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Development of a questionnaire to determine change in the occupational performance of pre-school children with autistic spectrum disorders receiving occupational therapy - sensory integration

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Chapter 4

RESULTS OF INTERVENTION STUDY

The results of Part 3 of the study (the intervention study) and a brief commentary will be included in this chapter. The demographics of the subjects as well as loss to follow-up that occurred during the study will be presented with the reasons for dropout being explained. The baseline data will then be presented with respect to the two groups. Thereafter the correlation between the three questionnaires and the results for each outcome assessed over time will be presented. Various sub-constructs will also be compared to determine whether any relationship existed between them.

4.1 Participants in the Study

Twenty-four children and their caregivers were recruited for this study. The study sample was divided into two groups, the private practice and the CDC group. By the six-month follow-up four subjects had dropped out. Their demographic information was not included in an evaluation of the two groups. A fifth child dropped out after the six-month period, so his data was also excluded. Nineteen children had intervention for the period of a school year.

The reasons for loss of five subjects were:

- Relocation of family.
  The relocation of one family to another country where OT-SI was not available occurred during the first six months, resulting in termination of treatment.
- Financial.
  In the second family, the parents separated and the child and his mother relocated to another town, but were unable to afford private OT-SI. This child was placed in a special school for children with ASD, but the occupational therapist at the school did not meet the fidelity criteria. Shortly after the six month follow-up, the fifth set of parents were unable to afford private OT-SI for their child as one parent, who suffered from a psychiatric condition had a psychiatric episode resulting in a loss of employment, which affected the family income. OT-SI was therefore discontinued.

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- Treatment priorities

  In the third instance, the parents withdrew the child from the research study prior to beginning OT-SI, as Speech Therapy and Applied Behaviour Analysis (ABA) were prioritised. A year later OT-SI commenced, but it was too late for inclusion in this study.

- Withdrawal of consent

  In the fourth case, where the parents were divorced, the father declined consent for the child to continue with OT-SI, even though the mother had signed consent. As the child's medical bills were paid by the father, OT–SI was discontinued.

4.2 Demographic Information

4.2.1 Demographic Information for the Subjects-Children with Autistic Spectrum Disorder

The number of subjects that were recruited into the study even using convenience sampling was small. Two distinct groups were recruited, one that received OT-SI in private practices (Group 1) and a second group who received OT-SI from the researcher at the CDC preschool (Group 2).

Table 4.2.1 Demographic information for Groups 1 and 2

	Group 1 Private group n=7	**Group 2 CDC group n=12**	**p value**
	Mean	**Mean**	
Age			0.07
Mean Chronological Age	3.63 yrs	4.30 yrs	
	n (percentage)	**n (percentage)**	
Gender			0.59
Girls	2 (28.5%)	2 (16.6%)	
Boys	5 (71.5%)	10 (83.4%)	
Medication	1 (14.2%)	9 (75%)	0.00**
Diagnosis			0.01**
AD	2 (28.6%)	13 (100%)	
PDD	4 (57.1%)	0	
AS	1 (14.3%)	0	

$p \leq 0.05$ significant
$p \leq 0.01$ highly significant

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These groups differed in terms of both socioeconomic status and race so it was necessary to compare the groups to establish whether these factors and others were significantly different and what effect these differences had on the OPQ scores. Demographic results for the two groups are presented in Table 4.2.1.

Although there was no significant difference between the groups in terms of age and gender, the CDC school group all had a diagnosis of ASD, and a much higher number of the subjects were on medication (Table 4.2.1).

All the subjects in the CDC group received speech therapy from the students at the University of the Witwatersrand, whereas not all the subjects in the private group had prioritised speech therapy (Table 4.2.2). There was no significant difference in the groups with reference to speech therapy, physiotherapy or ABA.

Table 4.2.2 Therapy received at the time of the study in Groups 1 and 2

	Group 1 Private group n=7	**Group 2 CDC group n=12**	**p value**
Supplementary therapy	**n (percentage)**	**n (percentage)**	
Speech Therapy	4 (57%)	12 (100%)	0.07
Physiotherapy	2 (28.5%)	0	0.17
Applied Behaviour Analysis (ABA)	1 (14.2%)	0	0.35

p ≤ 0.05 significant
p ≤ 0-01 highly significant

All the subjects in Group 2 attended the CDC school, whereas the Group 1 subjects were in a variety of different school environments (Table 4.2.3).

Table 4.2.3 Schooling at the time of the study in Groups 1 and 2

Schooling	**Group 1 Private group n=7**	**Group 2 CDC group n=12**	**p value**
	n (percentage)	**n (percentage)**	
At home	1 (14.2%)	0	0.35
Special school	1 (14.2%)	12 (100%)	0.00**
Regular nursery school	5 (71.5%)	0	0.00**

p ≤ 0.05 significant
p ≤ 0.01 highly significant

4.2.2 Family Demographics

The family demographics of the subjects were significantly different for all aspects. These included family income and ethnic background, which resulted in home languages that were very diverse. However the CDC school has a policy of using English as the teaching medium, so all the children in the study were educated in English (Table 4.2.4).

