

Nevertheless, we identified interesting differences in gender distribution. Particularly, Cluster 1 was mainly composed by females (72.7%), while Cluster 2 consisted of a majority of males (65.8%). This difference in gender distribution was statistically significant ($\chi^2=8.28$; $df=1$; $p=0.004$), so the rest of comparisons between these two groups were adjusted for gender by means of analyses of covariance. Such analyses²⁷ revealed a trend to worse overall spatial memory accuracy ($p=0.126$), more perseverative responses ($p=0.060$) and failures to maintain the set ($p=0.019$) in the WCST, and a trend to higher scores on borderline personality ($p=0.108$) in Cluster 1. Additionally, a trend to Cluster 2 to have more mixed-handed subjects ($p=0.135$) and Cluster 1 to show a lower birth weight ($p=0.053$) was observed.

✍ Statistical analyses

We performed analyses of covariance with dummy variables for Cluster 1 and Cluster 2 (both in reference to Cluster 3) as independent variables, and Phase III measures as dependent variables. These analyses were adjusted for gender, as can be seen in the following table:

	Status	Scale
<i>Attentional development cluster</i>	Independent	Categorical (k=3)
<i>Gender</i>	Control	Categorical (k=2)
<i>CPT-IP</i>	Dependent	Quantitative
<i>WCST</i>	Dependent	Quantitative
<i>SCWT</i>	Dependent	Quantitative
<i>FAS/Animal Naming</i>	Dependent	Quantitative
<i>CVLT</i>	Dependent	Quantitative
<i>Spatial Working Memory</i>	Dependent	Quantitative
<i>Finger Tapping</i>	Dependent	Quantitative
<i>Annett scale</i>	Dependent	Categorical (k=2) Quantitative
<i>NSS</i>	Dependent	Quantitative
<i>Observational assessment</i>	Dependent	Quantitative
<i>O-LIFE</i>	Dependent	Quantitative
<i>SCID-II</i>	Dependent Control	Quantitative
<i>DOIs</i>	Dependent	Quantitative
<i>Life Events scale</i>	Dependent	Quantitative
<i>COPE</i>	Dependent	Quantitative
<i>SCID-I</i>	Dependent	Categorical (k=2)
<i>PAS</i>	Dependent	Quantitative
<i>PSAS</i>	Dependent	Quantitative
<i>Prenatal & Birth Complications</i>	Dependent	Categorical (k=2) Quantitative

²⁷ After adjustment for gender

2.2.2 Developmental clusters description: Sociodemographics

Analyses of variance (ANOVA) with post-hoc Scheffé comparisons were performed between the three clusters and age, education, and intelligence. The result is offered in Table 4.28.

Table 4.28 Sociodemographic features of the developmental clusters: ANOVA comparison

	Cluster 1 \bar{x} ; SD	Cluster 2 \bar{x} ; SD	Cluster 3 \bar{x} ; SD	F; p
Age	22.00 (0.98)	21.92 (0.97)	22.25 (1.28)	0.354; 0.703
Education	12.64 (2.08)	12.79 (2.18)	12.38 (2.07)	0.135; 0.874
Raven	45.23 (6.19)	47.63 (5.14)	43.50 (6.70)	2.402; 0.099

No statistically significant differences were observed on age or education level. In view of the trend to statistical significance on Raven scores, Scheffé post-hoc comparisons revealed that the difference between Cluster 2 and 3 tended to statistical significance ($p=0.182$; 95%CI= -1.41 to 9.67) in favour of the Cluster 2.

Gender distribution by cluster and results of chi-square tests are showed in the following table.

Table 4.29 Gender distribution by cluster: Chi-square tests

	Cluster 1	Cluster 2	Cluster 3	χ^2 ; p
Male	6 (27.3%)*	25 (65.8%)	4 (50%)	8.28; 0.016
Female	16 (72.7%)	13 (34.2%)	4 (50%)	

* Column percentages

As can be seen, Cluster 1 is mainly composed by female (72.7%), while there is predominance of males (65.8%) in Cluster 2. Gender distribution in Cluster 1 and Cluster 2 was statistically different ($p=0.016$). However, no differences on gender distribution were observed in Cluster 3.

