

**BALANCE & LIFE  
RESEARCH LABORATORY**

# **Data Analysis Report for Minds-in-Motion, Inc**

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**Participant Demographics (Winter 2011-Spring 2013; Louisville Center Only)**

A total of 48 participants were included in the analysis. Participants were all recruited and tested at the Louisville center between the winter of 2011 and the spring of 2013. Basic demographic information is recorded in Tables 1 and 2. Average age of participants as a whole group was  $8.92 \pm 2.53$  with a range from 6-15 years old. The majority of participants were 9 years old with a median of 9 as well. Average age per test session can be viewed in Table 1.

Age at Testing

Session_Year	Session	Mean	Std. Deviation	N
2011	Winter	8.36	1.690	11
	Total	8.36	1.690	11
2012	Spring	7.56	1.509	9
	June	9.50	3.697	4
	July	9.30	2.908	10
	Fall	7.00	.000	2
	Winter	9.00	1.000	3
	Total	8.57	2.441	28
2013	Spring	10.67	3.122	9
	Total	10.67	3.122	9
Total	Spring	9.11	2.867	18
	June	9.50	3.697	4
	July	9.30	2.908	10
	Fall	7.00	.000	2
	Winter	8.50	1.557	14
	Total	8.92	2.533	48

Table 1: Age at Testing by Session

Participants were classified into five diagnoses categories if a doctor had given them a definitive diagnosis. For the purpose of further analysis, I identified individuals with autism related diagnoses, attention deficit disorders, sensory processing disorders, visual impairments, and auditory processing disorders. A breakdown of the frequency and percentage of each disorder per session and in total can be found in Table 2. The specific diagnoses included in each category is as follows:

- Autism – includes all participants with a diagnosis of autism, pervasive developmental disorder not otherwise specified (PDD-NOS), and aspergers which was given by a medical professional

- Attention Deficit Disorders – included all participants with a diagnosis of attentional deficit-hyperactivity disorder and attentional deficit disorder
- Sensory Disorders/Processing – includes all participants with a diagnosis of sensory processing disorder (SPD), central auditory processing disorder (CAPD), auditory processing disorder
- Visual Disorders/Processing – included all participants with a diagnosis of strabismus and nystagmus
- Auditory Disorders/Processing – included all participants with a diagnosis of central auditory processing disorder and auditory processing disorder

### Diagnosis History

Year	Session		Dx (Yes/No)		Autism		ADHD/ADD		Sensory		Visual		Auditory	
			Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
2011	Winter	Yes	1	9.1	0	0	1	9.1	0	0	0	0	0	0
		No	10	90.9	11	100	10	90.9	11	100	11	100	11	100
2012	Spring	Yes	6	66.7	1	11.1	3	33.3	1	11.1	2	22.2	0	0
		No	3	33.3	8	88.9	6	66.7	8	88.9	7	77.8	9	100
	June	Yes	3	75	0	0	2	50	2	50	1	25	1	25
		No	1	25	4	100	2	50	2	50	3	75	3	75
2012	July	Yes	6	60	0	0	4	40	3	30	0	0	2	20
		No	4	40	10	100	6	60	7	70	10	100	8	80
	Fall	Yes	1	50	0	0	0	0	0	0	0	0	0	0
		No	1	50	2	100	2	100	2	100	2	100	2	100
2012	Winter	Yes	1	33.3	0	0	1	33.3	0	0	0	0	0	0
		No	2	66.7	3	100	2	66.7	3	100	3	100	3	100
2013	Spring	Yes	7	77.8	2	22.2	3	33.3	3	33.3	0	0	1	11.1
		No	2	22.2	7	77.8	6	66.7	6	66.7	9	100	8	88.9
Total	Yes	Yes	25	52.1	3	6.3	14	29.2	9	18.8	3	6.3	4	8.3
		No	23	47.9	45	93.8	34	70.8	39	81.3	45	93.8	44	91.7

Table 2: Diagnosis category frequency per session and as a whole.

### Variable Changes Pre- to Post- (Whole Group)

**Question: What changes do we observe in each variable from the baseline to follow-up testing?**

To examine differences between pre- and post- testing, paired samples t-tests were utilized on each measured variable for the whole group. In some variables examined the data was not complete for all individuals so the number analyzed varied per variable. Significant changes were noted in the auditory digit span, binocular, star reading, sensory quotient, rhythmic weight shift, and limit of stability scores ( $p < .05$ ) (Table 3). In all cases (significant or not) except "Focus II", the average post-program measure was greater than the pre-program measure. Average scores for the whole group are reported for each variable in Table 4. From

these results it appears that the visual system may take longer to note significant improvements but the improvement in sensory processing does seem to have an impact on measures related to balance and motor control.

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	Interval of the				
				Lower	Upper			
Auditory Digit Span (Pre-/Post-)	-.2583	.3654	.0527	-.3644	-.1522	-4.898	47	.000
General Visual Skill % (Pre-/Post-)	-2.2708	13.1985	1.9050	-6.1033	1.5616	-1.192	47	.239
Eye Tracking (Pre-/Post-)	-5.958	25.606	3.696	-13.393	1.477	-1.612	47	.114
Focus I (Pre-/Post-)	-2.021	30.267	4.369	-10.810	6.768	-.463	47	.646
Focus II (Pre-/Post-)	5.6042	22.0808	3.1871	-.8074	12.0158	1.758	47	.085
Binocular (Pre-/Post-)	-6.1042	20.4879	2.9572	-12.0532	-.1551	-2.064	47	.045
Star Reading (Pre-/Post-)	-.4568	1.2655	.1908	-.8416	-.0721	-2.394	43	.021
Sensory Quotient (Pre-/Post-)	-4.4091	5.7438	.8659	-6.1554	-2.6628	-5.092	43	.000
Rhythmic Wt Shift (Pre-/Post-)	-3.3488	6.5279	.9955	-5.3578	-1.3398	-3.364	42	.002
CTSIB (Pre-/Post-)	-.0047	.1939	.0296	-.0643	.0550	-.157	42	.876
Limit of Stability (Pre-/Post-)	-7.9302	12.0087	1.8313	-11.6260	-4.2345	-4.330	42	.000

Table 3: Paired sample t-tests comparing baseline performance and post-program performance on all key variables.

