Comparing a Multisensory Approach to Traditional Speech and Language Intervention: Effects on the Language Abilities of Children with Fetal Alcohol Syndrome (Preliminary Results)

Élisa Langlois,B.Sc.S, M.Sc.S. student
Chantal Mayer-Crittenden, Ph.D.
Laurentian University, Sudbury ON, Canada

Context

- Providing therapy within a multisensory environment with various clinical populations can be very advantageous (e.g. Fowler, 2008; Fava & Strauss, 2010; Lotan, & Merrick, 2004; Mays & Baird, 2015).
- This offers various sensory experiences, within an atmosphere of trust and relaxation, promoting the stimulation of the senses.
- This environment could lead to increased abilities in communication, attention and concentration in people with learning disabilities or other impairments.
- Multisensory environments are common practices among the physiotherapy and occupational therapy fields.
- This approach can apply to many different clients, young and old, with physical or sensory impairments, cognitive delay, as well as developmental and intellectual disabilities, such is the case with **the foetal alcohol syndrome population (FAS) or Fetal Alcohol Spectrum Disorder (FASD)** (e.g. Franklin, Deitz, Jirikowic, and Astley, 2008; Abele-Webster, Magill-Evans and Pei, 2012).

PROBLEMATIC

Research showing the efficacy of a multisensory therapy approach in the field of speech and language pathology is scarce. There is a lack of in-depth knowledge and research on the effects of this multisensory approach. The maintenance and construction of a multisensory room requires considerable financial investment.

Objectives and hypothesis

Objectives

1. To compare the short terms effects of a multi-sensory approach on children's **communication**, **behaviour**, **motivation**, **attention** and **language** with a traditional approach in SLP.
2. To determine the feasibility of this type of study by **creating a multisensory** room within a budget of $1500 (Canadian dollars), making it more accessible to clinicians from various settings.

Hypotheses 1:

If various clinical populations benefit from a multisensory approach then it is postulated that greater gains in communication will be made by the children diagnosed with FASD in the multisensory approach group in comparison to those made by the children in the traditional group and the delayed therapy group.

Hypotheses 2:

Since the access to multisensory materials and equipment is now readily available on various online centralized networks (i.e. Kijiji) and since there are many do-it-yourself projects within this type of environment, the creation of a multisensory room for $1500 should be feasible.

Method

A **single subject design (SSD)** was used. At the outset, 8 participants were included in the study. Two participants didn't meet the inclusion criteria, two participants didn't complete the intervention sessions which lead to the elimination of a control subject to balance out the groups, leaving us with 3 participants.

P1	The first participant received speech and language therapy in an multisensory environment (8 sessions; twice a week)
P2	The second participant received traditional speech and language therapy (8 sessions; twice a week)
P3	The third participant (control) will receive intervention after the two first groups (delayed): control group

Participants:

Groups	P1	P2	P3
Age	7;08	7;01	8;02
Gender	Male	Male	Male
Leiter (IQ)	79	87	85
Diagnosis	ARND	Full FASD	Partial FSAD

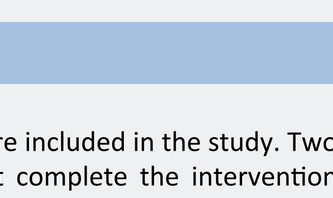
- ❑ **FASD:** Fetal alcohol spectrum disorder
- ❑ **ARND:** Alcohol-Related Neurodevelopmental Disorder
- ❑ **pFAS:** Partial Fetal Alcohol Syndrom

Measures:

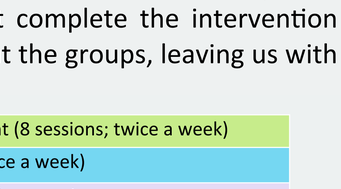
Two types of measures were used in this study: **repeated measures** and **pre-post standardized assessments**. Five repeated measures were used track progress in targeted skills at baseline and across the treatment period.