Table 4.2.4 Demographic information of Families in Groups 1 and 2

	Group 1 Private group n=7	**Group 2 CDC group n=12**	**p value**
	Mean	**Mean**	
Income			
Mean monthly income	R20,000	R6,916	0.00**
	n (percentage)	**n (percentage)**	
Marital status			0.00**
Married	8 (85.8%)	9 (75.1%)	
Single	0	3 (24.9%)	
Widowed	1 (14.2%)	0	
Divorced	0	0	
Race group			0.00**
Caucasian	6(90.9%)	0	
Asian	0	2 (16.6%)	
African	1 (14.2%)	10 (83.4%)	
Mixed	0	0	
Home language			0.00**
English	7(100%)	3 (24.9%)	
African language	0	9 (75.1%)	

p ≤ 0.05 significant
p ≤ 0.01 highly significant

4.2.3 Milestone Achievement

Questions on achievement of milestones in occupational performance recorded on the OPQ in the general information section indicated the level of functioning in this area for both groups at baseline. This included questions 16 – 19 related to sleeping, toilet training and tantrums. There was no significant difference between the two groups for these variables.

Table 4.2.5 Baseline milestone scores for Groups 1 and 2

	Group 1 Private group n=7	Group 2 CDC group n=12	p value
Activities of Daily Living	**n (percentage)**	**n (percentage)**	
Sleep through the night	6 (85.7%)	10 (83.4%)	0.61
Toilet trained (day)	3 (42.7%)	9 (75.1%)	0.06
Toilet trained (night)	2 (28.5%)	7 (58.1%)	0.23
No tantrums	0	0	1.00

$p \leq 0.05$ significant
$p \leq 0.01$ highly significant

Scores on the OPQ indicated there was no significant difference ($p < 0.05$) in the age at which subjects from the two groups slept through the night, were toilet trained during the day and at night and stopped having tantrums (Table 4.2.5).
Therefore the difference between the groups other than socio-economic status was in the diagnosis and medication, family demographics and schooling.

4.3 Outcome Measures at Baseline

A comparison of the scores at baseline was completed on the OPQ, using the t test to establish consequential validity.

4.3.1 Occupational Performance Questionnaire (OPQ)

The Total OPQ scores for Groups 1 and 2 was not significantly different at baseline but the sub constructs of Play, Personal management and Family impact were significantly different for the two groups. With regard to "Play", group 2 baseline scores were higher indicating that they were closer to the developmental norm. There was less "Family impact" and higher levels of baseline "Personal management" in Group 1 (Table 4.3.1). This indicates that the questionnaire did differentiate between the groups with similar demographics and developmental milestones in terms of "Personal management" and "Play".

The difference in the "Family impact" sub-construct could relate to the significant difference between the groups in relation to the family demographics.

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Table 4.3.1 Baseline occupational performance for Groups 1 and 2

	Group 1 Private group n=7	Group 2 CDC group n=12	p value
	Mean	Mean	
Personal	56.28	31.08	0.01**
Social Interaction	89.42	68.16	0.24
Communication	8.85	12.58	0.08
Play	49.85	60.00	0.02*
Family Impact	31.14	18.16	0.05*
Total OPQ	226.71	176.58	0.13

p ≤ 0.05 significant*
p ≤ 0.01 highly significant**

4.3.2 Standardised Questionnaires

In order to establish the homogeneity of the groups before other analysis was completed the scores at baseline for the two standardised tests were compared for the two groups. These tests are known to be uni-dimensional and only measure the construct they are designed to assess, therefore if no differences between the groups were found on the tests the groups could be considered homogeneous in terms of sensory processing and parent stress.

4.3.2.1 Short Sensory Profile

The Short Sensory Profile results indicated deficits in all aspects for subjects from both groups that were significantly different from the typical responses expected in the normal population.

There was no statistically significant difference between the groups in the total SSP scores or for any of the subtests ($p > 0.05$); with the exception of Subtest 4 “Under-responsive / seeks sensation” ($p<0.001$) (Table 4.3.2). Both groups were significantly different from the norm in aspects of sensory processing and overall. There is no significant difference between the two groups in terms of their sensory profiles at baseline. Therefore in terms of sensory processing the groups can be considered to be homogeneous.

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Table 4.3.2 Baseline Short Sensory Profile information for Groups 1 and 2

	Short Sensory Profile (SSP)				
	Group 1 Private group n=7 Mean	z score	Group 2 CDC group n=12 Mean	z score	p value
Tactile	23.71	-2.73**	20.75	-3.71**	0.37
Taste/Smell	12.28	-1.74**	10.5	-2.35**	0.55
Movement	9.0	-2.67**	10.5	-1.79*	0.39
Under-responsive	22.14	-2.04**	14.83	-4.02**	0.00**
Auditory Filtering	14.85	-3.25**	15.83	-2.93**	0.63
Low Energy	23.71	-1.7*	20.00	-3.15**	0.21
Visual/Auditory Sensitivity	15.28	-2.04**	15.00	--2.34**	0.92
Total SSP	121.00	-3.37**	107.41	-4.37**	0.25

z ≤-1.0 significant difference from typical*
z <-2.0 highly significant difference from typical**
p< 0.05 significant
P ≤ 0.01 highly significant

4.3.2.2 Parenting Stress Index- Short Form

The Parenting Stress Index (PSI-SF) indicated stress in both groups of parents at baseline. There is no significant difference between the two groups at baseline. Therefore, although there were significant demographic differences in the families there were no significant differences in the variable that was being considered i.e. parenting stress (Table 4.3.3.). Therefore the parents of the two groups could be considered homogeneous in terms of parent stress, even though the demographics were significantly different.

