

## The Effectiveness of a Short-Term Group Music Therapy Intervention for Parents Who Have a Child with a Disability

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**Background:** *The positive relationship between parent-child interactions and optimal child development is well established. Families of children with disabilities may face unique challenges in establishing positive parent-child relationships; yet, there are few studies examining the effectiveness of music therapy interventions to address these issues. In particular, these studies have been limited by small sample size and the use of measures of limited reliability and validity.*

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**Objective:** This study examined the effectiveness of a short-term group music therapy intervention for parents of children with disabilities and explored factors associated with better outcomes for participating families.

**Methods:** Participants were 201 mother-child dyads, where the child had a disability. Pre- and post-intervention parental questionnaires and clinician observation measures were completed to examine outcomes of parental wellbeing, parenting behaviors, and child development. Descriptive data, t-tests for repeated measures and a predictive model tested via logistic regression are presented.

**Results:** Significant improvements pre to post intervention were found for parent mental health, child communication and social skills, parenting sensitivity, parental engagement with child and acceptance of child, child responsiveness to parent, and child interest and participation in program activities. There was also evidence for high parental satisfaction and that the program brought social benefits to families. Reliable change on six or more indicators of parent or child functioning was predicted by attendance and parent education.

**Conclusions:** This study provides positive evidence for the effectiveness of group music therapy in promoting improved parental mental health, positive parenting and key child developmental areas.

**Keywords:** music therapy; children with a disability

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The relationship between the quality of parent-child interactions and positive child developmental trajectories is well established (Guralnick, 2006; Shonkoff & Meissels, 2000; Zubrick et al., 2008). A range of parental, family, and socio-economic risk factors are known to impede parents' capacity to provide responsive parenting for their children. Families with a child with a disability can be considered a special risk case where the atypical developmental characteristics of the child and associated behavioral problems may both add to parental stress (Webster, Majnemer, Platt, & Shevell, 2008) and make positive parental interaction styles more difficult for this group of parents (Guralnick, 2006). Families with a child with a disability are also more likely to experience economic disadvantage (Emerson & Llewellyn, 2008) and social isolation (MacDonald & Callery, 2007). This study examines the effectiveness of a group music therapy intervention that addresses the development of positive parenting behaviors with these families.

The importance of early intervention to promote positive parenting and child development for families is widely recognized (Shonkoff & Meissels, 2000). Parental responsiveness is considered to be a key pathway to positive outcomes for children (Mahoney & Perales, 2003). Considering the heightened exposure to other risk areas experienced by families with a child with a disability, interventions that also seek to address parent mental health and social support (Barnett, Clements, Kaplan-Estrin, & Fialka, 2003) would also be of further benefit to these families. Programs should aim to be highly acceptable and engaging to families who may otherwise be difficult to reach (Macias, Clifford, & Kreh, 2001) and should aim to achieve high levels of client satisfaction (Margalit & Kleithman, 2006). The medium of music therapy in early intervention parenting programs has the potential to meet such requirements through its use of hands-on, experiential learning for both children and parents.

Music therapy with families with young children has a small but growing evidence base. Approaches using music therapy have been associated with positive parent satisfaction (Mackenzie & Hamlett, 2005; Oldfield, Adams, & Bunce, 2003), high levels of parent and child engagement (Lyons, 2000; Oldfield et al., 2003), improved parent-child interactions (Mackenzie & Hamlett, 2005; Oldfield et al., 2003) and enhanced child developmental skills (Allgood, 2005; Archer, 2004; Muller & Warwick, 1993; Oldfield, 2006; Standley, Walworth, & Nguyen, 2009; Walworth, 2009). Studies have also reported that participants gained increased parenting skills (Archer, 2004; Oldfield et al., 2003; Vlismas & Bowes, 1999), strengthened social networks (Allgood, 2005; MacKenzie & Hamlett, 2005; Shoemark, 1996), and had higher levels of use of intervention resources in the home environment (Mackenzie & Hamlett, 2005; Shoemark, 1996). However, these findings should be regarded with caution as they are based mainly on descriptive case studies and conducted with small samples. Only a few studies have employed control group designs (Standley et al., 2009; Vlismas & Bowes, 1999; Walworth, 2009) or used previously established measures of outcomes (Muller & Warwick, 1993; Oldfield, 2006).

