

Evaluation of Speech Pathology Intervention within a Multi-faceted Early Intervention Program for Children At Risk

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Abstract

Research has consistently confirmed that children from vulnerable families, where there is social disadvantage, parental mental health problems, substance abuse or domestic violence, are at risk of long-term language delays and disorders. If allowed to persist these language difficulties can then directly contribute to a range of social, emotional and academic difficulties across the lifespan. A pilot study reported in 2009 evaluated the Spilstead Model (SM) of Early Intervention for vulnerable children. Results from a battery of standardised clinician and parent rated measures indicated that the SM of early intervention had the potential to maximise outcomes for both children and families with particular gains noted in speech and language skills. This associated study aimed to further examine language outcomes for a larger sample of children who received Speech Pathology services under the Spilstead Model. The study targeted all children attending the Spilstead Therapeutic Preschool who presented on enrolment with language delays. The Clinical Evaluation of Language Fundamental's Pre-school 2nd Edition was then administered to assess specific language skills via pre-post test research design. Results from a sample of 46 children indicated large effect size changes in receptive language at 0.87 and core language at 0.82 at a $p < 0.001$ level of significance. A moderate effect size of 0.62 was also found in expressive language scores at $p < 0.001$ level of significance. The significant role of speech and language pathology for at-risk populations and implications for long-term child outcomes are discussed.

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The Dalwood Spilstead Service (DSS) attempts to maximize the benefits of evidence-based interventions for vulnerable families and children who have experienced early childhood trauma within a comprehensive integrated centre-based approach. The Spilstead Model (SM) (Gwynne, Blick, & Duffy, 2009), combines parent support, home visiting and parent-child attachment interventions with multi-disciplinary early intervention and centre-based early childhood programming, in an environment of family-centred and strength-based practice. As a tertiary unit of the Northern Sydney Local Health District, this 'one stop shop' program is unique in its ability to provide holistic yet intensive services for vulnerable families under one service umbrella and from the one team. This enables optimum engagement with families and ensures co-ordination and consistency of service delivery. The service is targeted towards families with complex parental issues (i.e. mental illness, substance abuse, domestic violence, social isolation / culturally and linguistically diverse

backgrounds) and children under 9 years of age who are experiencing social, emotional or developmental delays/disorders. These families present with a multiplicity of both parent and child risk factors plus early indicators of poor childhood resilience. A pilot evaluation of the program indicated potential benefits of the Spilstead Model (SM) within the Australian context (Gwynne, Blick, & Duffy, 2009).

The Centre for Early Childhood Mental Health Consultation (CECMHC) defines social and emotional health in childhood as being 'the capacity to form secure relationships, experience and regulate

emotions and explore and learn' (CECMHC, 2012). This describes the foundation from which children are able to engage with others and acquire language in order to communicate. Developmental Trauma (Culp, Watkins, & Lawrence, 1991) in the early years impacts negatively on the development of secure emotional attachments, social and emotional health, all areas of learning and particularly language skills. (Culp, Watkins, & Lawrence, 1991; Hildyard & Wolfe, 2002; Murray & Andrews, 2000; Perry, Pollard, Blakely, Baker, & Vigilante, 1995; Gerhardt, 2004; Fonagy Target M., Steele M., Steele H., Leigh T., Levinson A., & Kennedy R, 1997; Sylvestre, Bussieres & Bouchard, 2016).

Indeed, children from vulnerable backgrounds with a history of developmental trauma have been found to perform poorly in all areas of language development compared to their age matched peers (McDonald, Milne, Knight & Webster, 2013; Sylvestre, Bouchard & Bussieres, 2016). Sylvestre, Bouchard & Bussiers (2016) found that on average children with a history of abuse and/or neglect performed between .48 and .67 standard deviations lower on language measures compared to children had not experienced maltreatment. They concluded that globally there appears to be a moderate to significant

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inverse association between physical abuse and / or neglect and language development further confirming children from

vulnerable families are at risk of experiencing long-term adverse social, emotional and academic outcomes related to developmental language disorders.

Poor academic results and an inability to access tertiary education can directly impair the acquisition of marketable employment skills and exclude youth with language disorders from a wide variety of employment opportunities (Dockrell, Lindsay, & Palikara, 2011; Conti-Ramsden, Botting, & Faragher, 2001; Conti, 2007).