Table 4.3.3 Baseline Parenting Stress Index information for Groups 1 and 2

Parent Stress Index-Short Form (PSI-SF)					
	Group 1 Private group n=7 Mean	percentile	Group 2 CDC group n=12 Mean	percentile	p values
PSI-SF	95.57	>95%	110.25	>95%	0.14
PD	33.58	85%	36.66	90%	0.10
PDI	30.73	>95%	32.58	>95%	0.19
DC	40.42	>95%	41.00	>95%	0.69

z > +1.0 significant stress (85%-95%)
z > +2.0 highly significant stress (>95%)
p ≤ 0.05 significant difference
p ≤ 0.01 highly significant difference

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Clinical significance of the outcome measures was established by calculating the z scores of the two standardised tests. It was noted that the subjects' scores were below the expected typical values for sensory processing and that the parents scored above the typical scores for the amount of stress experienced indicating this was a sample which required intervention.

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4.4 Convergent Validity (Correlations between Outcome Measures)

Convergent validity considers whether constructs and sub-constructs measured by outcome measures are associated or not.

4.4.1 Correlation between Total Scores of the Short Sensory Profile, Parenting Stress Index and Occupational Performance Questionnaire

In order to establish the relationship between the three instruments used, correlation coefficients were calculated on individual raw scores at baseline, 6 months and 12 months as well as on the change between 0 and 12 months (Table 4.4.1; Figures 4.4.1, 4.4.2 and 4.4.3.) All correlation in red were statistically significant and could not have occurred by chance ($p < 0.05$).

Table 4.4.1 Correlations of individual raw scores over three assessment periods

	Baseline	6 Months	12 Months
	R	r	r
OPQ and SSP	0.26	**0.61**	**0.67**
OPQ and PSI-SF	**-0.61**	**-0.67**	**-0.75**
PSI-SF and SSP	-0.41	**-0.73**	-0.42

r= -0.6 to -0.4 and r = 0.4 to 0.6 moderate correlation
r = -0.8 to – 0.6 and r = 0.6 to 0.8 high correlation
p<0.05

The correlation between the SSP and the other tests varied; although over the 12 month period the subjects were receiving OT-SI, the association of the SSP to the OPQ became stronger. The subjects' occupational performance scores were better related to their sensory processing after a period of therapy. It would appear that the constructs are not convergent until after a period of occupational therapy intervention.

The association between parent stress, measured on the (PSI-SF) and their child's score on the OPQ showed high negative association throughout the entire study indicating that as the child's occupational performance improved the parents stress decreased. Thus the two constructs are convergent.

The child's sensory processing (SSP) and the parents stress (PSI-SF) did not have any clear association trend as it varied between high and moderate over the 12 month period.

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4.4.2 Correlation of Sub-Constructs of the Questionnaires

4.4.2.1 Correlation of sub-constructs Short Sensory Profile (SSP) with sub-constructs of Occupational Performance Questionnaire (OPQ)

There does not appear to be convergence or divergence of the constructs or sub-constructs at baseline. Although it had been assumed that these constructs were related this was not the case for this sample initially (Table 4.4.2).

Table 4.4.2 Correlations at Baseline of Short Sensory Profile to the Occupational Performance Questionnaire (OPQ) sub-constructs

	Tactile Sensitivity	Taste-Smell Sensitivity	Movement Sensitivity	Under-responsive Seeks Sensation	Auditory filtering	Low energy	Visual /Auditory Sensitivity	**TOTAL SSP**
	r	**r**	**r**	**r**	**r**	**r**	**r**	**r**
Sleep	-0.16	-0.03	-0.04	-0.09	0.00	0.02	0.17	-0.03
Toilet	-0.46	-0.18	0.09	-0.35	0.19	0.00	0.04	-0.19
Feed	0.04	0.34	-0.21	0.06	-0.32	-0.05	0.20	0.05
Total Personal management	-0.23	0.11	-0.10	-0.15	-0.11	-0.02	0.20	-0.06
Social Interaction individual	0.34	-0.10	-0.04	0.33	-0.02	0.45	0.50	0.39
Social Interaction Peer	-0.24	0.03	0.31	-0.28	-0.16	-0.06	0.31	-0.05
Social Interaction Group	0.24	0.15	0.12	0.29	-0.12	0.22	0.36	0.31
Total Social interaction	0.23	-0.03	0.10	0.22	-0.10	0.37	0.56	0.34
Communication	0.08	0.23	-0.10	0.20	-0.42	0.12	0.06	0.08
Play level	-0.26	0.40	-0.17	0.14	-0.29	-0.33	-0.11	-0.14
Play Individual	-0.15	0.11	-0.09	0.11	-0.12	-0.31	-0.12	-0.14
Play -Group	0.34	0.13	0.18	0.21	0.11	0.29	0.28	0.37
Total Play	-0.05	0.30	-0.04	0.20	-0.14	-0.17	0.01	0.03

$p<0.05$

Significant ($p<0.05$) moderate correlations between some sensory categories and occupational performance constructs were evident at baseline i.e.