To further understand the clinical importance of the significant changes, the number of individuals that improved to those that didn't improve were compared as well as the average of the improvements and the average of the declines (Table 4 and 5). Improvements were noted in 50-75% of the participants in the categories noted with significant differences between baseline and post-program measures (Chart 1). The STAR reading score came in with the least amount of improvement (50% of the participants) and the auditory digit span, sensory quotient and LOS measures ranked the highest with around 75% improvement. The clinical importance of the magnitude of change is still to be determined and is in need of further analysis.

Due to the nature of the lateralization score it was analyzed separately with the following results.

- 6/48 changed from demonstrating lateralization at baseline to not demonstrating it at the post-test (5/6 changed at the ears, 1/6 changed at the foot)
- 3/48 changed from being non-lateralized to demonstrating lateralization at the post-test (2/3 changed at the ear, 1/3 changed at the foot)
- 30/48 were not lateralized and did not change
- 9/48 were lateralized at the pre-test and did not change

**Paired Samples Statistics**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	AudDigSpan_Pre	4.413	48	.8824	.1274
	AudDigSpan_Post	4.671	48	.9403	.1357
Pair 2	GenVisualSkillsPerct_Pre	47.854	48	19.0498	2.7496
	GenVisualSkillsPerct_Post	50.125	48	17.1099	2.4696
Pair 3	EyeTrack_Pre	47.56	48	25.627	3.699
	EyeTrack_Post	53.52	48	27.899	4.027
Pair 4	FocusI_Pre	52.23	48	28.037	4.047
	FocusI_Post	54.25	48	28.487	4.112
Pair 5	FocusII_Pre	30.792	48	22.6715	3.2724
	FocusII_Post	25.188	48	21.6958	3.1315
Pair 6	Binocular_Pre	61.188	48	29.7340	4.2917
	Binocular_Post	67.292	48	30.8917	4.4588
Pair 7	Star_Pre	3.602	44	2.9620	.4465
	Star_Post	4.059	44	3.0296	.4567
Pair 8	SensoryQuotient_Pre	59.977	44	10.3148	1.5550
	SensoryQuotient_Post	64.386	44	9.6983	1.4621
Pair 9	RWS_Pre	70.837	43	9.1494	1.3953
	RWS_Post	74.186	43	8.2469	1.2576
Pair 10	CTSIB_Pre	1.198	43	.3488	.0532
	CTSIB_Post	1.202	43	.3181	.0485
Pair 11	LOS_Pre	65.233	43	12.9593	1.9763
	LOS_Post	73.163	43	12.5526	1.9143

Table 4: Variable Averages for the whole group

	AudDigSpan_Change	GenVisualSkillsPerct_Change	EyeTrack_Change	FocusI_Change	FocusII_Change	Binocular_Change	Star_Change	SensoryQuotient_Change	RWS_Change	CTSIB_Change	LOS_Change
Average Change	0.258	2.271	5.958	2.021	-5.604	6.104	0.479	4.409	3.349	0.005	7.930
Average Increase	0.411	11.667	27.217	21.690	13.789	16.774	1.338	6.879	6.929	0.174	13.313
# Participants that Increased	35.000	27.000	23.000	29.000	19.000	31.000	21.000	33.000	28.000	19.000	32.000
Average Decrease	-0.200	-9.810	-22.667	-28.000	-19.667	-15.133	-0.500	-3.667	-4.167	-0.194	-9.444
# Participants that Decreased	10.000	21.000	15.000	19.000	27.000	15.000	16.000	9.000	12.000	16.000	9.000
# of Participants with No Change	3.000	0.000	10.000	0.000	2.000	2.000	5.000	2.000	3.000	8.000	2.000

Table 5: Breakdown of average increases and decreases for each variable.

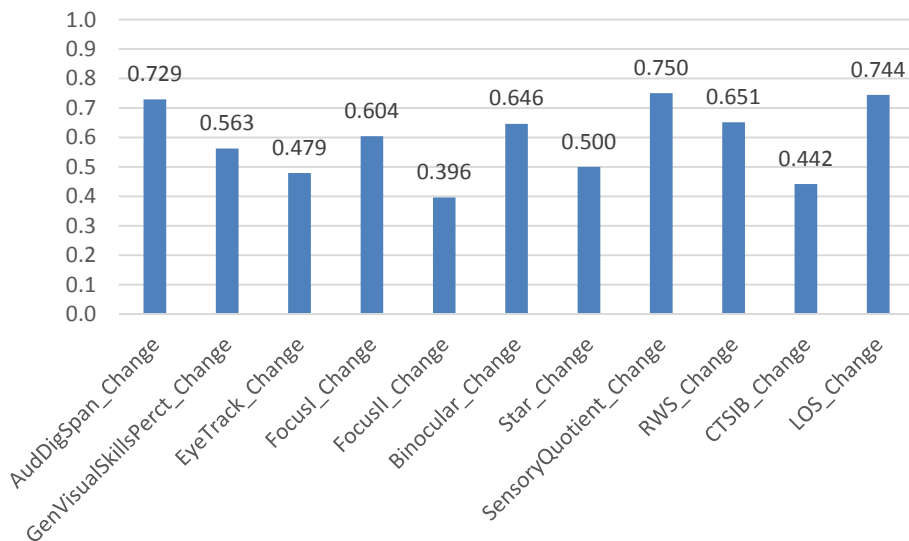


Chart 1: Percent of participants with improvements in each variable.