Language disorders also negatively impact social skill development. Children with language disorders lack the communication skills necessary to acknowledge emotions and negotiate conflict with peers (Clegg, Hollis, Mawhood, & Rutter, 2005; Snowling, M.J., Bishop, D.V.M., Stothard, E.E., Chipchase, B., & Kaplan, C, 2006). They are less able to engage in language-based social interactions, play and problem solving, compromising their ability to connect socially with peers and establish strong friendships (Huaqing, & Kaiser, 2004; Conti-Ramsden, & Botting, 2004).

Further, language difficulties have been correlated with disruptive behaviour. From an early age, children with language disorders can evidence emotional distress and hard-to-manage behaviours (Ripley, & Yuill, 2005; Sundheim, & Voeller, 2004). Behavioural problems at school with corresponding difficulties adhering to rules and responding to authority place children at risk of expulsion (Ripley & Yuill, 2005; Sundheim, & Voeller, 2004; Stephenson, 2007; Pagani, 2007). For a child with a history of trauma and compromised familial support, expulsion from school can further compound deprivation of positive relationships and modelling of appropriate social connections essential to mitigate antisocial behaviour (Stephenson, 2007; Pagani, 2007; Beitchman, JH., Wilson, B., Johnson, CJ. Atkinson, L., Young, A., Adlaf, E., Escobar, M., & Douglas, L, 2001). Studies have shown that developmental language problems in boys can be a strong predictor of

engagement in antisocial activity by 19 years (Beitchman et al, 2001; Johnson, C.J., Beitchman, J.H., Young, A., Escobar, M., Atkinson, L., Wilson, B., Brownlie, E.B., Douglas, L., Taback, N., Lam, I., & Wang, M., 1999; Brownlie E.B., Beitchman, J.H., Escobar, M., Young, A., Atkinson, L., Johnson, C., Wilson, B., & Douglas, L, 2004). Studies of prison populations and youth offender programs indicate a disproportionate number of prisoners with language difficulties. Bryan, Freer & Furlong (2007), found a prevalence of language and communication difficulties in 90% of juvenile offenders. This finding was later supported by Snow (2014), in a study that identified clinically significant yet previously undiagnosed language disorders in between 46-52% of young male offenders.

A growing body of evidence supports the positive impact of speech pathology intervention on children's language development in the early years (Sharp, & Hillenbrand, 2008; Veltman & Browne, 2001; Ward, 1999; Snow, 2009). Numerous studies have further indicated that the manner and frequency with which the speech pathology is provided can directly impact therapy outcomes. The most effective services tend to be those which offer elements of integrated programming combining health, education, home visiting and parenting support. (Erickson, & Kurz-Riemer, 2002; Wise, Da Silva, Webster, & Sanson, 2005; McCain, Mustard 2002).

Given the targeted and tertiary nature of the DSS it is not surprising that service statistics consistently record a high prevalence of language delays and / or disorders in the population of vulnerable children referred. The provision of expedient and comprehensive speech pathology intervention is therefore prioritised and integrated throughout all aspects of the Spilstead Model. This intensive approach to the early detection and treatment of language disorders is provided in order to maximize improvements in both cognitive and social

outcomes. Speech pathology services provided from within the framework of the Spilstead Model have two defining characteristics:

Trauma-informed multi-disciplinary team approach. Certified in the trauma-informed Neuro-sequential Model of Therapeutics (NMT) developed by Dr Bruce Perry, the DSS has integrated a "bottom up approach" to speech pathology service delivery, recognising that sensori-motor functioning, self-regulation and emotional security provide firm learning foundations for higher cortical functions such as social communication and language (Perry, 2006). The SM Spilstead Model endeavours to ensure that the child's regulation and emotional needs are addressed prior to the targeting of higher cortical functions such as language. The provision of speech pathology from within a holistic multi-faceted program where all services for both parents and children are provided from the one multi-disciplinary team (MDT) also ensures a trauma-informed approach. The MDT is able to create a platform of support and containment for families via the repetitive exposure to consistent, predictable, co-regulating relationships (Gwynne, Blick, & Duffy, 2009; Everitt, Hannaford, & Conti-Ramsden, 2013). This enables optimum engagement with families and facilitates open channels of communication between the child, carers and MDT.

