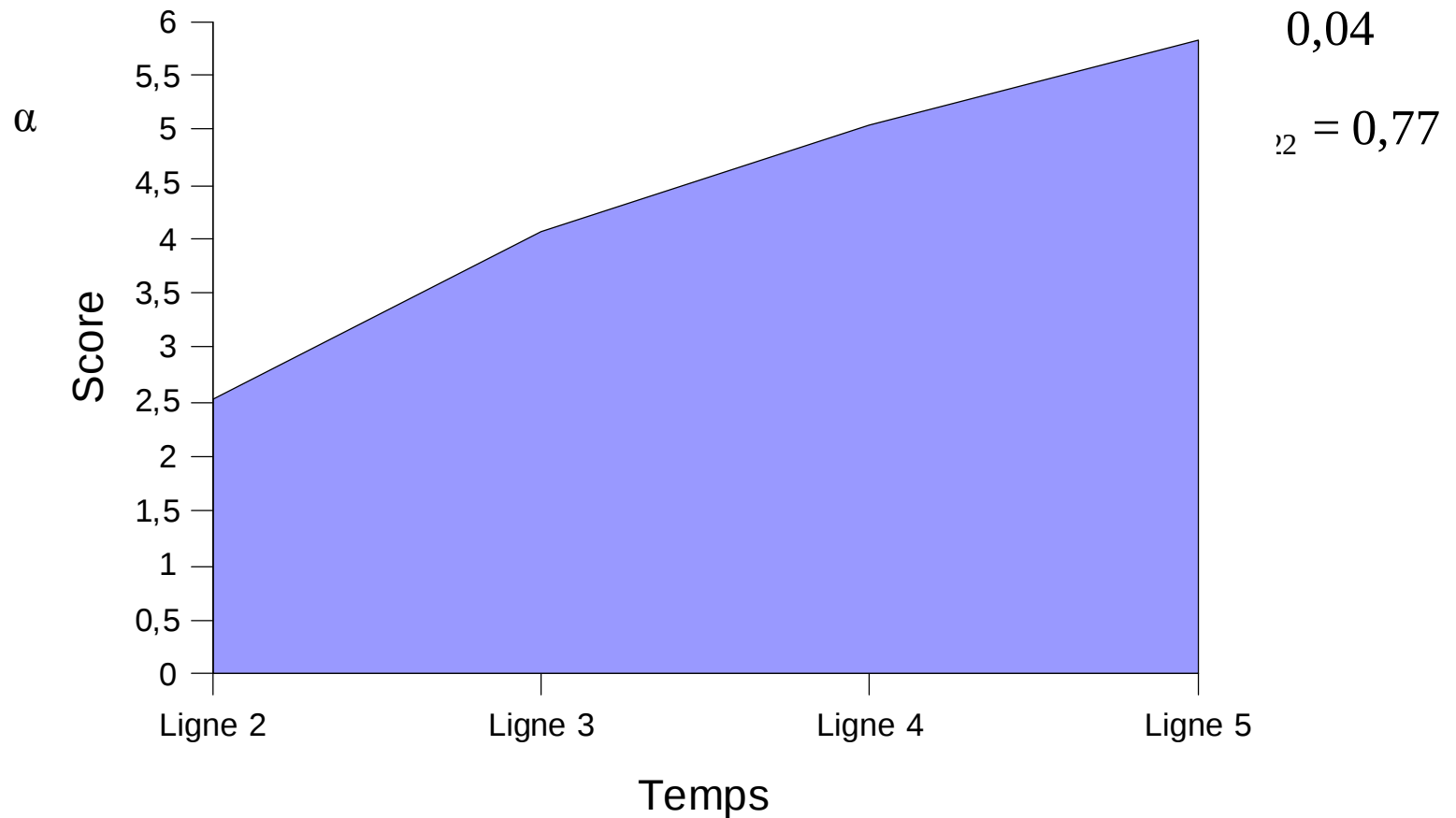
Représentation graphique du modèle non linéaire