### ***Variable Changes Pre- to Post- (Based on Diagnosis)***

**Question: Where the changes noted in each variable different between individuals with certain diagnoses?**

Overall the sample size limits the interpretability with this data as group sizes ranged between 3-15 participants: autism (3), ADD (12-15 depending on variable), sensory processing (7-9 depending on the variable), visual impairments (3), and auditory processing (3-4).

#### No Diagnosis vs. Any Diagnosis

Individuals with any of the categorical diagnoses had larger average changes than individuals without diagnoses in general visual skills percentage (4.56% improvement), focus I (improvement of 5.12), and sensory quotient (6.091 compared to 2.27 in individuals without diagnoses) (Table 6). Significant differences were noted in the focus II scores between those with a diagnosis and those without (Table 7). Those without a diagnosis actually decreased performance on average by about 13 points while those with a diagnosis had a slight increase of about 1.5 points. There was a trend towards significant differences in the sensory quotient score and the CTSIB though they were in opposite directions with greater changes noted in the diagnoses and non-diagnoses groups respectively.

**Group Statistics**

	Dx	N	Mean	Std. Deviation	Std. Error Mean
AudDigSpan_Change	Yes	25	.3000	.33166	.06633
	No	23	.2130	.40148	.08371
GenVisualSkillsPerct_Change	Yes	25	4.560	11.5256	2.3051
	No	23	-.217	14.6565	3.0561
EyeTrack_Change	Yes	25	4.80	25.032	5.006
	No	23	7.22	26.721	5.572
FocusI_Change	Yes	25	5.12	27.564	5.513
	No	23	-1.35	33.249	6.933
FocusII_Change	Yes	25	1.840	20.6593	4.1319
	No	23	-13.696	21.0852	4.3966
Binocular_Change	Yes	25	5.520	22.9113	4.5823
	No	23	6.739	17.9803	3.7492
Star_Change	Yes	22	.314	1.1072	.2361
	No	20	.660	1.4766	.3302
SensoryQuotient_Change	Yes	22	6.091	4.9272	1.0505
	No	22	2.727	6.1115	1.3030
RWS_Change	Yes	21	3.762	6.9275	1.5117
	No	22	2.955	6.2601	1.3346
CTSIB_Change	Yes	21	-.048	.1861	.0406
	No	22	.055	.1920	.0409
LOS_Change	Yes	21	5.381	9.6720	2.1106
	No	22	10.364	13.6610	2.9125

Table 6: Mean changes in variables by group (diagnoses vs. no diagnoses)

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
AudDigSpan_Change	Equal variances assumed	.532	.469	.821	46	.416	.08696	.10595	-1.2632	.30023
	Equal variances not assumed			.814	42.824	.420	.08696	.10681	-1.2847	.30238
GenVisualSkillsPerct_Change	Equal variances assumed	1.359	.250	1.261	46	.214	4.7774	3.7897	-2.8509	12.4057
	Equal variances not assumed			1.248	41.762	.219	4.7774	3.8280	-2.9491	12.5038
EyeTrack_Change	Equal variances assumed	.014	.908	-.324	46	.748	-2.417	7.470	-17.453	12.618
	Equal variances not assumed			-.323	44.985	.748	-2.417	7.490	-17.504	12.669
FocusI_Change	Equal variances assumed	1.458	.233	.736	46	.465	6.468	8.788	-11.221	24.157
	Equal variances not assumed			.730	42.896	.469	6.468	8.858	-11.396	24.332
FocusII_Change	Equal variances assumed	.087	.769	2.577	46	.013	15.5357	6.0282	3.4016	27.6697
	Equal variances not assumed			2.575	45.493	.013	15.5357	6.0334	3.3874	27.6839
Binocular_Change	Equal variances assumed	1.542	.221	-.204	46	.839	-1.2191	5.9808	-13.2578	10.8196
	Equal variances not assumed			-.206	44.925	.838	-1.2191	5.9206	-13.1443	10.7061
Star_Change	Equal variances assumed	.635	.430	-.865	40	.392	-.3464	.4004	-1.1556	.4628
	Equal variances not assumed			-.853	35.093	.399	-.3464	.4059	-1.1703	.4776
SensoryQuotient_Change	Equal variances assumed	1.047	.312	2.010	42	.051	3.3636	1.6737	-.0140	6.7413
	Equal variances not assumed			2.010	40.191	.051	3.3636	1.6737	-.0185	6.7458
RWS_Change	Equal variances assumed	.002	.962	.401	41	.690	.8074	2.0117	-3.2554	4.8701
	Equal variances not assumed			.400	40.117	.691	.8074	2.0166	-3.2679	4.8826
CTSIB_Change	Equal variances assumed	.152	.699	-1.770	41	.084	-1.022	.0577	-.2187	.0144
	Equal variances not assumed			-1.772	40.990	.084	-1.022	.0577	-.2186	.0143
LOS_Change	Equal variances assumed	1.464	.233	-1.374	41	.177	-4.9827	3.6255	-12.3044	2.3391
	Equal variances not assumed			-1.385	37.879	.174	-4.9827	3.5969	-12.2649	2.2966

Table 7: Comparison of means between those with diagnoses and those without.