2.2.3 Neuropsychological correlates of the developmental clusters

Analyses of covariance were performed between the developmental clusters and Phase III neuropsychological measures. Due to the imbalance in gender distribution across clusters, we entered sex as a covariate. Given that we had an independent variable with $k=3$ categories, we created two "dummy" (fictitious) variables that were always entered together in the analyses. Because of its small size (perhaps indicating a

greater difference from the other two clusters), the group of reference was Cluster 3, as can be seen in the following table.

Table 4.30 Value of "dummy" variables entered in the analyses of covariance

	Dummy 1 Cluster 1 vs Cluster 3	Dummy 2 Cluster 2 vs Cluster 3
Cluster 1	1	0
Cluster 2	0	1
Cluster 3	0	0

⌘ *Attentional measures*

Mean and standard deviations by cluster, as well as statistically significant and trend differences resulting from the analysis of covariance are presented in Table 4.31 (next page). These analyses revealed that the developmental clusters differed mainly on spatial sustained attention. At a statistically significant level, Cluster 3 committed more omission errors than Clusters 1 ($p=0.005$) and 2 ($p=0.036$), more distraction errors than Cluster 2 ($p=0.018$), and obtained a lower spatial d' than Cluster 1 ($p=0.039$) and Cluster 2 ($p=0.026$). At a trend level, Cluster 3 tended to commit more distraction errors than Cluster 1 ($p=0.059$) and more commission errors than Cluster 2 ($p=0.155$).

In the verbal condition, Cluster 3 subjects tended to commit more omission errors ($p=0.161$) than Cluster 1 and to be more rapid than Cluster 2 ($p=0.111$). Interestingly, the pattern of reaction time across clusters reversed in the spatial condition (Cluster 3 was the slowest), but no statistically significant nor trend differences were reached.

Concerning the mean verbal/spatial d' , Clusters 1 and 2 obtained exactly the same score and differed at a trend level from Cluster 3 ($p=0.069$, $p=0.138$, respectively) showing a better performance.

Table 4.31 Developmental clusters and Phase III attentional performance: Analysis of covariance

		Cluster 1 \bar{x} ; SD	Cluster 2 \bar{x} ; SD	Cluster 3 \bar{x} ; SD	Dummy 1 d; p; 95%CI*	Dummy 2 d; p; 95%CI*
Verbal CPT-IP	Omission errors	4.09; 3.31	4.42; 3.06	6.13; 7.66	-2.30; 0.161 -5.54 to 0.94	NS
	Commission errors	0.86; 1.28	0.76; 1.00	1.00; 1.31	NS	NS
	Distraction errors	0.41; 1.05	0.16; 0.55	0.63; 1.77	NS	NS
	Reaction time	546.43; 67.05	542.23; 69.76	499.86; 59.28	NS	44.40; 0.111 -10.50 to 99.29
	d' numbers	3.26; 0.82	3.15; 0.59	2.96; 1.13	NS	NS
	? numbers	4.58; 3.58	5.37; 3.96	4.47; 4.30	NS	NS
Spatial	Omission errors	4.73; 2.69	5.00; 3.32	8.25; 6.32	-4.11; 0.005 -6.94 to -1.27	-2.84; 0.036 -5.50 to -0.18