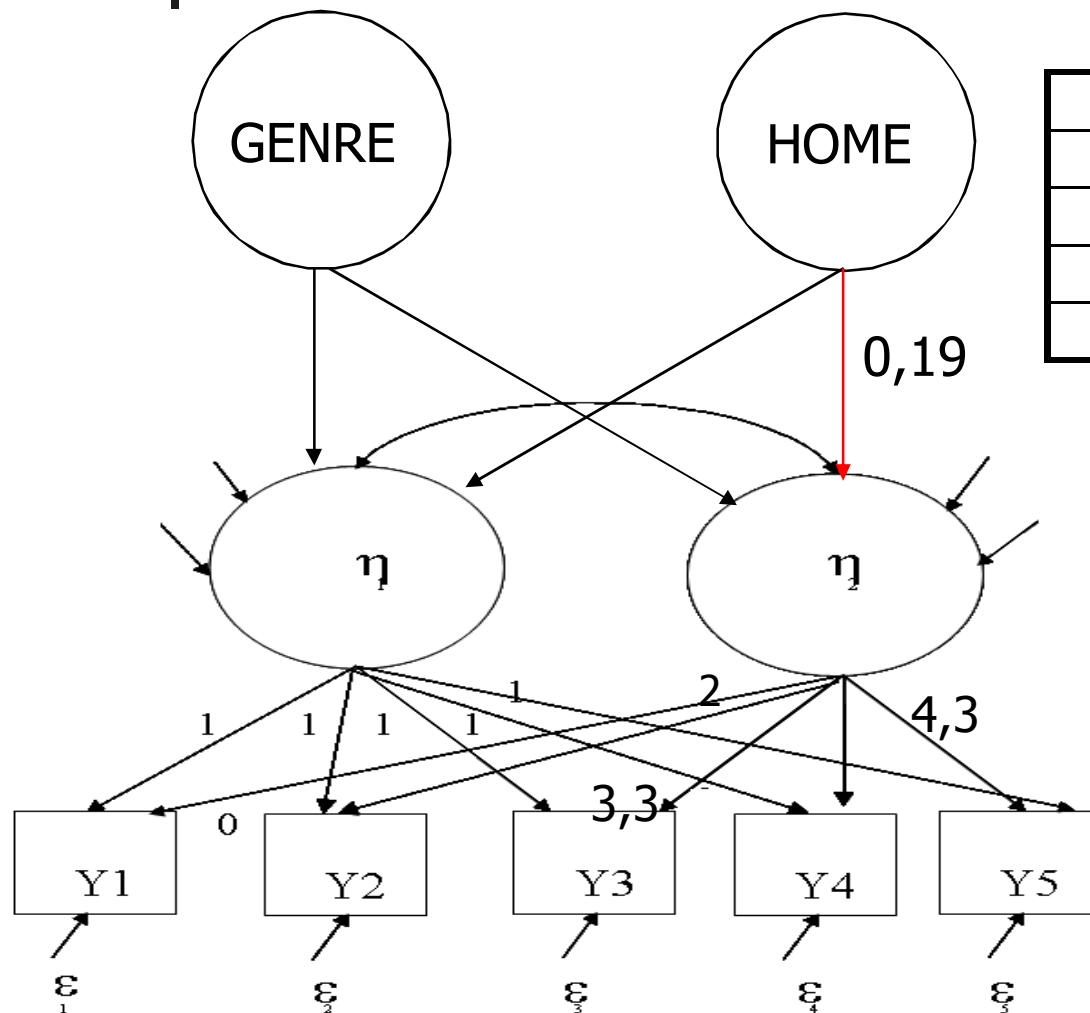


Courbe du modèle non linéaire

Courbe latente non linéaire pour la lecture



Paramètres estimés pour le modèle non linéaire conditionnel



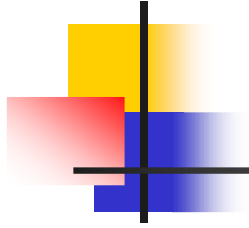
MODELE CONDITIONNEL

$$\chi^2(9) = 8,13, p = 0,52$$

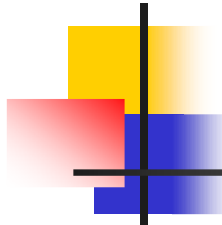
$$NNFI = 1,00$$

$$RMRS = 0,04$$

$$NNFI = 1,00 \text{ GFI} = 0,97$$



Approches idiographiques



Programmer sous SPSS

analyse individuelle.sav [DataSet1] - SPSS Data Editor

File Edit View Data Transform Analyze Graphs Utilities Window Help

8 : filter_\$ 1 Visible: 17 of 17 Variables

	anti1	anti2	anti3	anti4	read1	age	read2	read3	read4	gen	homecog	subjid	change re	anti	read	lin read	filter \$	var	var
1	3	6	4	5	2,1	7,00	2,9	4,5	4,5	1	9	1	,00	3	2,1	1,00	0		
2	0	2	0	1	2,3	7,00	4,5	4,2	4,6	0	9	2	,00	0	2,3	,00	1		
3	1	1	2	1	2,3	7,00	3,8	4,3	6,2	0	10	3	1,00	1	2,3	1,00	0		
4	3	4	3	5	1,8	7,00	2,6	4,1	4,0	1	8	4	,00	3	1,8	,00	1		
5	5	4	5	5	3,5	7,00	4,8	5,8	7,5	1	10	5	1,00	5	3,5	1,00	0		
6	1	2	2	0	3,5	7,00	5,7	7,0	6,9	0	9	6	,00	1	3,5	,00	1		
7	2	3	4														1		
8	0	6	0														1		
9	1	0	2														1,00	0	
10	0	0	0														,00	1	
11	2	6	3														,00	1	
12	3	2	3														,00	1	
13	0	1	2														,00	0	
14	1	1	0														,00	0	
15	2	6	5														,00	0	
16	3	3	2														,00	0	
17	0	0	1														,00	0	
18	1	3	0														,00	1	
19	2	0	1														,00	0	
20	0	3	2														,00	1	
21	5	0	5														,00	0	
22	0	1	2														,00	0	
23	1	4	1														,00	1	
24	1	3	3														,00	1	
25	0	0	0														,00	1	
26	1	3	3														,00	0	
27	1	2	3														,00	0	
28	2	2	4														,00	0	
29	2	5	5														,00	0	
30	4	0	4														,00	0	
31	1	3	3														,00	0	
32	3	0	4														,00	1	
33	0	0	1														,00	1	
34	4	2	2														,00	0	
35	6	5	3														,00	0	
36	2	5	1														,00	0	
37	0	0	2														,00	0	
38	0	3	4														,00	0	

Syntax1 - SPSS Syntax Editor

File Edit View Data Transform Analyze Graphs Utilities Run Window Help

All
Selection
Current Ctrl+R
To End

```

igraph
/x1=var(age) type=scale
/y=var(read) type=scale
/style=var(subjid)
/fitline method=regression linear line=total spike=off
/scalerange=var(read) min=0 max=9
/scatter.

```

Run All Running IGRAPH...

Data View Variable View

Running IGRAPH...

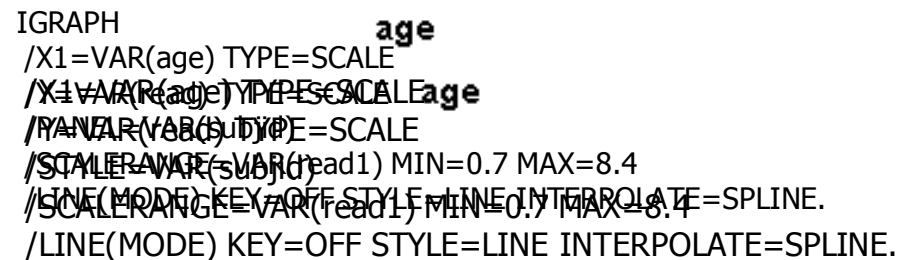
FR 17:48

Organisation du fichier de données



gen	homecog	subjid	change_re ad	anti	read	age
1	9	1	,00	3	2,1	7,00
0	9	2	,00	0	2,3	7,00
0	10	3	1,00	1	2,3	7,00
1	8	4	,00	3	1,8	7,00
1	10	5	1,00	5	3,5	7,00
0	9	6	,00	1	3,5	7,00
1	6	7	,00	2	2,6	7,00
1	7	8	8,00	0	1,8	7,00

	gen	homecog	subjid	change_re ad	anti	read	age
214	1	10	214	1,00	0	2,1	7,00
215	1	9	215	1,00	0	5,1	7,00
216	1	11	216	1,00	0	2,6	7,00
217	0	5	217	1,00	3	4,0	7,00
218	1	9	218	1,00	4	1,6	7,00
219	0	11	219	1,00	2	1,8	7,00
220	1	10	220	1,00	0	1,8	7,00
221	0	4	221	1,00	2	1,7	7,00
222	.	.	1	.	6	2,9	9,00
223	.	.	2	.	2	4,5	9,00
224	.	.	3	.	1	3,8	9,00