Environment

Traditional environment
- Standard room (suitable for this purpose): table & chairs



Multi-sensory environment
- Multi-sensory stimuli were presented simultaneously through sensory modalities of vision, hearing and touch



VISUAL STIMULATION
- Fiber optic lights
- Multiple light effects
- Light projectors
- Disco ball
- Mirrors
- Lava lamp
- Aquarium with LED light, fish and bubbles
- Interactive carpet with optical fibers
- Veiled tent
- Glow stars

AUDITORY STIMULATION
- Relaxation Music
- Background noise
- Bubble

TACTILE STIMULATION
- Giant beanbag
- Panel with tactile sensation (soft, rough, smooth, hard…)
- Variety of toys
- Kinetic sand
- Fan
- Colorful rice play-tub
- Water play-tub
- Soft pillows



The creation of this multi-sensory room:

Included in this room were items we purchased from various online centralized networks (e.g. Kijiji), materials created in-house (e.g. Panel with tactile sensation) as well as items that our speech language pathology clinic already owned (i.e. objects commonly found in clinical settings).

Preliminary results

Measures (dependent variables):
1) Repeated measures (see table 1.)
2) Standardized pre/post-treatment assessments (see table 2.)

Table 1. Repeated measures effect sizes

	P1 (multi sensory)		P2 (traditional)		P3 (delayed)	
Task	**Type**	**Effect size**	**Type**	**Effect size**	**Type**	**Effect size**
Sentence repetition	d	-0,62	d	0,85*	d	N/A
	$SMD_{baseline}$	-0,27	$SMD_{baseline}$	0,27	$SMD_{baseline}$	N/A
	SMD_{pooled}	-0,46	SMD_{pooled}	0,35	SMD_{pooled}	N/A
Rapid Automatic Naming (time)	d	-0,45	d	-0,27	d	N/A
	$SMD_{baseline}$	-0,32	$SMD_{baseline}$	0,69	$SMD_{baseline}$	N/A
	SMD_{pooled}	-0,05	SMD_{pooled}	0,28	SMD_{pooled}	N/A
Rapid Automatic Naming (errors)	d	1,10*	D	-1,35	d	N/A
	$SMD_{baseline}$	0,93*	$SMD_{baseline}$	-1,88	$SMD_{baseline}$	N/A
	SMD_{pooled}	0,58	SMD_{pooled}	-0,63	SMD_{pooled}	N/A
Observation checklist**	d	2,20*	d	-1,41	d	N/A
	$SMD_{baseline}$	1,44*	$SMD_{baseline}$	-1,34	$SMD_{baseline}$	N/A
	SMD_{pooled}	1,46*	SMD_{pooled}	-0,47	SMD_{pooled}	N/A
Sustained Attention	d	0,97*	d	1,61*	d	N/A
	$SMD_{baseline}$	0,66	$SMD_{baseline}$	0,76	$SMD_{baseline}$	N/A
	SMD_{pooled}	0,69	SMD_{pooled}	1,02	SMD_{pooled}	N/A

Collection of these data are **currently in process**

*Effect sizes of 0.8 or larger indicate clinically significant change
** **Covers**: internal and external social-emotional behavior, compliance, motivation, attention, ability to attend to the task, etc.