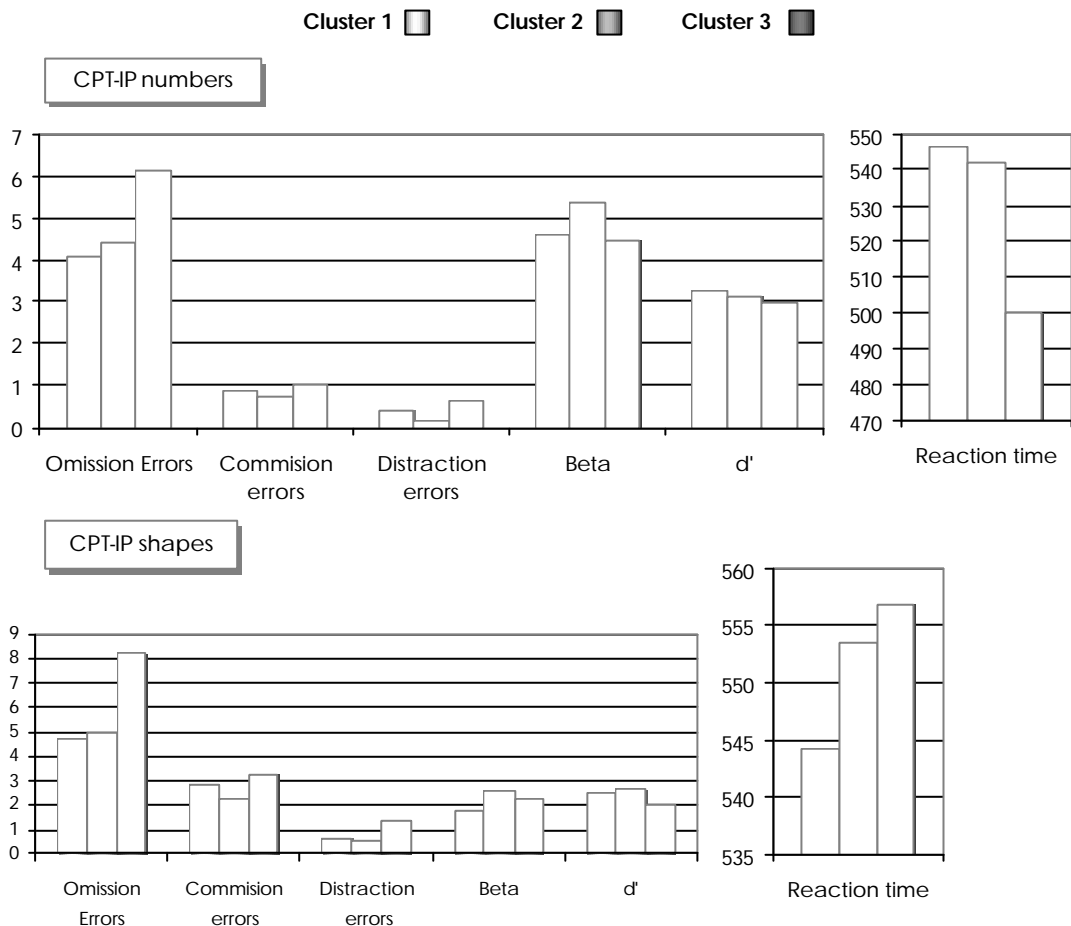
Commission errors	2.86; 1.98	2.24; 1.55	3.25; 2.25	NS	-1.01; 0.155 -2.42 to 0.39
Distraction errors	0.64; 0.95	0.55; 0.79	1.38; 1.06	-0.71; 0.059 -1.45 to 0.03	-0.84; 0.018 -1.53 to -0.15
Reaction time	544.14; 46.84	553.57; 71.95	556.86; 48.30	NS	NS
d' shapes	2.52; 0.67	2.62; 0.63	2.02; 0.56	0.56; 0.039 0.03 to 1.09	0.56; 0.026 0.07 to 1.06
β shapes	1.81; 1.07	2.54; 1.88	2.23; 1.51	NS	NS
Mean d'	2.89; 0.67	2.89; 0.53	2.49; 0.80	0.46; 0.069 -0.04 to 0.96	0.35; 0.138 -0.12 to 0.82

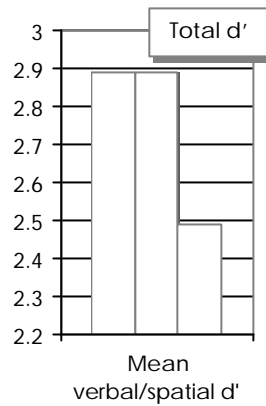
Abbreviations: "d": difference; "p": significance of the difference; "95%CI": 95% confidence interval of the difference.

*Parameters adjusted for gender

Figure 4.6 displays a graphic representation of CPT-IP scores by cluster.

Figure 4.6 Phase III attentional performance by cluster





Executive functioning

Table 4.32 displays the results of analyses of covariance between the developmental clusters and executive functioning tests.

Table 4.32 Developmental clusters and Phase III executive performance: Analysis of covariance