## Autism Related Dx vs. No Dx

Due to the small number of participants the outcome of this analysis is not generalizable though it is presented in Tables 8 and 9.

**Group Statistics**

	Autism Related Diagnosis?	N	Mean	Std. Deviation	Std. Error Mean
AudDigSpan_Change	Yes	3	.3000	.43589	.25166
	No	23	.2130	.40148	.08371
GenVisualSkillsPerct_Change	Yes	3	4.667	18.0093	10.3976
	No	23	-.217	14.6565	3.0561
EyeTrack_Change	Yes	3	7.00	29.138	16.823
	No	23	7.22	26.721	5.572
FocusI_Change	Yes	3	3.00	14.107	8.145
	No	23	-1.35	33.249	6.933
FocusII_Change	Yes	3	5.667	16.9214	9.7696
	No	23	-13.696	21.0852	4.3966
Binocular_Change	Yes	3	1.000	44.5758	25.7358
	No	23	6.739	17.9803	3.7492
Star_Change	Yes	2	-.400	.4243	.3000
	No	20	.660	1.4766	.3302
SensoryQuotient_Change	Yes	3	6.333	5.5076	3.1798
	No	22	2.727	6.1115	1.3030
RWS_Change	Yes	3	2.333	3.7859	2.1858
	No	22	2.955	6.2601	1.3346
CTSIB_Change	Yes	3	-.100	.1000	.0577
	No	22	.055	.1920	.0409
LOS_Change	Yes	3	3.333	3.5119	2.0276
	No	22	10.364	13.6610	2.9125

Table 8: Mean changes in variables by group (autism related diagnoses vs. no diagnoses)



**Independent Samples Test**

		Levene's Test for Equality of Variances		t-Test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
AudDigSpan_Change	Equal variances assumed	.024	.877	.350	24	.729	.08696	.24828	-.42546	.59938
	Equal variances not assumed			.328	2.464	.769	.08696	.26522	-.87099	1.04491
GenVisualSkillsPerct_Change	Equal variances assumed	.014	.906	.532	24	.600	4.8841	9.1860	-14.0750	23.8431
	Equal variances not assumed			.451	2.359	.690	4.8841	10.8375	-35.5656	45.3338
EyeTrack_Change	Equal variances assumed	.003	.954	-.013	24	.990	-.217	16.531	-34.336	33.901
	Equal variances not assumed			-.012	2.460	.991	-.217	17.721	-64.305	63.870
FocusI_Change	Equal variances assumed	2.329	.140	.221	24	.827	4.348	19.700	-36.312	45.007
	Equal variances not assumed			.407	5.678	.699	4.348	10.696	-22.188	30.884
FocusII_Change	Equal variances assumed	.260	.615	1.519	24	.142	19.3623	12.7497	-6.9518	45.6765
	Equal variances not assumed			1.807	2.881	.172	19.3623	10.7133	-15.5400	54.2647
Binocular_Change	Equal variances assumed	4.515	.044	-.435	24	.667	-5.7391	13.1933	-32.9687	21.4904
	Equal variances not assumed			-.221	2.086	.845	-5.7391	26.0075	-113.3474	101.8691
Star_Change	Equal variances assumed	.801	.382	-.991	20	.334	-1.0600	1.0697	-3.2913	1.1713
	Equal variances not assumed			-2.376	4.539	.069	-1.0600	.4461	-2.2427	.1227
SensoryQuotient_Change	Equal variances assumed	.241	.628	.967	23	.344	3.6061	3.7305	-4.1111	11.3232
	Equal variances not assumed			1.049	2.721	.378	3.6061	3.4364	-7.9934	15.2056
RWS_Change	Equal variances assumed	1.067	.312	-.166	23	.870	-.6212	3.7450	-8.3684	7.1260
	Equal variances not assumed			-.243	3.720	.821	-.6212	2.5611	-7.9480	6.7055
CTSIB_Change	Equal variances assumed	1.761	.198	-1.351	23	.190	-1.545	.1144	-.3912	.0821
	Equal variances not assumed			-2.183	4.411	.088	-1.545	.0708	-.3440	.0350
LOS_Change	Equal variances assumed	2.596	.121	-.872	23	.392	-7.0303	8.0591	-23.7019	9.6413
	Equal variances not assumed			-1.981	13.354	.069	-7.0303	3.5488	-14.6764	.6158

Table 9: Comparison of means between those with autism related diagnoses and those without any diagnosis.

Attention Deficit Disorder Related Dx vs. No Dx

Significant differences were only noted in focus II scores between those with an attention deficit disorder related diagnosis and those without any diagnosis (Table 11). Individuals without a diagnosis decreased on average more than 13 points while those in the ADD group increased 3.5. Even though statistically significant changes were not noted in the other variables, individuals with ADD had greater improvements than those without any diagnosis in 7 of the 11 variables (Table 10).