Negative correlations were found between “Toilet training” and “Tactile sensitivity” as well as “Communication” and “Auditory filtering”.

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Positive correlations between "Social Interaction" and "Visual-Auditory Sensitivity"; "Social Interaction: Individual", with "Visual / Auditory Sensitivity" and "Play" with "Taste-smell sensitivity". These scattered moderate associations were significant but may have been because of the small sample. Little change was noted after six months while subjects received OT-SI except a moderate association between "Social Interaction" with the total SSP score was noted (Table 4.4.3).

Table 4.4.3 Correlations at 6 months of Short Sensory Profile to the Occupational Performance Questionnaire (OPQ) sub-constructs

	Tactile Sensitivity	Taste-Smell Sensitivity	Movement Sensitivity	Under-responsive Seeks Sensation	Auditory filtering	Low energy	Visual /Auditory Sensitivity	**TOTAL SSP**
Sleep	-0.06	0.25	-0.20	0.03	0.31	-0.02	0.13	0.13
Toilet	-0.21	0.03	-0.05	-0.03	0.17	0.21	0.15	0.08
Feed	-0.16	0.69	-0.22	0.02	0.13	0.04	0.28	0.24
Total Personal management	-0.18	0.45	-0.19	0.01	0.22	0.09	0.24	0.19
Social Interaction individual	0.26	0.17	0.01	0.44	0.45	0.09	0.45	**0.52**
Social Interaction Peer	-0.26	0.22	0.15	0.20	0.47	0.18	0.14	0.30
Social Interaction Group	0.09	-0.06	-0.13	0.34	0.31	0.00	0.24	0.23
Total Social interaction	0.09	0.17	0.04	0.40	0.50	0.12	0.37	**0.47**
Communication	0.15	-0.25	0.33	0.07	-0.09	0.47	0.40	0.28
Play level	-0.40	0.06	-0.23	0.09	0.28	-0.16	-0.02	-0.10
Play Individual	-0.13	0.08	0.12	0.31	0.36	0.27	0.28	0.36
Play -Group	-0.18	0.19	0.24	0.19	0.56	0.15	0.22	0.35
Total Play	-0.25	0.18	0.14	0.28	0.44	0.18	0.23	0.33

$p<0.05$

A trend of moderate association between "Social Interaction", "Auditory Filtering", and "Under-responsive/ seeks sensation" in the SSP. "Social interaction: Individual" also showed some moderate association to aspects of the SSP. Moderate correlation with "Low energy" and "Visual / auditory sensitivity" and "Communication" emerged at 6 months.

After 12 months of receiving SI-OT a clearer pattern of association, particularly between "Social interaction: Individual" and "Social Interaction: Group" emerged. Moderate

associations were again related to “Under-responsive/seeks sensation” and the total SSP (Table 4.4.4.)

Table 4.4.4 Correlations at 12 months of Short Sensory Profile to the Occupational Performance Questionnaire (OPQ) sub-constructs

OPQ	Tactile Sensitivity	Taste-Smell Sensitivity	Movement Sensitivity	Under-responsive Seeks Sensation	Auditory filtering	Low energy	Visual /Auditory Sensitivity	TOTAL SSP
	r	r	r	r	r	r	r	r
Sleep	0.42	0.51	0.41	-0.11	0.23	0.45	0.56	**0.55**
Toilet	-0.22	0.06	0.26	0.06	0.10	0.22	0.42	0.22
Feed	0.05	0.57	-0.03	-0.06	0.27	0.24	0.28	0.35
Total Personal management	0.05	0.47	0.17	-0.04	0.24	0.32	0.45	**0.41**
Social Interaction individual	0.34	0.26	0.03	0.65	0.25	0.34	0.40	**0.61**
Social Interaction Peer	-0.08	0.38	-0.02	0.28	0.22	-0.09	0.20	0.27
Social Interaction Group	0.57	0.18	0.25	0.60	0.12	0.29	0.49	**0.62**
Total Social interaction	0.29	0.32	0.05	0.62	0.26	0.25	0.41	**0.59**
Communication	0.13	0.07	0.02	0.65	0.10	-0.02	0.21	0.34
Play level	0.03	0.34	0.11	0.57	0.13	-0.06	0.15	0.37
Play Individual	-0.15	0.17	0.37	0.32	0.25	0.12	0.49	0.40
Play -Group	0.25	0.20	0.09	0.52	-0.07	-0.03	0.19	0.32
Total Play	0.06	0.27	0.22	0.55	0.11	0.01	0.32	**0.42**

$p<0.05$

Moderate association between the total scores for “Personal management”, “Play” and the SSP were also found at 12 months. The sub constructs of “Under-responsive / seeks sensation” and “Visual/auditory sensitivity” showed association to sub- constructs of the OPQ. Therefore, although convergent validity was low from SSP sub-constructs and all the sub- constructs of the OPQ except “Socialisation” at baseline; the association between a number of sub-constructs was stronger after 12 months for the 19 subjects.