Intensity of Speech Pathology intervention. Intensive therapy has been defined as therapy that includes many repetitions conducted over specific periods of times incorporating a high level of collaboration with the child's teachers and families (Montgomery, 2006). Evidence suggests that speech pathology intervention needs to be intensive in order to influence change (Enderby, 2012; Baker, 2012; Warren, Fey, Yoder, 2012). Therapy is often not effective enough and in some cases not effective at all if the intensity of the intervention provided is inadequate (Glogowska, Roulstone, Enderby, Peters, 2000; Lincoln, McGuire, Mulley, Lendrem, Jones & Mitchell, 1984; Tomblin, Zhang, Buckwalter, & O'Brien, 2003).

Unfortunately the intensity of speech pathology provision in community health settings can be compromised by a variety of system related factors including long waiting lists, eligibility criteria and policies limiting delivery of services (Ward, 1999).

Difficulties faced by traumatised families in navigating complex service systems can further exacerbate their disadvantage (Queensland Council of Social Service, 2011). In contrast the Spilstead Model supports the provision of intensive intervention with fewer service delivery barriers. The co-location of therapy, therapeutic preschool and playgroup facilities also results in improved access for children to both individual and group-based speech pathology services. Children who require more intense intervention are further able to receive indirect therapy provided by therapy aides and teachers from the MDT who receive regular training and support from the child's speech pathologist. Evidence indicates therapy can be effective if it is provided by teachers /aides /carers who have been highly trained and supported by a Speech Pathologist (Boyle, McCartney, Forbes, & O'Hare, 2007; Baxendale, & Hesketh, 2003).

The initial pilot evaluation of the Spilstead Model indicated large Effect Size changes in parent / child interaction, reduced parent stress, as well as improved parental satisfaction, parent confidence, parental capacity, family interactions, child well-being and family functioning after only 12 months of intervention (Gwynne, Blick, & Duffy, 2009). As all these elements of family functioning have been shown to influence paediatric language development, this holistic approach would be expected to add intrinsic value to any speech and language intervention.

This study therefore attempted to further evaluate the specific speech pathology component of the Spilstead Model which combines both a trauma-informed and intensive approach to intervention.

Method

The study targeted all 3 – 6 year old children enrolled in the Spilstead Therapeutic Preschool over a two year period who required speech pathology intervention. This sample of convenience included children drawn from the DSS geographical catchment which covers the Northern Beaches and Lower North Shore regions of Sydney. The region is comparatively homogeneous with approx. 33% of the population born overseas and 18% of non-English speaking backgrounds.

As a tertiary unit of the Child and Family Health service referrals were received from health, education and welfare sector professionals with the majority of referrals being submitted by the local Family and Community Services child protection unit. Priority of access was provided to families with complex parental issues (i.e. mental illness, substance abuse, domestic violence, and social isolation) and children less than three years of age. Consent was obtained from parents.

Study inclusion criteria:

- Child aged between 3 – 6 years.
- Presentation of concerns re language development.
- Enrolment in the Spilstead Therapeutic Preschool two days per week for a minimum of 12 months.

Pre and post assessments were conducted using the Australian version of the Clinical Evaluation of Language Fundamentals®-Pre-school-2 (CELF® P-2) a clinical tool for identifying, diagnosing and evaluating language deficits in children aged 3 to 6 years (Wiig EH, Wayne A., Secord W & Semel E, 2006). All participants were assessed using the CELF P2 upon enrolment to the therapeutic pre-school. On average the assessment was

administered over two 60 minute sessions. Post testing was completed at a clinically appropriate point in the individual child's case plan e.g. when significant observable changes were noted by the therapist or other members of the multi-disciplinary team.

Statistical Analysis. Power analysis revealed that in order to achieve a power of >0.8 at $p < 0.05$ level of significance, and determine an Effect Size >80, a minimum sample size of 20 would be required. A pre-post study design was adopted with each participant acting as their own control. Background data was collected via interview with the parents plus collation of information from referral documentation and contact with previous services attended.