**Group Statistics**

	Attention Deficit Related Dx	N	Mean	Std. Deviation	Std. Error Mean
AudDigSpan_Change	Yes	15	.2333	.28950	.07475
	No	23	.2130	.40148	.08371
GenVisualSkillsPerct_Change	Yes	15	6.467	12.0408	3.1089
	No	23	-.217	14.6565	3.0561
EyeTrack_Change	Yes	15	9.93	26.084	6.735
	No	23	7.22	26.721	5.572
FocusI_Change	Yes	15	2.33	27.984	7.225
	No	23	-1.35	33.249	6.933
FocusII_Change	Yes	15	3.533	18.3531	4.7388
	No	23	-13.696	21.0852	4.3966
Binocular_Change	Yes	15	8.667	28.5624	7.3748
	No	23	6.739	17.9803	3.7492
Star_Change	Yes	14	.600	1.2496	.3340
	No	20	.660	1.4766	.3302
SensoryQuotient_Change	Yes	13	7.462	5.3637	1.4876
	No	22	2.727	6.1115	1.3030
RWS_Change	Yes	12	2.667	8.0941	2.3366
	No	22	2.955	6.2601	1.3346
CTSIB_Change	Yes	12	-.050	.1977	.0571
	No	22	.055	.1920	.0409
LOS_Change	Yes	12	4.917	7.5252	2.1723
	No	22	10.364	13.6610	2.9125

Table 10: Mean changes in variables by group (ADD related diagnosis vs. no diagnoses)

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
AudDigSpan_Change	Equal variances assumed	1.095	.302	.169	36	.867	.02029	.12016	-.22341	.26399
	Equal variances not assumed			.181	35.552	.858	.02029	.11223	-.20742	.24800
GenVisualSkillsPerct_Change	Equal variances assumed	.391	.536	1.470	36	.150	6.6841	4.5464	-2.5364	15.9045
	Equal variances not assumed			1.533	33.954	.134	6.6841	4.3595	-2.1759	15.5441
EyeTrack_Change	Equal variances assumed	.054	.817	.309	36	.759	2.716	8.786	-15.104	20.536
	Equal variances not assumed			.311	30.600	.758	2.716	8.741	-15.120	20.552
FocusI_Change	Equal variances assumed	.922	.343	.354	36	.725	3.681	10.390	-17.391	24.753
	Equal variances not assumed			.368	33.549	.715	3.681	10.014	-16.679	24.041
FocusII_Change	Equal variances assumed	.436	.513	2.587	36	.014	17.2290	6.6598	3.7222	30.7358
	Equal variances not assumed			2.665	32.943	.012	17.2290	6.4642	4.0766	30.3813
Binocular_Change	Equal variances assumed	6.146	.018	.256	36	.799	1.9275	7.5303	-13.3446	17.1997
	Equal variances not assumed			.233	21.268	.818	1.9275	8.2731	-15.2641	19.1191
Star_Change	Equal variances assumed	.183	.672	-1.124	32	.902	-.0600	.4840	-1.0458	.9258
	Equal variances not assumed			-1.128	30.739	.899	-.0600	.4696	-1.0182	.8982
SensoryQuotient_Change	Equal variances assumed	.183	.672	2.313	33	.027	4.7343	2.0467	.5702	8.8983
	Equal variances not assumed			2.394	28.043	.024	4.7343	1.9776	.6837	8.7848
RWS_Change	Equal variances assumed	.081	.777	-.115	32	.909	-.2879	2.4925	-5.3649	4.7892
	Equal variances not assumed			-.107	18.327	.916	-.2879	2.6909	-5.9340	5.3582
CTSIB_Change	Equal variances assumed	.008	.928	-1.502	32	.143	-1.045	.0696	-.2464	.0373
	Equal variances not assumed			-1.488	22.161	.151	-1.045	.0702	-.2502	.0411
LOS_Change	Equal variances assumed	2.855	.101	-1.274	32	.212	-5.4470	4.2755	-14.1559	3.2619
	Equal variances not assumed			-1.499	31.973	.144	-5.4470	3.6334	-12.8483	1.9544

Table 11: Comparison of means between those with ADD related diagnoses and those without any diagnosis.

Sensory Processing Related Dx vs. No Dx

No significant differences were noted between individuals with a diagnosis that affected sensory processing and those without any diagnosis (Table 13). There was a trend towards significance in the STAR reading score performance with greater improvement in those without a diagnosis (Table 12).

**Group Statistics**

	Sensory Processing Related Dx	N	Mean	Std. Deviation	Std. Error Mean
AudDigSpan_Change	Yes	9	.2556	.45031	.15010
	No	23	.2130	.40148	.08371
GenVisualSkillsPerct_Change	Yes	9	2.222	11.5734	3.8578
	No	23	-.217	14.6565	3.0561
EyeTrack_Change	Yes	9	4.89	23.454	7.818
	No	23	7.22	26.721	5.572
FocusI_Change	Yes	9	7.22	27.376	9.125
	No	23	-1.35	33.249	6.933
FocusII_Change	Yes	9	.111	23.1972	7.7324
	No	23	-13.696	21.0852	4.3966
Binocular_Change	Yes	9	-3.889	25.6537	8.5512
	No	23	6.739	17.9803	3.7492
Star_Change	Yes	7	-.357	.3359	.1270
	No	20	.660	1.4766	.3302
SensoryQuotient_Change	Yes	8	3.500	5.1270	1.8127
	No	22	2.727	6.1115	1.3030
RWS_Change	Yes	8	5.750	8.9722	3.1721
	No	22	2.955	6.2601	1.3346
CTSIB_Change	Yes	8	.013	.0991	.0350
	No	22	.055	.1920	.0409
LOS_Change	Yes	8	4.875	9.4784	3.3511
	No	22	10.364	13.6610	2.9125