		Cluster 1 \bar{x} ; SD	Cluster 2 \bar{x} ; SD	Cluster 3 \bar{x} ; SD	Dummy 1 d; p; 95%CI*	Dummy 2 d; p; 95%CI*
WCST	Errors	13.86; 7.60	11.74; 4.64	14.25; 8.48	NS	NS
	Perseverat.	8.18; 5.34	5.68; 2.29	5.88; 2.70	2.05; 0.175 -0.94 to 5.04	NS
	PE	7.14; 4.29	5.39; 1.94	5.63; 2.45	NS	NS
	NPE	6.73; 4.85	6.34; 3.71	8.63; 6.25	NS	-2.34; 0.185 -5.83 to 1.15
	CLR	46.32; 10.24	49.68; 6.66	44.25; 14.34	NS	5.32; 0.141 -1.82 to 12.45
	Categories	3.91; 1.15	3.92; 1.07	3.50; 1.41	NS	NS
	Trials	11.45; 1.84	11.29; 1.09	15.38; 10.39	-3.65; 0.019 -6.69 to -0.62	-4.27; 0.004 -7.12 to -1.42
	FMS	0.09; 0.29	0.55; 0.76	0.38; 0.74	NS	NS
SCWT	# W-C	46.91; 11.27	46.89; 8.68	42.25; 11.92	NS	NS
	Interference	4.75; 9.05	3.85; 6.65	-0.19; 6.97	5.27; 0.101 -1.05 to 11.59	NS
VF	F.A.S.	38.00; 8.20	39.32; 11.65	42.50; 9.91	NS	NS
	AN	20.45; 6.04	20.87; 4.53	23.13; 6.31	NS	NS

Abbreviations. "d": difference; "p": significance of the difference; "95%CI": 95% confidence interval of the difference. "Persever.": perseverative responses; "PE": perseverative errors; "NPE": non perseverative errors; "CLR": conceptual level responses; "FMS": failures to maintain the set. "#W-C": number of word-colour items correctly named in the SCWT interference task; "AN": Animal Naming; "VF": verbal fluencies.

*Parameters adjusted for gender

As can be seen in Table 4.32, Cluster 3 required a statistically significant higher number of trials to complete the first category in the WCST, as compared to Clusters 1 (p=0.019) and 2 (p=0.004). Cluster 3 also showed a trend to commit more non perseverative errors than Cluster 2 (p=0.185), but less perseverative responses (p=0.175) than Cluster 1. Finally, Cluster 2 tended to show a higher number of conceptual level responses (p=0.141).

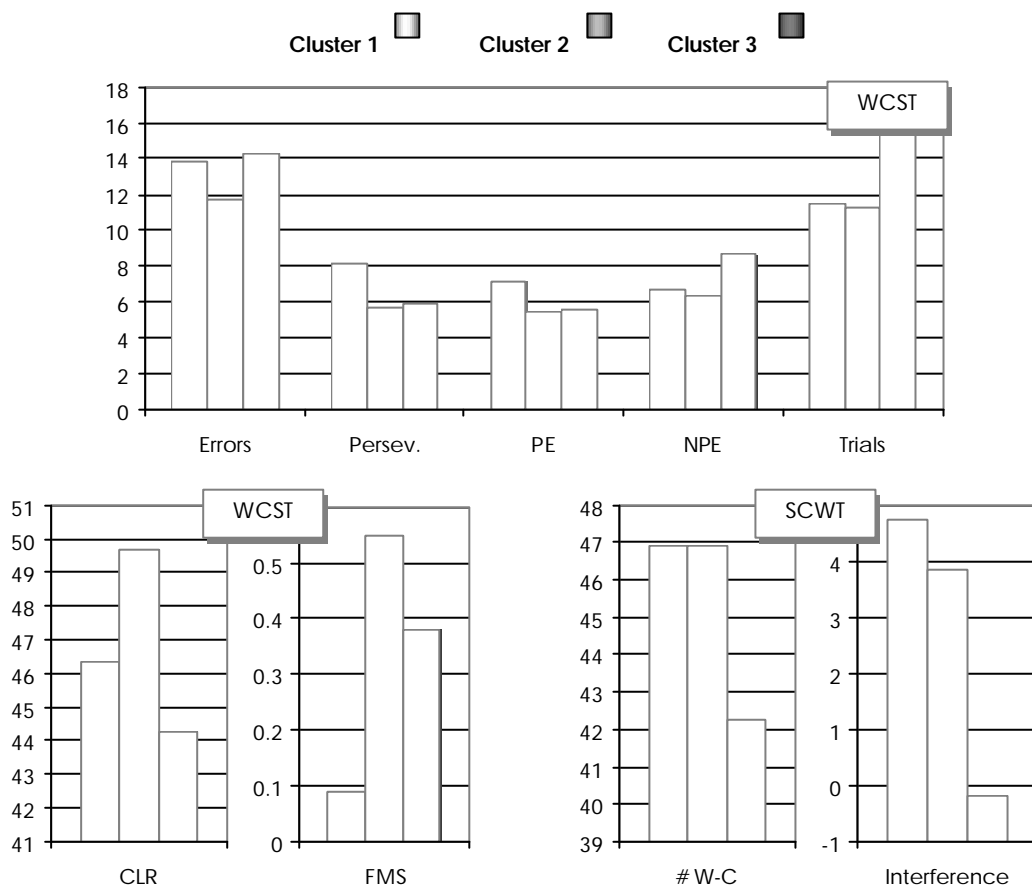
In the SCWT, only Cluster 1 exhibited a trend to more inhibitory control than Cluster 3 ($p=0.101$).