All pre and post testing was conducted by the same Speech Pathologist

(SP) employed by the Dalwood Spilstead Service in order to ensure inter-rater reliability. Results were analysed for statistical significance using a paired two-sample t-Test, by a separate SP research assistant who was blinded to the client referral and pre-test details. The Effect Size of change on post testing was then calculated.

Intervention. Speech pathology intervention was provided within the framework of the multi-faceted Spilstead Model of early intervention. Speech pathology intervention was provided collaboratively within a multi-disciplinary team where team members contributed to an intervention plan tailored to the individual needs of the child and family. A comprehensive approach to the provision of therapy services was then adopted drawing on principles of both behavioural and developmental approaches.

Speech pathology intervention was designed in response to the individual needs of each child. Decisions regarding the timing and nature of all assessment, therapy and review practices were based on both the clinical presentation and emotional status of the child with the NMT bottom-up approach integral to all aspects of intervention.

Intervention included weekly individual or group therapy as required combined with parent education and training plus weekly teacher liaison and consultation. Participants received a weekly 30 minute speech pathology session. These therapy sessions were delivered in a 'direct' format where an individual or group service was provided by the speech pathologist working directly with the child. All participants also received supplementary 'indirect' therapy provided by a trained teacher or classroom aide. This ensured that extra support in the classroom setting could be provided as needed.

Results

46 children aged 3 years and over who attended the Spilstead Therapeutic Preschool over the 2 year study period presented with concerns regarding language development on enrolment. This equated to 81% of the total children enrolled in the preschool during the period. Parent consent was provided for all of the 46 children including 29 boys and 17 girls to participate in the study.

Of the 46 participants 13 were from CALD (Culturally and Linguistically Diverse) backgrounds, while 6 reported an Aboriginal or Torres Strait Islander heritage. All children presented with a history of both family vulnerability and child developmental concerns on referral. 25 participants came from single parent families, 40 were living with parents who identified themselves as having mental health issues, 20 came from families with drug and alcohol issues, 29 from families with a history of domestic violence, 35 from families where parents identified low levels of support services and 31 of the participants had been identified as at Risk Of Significant Harm by the NSW Family and Community Services child protection service. Table 1 summarises the presenting risk factors on referral and the children's pre-entry diagnoses. All 46 of the participants presented with at least one parental risk factor.

15% came from families with 3-4 risk factors and 53% of participants had evidence of 5-6 parental risk factors.

Pre-post speech pathology assessments utilizing the CELF P2 were conducted for all 46 children. Average age at pre-testing was 3 years 7

months. On pre-testing 7 (15%) were found to be functioning within the low average to average range on all CELF P2 composite scores while 39 (85%) were identified with clinical delays at one or more standard deviations below the mean in at least one composite score. 65% were identified with delays in receptive language skills, 61% in expressive language skills and 44% in core language skills. 17 (37%) were found on pre-testing to be 1-2 standard deviations below the mean while 22 (48%) demonstrated delays at >2 standard deviations below the mean. Speech pathology intervention according to the study methodology was provided on average for a period of 18 months.

35 children (76%) improved by at least one standard deviation on post-testing on one or more of the CELF P2 composite scores. 13 (28%) improved by more than 1 standard deviation on at least one composite score. Figure 1 illustrates the children's progress according to standard deviations. 28 children (61%) moved from the below average range to within the average range for their age on at least one composite score. Figure 2 illustrates progress from the clinically delayed to average range of performance. Results indicated moderate Effect Size changes (Cohen's $d = 0.62$) on scores of Expressive Language functioning while Large Effect Size changes were noted in both Receptive Language ($d = 0.87$) and Core Language skills ($d = 0.82$). Effect Size results are summarized in Table 2.

Discussion

There are several limitations to this study. The small sample size and lack of a control group hindered conclusive comparative evaluation of the speech pathology services provided. The inclusion of only one norm-referenced measure of language skills also inhibited a

comprehensive review of functional and social communication skills. Administration of a range of norm-referenced clinical measures combined with a double-blind analysis by an independent researcher would have been optimal. Given the numerous variables associated with the children and families participation in the multi-faceted program provided under the Spilstead Model it is also difficult to evaluate speech pathology intervention in isolation.