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The sub-constructs of "Personal management" showed convergence with the sub-construct of "Taste / smell sensitivity" and with "Sleep" a moderate association to "Visual/auditory sensitivity". "Sleep" was also convergent with "Tactile sensitivity" on the SSP. "Play", and specifically "Level of play" was found to have a moderate association with "Under-responsive / seeks sensation" with "Play: Individual" being associated with "Visual / auditory sensitivity" on the SSP.

4.4.2.2 Correlation of sub-constructs Parent Stress Questionnaire (PSI) with sub-constructs of Occupational Performance Questionnaire (OPQ) Family Impact

The moderate convergence between the "OPQ: Family Impact" construct and the PSI-SF was fairly constant throughout the year (Table 4.4.5).

Table 4.4.5 Correlations at Baseline, 6 months and 12 months of Parent Stress Questionnaire to the Family Impact aspect of the Occupational Performance Questionnaire (OPQ)

	Parenting Distress	Parent-Child Interaction	Difficult Child	PSI:TOTAL
OPQ : Family Impact	r	r	r	r
Baseline	-0.60	-0.34	-0.34	-0.55
6 months	-0.58	-0.54	-0.53	-0.58
12 months	-0.49	-0.33	-0.55	-0.56

$p < 0.05$

The association between the "Difficult Child" sub-construct was slightly stronger and improved slightly during the year the child was receiving OT-SI. The correlation between "Parenting Distress" and "OPQ: Family Impact" became weaker over the year.

The fluctuations seen may be due to the small sample used but the PSI-SF was convergent with the "Family Impact" sub-construct of the OPQ.

4.5 Test Response to Change and Sensitivity

4.5.1 Change in Questionnaire Scores over the Study Period

In this section change over time in the three variables - Occupational performance, Parenting stress and Sensory processing were analysed. In order to determine the ability of the OPQ to measure a change in the construct over time or the sensitivity of the questionnaires to measure changes in occupational performance.

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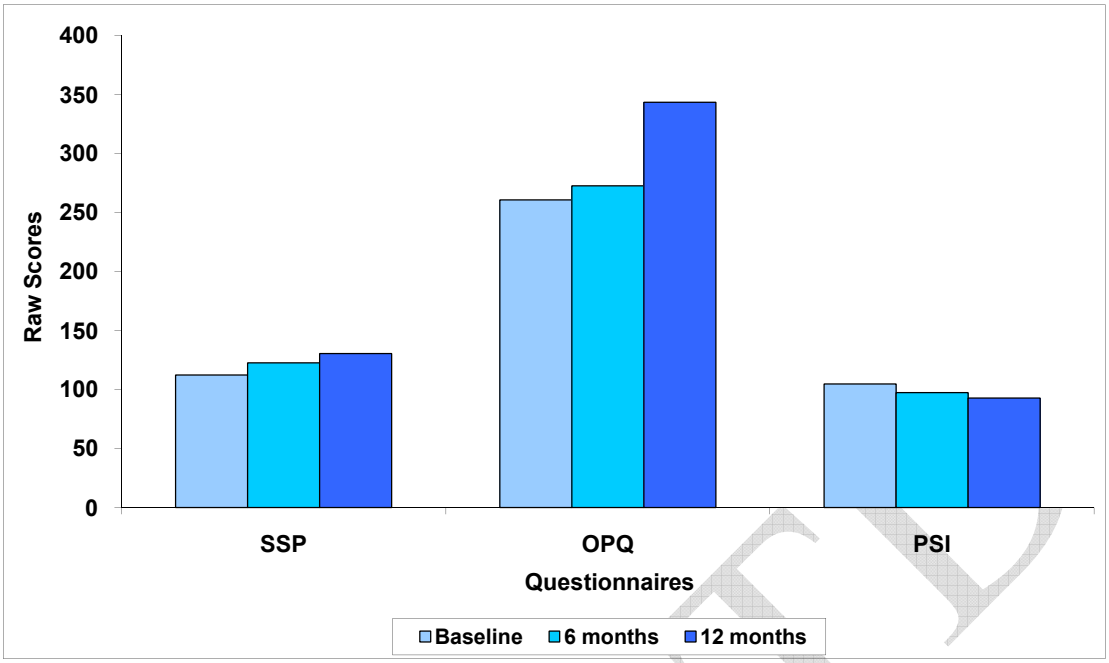


Figure 4.5.1 Change in scores on three questionnaires over the study period

Figure 4.5.1 indicates that the while the standardised outcome measures are sensitive to change in a constant manner over time the OPQ showed a fluctuation in measuring change with a greater difference between 6 and 12 months than the change seen between baseline and 6 months.

4.5.1.2 Occupational Performance Questionnaire

Results indicate that the change over 12 months was a significant, with improvement in Occupational performance ($p<0.001$). The improvement in the "Personal management" sub-construct was significant, after both the 6 and 12 month period at $p<0.001$. The "Play" sub-construct also showed a significant change after 12 months ($p\leq0.01$) with "Socialisation", "Family Impact" and the "Communication" sub-constructs showing positive change that was not significant. Therefore the OPQ has the capacity to measure change over time, with the total score on the OPQ and the "Personal management" sub-construct significantly sensitive to change after six months, and the "Play" sub-construct after 12 months (Table 4.5.1).