Analyses individuelles

igraph

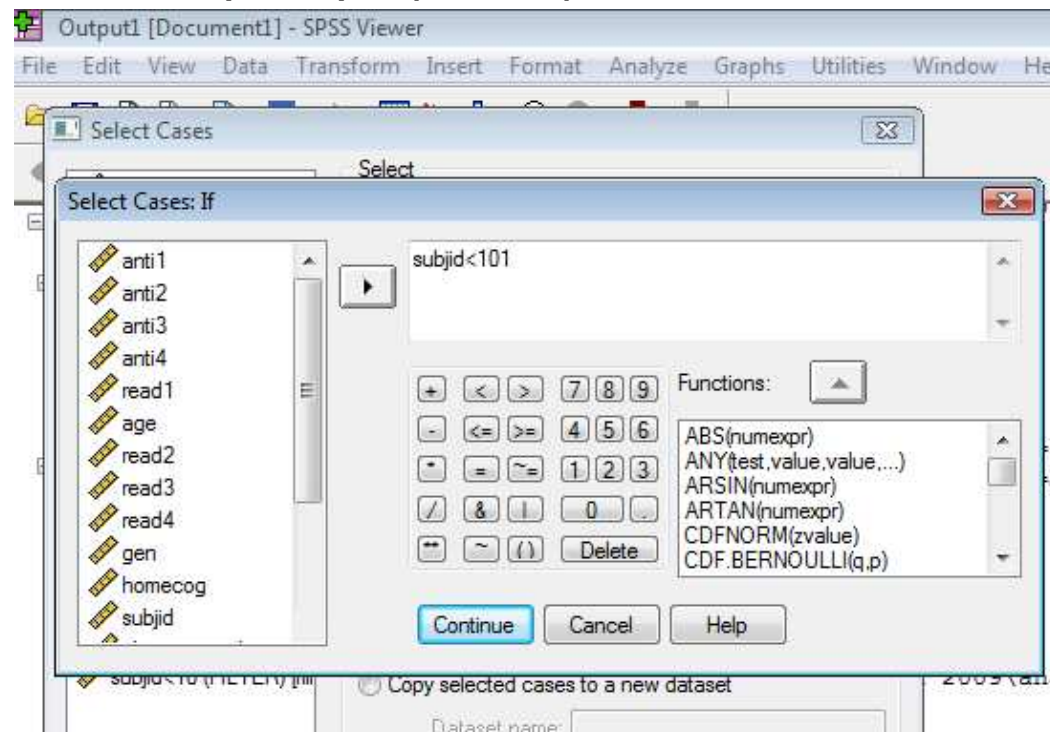
/x1=var(age) type=scale

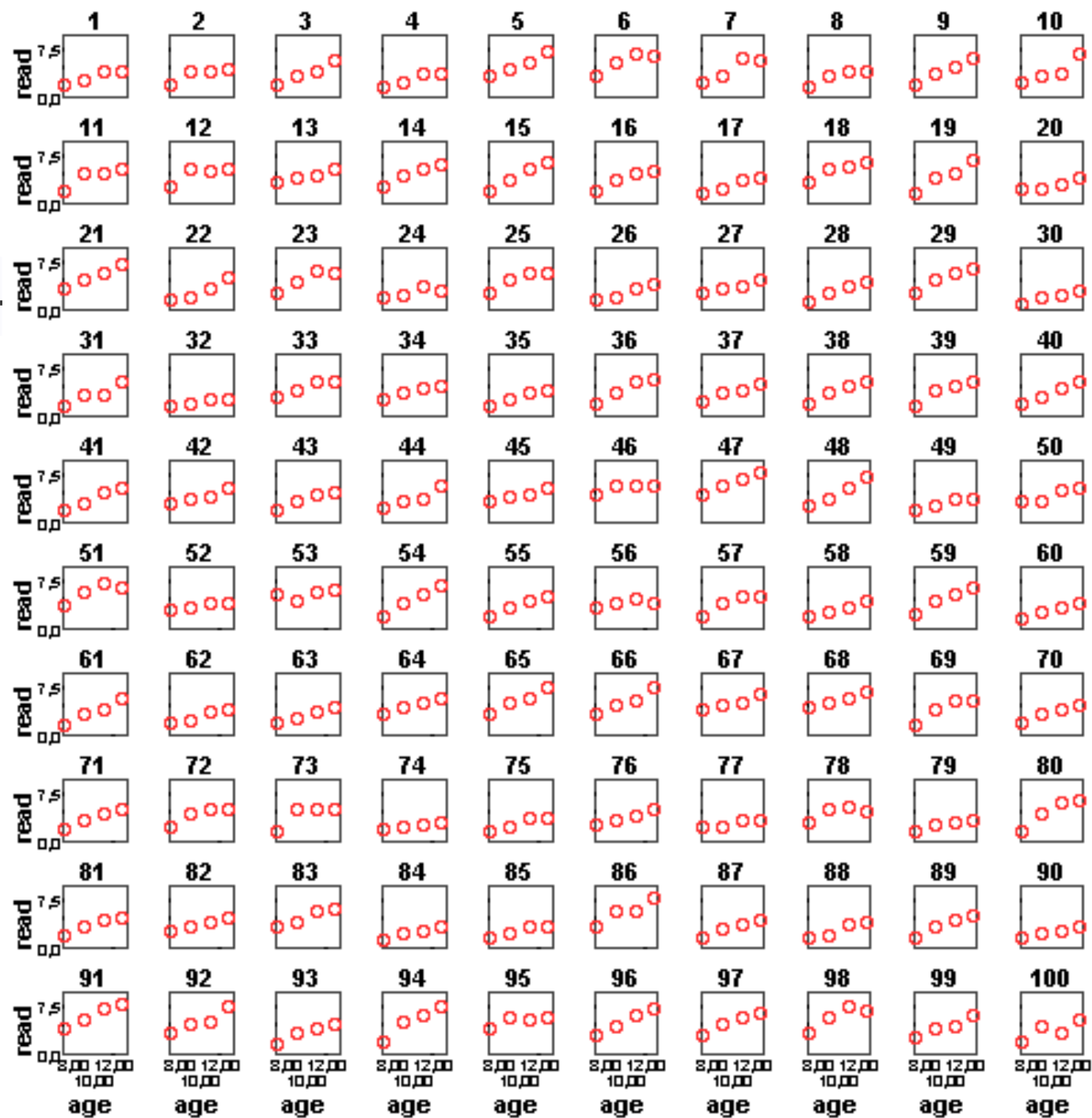
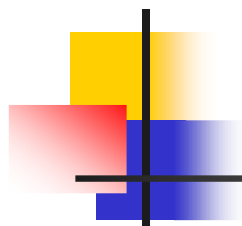
/y=var(read) type=scale

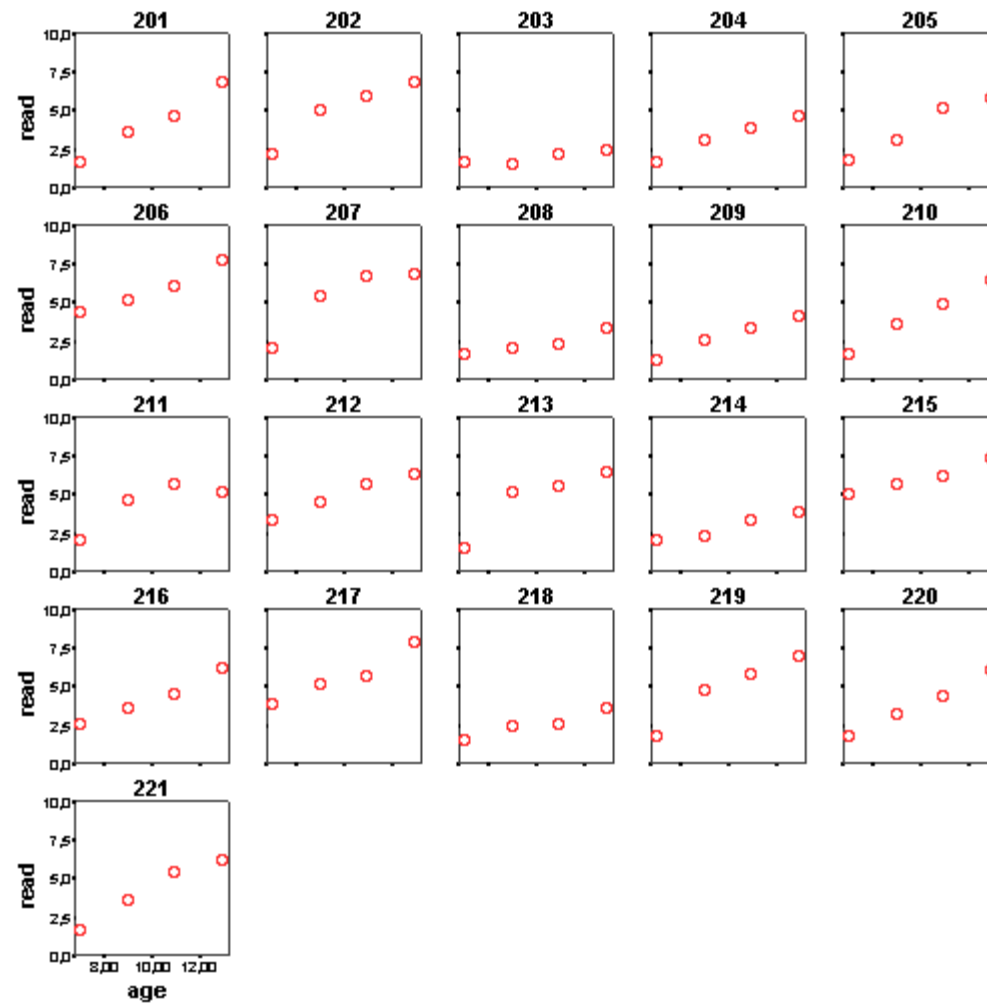
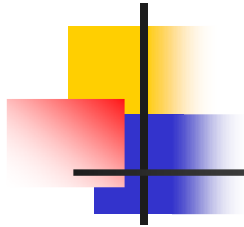
/style=var(subjid)

/scalerange=var(read) min=0 max=10

/line(mode) key=off style=dot.







igraph

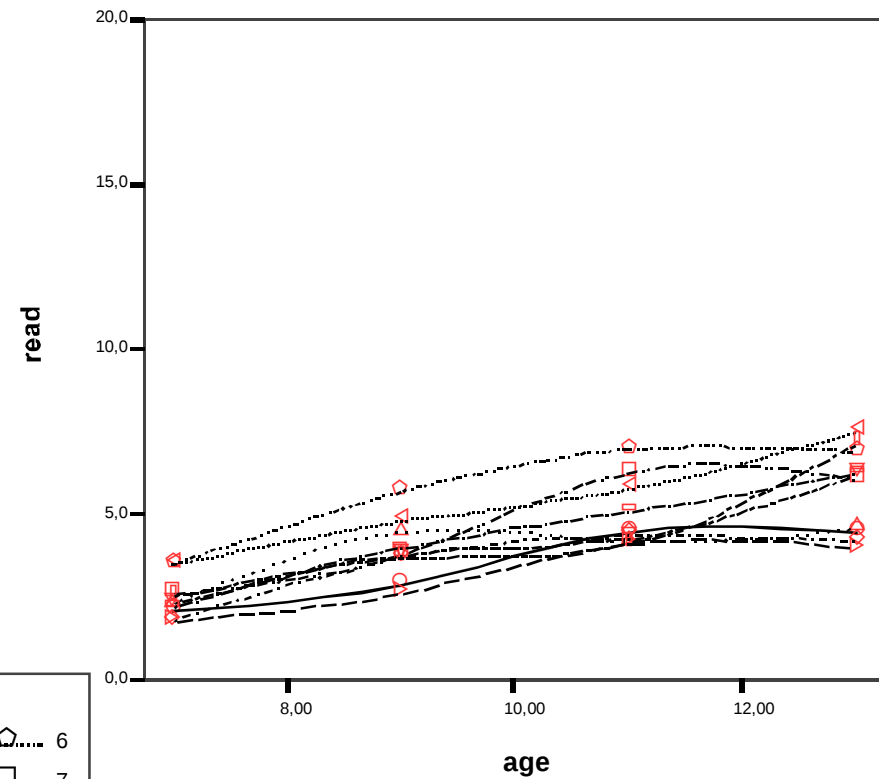
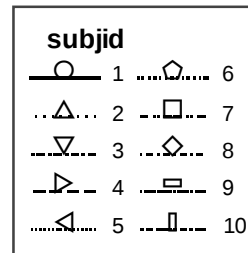
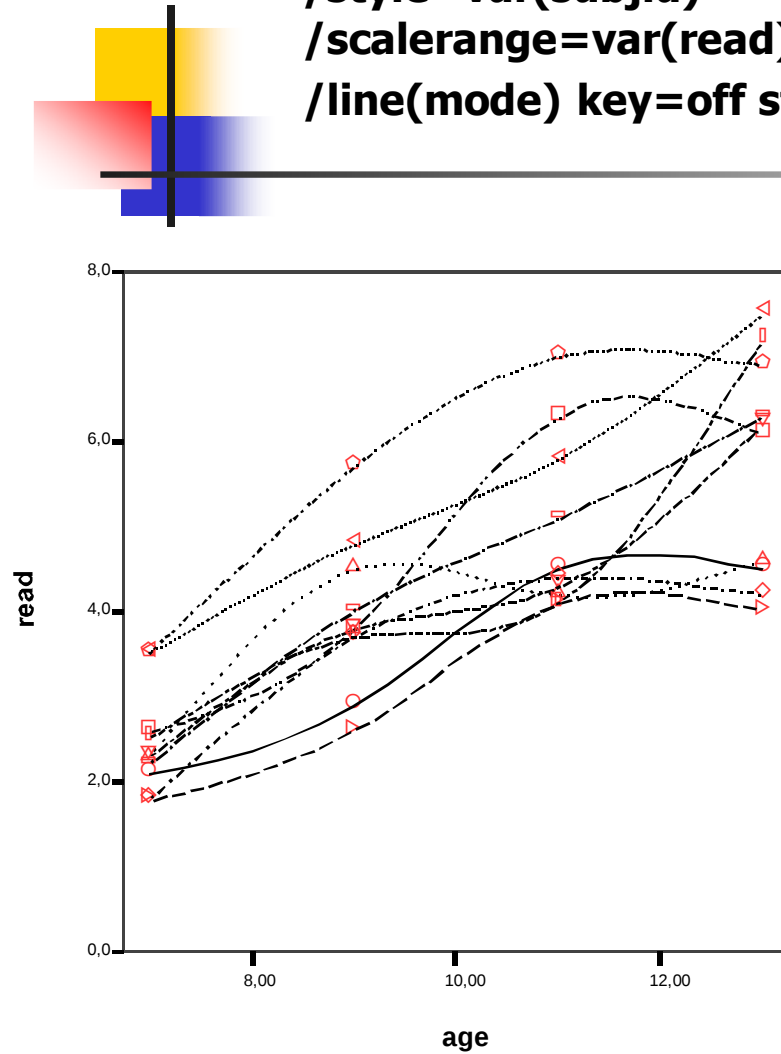
/x1=var(age) type=scale