Table 12: Mean changes in variables by group (sensory processing related diagnosis vs. no diagnoses)

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-Test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
AudDigSpan_Change	Equal variances assumed	.170	.683	.261	30	.796	.04251	.16319	-.29077	.37580
	Equal variances not assumed			.247	13.283	.808	.04251	.17187	-.32798	.41301
GenVisualSkillsPerct_Change	Equal variances assumed	.934	.341	.446	30	.659	2.4396	5.4657	-8.7229	13.6021
	Equal variances not assumed			.496	18.537	.626	2.4396	4.9216	-7.8789	12.7582
EyeTrack_Change	Equal variances assumed	.111	.742	-.229	30	.821	-2.329	10.179	-23.118	18.461
	Equal variances not assumed			-.243	16.630	.811	-2.329	9.600	-22.618	17.961
FocusI_Change	Equal variances assumed	.663	.422	.686	30	.498	8.570	12.499	-16.956	34.096
	Equal variances not assumed			.748	17.750	.464	8.570	11.460	-15.531	32.671
FocusII_Change	Equal variances assumed	.064	.802	1.621	30	.116	13.8068	8.5196	-3.5926	31.2061
	Equal variances not assumed			1.552	13.496	.144	13.8068	8.8949	-5.3380	32.9516
Binocular_Change	Equal variances assumed	2.249	.144	-1.331	30	.193	-10.6280	7.9862	-26.9381	5.6821
	Equal variances not assumed			-1.138	11.220	.279	-10.6280	9.3370	-31.1295	9.8734
Star_Change	Equal variances assumed	2.896	.101	-1.785	25	.086	-1.0171	.5699	-2.1909	.1566
	Equal variances not assumed			-2.875	23.414	.008	-1.0171	.3538	-1.7482	-.2861
SensoryQuotient_Change	Equal variances assumed	.188	.668	.318	28	.753	.7727	2.4280	-4.2008	5.7462
	Equal variances not assumed			.346	14.787	.734	.7727	2.2324	-3.9914	5.5369
RWS_Change	Equal variances assumed	1.030	.319	.962	28	.344	2.7955	2.9052	-3.1556	8.7465
	Equal variances not assumed			.812	9.597	.436	2.7955	3.4415	-4.9165	10.5074
CTSIB_Change	Equal variances assumed	4.152	.051	-.587	28	.562	-.0420	.0716	-.1888	.1047
	Equal variances not assumed			-.780	24.156	.443	-.0420	.0539	-.1532	.0691
LOS_Change	Equal variances assumed	1.198	.283	-1.043	28	.306	-5.4886	5.2618	-16.2669	5.2897
	Equal variances not assumed			-1.236	18.123	.232	-5.4886	4.4399	-14.8120	3.8347

Table 13: Comparison of means between those with sensory processing related diagnoses and those without any diagnosis.

Visual Impairment Dx vs. No Dx

Due to the small number of participants the outcome of this analysis is not generalizable though it is presented in Tables 14 and 15.

**Group Statistics**

	Visual Processing Related Dx	N	Mean	Std. Deviation	Std. Error Mean
AudDigSpan_Change	Yes	3	.3667	.28868	.16667
	No	23	.2130	.40148	.08371
GenVisualSkillsPerct_Change	Yes	3	4.333	15.5671	8.9876
	No	23	-.217	14.6565	3.0561
EyeTrack_Change	Yes	3	-7.33	36.556	21.106
	No	23	7.22	26.721	5.572
FocusI_Change	Yes	3	7.67	18.556	10.713
	No	23	-1.35	33.249	6.933
FocusII_Change	Yes	3	17.667	24.9466	14.4029
	No	23	-13.696	21.0852	4.3966
Binocular_Change	Yes	3	-1.000	1.0000	.5774
	No	23	6.739	17.9803	3.7492
Star_Change	Yes	3	-.433	.5859	.3383
	No	20	.660	1.4766	.3302
SensoryQuotient_Change	Yes	3	4.000	1.7321	1.0000
	No	22	2.727	6.1115	1.3030
RWS_Change	Yes	3	3.667	4.7258	2.7285
	No	22	2.955	6.2601	1.3346
CTSIB_Change	Yes	3	.033	.1528	.0882
	No	22	.055	.1920	.0409
LOS_Change	Yes	3	8.667	17.3877	10.0388
	No	22	10.364	13.6610	2.9125

Table 14: Mean changes in variables by group (visual impairment related diagnosis vs. no diagnoses)