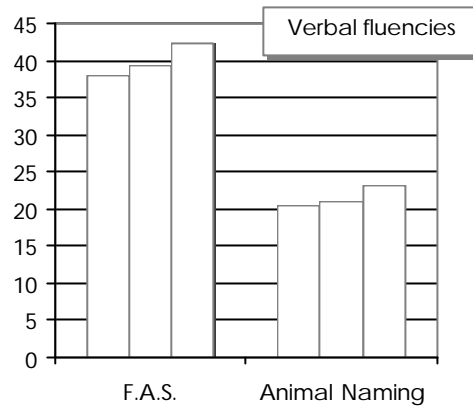
No statistically significant differences among clusters appeared on verbal fluency tests, though a non-significant higher semantic and phonetic verbal fluency was systematically observed in Cluster 3 subjects.

The graphic representation of these cluster differences is offered in

Figure 4.7.

Figure 4.7 Phase III executive functioning by cluster





Memory performance

Table 4.33 shows the results of the analyses of covariance between the developmental clusters and memory tests. Given the large amount of indices provided by the CVLT, only those yielding statistically significant or relevant trend differences among groups are showed.

Table 4.33 Developmental clusters and Phase III memory performance: Analyses of covariance

		Cluster 1 \bar{x} ; SD	Cluster 2 \bar{x} ; SD	Cluster 3 \bar{x} ; SD	Dummy 1 d; p; 95%CI*	Dummy 2 d; p; 95%CI*
CVLT	Slope	1.31; 0.56	1.35; 0.51	1.66; 0.74	-0.36; 0.129 -0.83 to 0.11	-0.30; 0.174 -0.74 to 0.14
	Perseverat. (total)	5.59; 4.46	5.68; 4.69	9.75; 4.10	-3.92; 0.043 -7.73 to -0.12	-4.23; 0.021 -7.79 to -0.66
SWM	% overall accuracy	64.49; 16.94	70.90; 10.73	55.02; 14.97	9.78; 0.089 -1.55 to 21.11	15.66; 0.004 5.04 to 26.29
	% left accuracy	56.16; 21.78	63.10; 19.42	43.22; 25.68	14.50; 0.100 -2.87 to 31.87	18.79; 0.024 2.50 to 35.08
	% right accuracy	75.05; 23.36	79.64; 12.90	66.01; 18.70	NS	14.61; 0.036 0.97 to 28.24

Abbreviations. "%corr. recall midd. region": % of correct recall in the middle region; "Perseverat. total": total number of perseverative responses; "SWM": spatial working memory.