/y=var(read) type=scale

/style=var(subjid)

/scalerange=var(read) min=0 max=8

/line(mode) key=off style=dotline interpolate=spline.



igraph

/x1=var(age) type=scale

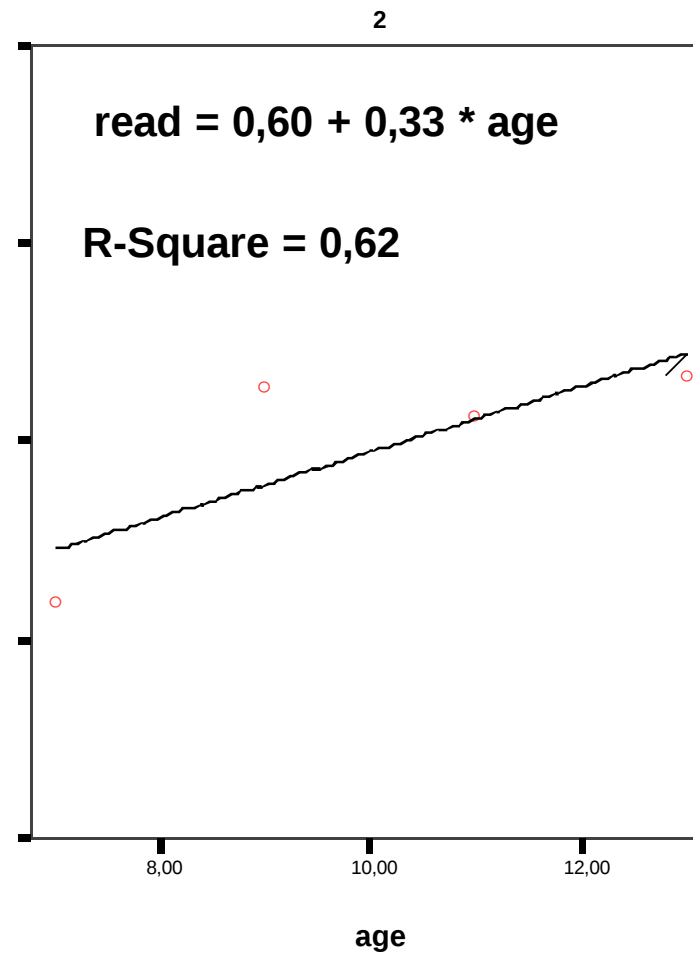
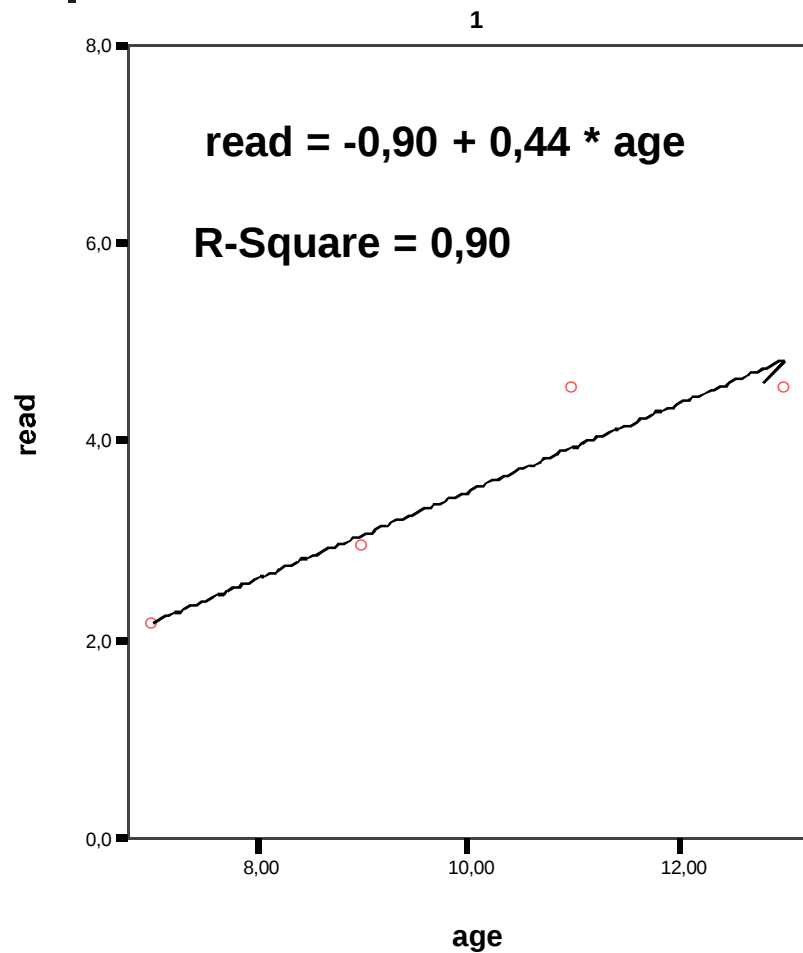
/y=var(read) type=scale

/panel=var(subjid)