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-Test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
AudDigSpan_Change	Equal variances assumed	.367	.550	.636	24	.531	.15362	.24144	-.34468	.65193
	Equal variances not assumed			.824	3.118	.468	.15362	.18651	-.42738	.73463
GenVisualSkillsPerct_Change	Equal variances assumed	.017	.897	.503	24	.619	4.5507	9.0448	-14.1168	23.2183
	Equal variances not assumed			.479	2.486	.671	4.5507	9.4930	-29.5186	38.6201
EyeTrack_Change	Equal variances assumed	.323	.575	-.857	24	.400	-14.551	16.988	-49.612	20.510
	Equal variances not assumed			-.667	2.287	.566	-14.551	21.829	-98.020	68.919
FocusI_Change	Equal variances assumed	1.582	.221	.455	24	.653	9.014	19.816	-31.883	49.912
	Equal variances not assumed			.706	3.963	.519	9.014	12.761	-26.548	44.577
FocusII_Change	Equal variances assumed	.108	.746	2.384	24	.025	31.3623	13.1570	4.2076	58.5170
	Equal variances not assumed			2.083	2.388	.152	31.3623	15.0590	-24.3150	87.0396
Binocular_Change	Equal variances assumed	2.734	.111	-.732	24	.471	-7.7391	10.5688	-29.5521	14.0739
	Equal variances not assumed			-2.040	22.914	.053	-7.7391	3.7934	-15.5879	.1096
Star_Change	Equal variances assumed	.752	.396	-1.247	21	.226	-1.0933	.8768	-2.9167	.7301
	Equal variances not assumed			-2.313	6.960	.054	-1.0933	.4727	-2.2124	.0258
SensoryQuotient_Change	Equal variances assumed	2.780	.109	.353	23	.727	1.2727	3.6078	-6.1907	8.7361
	Equal variances not assumed			.775	11.421	.454	1.2727	1.6425	-2.3262	4.8716
RWS_Change	Equal variances assumed	.504	.485	.188	23	.852	.7121	3.7801	-7.1075	8.5318
	Equal variances not assumed			.234	3.055	.829	.7121	3.0374	-8.8566	10.2808
CTSIB_Change	Equal variances assumed	.417	.525	-.182	23	.857	-.0212	.1163	-.2618	.2194
	Equal variances not assumed			-.218	2.942	.842	-.0212	.0972	-.3341	.2917
LOS_Change	Equal variances assumed	.264	.612	-.197	23	.846	-1.6970	8.6315	-19.5525	16.1585
	Equal variances not assumed			-.162	2.349	.884	-1.6970	10.4528	-40.8342	37.4403

Table 15: Comparison of means between those with visual impairment diagnoses and those without any diagnosis.

Auditory Processing Dx vs. No Dx

Due to the small number of participants the outcome of this analysis is not generalizable though it is presented in Tables 16 and 17.

**Group Statistics**

	Auditory Processing Related Dx	N	Mean	Std. Deviation	Std. Error Mean
AudDigSpan_Change	Yes	4	.5000	.53541	.26771
	No	23	.2130	.40148	.08371
GenVisualSkillsPerct_Change	Yes	4	1.500	7.8951	3.9476
	No	23	-.217	14.6565	3.0561
EyeTrack_Change	Yes	4	-4.00	22.554	11.277
	No	23	7.22	26.721	5.572
FocusI_Change	Yes	4	22.50	35.313	17.656
	No	23	-1.35	33.249	6.933
FocusII_Change	Yes	4	-8.750	32.0663	16.0332
	No	23	-13.696	21.0852	4.3966
Binocular_Change	Yes	4	-3.500	26.1852	13.0926
	No	23	6.739	17.9803	3.7492
Star_Change	Yes	3	-.267	.4619	.2667
	No	20	.660	1.4766	.3302
SensoryQuotient_Change	Yes	3	4.667	5.1316	2.9627
	No	22	2.727	6.1115	1.3030
RWS_Change	Yes	3	1.000	5.2915	3.0551
	No	22	2.955	6.2601	1.3346
CTSIB_Change	Yes	3	.067	.1528	.0882
	No	22	.055	.1920	.0409
LOS_Change	Yes	3	7.000	10.5357	6.0828
	No	22	10.364	13.6610	2.9125

Table 16: Mean changes in variables by group (auditory processing related diagnosis vs. no diagnoses)



**Independent Samples Test**

		Levene's Test for Equality of Variances		t-Test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
AudDigSpan_Change	Equal variances assumed	.079	.782	1.262	25	.219	-.28696	.22743	-.18144	.75535
	Equal variances not assumed			1.023	3.611	.370	-.28696	.28049	-.52607	1.09998
GenVisualSkillsPerct_Change	Equal variances assumed	1.707	.203	.226	25	.823	1.7174	7.5943	-13.9234	17.3581
	Equal variances not assumed			.344	7.315	.741	1.7174	4.9923	-9.9851	13.4199
EyeTrack_Change	Equal variances assumed	.196	.662	-.789	25	.438	-11.217	14.224	-40.511	18.077
	Equal variances not assumed			-.892	4.606	.417	-11.217	12.578	-44.400	21.966
FocusI_Change	Equal variances assumed	.001	.970	1.314	25	.201	23.848	18.150	-13.533	61.229
	Equal variances not assumed			1.257	3.983	.277	23.848	18.969	-28.904	76.600
FocusII_Change	Equal variances assumed	1.218	.280	.402	25	.691	4.9457	12.2895	-20.3650	30.2563
	Equal variances not assumed			.297	3.465	.783	4.9457	16.6250	-44.1611	54.0524
Binocular_Change	Equal variances assumed	.915	.348	-.987	25	.333	-10.2391	10.3750	-31.6069	11.1286
	Equal variances not assumed			-.752	3.509	.499	-10.2391	13.6188	-50.2322	29.7539
Star_Change	Equal variances assumed	1.018	.324	-1.060	21	.301	-.9267	.8741	-2.7444	.8911
	Equal variances not assumed			-2.183	10.288	.053	-.9267	.4244	-1.8688	.0154
SensoryQuotient_Change	Equal variances assumed	.248	.623	.522	23	.606	1.9394	3.7128	-5.7412	9.6200
	Equal variances not assumed			.599	2.838	.593	1.9394	3.2366	-8.7008	12.5796
RWS_Change	Equal variances assumed	.248	.623	-.514	23	.612	-1.9545	3.8047	-9.8251	5.9160
	Equal variances not assumed			-.586	2.826	.601	-1.9545	3.3339	-12.9426	9.0335
CTSIB_Change	Equal variances assumed	.417	.525	.104	23	.918	.0121	.1163	-.2285	.2527
	Equal variances not assumed			.125	2.942	.909	.0121	.0972	-.3008	.3250
LOS_Change	Equal variances assumed	.384	.541	-.407	23	.688	-3.3636	8.2583	-20.4473	13.7200
	Equal variances not assumed			-.499	3.007	.652	-3.3636	6.7441	-24.7976	18.0703

Table 17: Comparison of means between those with auditory processing related diagnoses and those without any diagnosis.