Research with *Sing & Grow* has aimed to address some of the limitations of prior work by involving a larger sample of participants, a repeated measures design, and by employing stronger outcome measures with established reliability and validity

(Nicholson, Berthelsen, Abad, Williams, & Bradley, 2008). The study involved young parents, parents with a child with a disability and families experiencing general socioeconomic disadvantage. The research found significant improvements over time on both parent-reported and clinician-rated measures. Improvements from pre to post were found for parenting behaviors (reported irritability, and observed sensitivity, engagement and acceptance), child outcomes (reported communication and social play skills, and observed responsiveness, interest and social participation), and parent mental health (Nicholson et al., 2008). These results built on previous findings on the *Sing & Grow* intervention (Abad, 2002; Williams & Abad, 2005) that indicated a high degree of parent satisfaction with the intervention, and high rates of reported use of the intervention strategies at home. Other research with *Sing & Grow* has indicated that the gains made by participants are relatively robust to variations in implementation conditions that occurred as the program was expanded on a national scale (Nicholson, Berthelsen, Williams & Abad, 2010).

Thus, it appears that the medium of music therapy in early parenting intervention programs has the potential to meet the desirable attributes outlined in the literature. However, while the results from *Sing & Grow* and other studies have been encouraging, the impact of music therapy as a parenting intervention is yet to be fully established. In particular, questions regarding the effectiveness for particular client groups, how reliable or robust any changes are, and what factors predict whether families show improvements across multiple outcomes are yet to be answered.

This study aimed to address these issues with a focus on parents who had a child with a disability. Changes over time were assessed in terms of parent-reported parenting behaviors, parent mental health, and children's behavioral, social and communication skills, and therapist observation of parent and child behaviors. This study also extended previous research by investigating the extent to which any pre to post gains made could be considered reliable and robust. As a further extension to prior research in the area, the extent to which child and family characteristics were influential in predicting positive outcomes across multiple measures, while taking account of level of participation (attendance) in the program, was also examined.

## Method

### Participants

The participants for this study were 201 mother-child dyads who attended 44 *Sing & Grow* programs held for children with disabilities between July 2005 and September 2007. The programs were led by 22 music therapists who received initial and ongoing training and continuing supervision, to deliver the program with fidelity. Participants were referred by community and government agencies which specialize in providing services to young children who have a disability and their families. These families met the organizational criteria for support through early intervention services because a child in the family had a diagnosed disability or recognized developmental delay. The research was approved by a University Ethics Committee and each of the parents provided written informed consent regarding research participation. The mothers had returned completed, or mostly completed, pre and post surveys. Pre and post clinician observation data were also available for these participants.

Participating mothers were aged from 23 years to 47 years, with a mean age of 34.6 years (mode = 39 years). Their children were aged between 3 to 60 months, with a mean age of 34.4 months (mode = 48 months). The majority of mothers were married or in a cohabiting relationship (90%) and were not in paid employment (68%). A third of mothers (34%) had not completed high school; 17% indicated that their family income was predominantly from benefits; 16% reported speaking a main language other than English; and 36% reported on a simple screener (Kemper & Babonis, 1992) that they had experienced a significant episode of depression in the last year. A third of parents provided information on the nature of their child's disability. Of these, 32% identified their child as having a general, usually global, developmental delay; 18% indicated Down syndrome; 18% indicated other syndromes or specific diagnoses including brain injury, fetal alcohol syndrome, and rare chromosomal abnormalities; and 15% indicated an autistic spectrum disorder. The remaining 18% had a speech and language impairment, cerebral palsy or a sensory impairment.

### Design of the Research Study

Data were collected from participating parents pre and post intervention and from clinicians during the first two and last two

sessions of the program (typically Sessions 1, 2, 9, & 10). Brief demographic data were collected from all families attending programs. For those parents who agreed to participate in the research, questionnaire data were collected at the end of the first (pre) and last sessions (post). Post questionnaires were mailed to parents who failed to attend the final session. Questionnaires were five pages long, taking 10–15 min to complete.

### **The Intervention**

*Sing & Grow* is an Australian national early parenting intervention music therapy program. It is designed, managed and delivered by tertiary trained, and professionally registered music therapists for families with children aged from birth to 3 years, and children with a disability aged up to 5 years. The program's overarching aims are to improve parenting skills and confidence, increase positive parent-child interactions, stimulate child development, and provide social networking opportunities. Each program is run in a community setting and hosted by a local community organization which refers families and provides venue and staffing support to deliver the program. The program is provided free to eligible families as a government-funded service.

The 10-week group program is designed for weekly delivery (1 hr/week) for 8–10 parent-child pairs. The program targets a range of families including young parents, culturally and linguistically diverse families, parents with mental health difficulties (e.g., depression), families from low socioeconomic areas and parents of a child with a disability. Each session contains the following elements to promote children's developmental skills: greeting and farewell songs to encourage social responsiveness; familiar songs for engaging participation; action and movement songs to provide practice of fine and gross motor skills and concept comprehension; instrumental play for promoting motor skills, following simple instructions, turn-taking and sharing; and quiet music to encourage physical touch, closeness and bonding between parent and child.