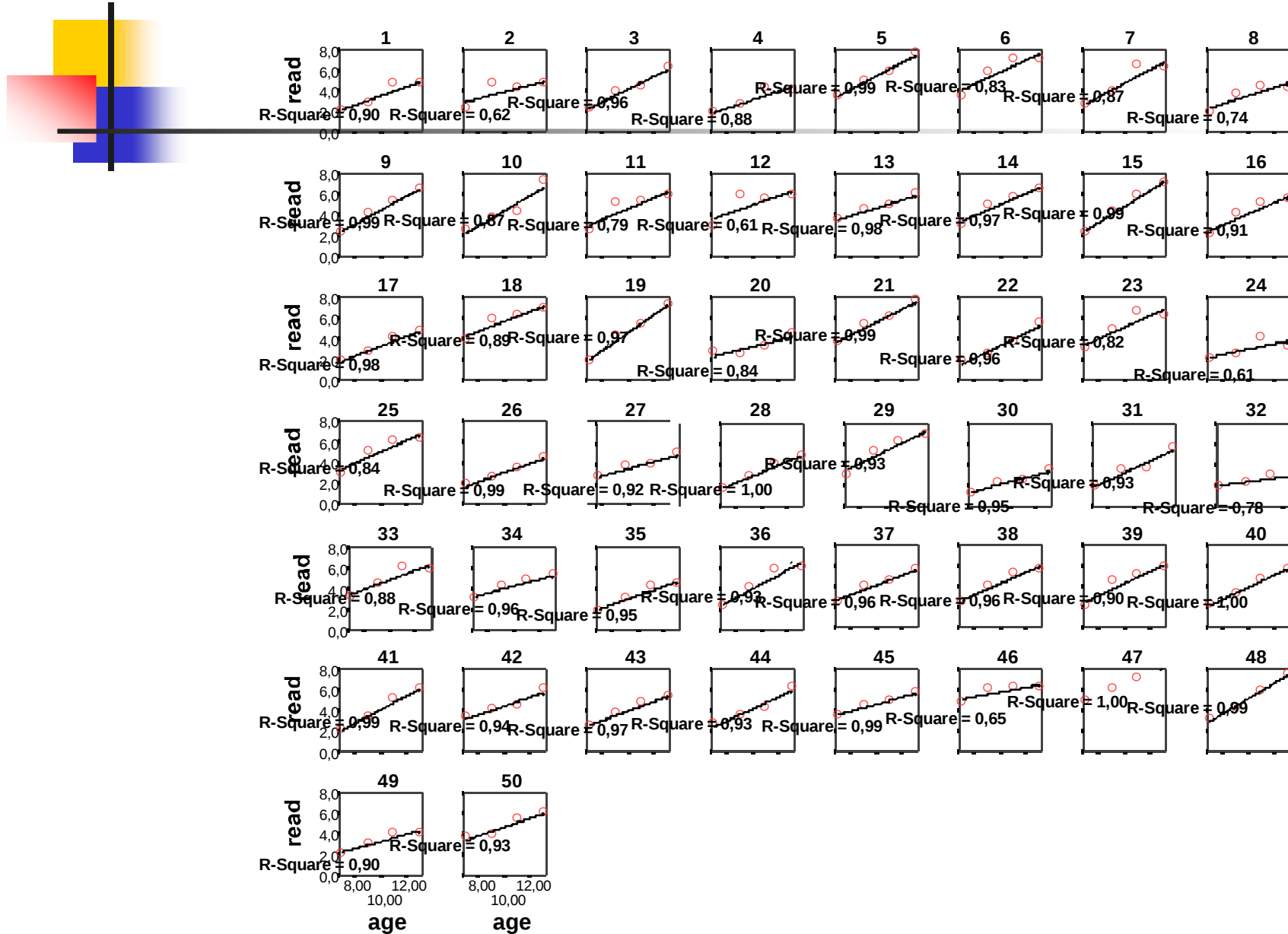
/fitline method=regression linear line=total spike=off

/scalerange=var(read) min=0 max=8

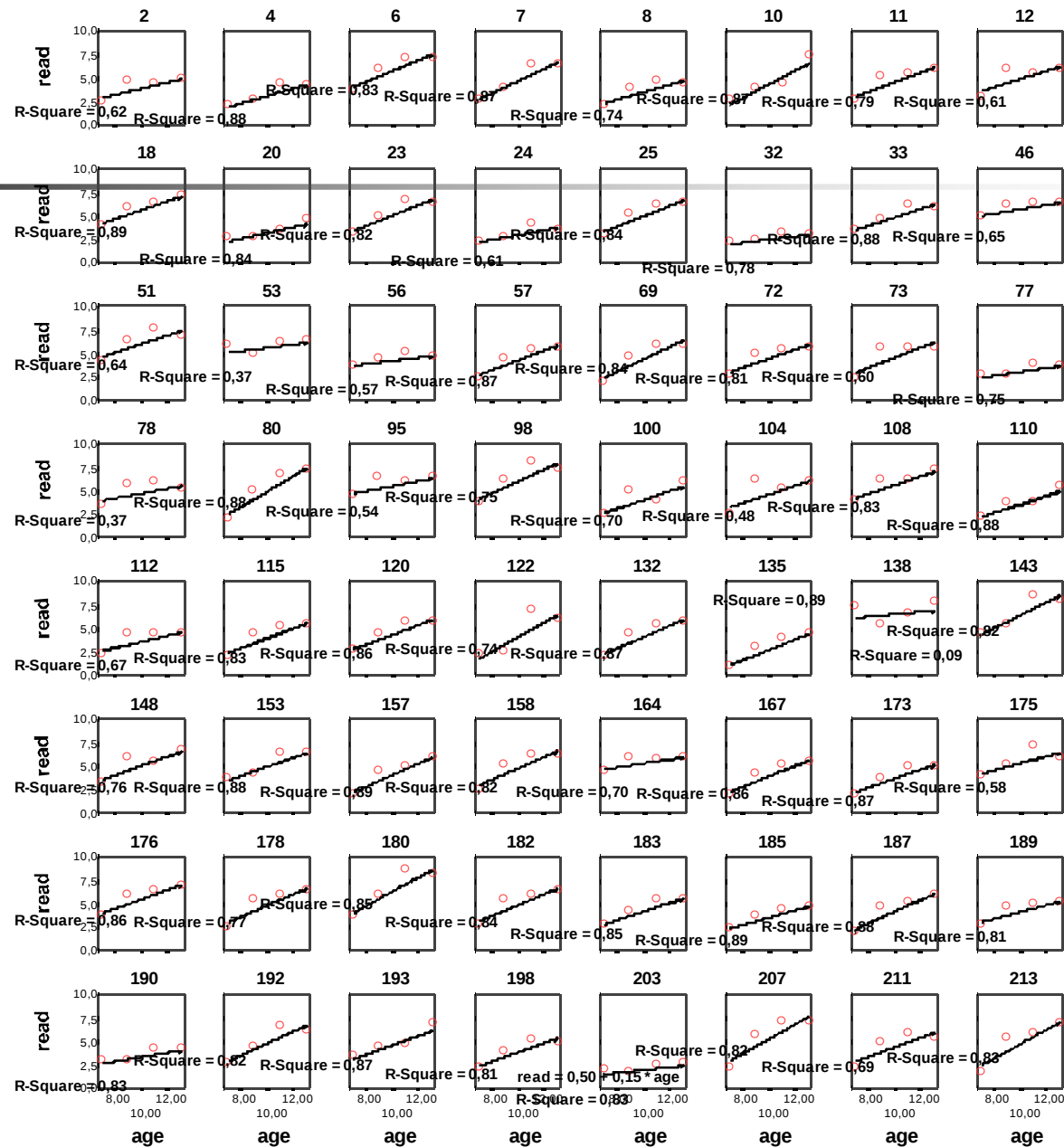
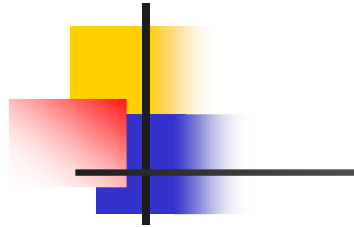
/scatter.



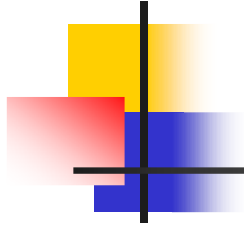
Ajustement linéaire individuelle



Graphiques des sujets non linéaires



Modèle de régression



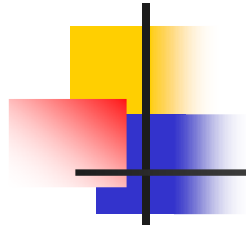
Modèle de régression (N=221)

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-1,075	,166		-6,494	,000
age	,542	,016	,749	33,557	,000

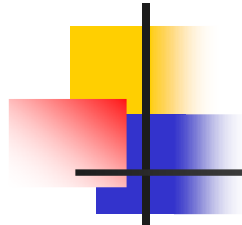
a. Dependent Variable: read1

Régressions individuelles

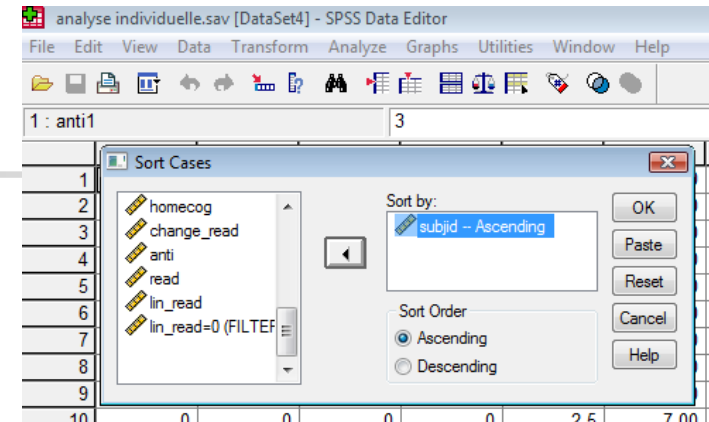


gen	homecog	subjid	change_re ad	anti	read	age
1	9	1	,00	3	2,1	7,00
0	9	2	,00	0	2,3	7,00
0	10	3	1,00	1	2,3	7,00
1	8	4	,00	3	1,8	7,00
1	10	5	1,00	5	3,5	7,00
0	9	6	,00	1	3,5	7,00
1	6	7	,00	2	2,6	7,00
1	7	8	8,00	0	1,8	7,00

Régressions individuelles

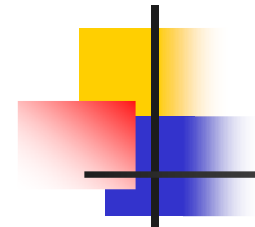


sort cases by subjid.
split file by subjid.
regress /dep=read /meth=enter age.
split file off.