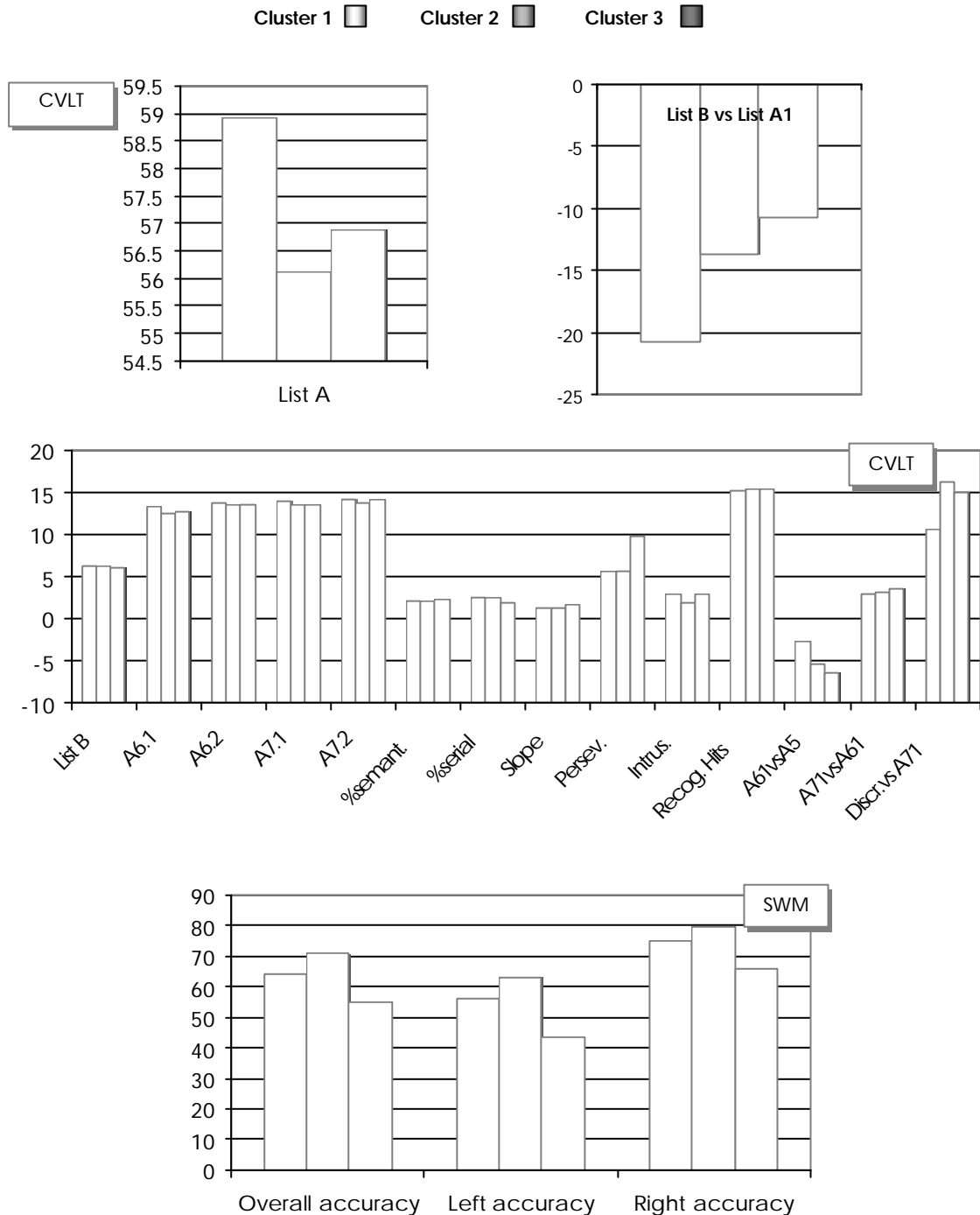
*Parameters adjusted for gender.

Concerning verbal memory, Cluster 3 tended to show a steeper slope than Cluster 1 (p=0.129) and Cluster 2 (p=0.174). Cluster 3 also showed a statistically significant higher number of perseverations than Cluster 1 (p=0.043) and 2 (p=0.021).

The strongest differences, however, appeared on spatial working memory. Cluster 3 displayed a systematically poorer performance on all indices. This cluster exhibited a worse performance than Cluster 2 at a statistically significant level (overall accuracy: p=0.004; left accuracy: p=0.024; right accuracy: p=0.036), while non-significant trends appeared in relation to Cluster 1 (overall accuracy: p=0.089; left accuracy: p=0.100).

Figure 4.8 presents a graphic representation of all CVLT and spatial working memory indices.

Figure 4.8 Phase III memory performance by cluster



2.2.4 Neurodevelopmental correlates

Analyses of covariance were performed with the three developmental clusters as independent variables and quantitative neurodevelopmental / neurointegrative

indices (Finger Tapping, NSS, total Annett score, birth weight and pregnancy duration). Again, we used gender as a covariate and applied dummy variables, as described in the previous point. The categorical consideration of laterality (strong-mixed) was analysed by means of a logistic regression analysis adjusted for gender (backward method) in order to determine the influence of cluster pertinence in handedness. A chi-square test was also performed in order to determine if the differences in handedness distribution were statistically significant. Chi-square tests were also applied for categorical PBCs indices (complications during pregnancy and delivery) by cluster. Table 4.34 shows the results of the analyses of covariance.