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Table 4.5.1 Change in OPQ and subsections over the study period

Occupational Performance Questionnaire n=19							
	Variable	Baseline	6 months	12 months	p value		
		Mean (SD)	Mean (SD)	Mean (SD)	0-6 mo	0-12 mo	6 mo- 12 mo
1	Sleep	4.36 (0.71)	4.44 (0.55)	4.61 (0.40)	0.42	0.01*	0.11
2	Toilet	3.08 (1.60)	3.34 (1.47)	3.41 (1.48)	0.19	0.10	0.74
3	Feeding	3.26 (0.75)	3.68 (0.75)	3.63 (0.81)	0.001***	0.00**	0.68
4	Social – individual	3.74 (0.65)	3.90 (0.65)	4.06 (0.66)	0.05*	0.11	0.12
5	Peer interaction	3.13 (0.67)	3.06 (0.82)	2.98 (0.75)	0.66	0.33	0.58
6	Group interaction	3.58 (0.93)	3.57 (0.93)	3.64 (0.95)	0.96	0.75	0.72
7	Communication	2.90 (0.93)	2.93 (0.93)	3.13 (1.23)	0.92	0.31	0.35
8	Level of play	2.73 (0.74)	2.89 (0.86)	3.08 (0.71)	0.29	0.02*	0.21
9	Play – individual	2.86 (0.47)	2.89 (0.54)	3.00 (0.57)	0.76	0.14	0.25
10	Play group	2.74 (0.49)	2.90 (0.70)	2.92 (0.65)	0.21	0.15	0.85
11	Family impact	3.66 (0.98)	3.69 (0.63)	3.84 (0.98)	0.84	0.24	0.33
1,2,3	Personal	3.63 (0.62)	3.92 (0.68)	3.95 (0.67)	0.000***	0.000***	0.73
4,5,6	Social	3.56 (0.52)	3.64 (0.63)	3.72 (0.62)	0.42	0.09	0.37
7	Communication	2.90 (0.93)	2.93 (0.93)	3.13 (1.23)	0.92	0.30	0.35
8,9,10	Play	2.78 (0.42)	2.89 (0.62)	2.99 (0.55)	0.17	0.01**	0.22
11	Family Impact	3.66 (0.98)	3.69 (0.63)	3.84 (0.98)	0.84	0.24	0.33
	OPQ Total	3.39 (0.43)	3.51 (0.46)	3.60 (0.50)	0.05*	0.000***	0.16

$p \leq 0.05$ significant*

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p ≤ 0.01 highly significant**
p ≤ 0.001 highly significant***

4.5.1.3 Change in the Sensory Profile

The SSP was administered to parents at baseline, 6 months and 12 months (Table 4.5.2).

Table 4.5.2 Depicts changes in the Sensory Profile and subsections over the study period

Short Sensory Profile (SSP) n=19							
					p values		
Items	Subsections	Baseline Mean (SD)	6 months Mean (SD)	12 months Mean (SD)	0-6 mo	0-12 mo	6 mo-12 mo
1 to 7	Tactile Sensitivity	21.84 (6.56)	24.58 (5.50)	26.95 (3.52)	0.02*	0.00***	0.04
8 to 11	Taste/Smell	11.16 (5.97)	12.26 (5.92)	13.68 (5.80)	0.07	0.01**	0.16
12 to 14	Movement Sens	9.95 (3.49)	10.32 (3.43)	11.37(2.71)	0.63	0.064	0.17
15 to 21	Underresp/seeks	17.52 (6.34)	19.16 (7.07)	19.16 (6.63)	0.21	0.212	1.00
22 to 27	Auditory filter	15.47 (4.74)	17.53 (4.67)	18.95 (4.45)	0.13	0.01**	0.30
28 to 33	Low energy	21.37 (7.35)	20.95 (6.80)	22.68 (5.06)	0.78	0.394	0.26
34 to 38	Vis/Aud Sens	15.11 (6.07)	17.84 (3.70)	17.68 (4.88)	0.02*	0.03*	0.89
	SSP Total z scores	112.42 -4.00	122.63 -3.26	130.47 -2.68	0.06 +0.75	0.00*** +1.3	0.01** + 0.57

p ≤ 0.05 significant*
p ≤ 0.01 highly significant**
p ≤ 0.001 highly significant***

The results indicate that there is a significant mean improvement in the Sensory Profiles ($p<0.001$) over the study period. “Tactile sensitivity”, “Taste and smell sensitivity”, and “Auditory filtering” improved significantly ($p\leq 0.01$), and “Visual/auditory sensitivity” ($p\leq 0.05$) also showed a significant improvement. The subjects who were “Under-responsive” and sought sensation and those who were “Weak and had low energy levels” displayed the least improvement. In all areas an improvement was seen, but not to a statistically significant level (Table 4.5.2.)

4.5.1.4 Change in the Parenting Stress Index-Short Form

The PSI-SF was administered to the caregivers of the subjects at baseline, 6 months and 12 months (Table 4.5.3).