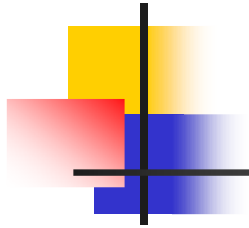
gen	homecog	subjid	change_re ad	anti	read	age
1	9	1	,00	3	2,1	7,00
.	.	1	.	6	2,9	9,00
.	.	1	.	4	4,5	11,00
.	.	1	.	5	4,5	13,00
0	9	2	,00	0	2,3	7,00
.	.	2	.	2	4,5	9,00
.	.	2	.	0	4,2	11,00
.	.	2	.	1	4,6	13,00
0	10	3	1,00	1	2,3	7,00
.	.	3	.	1	3,8	9,00
.	.	3	.	2	4,3	11,00
.	.	3	.	1	6,2	13,00

Régressions individuelles

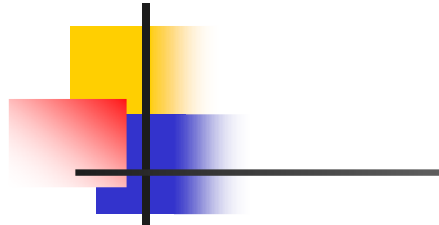


Coefficients^{a,b}

			A	B	C	D	E
Sujet 1				2,1	2,9	4,5	4,5
Sujet 2				2,3	4,5	4,2	4,6
Sujet 3				2,3	3,8	4,3	6,2
2	1	(Constant)		,000	1,863		,322
		age		,330	,182	,789	1,815
3	1	(Constant)		-1,950	,928		-2,102
		age		,610	,091	,979	6,736
		Total		1,110	3		



et nomothétique



Correlations

		read1	read2	read3	read4
read1	Pearson Correlation	1	,620**	,533**	,459**
	Sig. (2-tailed)		,000	,000	,000
	N	221	221	221	221
read2	Pearson Correlation	,620**	1	,807**	,752**
	Sig. (2-tailed)	,000		,000	,000
	N	221	221	221	221
read3	Pearson Correlation	,533**	,807**	1	,816**
	Sig. (2-tailed)	,000	,000		,000
	N	221	221	221	221
read4	Pearson Correlation	,459**	,752**	,816**	1
	Sig. (2-tailed)	,000	,000	,000	
	N	221	221	221	221

** . Correlation is significant at the 0.01 level (2-tailed).

N = 221

Correlations

		read1	read2	read3	read4
read1	Pearson Correlation	1	,707**	,548**	,492**
	Sig. (2-tailed)		,000	,000	,000
	N	161	161	161	161
read2	Pearson Correlation	,707**	1	,857**	,847**
	Sig. (2-tailed)	,000		,000	,000
	N	161	161	161	161
read3	Pearson Correlation	,548**	,857**	1	,882**
	Sig. (2-tailed)	,000	,000		,000
	N	161	161	161	161
read4	Pearson Correlation	,492**	,847**	,882**	1
	Sig. (2-tailed)	,000	,000	,000	
	N	161	161	161	161

** . Correlation is significant at the 0.01 level (2-tailed).

Changement (β ind = S)

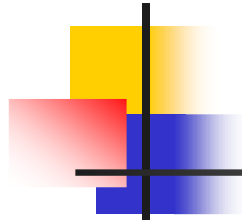
Correlations

		read1	read2	read3	read4
read1	Pearson Correlation	1	,444**	,470**	,466**
	Sig. (2-tailed)		,000	,000	,000
	N	59	59	59	59
read2	Pearson Correlation	,444**	1	,691**	,743**
	Sig. (2-tailed)	,000		,000	,000
	N	59	59	59	59
read3	Pearson Correlation	,470**	,691**	1	,810**
	Sig. (2-tailed)	,000	,000		,000
	N	59	59	59	59
read4	Pearson Correlation	,466**	,743**	,810**	1
	Sig. (2-tailed)	,000	,000	,000	
	N	59	59	59	59

** . Correlation is significant at the 0.01 level (2-tailed).

Pas de changement (β ind = NS)

Matrices des variances-covariances et des corrélations



Correlations

		read1	read2	read3	read4
read1	Pearson Correlation	1	,620**	,533**	,459**
	Sig. (2-tailed)		,000	,000	,000
	Sum of Squares and Cross-products	170,161	120,452	113,865	108,149
	Covariance	,773	,548	,518	,492
	N	221	221	221	221
read2	Pearson Correlation	,620**	1	,807**	,752**
	Sig. (2-tailed)	,000		,000	,000
	Sum of Squares and Cross-products	120,452	221,735	196,621	202,071
	Covariance	,548	1,008	,894	,919
	N	221	221	221	221
read3	Pearson Correlation	,533**	,807**	1	,816**
	Sig. (2-tailed)	,000	,000		,000
	Sum of Squares and Cross-products	113,865	196,621	267,724	240,955
	Covariance	,518	,894	1,217	1,095
	N	221	221	221	221
read4	Pearson Correlation	,459**	,752**	,816**	1
	Sig. (2-tailed)	,000	,000	,000	
	Sum of Squares and Cross-products	108,149	202,071	240,955	325,608
	Covariance	,492	,919	1,095	1,480
	N	221	221	221	221

** . Correlation is significant at the 0.01 level (2-tailed).

Correlations

		read1	read2	read3	read4
read1	Pearson Correlation	1	,485**	,506**	,521**
	Sig. (2-tailed)		,000	,000	,000
	Sum of Squares and Cross-products	71,184	35,684	41,546	39,928
	Covariance	1,130	,566	,659	,634
	N	64	64	64	64
read2	Pearson Correlation	,485**	1	,687**	,747**
	Sig. (2-tailed)	,000		,000	,000
	Sum of Squares and Cross-products	35,684	76,124	58,321	59,243
	Covariance	,566	1,208	,926	,940
	N	64	64	64	64
read3	Pearson Correlation	,506**	,687**	1	,810**
	Sig. (2-tailed)	,000	,000		,000
	Sum of Squares and Cross-products	41,546	58,321	94,767	71,664
	Covariance	,659	,926	1,504	1,138
	N	64	64	64	64
read4	Pearson Correlation	,521**	,747**	,810**	1
	Sig. (2-tailed)	,000	,000	,000	
	Sum of Squares and Cross-products	39,928	59,243	71,664	82,630
	Covariance	,634	,940	1,138	1,312
	N	64	64	64	64

** . Correlation is significant at the 0.01 level (2-tailed).

Correlations

		read1	read2	read3	read4
read1	Pearson Correlation	1	,694**	,532**	,475**
	Sig. (2-tailed)		,000	,000	,000
	Sum of Squares and Cross-products	95,397	77,145	66,155	71,841
	Covariance	,612	,495	,424	,461
	N	157	157	157	157
read2	Pearson Correlation	,694**	1	,864**	,856**
	Sig. (2-tailed)	,000		,000	,000
	Sum of Squares and Cross-products	77,145	129,381	125,174	150,537
	Covariance	,495	,829	,802	,965
	N	157	157	157	157
read3	Pearson Correlation	,532**	,864**	1	,891**
	Sig. (2-tailed)	,000	,000		,000
	Sum of Squares and Cross-products	66,155	125,174	162,343	175,526
	Covariance	,424	,802	1,041	1,125
	N	157	157	157	157
read4	Pearson Correlation	,475**	,856**	,891**	1
	Sig. (2-tailed)	,000	,000	,000	
	Sum of Squares and Cross-products	71,841	150,537	175,526	239,316
	Covariance	,461	,965	1,125	1,534
	N	157	157	157	157

** . Correlation is significant at the 0.01 level (2-tailed).

Échantillon complet

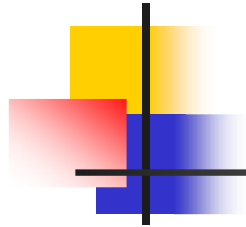
sujets « non linéaires »

« sujets linéaires »