The music used consists of traditional children's songs, original compositions and improvised material. Original compositions by the program's developers are designed to provide a context for the practice of specific developmental skills such as concept comprehension (e.g., 'up,' 'down') and expressive language skills. Some of the music contains instructive lyrics to support parents in

their use of music for interacting with their child. Improvised material is usually based on a known song, embellished musically or harmonically. This material enables the clinician to respond to group dynamics and specific events. For example, improvised materials could be used to influence the mood of the group (e.g., to facilitate a transition from boisterous to quiet activity) or as a means of responding to a particular parent or child, either to highlight achievements or to engage their attention and participation.

*Sing & Grow* is designed to combine elements of both relationship-focused (Mahoney, Boyce, Fewell, Spiker, & Wheeden, 1998) and behavioral parenting interventions (Sanders, Turner, & Markie-Dadds, 2002). As with many other music therapy interventions, *Sing & Grow* builds on the principle that there are many musical elements at the core of healthy parent-child interactions (Malloch, 1999; Stern, 1998). Using the format described above, music and songs provide a therapeutic context for promoting positive parent-child interactions, parental responsiveness, parenting self-efficacy and children's skill development. Following behavioral parent training principles (Sanders, 1999), observed skills (of the parent and child) are identified, described and reinforced. Parents who are observed to have specific skills deficits are given verbal encouragement to try new things, by use of behaviorally specific verbal suggestions, followed by descriptive praise for attempted change. Specific parenting strategies that are modeled and coached include: the use of praise, modeling and positive reinforcement to shape children's social, behavioral and motor skills; improving parental nonverbal communication through eye contact, smiling, touch and physical affection; the use of simple instructions and limit setting; the use of cofacilitated play to practice fine and gross motor skills; and the use of music to entertain or calm children. Parents are guided through the practice of activities that extend children's developmental skills and are shown how repetition enhances developmental competence. To aid in the transfer of activities to the home environment, participants are provided with a CD and song book.

## Measures

**Questionnaire measures.** *Family demographic details* included (i) for the parent and child: age, gender, ethnicity and main language spoken (English or other); (ii) for the parent: marital

status, highest level of education, and employment status; (iii) for the family: family structure and whether the family income was mainly from government benefits. In addition, a single item assessed experience of a depressive episode lasting for two weeks or more in the last 12 months (Kemper & Babonis, 1992).

*Parental mental health* symptoms were measured with the Kessler K6 screening scale which aims to detect psychological symptoms and has been widely used in Australian and international population studies (Furukawa, Kessler, Slade, & Andrews, 2003). Parents completed six items about their feelings over the last 4 weeks, rated on a 5-point scale (Cronbach's alpha for internal consistency,  $\alpha = .90$ ). Higher scores indicated the presence of more symptoms.

*Parenting self-efficacy* was assessed with four items modified from the Early Childhood Longitudinal Study—Birth Cohort (National Center for Education Statistics, 2004) on which parents rated their confidence in undertaking tasks associated with raising a young child. Items were rated on a 5-point scale, then summed and averaged to give a total score ranging from 1–5, with higher scores indicating higher levels of self-efficacy ( $\alpha = .76$ ).

Three aspects of parent-child interactions were assessed using short parent-report measures employed by a national Australian study of early child development (Zubrick et al., 2008). *Parental responsiveness/warmth* was assessed using six items from the Child Rearing Questionnaire (Paterson & Sanson, 1999) on which parents rated their expression of physical affection and enjoyment of the child ( $\alpha = .87$ ). *Irritable parenting* was assessed with five items from the Parental Perceptions and Behaviors Scale (Institut de la Statistique du Québec, 2000) which rated the frequency of parental anger and irritability towards the child ( $\alpha = .85$ ). *Parent engagement in home learning activities with their child* was rated on five items assessing the frequency of activities in a typical week (e.g., "How often do you play with toys or games indoors with your child?" rated on a 4-point scale: 'not at all' to 'every day') ( $\alpha = .66$ ).