Table 4.5.3 The changes in total parent stress and subtest scores over the study period

Parent Stress Index- Short Form (PSI-SF) n=19							
		Baseline	**6 months**	**12 months**	p values		
		Mean (SD)	**Mean (SD)**	**Mean (SD)**	0-6 mo	0-12 mo	6 mo-12 mo
1 to 12	Parental Distress	33.68 (11.55)	31.11 (9.75)	30.26 (11.18)	0.13	0.05*	0.62
13 to 24	Parent-Child Inter	30.74 (8.09)	27.74 (8.29)	26.95 (7.22)	0.04*	0.01**	0.59
24 to 36	Difficult Child	40.42 (8.40)	37.84 (9.70)	35.26 (9.21)	0.13	0.00**	0.13
	PSI-SF Total z scores	104.84 +3.35	97.42 +2.66	92.84 +2.23	0.02* +0.69	0.00*** +1.12	0.21 +0.43

p ≤ 0.05 significant*
p ≤ 0.01 highly significant**
p ≤ 0.001 highly significant***

The PSI-SF scores came down significantly during the course of the study, with the scores at 12 months being significantly lower than those at baseline ($p<0.001$). Closer analysis revealed that of the three subscales of the PSI-SF there was the most change in the "Difficult Child" ($p<0.005$) subtest during the 6–12 month period. A decrease in "Parent-Child Dysfunctional Interaction" ($p<0.01$) was observed, and "Parental distress" also reduced significantly ($p<0.05$).

Therefore significant change was seen in all three outcome measures over the 12 month period of the study suggesting the OPQ was sensitive to change as measured by other questionnaires known to be able to measure change in adaptive abilities (Jasmin et al. 2009).

4.5.2 Correlations of Change over time

This was to measure whether the change measured by the OPQ correlated with the changes in the SSP and PSI-SF. Although the convergence of the SSP with the Occupational performance on the OPQ fluctuated the convergence of the PSI-SF with "Family impact" on the OPQ was constant so the association of change in the OPQ with change on the SSP and PSI-SF was therefore assessed.

The combined scores for the change in SSP (at baseline, 6 months and 12 months) and the change in the combined OPQ scores (r= 0.48) correlated moderately, (p<0.001), indicating that subjects with higher scores on the QPQ obtained higher scores on the SSP. The change that occurred in the subjects SSP scores indicated an improvement in sensory processing and higher OPQ scores indicate a higher level of performance on the occupational tasks of childhood (Figure 4.5.1).

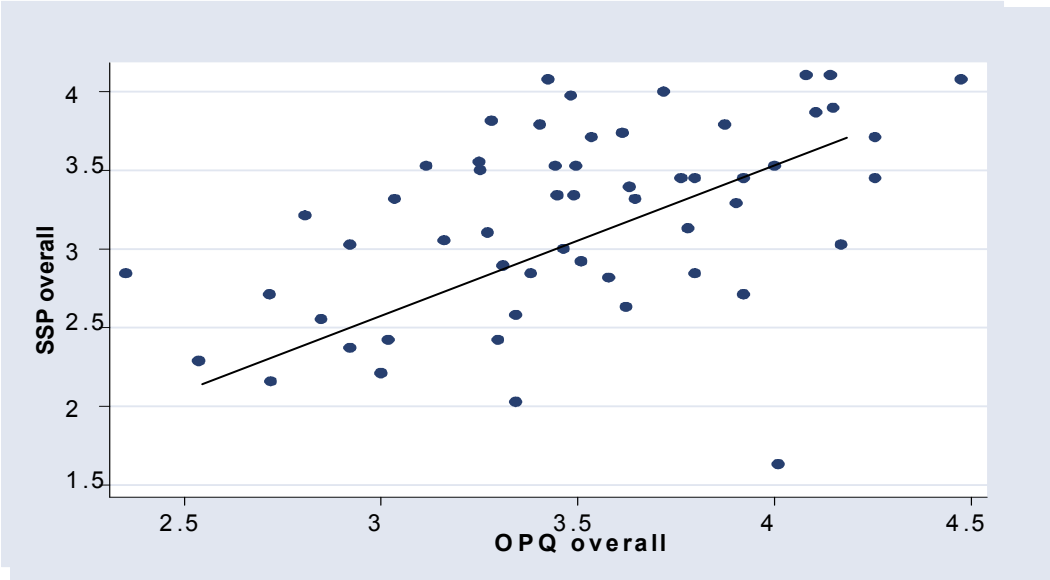


Figure 4.5.2 Correlation between Short Sensory Profile and Occupational Performance Questionnaire