**Group Differences (Based on Session Length)**

**Question: Did the length of the session influence the changes among participants?**

No significant differences in improvements were noted between individuals who participated in a more condensed 4 week session and those in a 10 week session (Table 19). Observation of mean changes indicates there might be a trend towards greater improvements in visual skills and the overall sensory quotient in individuals who took the condensed summer sessions while individuals that spread the program over 10 weeks seemed to improve more in reading scores and balance related measures (Table 18).

**Group Statistics**

	CourseLength	N	Mean	Std. Deviation	Std. Error Mean
AudDigSpan_Change	Summer-4wk	14	.3000	.44376	.11860
	School Year - 10 wk	34	.2412	.33405	.05729
GenVisualSkillsPerct_Change	Summer-4wk	14	5.429	14.6588	3.9177
	School Year - 10 wk	34	.971	12.5493	2.1522
EyeTrack_Change	Summer-4wk	14	10.71	21.481	5.741
	School Year - 10 wk	34	4.00	27.175	4.660
FocusI_Change	Summer-4wk	14	8.50	36.965	9.879
	School Year - 10 wk	34	-.65	27.227	4.669
FocusII_Change	Summer-4wk	14	-.071	24.1070	6.4429
	School Year - 10 wk	34	-7.882	21.1456	3.6264
Binocular_Change	Summer-4wk	14	2.000	18.7206	5.0033
	School Year - 10 wk	34	7.794	21.2057	3.6368
Star_Change	Summer-4wk	13	.292	.8827	.2448
	School Year - 10 wk	29	.562	1.4445	.2682
SensoryQuotient_Change	Summer-4wk	14	5.786	6.1542	1.6448
	School Year - 10 wk	30	3.767	5.5316	1.0099
RWS_Change	Summer-4wk	14	2.571	7.9876	2.1348
	School Year - 10 wk	29	3.724	5.8181	1.0804
CTSIB_Change	Summer-4wk	14	-.036	.1865	.0498
	School Year - 10 wk	29	.024	.1976	.0367
LOS_Change	Summer-4wk	14	4.071	9.8798	2.6405
	School Year - 10 wk	29	9.793	12.6474	2.3486

Table 18: Mean scores for variables by session length.

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
AudDigSpan_Change	Equal variances assumed	1.205	.278	.503	46	.617	.05882	.11698	-.17665	.29429
	Equal variances not assumed			.447	19.359	.660	.05882	.13171	-.21651	.33415
GenVisualSkillsPerct_Change	Equal variances assumed	.392	.535	1.065	46	.292	4.4580	4.1853	-3.9665	12.8825
	Equal variances not assumed			.997	21.267	.330	4.4580	4.4699	-4.8307	13.7466
EyeTrack_Change	Equal variances assumed	.549	.463	.823	46	.415	6.714	8.159	-9.710	23.138
	Equal variances not assumed			.908	30.552	.371	6.714	7.395	-8.376	21.805
FocusI_Change	Equal variances assumed	.978	.328	.951	46	.347	9.147	9.621	-10.220	28.514
	Equal variances not assumed			.837	19.082	.413	9.147	10.927	-13.717	32.011
FocusII_Change	Equal variances assumed	.128	.722	1.117	46	.270	7.8109	6.9935	-6.2662	21.8880
	Equal variances not assumed			1.056	21.685	.302	7.8109	7.3934	-7.5349	23.1567
Binocular_Change	Equal variances assumed	1.125	.294	-.889	46	.379	-5.7941	6.5206	-18.9195	7.3312
	Equal variances not assumed			-.937	27.357	.357	-5.7941	6.1854	-18.4777	6.8895
Star_Change	Equal variances assumed	.498	.484	-.621	40	.538	-.2698	.4345	-1.1479	.6083
	Equal variances not assumed			-.743	35.922	.462	-.2698	.3632	-1.0063	.4668
SensoryQuotient_Change	Equal variances assumed	.798	.377	1.088	42	.283	2.0190	1.8551	-1.7247	5.7628
	Equal variances not assumed			1.046	23.174	.306	2.0190	1.9301	-1.9720	6.0101
RWS_Change	Equal variances assumed	.700	.408	-.538	41	.593	-1.1527	2.1426	-5.4799	3.1744
	Equal variances not assumed			-.482	19.906	.635	-1.1527	2.3926	-6.1451	3.8397
CTSIB_Change	Equal variances assumed	.159	.692	-.947	41	.349	-.0599	.0632	-.1874	.0677
	Equal variances not assumed			-.967	27.198	.342	-.0599	.0619	-.1868	.0671
LOS_Change	Equal variances assumed	.294	.591	-1.485	41	.145	-5.7217	3.8532	-13.5034	2.0601
	Equal variances not assumed			-1.619	32.315	.115	-5.7217	3.5338	-12.9171	1.4737

Table 19: Comparison of means for participants involved in different session lengths.