29%

$R^2 < 0,90$

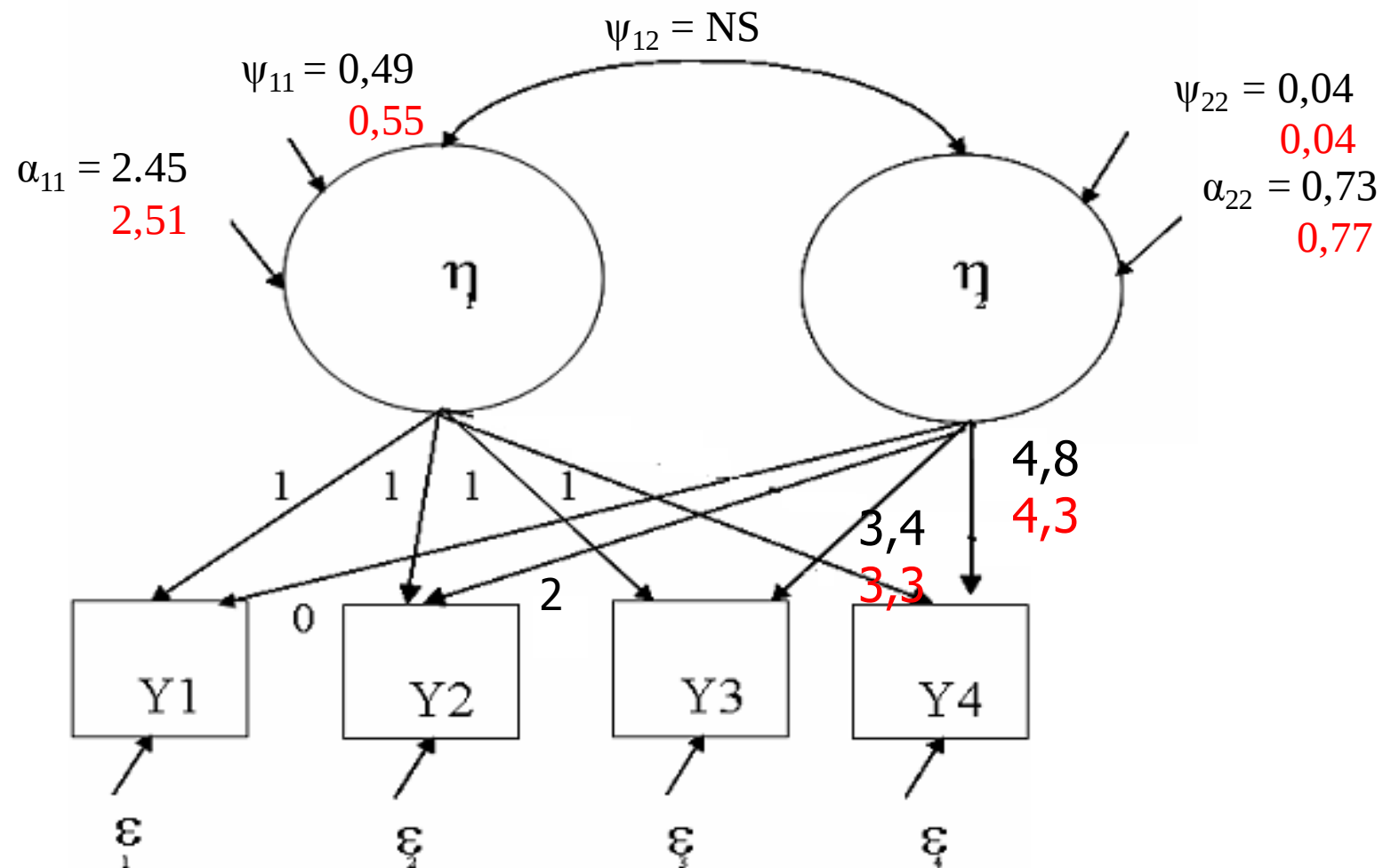
Indices d'ajustement des modèles en croissance latente estimés (sujets « linéaires »)

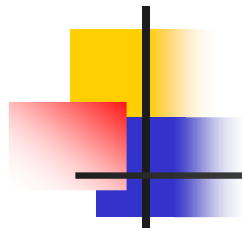


MODELE LINEAIRE	MODELE QUADRATIQUE	MODELE NON LINEAIRE
$\chi^2(5) = 81,79, P=0,0$	Pas de convergence	$\chi^2(3) = 1,90, P=0,01$
AIC = 82,13		AIC = 32,01
NNFI = 0,85		NNFI = 0,97
RMRS = 0,10		RMRS = 0,06
GFI = 0,95		GFI = 0,97

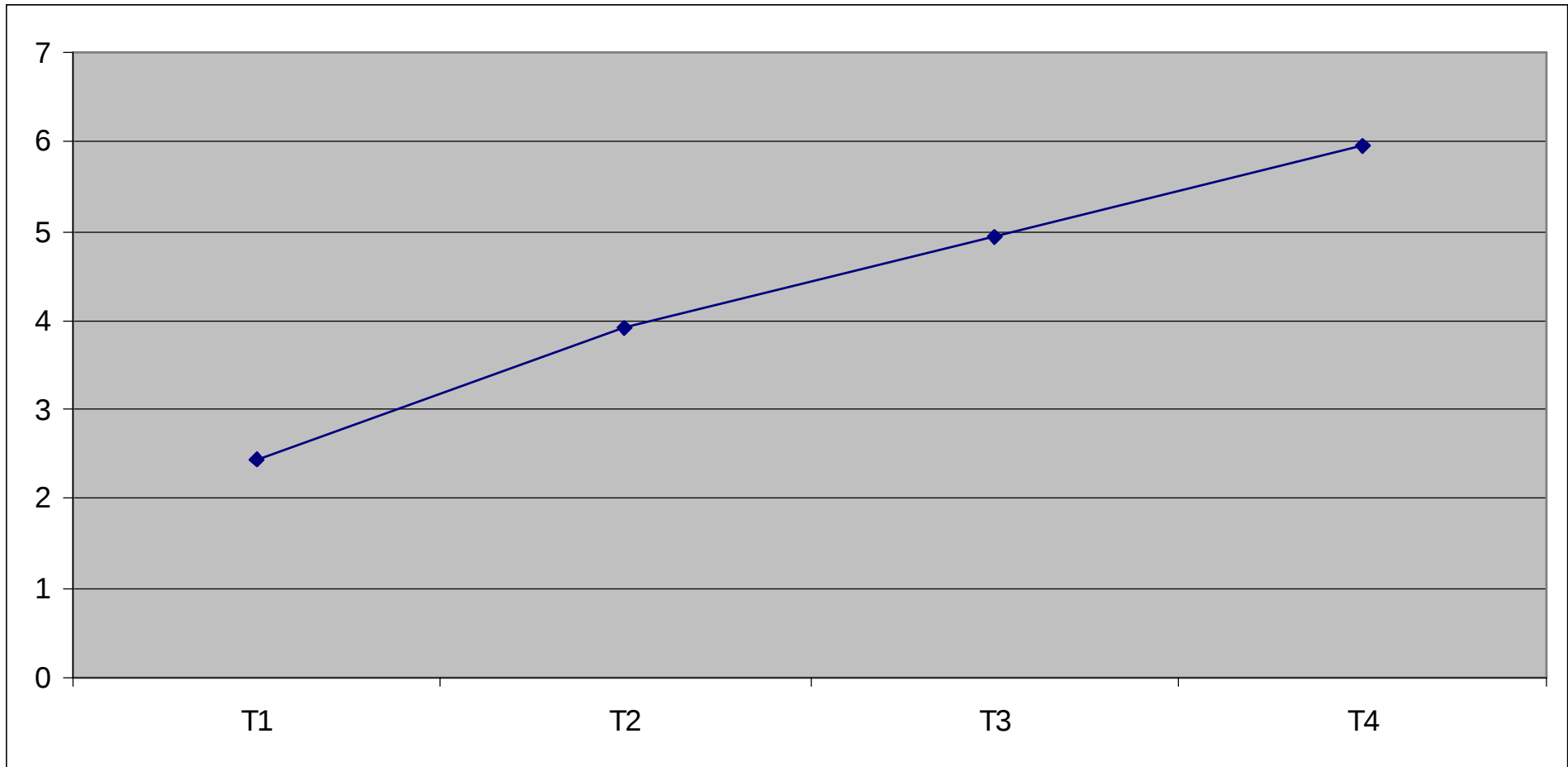
Représentation graphique du modèle non linéaire pour les sujets « linéaires »

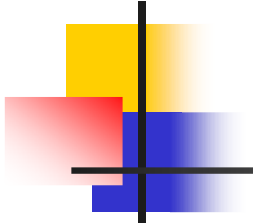
En rouge, N=221





Représentation graphique du modèle non linéaire des sujets « linéaires »





