

Evaluation of the Language Acquisition through Motor Planning (LAMP) program with children with autism spectrum disorders (ASD)

An Autism Spectrum Australia (Aspect) research project supported by Nigel Duckett, Liberator Pty. Ltd. and John and Cindy Hallorhan, The Centre for AAC and Autism in the USA.

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Background

It is estimated that 30 to 50 per cent of individuals with an autism spectrum disorder (ASD) do not use functional speech (Peters & Gillberg, 1999; National Research Council, 2001). In order to address this difficulty, professionals working with children with ASD often introduce alternative and augmentative communication (AAC) strategies in order to optimise communication (Johnston et al, 2004).

The National Standards Report recently produced by the National Autism Centre lists AAC as a treatment for ASD that is emerging and cannot be discounted as an effective treatment at this point in time (National Autism Centre, 2009). Yet although the use of AAC with individuals with ASD is becoming common practice, it is recognised that there is little quantitative data to support such treatments (Hill, 2006). Furthermore, researchers have indicated that there are still questions that need answering with regard to the effectiveness of using AAC with people with ASD (Mirenda, 2001; Schlosser & Blischak, 2001). This calls for more high quality research in the area.

The Language Acquisition through Motor Planning (LAMP) Program (Halloran, 2012) is marketed as a program that develops communication for individuals with autism spectrum disorders through the use of high-tech alternative and augmentative strategies. While there are a number of programs that provide a specific set of guidelines for developing the communication of children with autism through low-tech AAC systems, such as Picture Exchange Communication System (PECS), LAMP is the only program that provides specific guidelines and teaching strategies for introducing high-tech AAC with children with autism.

What is the LAMP program?

The LAMP program is described as being particularly beneficial for children with autism, because of its heavy emphasis on motor planning. The use of consistent motor patterns is advantageous because it:

- » decreases the need to learn the meaning of a symbol: this is particularly important when only five per cent of words frequently used by toddlers are picture producers (Banajee *et al.*, 2003);
- » results in more automatic and therefore faster communication over time (e.g. touch typing); and
- » reduces the cognitive demands associated with continually analysing and choosing from different symbol sets.

The LAMP program has been developed in association with the Prentke Romich Company (PRC). PRC developed the electronic communication devices that are utilised in the LAMP program.

These devices are loaded with Minspeak software that was developed by Semantic Compactions Systems. Minspeak supports the use of consistent motor patterns through:

- » a small set of consistently located icons;
- » a large vocabulary that is accessible through short motor sequence;
- » a vocabulary that is expandable without changing motor patterns.

Aside from the unique use of the high-tech AAC device, the LAMP program incorporates many elements that are proven methods for increasing the communication of children with autism. These include following the child's lead; providing therapy when the child is in the optimal arousal zone; creating an opportunity for communication; establishing an interaction; and having a consequence for communication.

How did Aspect trial LAMP and Minspeak on the Vantage Lite AAC device?

Nine children with a diagnosis of autism spectrum disorder (ASD) were selected to take part in this research. Three of the children were involved in an Aspect Building Blocks Early Intervention program, while the remaining six attended an Aspect school (three at the Central Coast and three at the South Coast).

The participants were selected based on the number of other methods of intervention that had been previously trialled. Most of the children had a communication system in place, that may not have been used consistently or spontaneously (these included non-verbal or symbolic methods). In addition, consideration was given to the families' willingness to be trained and participate in the research. The children were aged between four and 12 years.

Each family received individual training in LAMP and Minspeak theory, and practical training in using the Vantage Lite, provided by their speech therapist. Similar formalised training was also provided at the two participating schools for the teachers who were going to be involved in implementation of the research. The children were observed across two environments (home and school) over a period of 14 weeks in total.

"It has been his voice. It has also given him further confidence in being heard and listened to..." Parent.

Baseline data, collected across home and school environments, consisted of:

- » Aspect Building Blocks Communication Checklists - expressive and receptive
- » Interests Inventory (LAMP specific)
- » LAMP Summary form (LAMP specific)
- » Parent/teacher questionnaire
- » Aspect Building Blocks Spoken Language Assessment
- » Sensory questionnaire (optional - to gather more information about the child's sensory needs).

Five weeks of structured and un-structured use of the Vantage Lite and LAMP took place after initial assessments and baseline data gathering. Structured

sessions involved structured teaching, including focus words, prompting, strategic movement onto next level (e.g. from one to two word phrases). The non-structured sessions were any other time the device was used in the child's natural settings to communicate. Prompting and vocabulary selection were still used in these sessions to maximise success and generalise outcomes

"They are using new words that no one has taught them..." Classroom Teacher.

The five weeks of intervention were followed by two weeks of maintenance after which final data were collected.

What were the outcomes?

Each participating child's data were written up as a case study (see summary of case study 1) and the overall outcomes were analysed for common themes. The results indicate an improvement for all participants, whether in use of symbolic communication, vocabulary, length of utterances, spontaneous use of language and independence, as well as in other areas such as general interest, motivation and social interaction.

Although these gains differed in the level of increase or change for each participant, there were changes and improvements seen for all participants. This change was seen to be confirmed and reported by their caregivers, teachers or the speech pathologist involved.