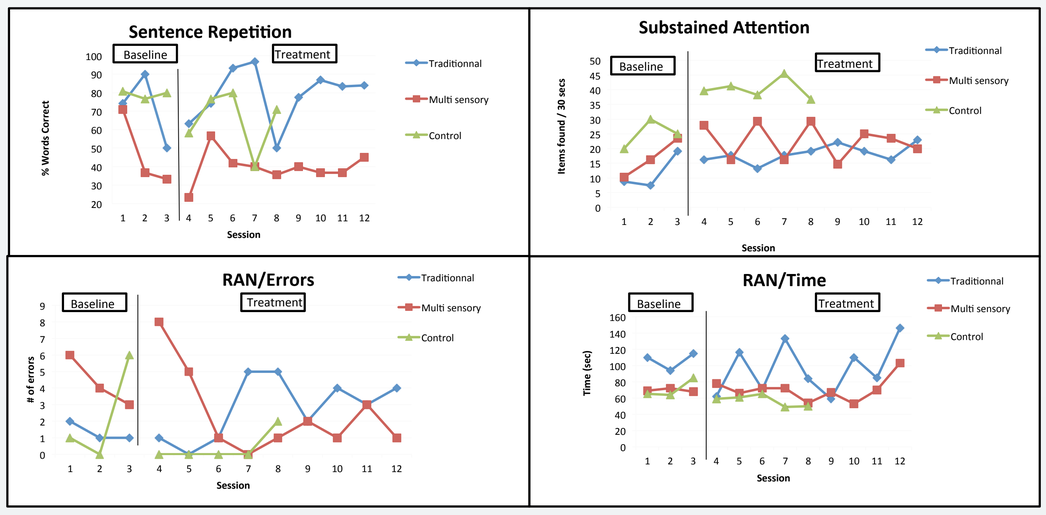
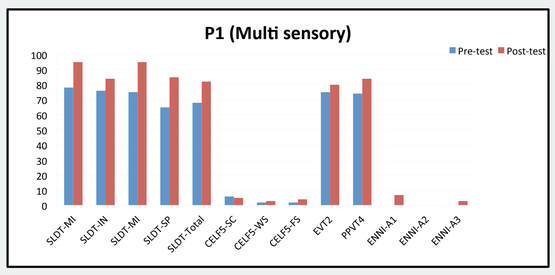


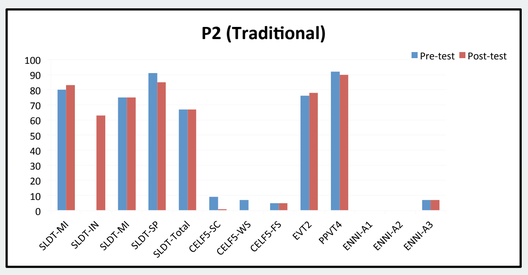
Table 2. Pre- and post-test scores for standardized language tests

	P1 (Multi sensory)		P2 (Traditional)		P3 (Delayed)	
Test	**Pre-test**	**Post-test**	**Pre-test**	**Post-test**	**Pre-test**	**Post-test**
SLDT-MI	78	95	80	83	87	N/A
SLDT-IN	76	84	<60	63	77	N/A
SLDT-MI	75	95	75	75	85	N/A
SLDT-SP	65	85	91	85	92	N/A
SLDT-Total	68	82	67	67	79	N/A
CELF5-SC	6	5	9	1	5	N/A
CELF5-WS	2	3	7	--	4	N/A
CELF5-FS	2	4*	5	5	1	N/A
EVT	75	80	76	78	88	N/A
PPVT	74	84*	92	90	88	N/A
ENNI-A1	<1	7	<1	<1	<1	N/A
ENNI-A2	<1	<1	<1	<1	<1	N/A
ENNI-A3	<1	3	7	7	2	N/A

Collection of these data are **currently in process**

* Post-test score exceeds the 90% confidence interval surrounding the pre-test score when available





Discussion and Conclusion

The results obtained in the pre and post- evaluations showed that participant 1 made more gains than participant 2. More gains were made post-test by participant 1 who receive intervention in the multi-sensory environment on tests that assessed pragmatic skills, narrative skills and receptive vocabulary. For the repeated measures, pragmatic abilities improved significantly over time for P1 but not for P2. In fact, P2 regressed in this area. P1 also showed gains in lexical processing efficiency (RAN). P2 showed gains in sentence repetition. It should be noted that P1 had a lot of difficulty with this task. Both participants made gains in sustained attention. However, since we are still missing a few data from participant 3 (currently in process), we are unable to confirm with certainty hypothesis 1, though the preliminary results are very promising. Hypothesis 2 can be accepted. The multisensory room was created within a budget of $1500.

Acknowledgement

We would like to thank Santé Canada and the "Consortium national de formation en santé"(CNFS) for their financial contribution to this project.

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