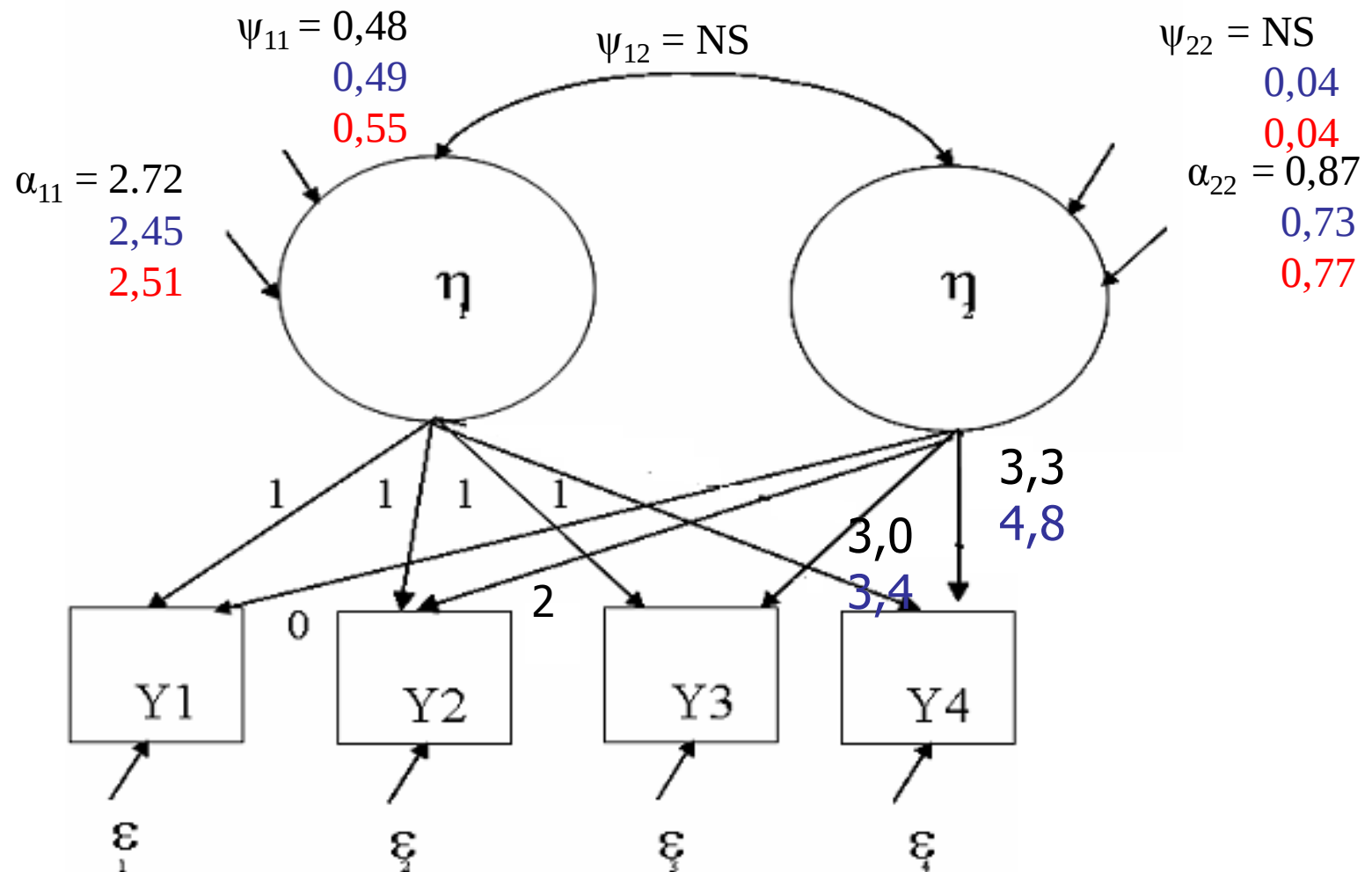
Indices d'ajustement des modèles en croissance latente estimés (sujets « non linéaires »)

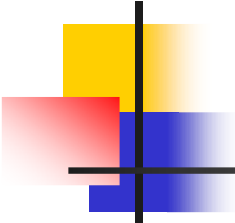
MODELE LINEAIRE	MODELE QUADRATIQUE	MODELE NON LINEAIRE
$\chi^2(5) = 67,06, p=0,0$	PAS DE CONVERGENCE	$\chi^2(3) = 0,19, P = 0,98$
AIC = 76,55		AIC = 22,20
NNFI = 0,46		NNFI = 1,04
RMRS = 0,09		RMRS = 0,01
GFI = 0,89		GFI = 1,00

Représentation graphique du modèle non linéaire pour les sujets « non linéaires »

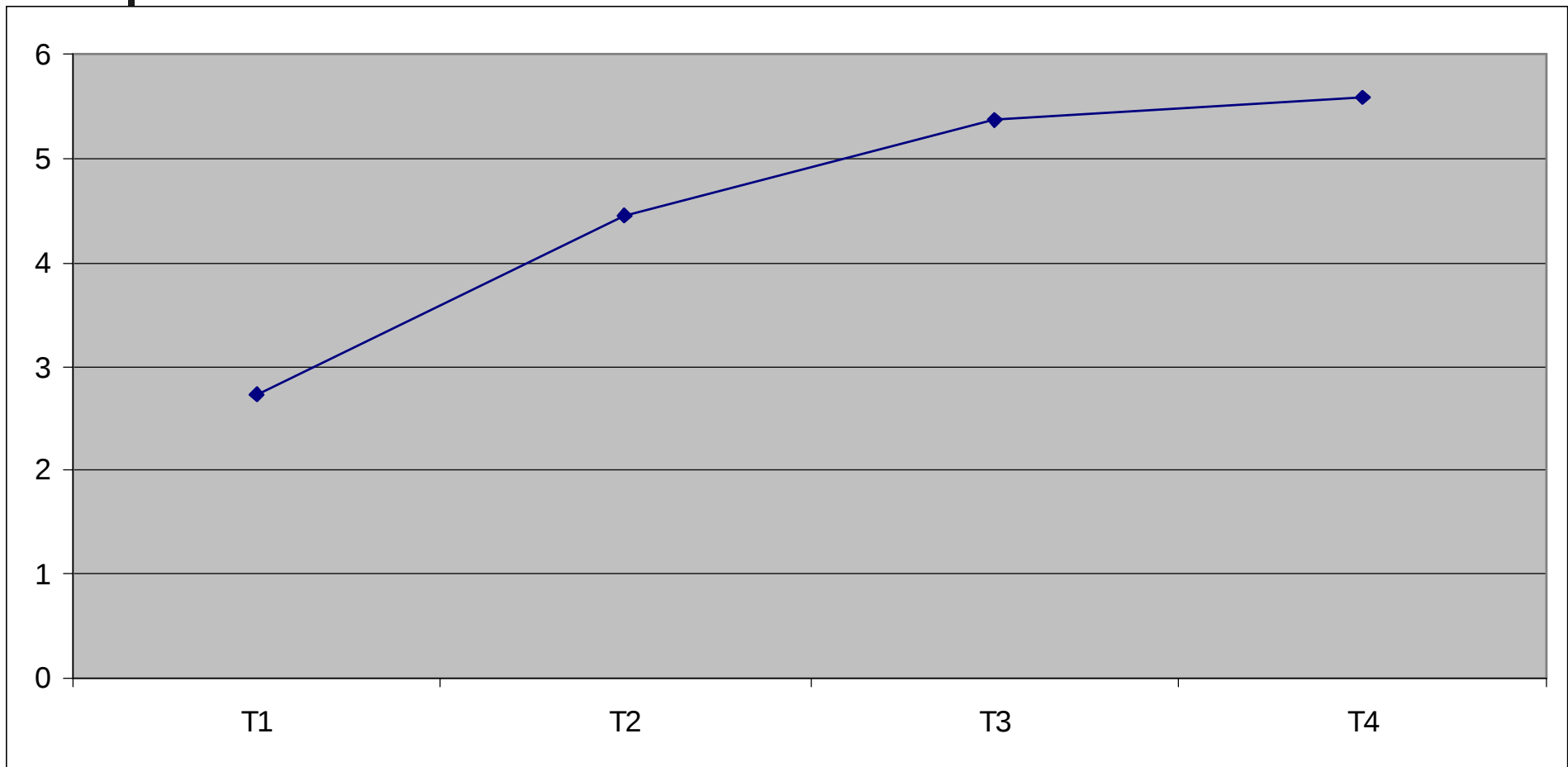
En bleu = « linéaire »

En rouge, N=221





Représentation graphique du modèle non linéaire des sujets « non linéaires »



Conclusion

Tentative de partir des données individuelles (idiographie) pour aller vers des paramètres de groupe (nomothétie)

Le critère R^2 de 0,90 est sans doute trop « faible » (NS)

Le caractère exploratoire rend difficile les prises de décision

La difficile extrapolation étant donné la perte importante de sujets (de 405 à 221)

Pour R , consulter :

<http://www.springerlink.com/content/e27p2584387532g8/?p=d31c3f43a44546ee91350625fe68e4e1&pi=2>, pp. 1–17.