Table 4.34 Developmental clusters and neurodevelopmental correlates: Analysis of covariance

		Cluster 1 \bar{x} ; SD	Cluster 2 \bar{x} ; SD	Cluster 3 \bar{x} ; SD	Dummy 1 d; p; 95%CI*	Dummy 2 d; p; 95%CI*
FT	Left	4.06; 0.66	4.48; 0.81	3.98; 0.56	NS	0.43; 0.130 -0.13 to 0.98
	Right	4.59; 0.88	4.92; 1.15	4.57; 0.67	NS	NS
NSS	Total	2.95; 4.43	1.87; 1.96	2.75; 3.15	NS	NS
Annett	Total sum	19.77; 10.16	20.11; 7.13	25.12; 13.78	NS	-5.38; 0.137 -12.52 to 1.76
PBCs	Pre.Dur.	8.91; 0.36	9.01; 0.18	9.02; 0.06	NS	NS
	Birth weight	3.23; 0.36	3.55; 0.48	2.89; 0.76	0.36; 0.139 -0.12 to 0.83	0.66; 0.008 0.18 to 1.13

Abbreviations. Pre.Dur.: Pregnancy duration

*Parameters adjusted for gender.

Sample size. FT: Cluster 1: n=; Cluster 2: n=; Cluster 3: n=; Annett: Cluster 1: n=; Cluster 2: n=; Cluster 3: n=; PBCs: Cluster 1: n=17; Cluster 2: n=17; Cluster 3: n=6

As can be observed, Cluster 3 tended to exhibit a slower left hand speed than Cluster 2 ($p=0.130$) and a higher total score on laterality in the Annett scale ($p=0.137$), indicating more mixed handedness. As well, it is noticeable the statistically significant difference on birth weight between Cluster 2 and Cluster 3 ($p=0.008$), and to a lesser degree between Cluster 1 and Cluster 3 ($p=0.139$), indicating that Cluster 3 subjects showed a significantly lower birth weight with respect to the other clusters.

The results of the logistic regression analysis with the developmental clusters and categorically-measured handedness (strong-mixed), as well as those of chi-square tests are offered in Table 4.35.

Table 4.35 Developmental clusters and Phase III handedness: Logistic regression analysis and Chi-square tests

	Cluster 1	Cluster 2	Cluster 3	Logistic Regression	Chi-square
Strong	17 (77.3%)*	22 (57.9%)	4 (50.0%)	B=0.67; df=1; p=0.105	??=2.93; p=0.231
Mixed	5 (22.7%)	16 (42.1%)	4 (50.0%)		

Abbreviations. "df": degrees of freedom.

*Column percentages

Logistic regression analyses revealed that the influence of the developmental cluster in handedness tended to be statistically significant ($p=0.105$). This result was maintained when the strong left-handed subject mentioned before was drop out of the analysis. Cluster 3 showed the highest representation of mixed-handedness (50%), followed by Cluster 2 (42.1%) and Cluster 1 (22.7%). Chi-square tests, however, did not detect a statistically significant or trend difference in the general distribution of handedness by cluster. However, when the percentage of mixed handedness was compared by pairs of clusters (by chi-square tests), the difference between Cluster 1 and Cluster 3, and between Cluster 1 and Cluster 2 tended to be significant ($p=0.149$; $p=0.129$, respectively).

Concerning categorical PBC indices, Table 4.36 displays the results of chi-square tests.

Table 4.36 Developmental clusters and PBCs: Chi-square tests

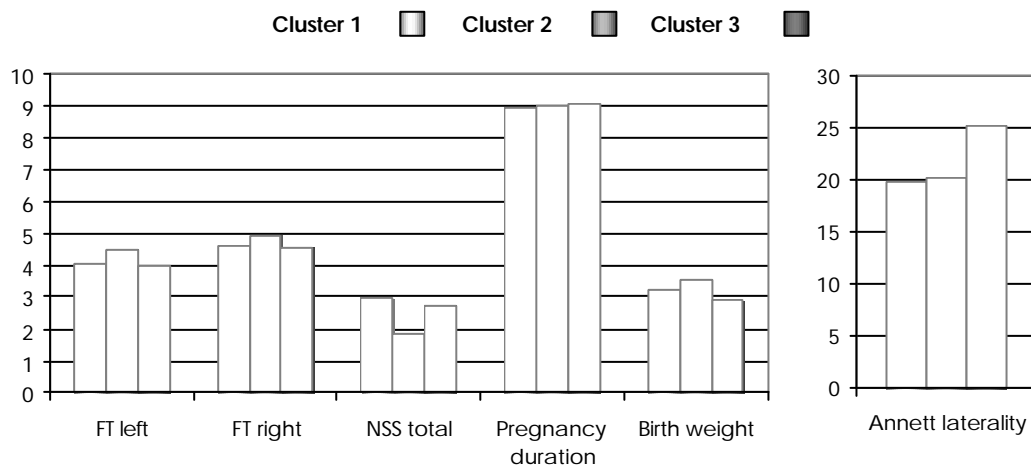
		Cluster 1	Cluster 2	Cluster 3	Chi-square test
Complications during pregnancy	Yes	n=1 (5.9%)*	n=1(5.9%)	n=0 (0.0%)	$\chi^2=0.37$; $p=0.830$
	No	n=16 (94.1%)	n=16 (94.1%)	n=6 (100.0%)	
Complications during delivery	Yes	n=3 (16.7%)	n=2 (11.8%)	n=2 (33.3%)	$\chi^2=1.46$; $p=0.482$
	No	n=15 (83.3%)	n=15 (88.2%)	n=4 (66.7%)	