The greatest gains and outcomes seen from the results of implementation of LAMP, through the Vantage Lite, were improvements in expressive communication. Four out of the eight participants went from being mainly in the pre-intentional/intentional stages of communication, to using intentional and symbolic communication, through the Vantage Lite, while the other four participants who were already using both intentional and symbolic communication, increased their use of symbolic communication across the functions of communication, and as a consistent method of communicating.

Prior to the research 87% of participants were using a method of communication to protest; 62% were able to gain attention, greet and farewell or express feelings using some sort of communication or physical behaviour (e.g. hugging another person). Only two of the participants (25%) were commenting in some

way, at the pre-assessment. At the post-assessment and maintenance stages, all the participants were requesting using a symbolic means of communication (device or spoken language) and 100% of participants were developing social communication through commenting. Other improvements in functional communication were an increase of 75% of participants developing communication to gain attention and express feelings, and 87% using communication to greet or farewell others. The significance of this is that all of the participants had previous intervention, ranging in degree and number of years (up to nine years) yet only 25% were able to comment prior to participating in the research.

Case 1 - Peter

Peter is a 6 year old boy who had been on Aspect Building Blocks caseload for 3 years - he received 1 year of group therapy and 2 years of fortnightly home-based speech therapy. His speech pathologist had previously tried a range of communication strategies including picture exchange and signed language. His response was inconsistent in all of these systems.

Expressive language

Peter was introduced to the LAMP methodology with a Vantage Lite device at home.

Peter was using symbolic communication mainly to request and protest, at the pre-assessment, with pre-intentional and intentional communication for other functions such as refusing and greeting. He developed more symbolic communication at post-assessment and maintenance across the functions of communication, using both spoken language and the device at a single word and phrase level.

Peter moved through use of the Vantage Lite to express himself for the range of functions mentioned, at a rate of single word to 2 word phrases in a session (prompted to spontaneous use); 3 word phrases in a week (prompted and spontaneous); and use of up to 12 words in the first week of implementation. See the graph below for a representation of Peter's vocabulary development using the device.

Prior to implementing use of the Vantage Lite, Peter was mainly requesting using objects and gestures, using some single words or phrases, and visual supports when prompted. He was commenting

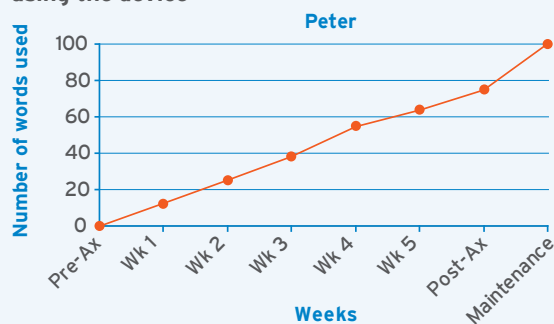
Another significant increase in expressive communication measures was in the range of vocabulary and the length of utterances used by participants. Fifty per cent of participants had up to 10 words by session five; while the other 50% had greater than 30 words being used spontaneously on the device, by session five (three of these had a vocabulary of between 40 to 65 words at this stage).

There were other positive results of the impact of children being given a voice, on behaviour, motivation, play skills and for some, academic improvements.

inconsistently, and mainly gaining attention, refusing or protesting by using less preferred behaviours. After implementing the Vantage Lite, Peter was using spoken language at the phrase level to request, comment, refuse, gain attention, and express feelings.

NB: Peter was creating the two and three word phrases from the single words stored in the device; there are no pre-determined phrases programed in Minspeak.

Development of spontaneous communication using the device



(Numbers were counted at the structured sessions and represent use of words on the Vantage Lite)

Receptive language

Peter was able to follow 1-part directions in and out of routine, 2-part sequential directions, and was acquiring 3-part direction with prompts, at the pre-assessment stage. This was consistent across the research with a decrease in reliance on prompts.

Peter was able to understand a variety of words and information at pre-assessment, including preferred/non-preferred food/items/people, comments about surroundings and changes in routines, and greetings. He moved from needing more visual/object prompts to responding to verbal prompts alone.

Conclusion

The results of this research add to the evidence regarding the effectiveness of using AAC with people with an ASD (Mirenda, 2001; Schlosser & Blischak, 2001), and adds to the knowledge of why AAC systems are potentially beneficial for children with autism, (The National Standards Report). Effective teaching of motor plans, using the LAMP theory, can be seen to allow for increased storage and retention of symbolic information, resulting with more automatic communication over time, and reducing the cognitive demands associated with analysing and choosing from different symbol sets, as described in the LAMP Manuals (Halloran and Emerson, 2006; Halloran and Halloran, 2012).

The families of the children who took part in the Aspect research all requested support with an application for a Vantage Lite device of their own to continue their progress in communication development. All families were successfully supported by Enable NSW.

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The Aspect vision for research

Aspect is committed to improving the lives of individuals with ASDs through service provision and evaluation for continuous improvement. As the largest ASD-specific service provider in the country and one of the largest in the world, Aspect is well positioned to facilitate and conduct such evaluation. Aspect undertakes and supports research to evaluate Aspect's and other programs, practices and interventions in order to provide improved services and interventions for children and adults with ASDs. Aspect also promotes research at state and national levels and facilitates tertiary students' research. As our aim is to develop our knowledge of what can be done to support individuals with ASDs, research findings will also make a significant contribution to the field of international research into ASDs. Aspect requires ongoing funding to support these key initiatives and is always keen to talk to potential new partners and donors.



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