Despite the study limitations these results support the potential for positive outcomes in all areas of language development for children at risk in the presence of a trauma informed and intensive therapy approach. The large Effect Size changes reported in relation to both expressive and receptive language were achieved despite a relatively short duration of speech pathology intervention contributing to the cost effectiveness of the services provided in the short term. The longer-term benefits anticipated as a result of these substantial improvements in early language skills are known to be considerably more significant. The positive impact of improved language competence on educational success, social connection and employment potential would be expected to ensure a long-term cost benefit to the community as well as profound benefits to the individual's long-term life outcomes.

There are many implications for further investigation. A more extensive study incorporating a larger cohort of children and routine follow-up would ensure a more detailed analysis of the value of this speech pathology approach. Comparative data collection from a matched sample of families receiving alternative models of care would also enable comparison across different service delivery models. Matched controls and longitudinal follow up of participants receiving speech pathology under the Spilstead Model could also address questions

regarding sustainability of gains in language skills and associated life outcomes. In the interim, this study has indicated that trauma-informed intensive speech pathology intervention within a multi-faceted early intervention program demonstrates the potential for achieving extremely positive outcomes for vulnerable children with language delay / disorders in the Australian context.

Table 1. Family and Child and Diagnoses n=46 families.

Family Issues n=46	Child Diagnosis n= 46 children, 3-5 years
Current child Protection Concerns	31 Global Developmental Delay 23
Parent with Mental Illness	40 Autism Spectrum Disorder 5
Parent with Drug & Alcohol Problems	20 Emotional Disorder 40
Domestic Violence	29 Behavioural Disorder 5
Single Parent	25 *ADHD 5
Limited Social Supports	35

* ADHD, Attention Deficit Hyperactivity Disorder

Table 2. Effect Size Change per CELF P2 Subscale n=46

	Effect Size	Interpretation	
Receptive Language	0.87	Large	P<0.0001
Expressive Language	0.62	Moderate	P<0.0001
Core Language	0.82	Large	P<0.0001

Figure 1. Improvements on the CELFP2 composite scores for children presenting on pre-testing in the clinical range. n= 39

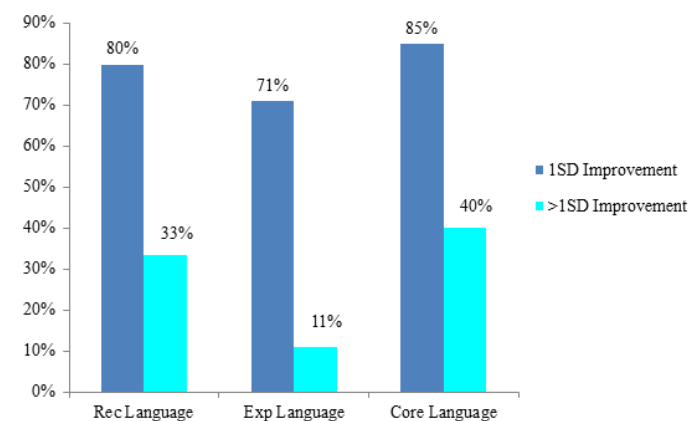
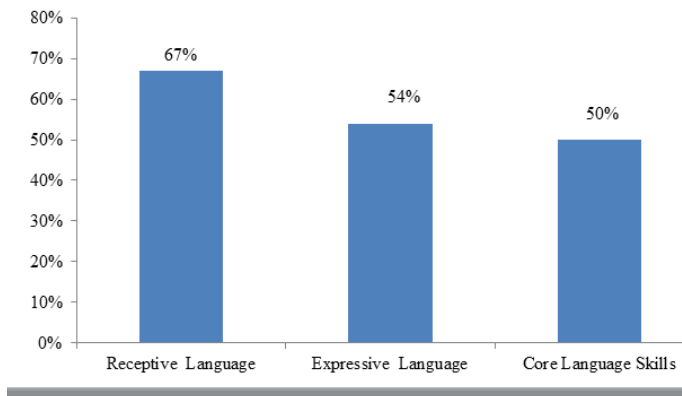


Figure 2. Percentage of children who improved from the clinical range on pre-testing to scores within the normal range on post-testing per CELF P2 composite score. n=39



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