* Column percentages

As can be seen, no statistically significant nor trend differences were evident, though it is noticeable the visibly higher percentage of delivery complications in Cluster 3 subjects.

The following graphic offers a visual representation of quantitative neurodevelopmental variables by cluster.

Figure 4.9 Phase III neurointegrative performance by cluster



2.2.5 Personality correlates of the developmental clusters

We performed analyses of covariance between the developmental clusters and personality measures (SCID-II, O-LIFE) using dummy variables and gender as a covariate. In addition, we added the total score on the different personality clusters (A, B, C) as covariates.

✦ Axis II personality assessment

We adjusted the analyses for total scores on SCID-II personality clusters other than the one being analysed. For instance, when Cluster A personality disorders (paranoid, schizotypal, schizoid) were analysed, an adjustment for total scores on Cluster B and Cluster C was performed, and the same method was applied to the other personality disorders according to their cluster “membership”. Passive-Aggressive personality disorder and Depressive personality disorder scores were analysed adjusting for Clusters A, B, and C. The adjustment for gender was always made.

Table 4.37 Developmental clusters and Phase III axis II personality: Analyses of covariance

	Cluster 1 \bar{x} ; SD	Cluster 2 \bar{x} ; SD	Cluster 3 \bar{x} ; SD	Dummy 1 d; p; 95%CI*	Dummy 2 d; p; 95%CI*
Avoidant	2.05; 3.29	1.29; 1.87	3.88; 4.05	NS	-1.93; 0.052 -3.88 to 0.01
Dependent	1.95; 2.46	1.08; 1.68	1.88; 2.23	NS	NS
Obs.Compul.	2.64; 2.24	2.29; 2.17	2.38; 1.19	NS	NS
Pass.Aggres.	1.77; 2.16	1.39; 1.68	1.13; 0.83	NS	NS
Depressive	1.55; 2.96	1.68; 2.01	2.75; 2.25	NS	NS
Paranoid	1.50; 1.90	1.34; 1.53	2.13; 2.36	NS	NS
Schizotypal	1.18; 1.43	1.16; 1.68	1.63; 2.67	NS	NS
Schizoid	0.23; 0.53	0.82; 1.64	1.13; 2.80	NS	NS
Histrionic	1.18; 1.71	0.82; 1.18	0.88; 1.73	NS	NS
Narcissistic	1.32; 1.94	1.16; 1.90	1.13; 1.36	NS	NS
Borderline	3.23; 2.37	2.00; 2.09	3.13; 2.36	NS	NS
Antisocial	1.27; 3.84	1.66; 2.70	0.38; 0.74	NS	NS
Cluster A	2.91; 2.71	3.31; 3.45	4.87; 6.49	NS	NS
Cluster B	7.00; 7.18	5.63; 5.56	5.50; 5.04	3.39; 0.156 -1.33 to 8.12	NS
Cluster C	6.64; 6.37	4.66; 3.79	8.12; 5.33	NS	NS

Abbreviations “Obs.Compul.”: obsessive-compulsive; “Pass-Aggres.”: pasive-aggressive.

*Parameters adjusted for gender and total score on personality clusters other than the one being analysed.

The developmental clusters showed no clear SCID-II correlates. Cluster 3 only tended to score higher than Cluster 2 on avoidant personality (p=0.052) and Cluster 1 tended to display higher scores than Cluster 3 on Cluster B total score (p=0.156).

Figure 4.10 shows a graphic representation of the observed SCID-II means by cluster.