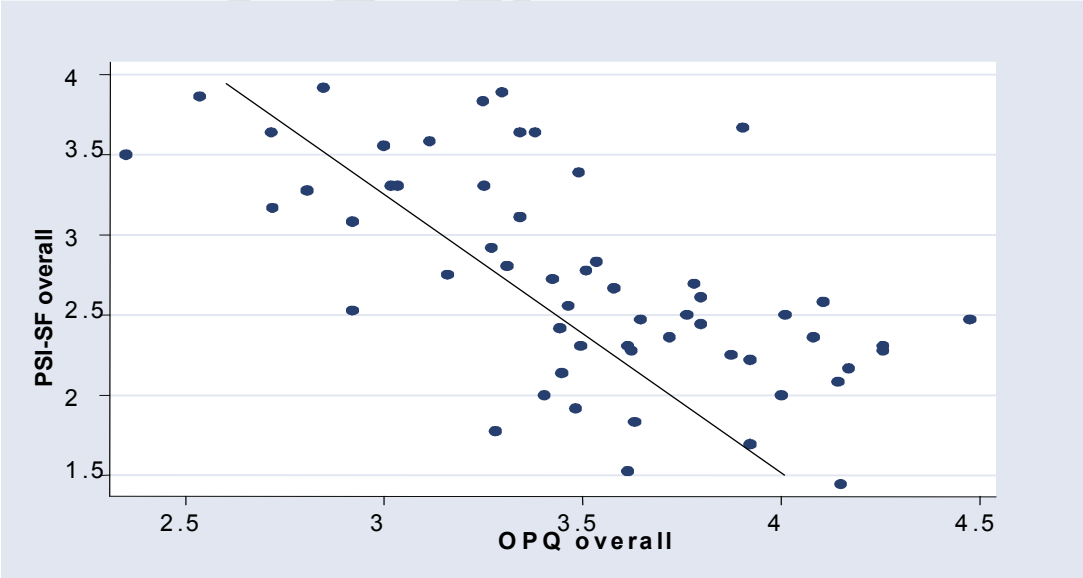


Figure 4.5.3 Correlation between the Parent Stress Index and Occupational Performance Questionnaire

When comparing the combined PSI-SF scores to the combined OPQ scores a moderate negative correlation(r = - 0.62) indicates that positive change with higher scores on the OPQ were moderately associated with negative lower scores indicating less stress on the Parenting Stress Index ($p<0.001$). A negative correlation indicates that as the scores for occupational performance improve, those for parenting stress decrease (Figure 4.5.2). Thus change in the OPQ was associated with change in the SSP and PSI-SF indicating that the OPQ was sensitive to a similar amount of positive change that occurred over 12 months.

4.5.2.1 Correlations between changes in the sub-constructs of the Occupational Performance Questionnaire and other questionnaires

In order to establish which sub constructs of the OPQ showed sensitivity to change over time the changes in the SSP were correlated with the changes in the sub-constructs of the OPQ.

Table 4.5.4 Correlation between changes in the Short Sensory Profile and changes in the sub-constructs of the Occupational Performance Questionnaire

	Short Sensory Profile r
Personal management	0.22
Communication	0.23
Sleep	0.20
Feeding	0.25
Play	0.29
Level of Play	0.16
Social Interaction	0.45
Individual Social Interaction : Individual	0.51

Moderate association was found between changes in the SSP and the changes measured in the “Social interaction” of the OPQ only (Table 4.5.4).

4.5.2.2 Correlations between change in Parenting Stress and change in the Occupational Performance Questionnaire: Family Impact

The correlation between Parenting Stress (PSI-SF) and “Family Impact” (OPQ:FI) (r = - 0.57) shows that there is significant correlation (($p<0.001$) between high scores on the PSI-SF and low scores on the OPQ:FI. The subsections of the PSI-SF were also analysed separately, because not only the total Parent stress scores (PSI-SF) but specifically the Difficult Child (DC) and the Parent-Child Dysfunctional Interaction (P-CDI)

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subscales were considered to have a possible impact on the family of the child with ASD (Table 4.5.5).

Table 4.5.5 Correlation between change in OPQ: Family Impact and Parenting Stress

		r
OPQ :Family Impact	Parenting Stress Index	- 0.57
OPQ :Family Impact	Parenting Stress Index: Parent-Child Dysfunctional Interaction	- 0 .47
OPQ : Family Impact	Parenting Stress Index: Difficult Child	- 0 .45

Changes in both sub- constructs of the PSI-SF – the Parent-Child Dysfunctional Interaction and the "Difficult Child "showed moderate negative correlations (r = -0 .47) and (r = -0.45) respectively, to the OPQ: Family impact. Thus the change in the OPQ : Family Impact section was sensitive to a similar amount of change to that measured by the PSI-SF for all sub constructs of the PSI-SF.

4.6 Conclusion

The findings of this study confirm that the although two different groups of subjects were used in the study with significant differences between them in terms of medication, schooling and family background, the constructs of sensory processing and parent stress measured by the SSP and PSI-SF were not affected by these differences.

The OPQ did have some consequential validity concerns in that significant differences were found for the groups for "Personal management" scores and "Play" even though milestones for the groups were not significantly different indicating factors other than the identified construct may have been interfering with the scores.

No convergent validity was found between the SSP and OPQ at baseline although the convergent association between the outcome measures became stronger the longer the subjects received OT-SI. This was particularly true for "Social interaction" and to a lesser extent for "Personal management" and "Play".

The OPQ was sensitive to change and significant change in this outcome measured occurred at the same time as a significant change was seen in the SSP and PSI-SF. This

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the OPQ was able to measure change over a 12 month period associated with change measured by the other questionnaires but could not record the change in a constant manner.

Changes assessed by the OPQ were associated in a constant positive direction in relation to the SSP, and the association was negative in relation to the PSI-SF.

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