*Child behavior* was assessed with four items from the Mood and Behavior subscale of the NEILS Scales of Developmental Competency (SRI International, 2003). For each item the parent was asked to indicate which of three descriptions was most like their child, with items assessing mood, temper, and manageability ( $\alpha = .81$ ). Higher scores indicated more difficulties. *Social play skills* such as social awareness and level of social interactions ( $\alpha = .82$ ) and



*receptive communication skills* such as language awareness and understanding of instructions ( $\alpha = .85$ ) were assessed with five items each, derived from subscales of the NEILS Scales of Developmental Competency (SRI International, 2003). Each item described a developmental skill and parents rated the extent to which the child currently displayed that skill (from 'does not do it at all' to 'does it a lot'). Scores were averaged across items so that greater developmental competence was indicated by higher scores.

*Social support, satisfaction and perceived benefits* were measured on the post questionnaire only. Parents responded to items asking them to indicate whether or not they had contact with other participating parents outside the program sessions and whether or not this was likely to continue. Parents were also asked if their participation in *Sing & Grow* had facilitated their contact with other professionals (e.g., occupational therapist, physiotherapist, speech therapists, social worker, & family support worker). They also completed a series of questions that asked about their satisfaction with the program and staff (two items; 4-point rating scale from 'very dissatisfied' to 'very satisfied'); and the extent to which they gained an improved understanding of child development and learnt new ways to play with their child (two items; 3-point rating scale from benefited 'not at all' to 'a lot').

### **Observational measures**

Clinicians completed a 6-item observational checklist (Nicholson et al., 2008) for each parent-child pair attending the first two and last two sessions of the program. The quality of parental behavior towards the child was rated on three items (sensitivity to the child demonstrated through awareness of the child's signals; effective engagement of the child in the program; and acceptance of the child demonstrated through positive affect), and the child's behavior towards the parent and others was rated on three items (responsiveness to parent demonstrated through positive interactions with the parent; interest and participation in the program; and social engagement with other adults and peers). Items were rated on a 5-point scale. Scores were averaged across the two observations for pre and post to provide means ranging from 1–5, with higher scores indicating more frequent displays of positive behaviors.

Behaviors were independently coded by a second observer in 10% of sessions. The proportion of ratings consistently rated in

agreement, allowing for differences of plus or minus one on the scale, ranged from 91.1% for child social engagement to 95.7% for parental acceptance.

### **Data Analysis**

For items measured at post only, descriptive statistics are presented. For the variables measured at pre and post by the parent questionnaires and clinician observation measures, *t*-tests for repeated measures were used. The proportion of participants who achieved reliable change on key pre and post measures was then examined using the Reliable Change Index (Jacobsen & Truax, 1991).

The Reliable Change Index is a statistical approach used to define meaningful change in psychotherapeutic interventions. This technique allows the researcher to assess on a case by case basis, which participants have achieved reliable change. In this way, the technique differs from the use of *t*-tests which use aggregated group data to determine whether the overall level of change across a sample, is statistically significant. This index indicates the pre to post change *per case*, which is calculated and represented at the group level by the percentage of cases that have shown positive change (Jacobsen & Truax, 1991). In this study, the difference between the pre and post scores had to be at least 1.96 times the standard error of the difference in order for a case to be declared to have shown a positive change.

The final part of the study used logistic regression to explore the contribution of child and family demographic characteristics to overall outcomes as a result of participation in the intervention. It also examined the contribution of level of participation in the program to better outcomes. Using the variables for which there were significant change pre to post, an Overall Outcome Index was developed and used as the dependent variable in a logistic regression model. Level of participation was measured by the total number of sessions attended by the parent-child dyad.

## **Results**

### **Parent Mental Health, Parenting and Child Behaviors**

Pre and post scores and *t*-test results are shown in Table 1. There was a significant reduction in parents' self-reported mental

TABLE 1  
Pre and Post Outcome Scores, *t*-tests

Measure	N	Pre	Post	<i>t</i> -test for repeated measures	
		<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>t</i> ( <i>df</i> )	<i>p</i>
Parent reports					
Parent mental health	191	1.76 (.768)	1.65 (.690)	2.67 (190)	.008
Parenting self-efficacy	194	4.108 (.588)	4.109 (.595)	-.026 (193)	.979
Parenting warmth	196	4.56 (.522)	4.60 (.492)	-1.48 (195)	.141
Parenting irritability	197	2.11 (.703)	2.05 (.701)	1.55 (196)	.124
Activities with child	193	3.15 (.595)	3.21 (.602)	-1.69 (192)	.091
Child behavior problems	184	1.84 (.577)	1.88 (.562)	-1.42 (186)	.157
Child communication	192	2.25 (.547)	2.33 (.548)	-3.23 (191)	.000
Child social play skills	187	1.95 (.549)	2.03 (.544)	-2.96 (.544)	.004
Observer ratings					
Parent sensitivity	201	3.15 (.747)	3.92 (.729)	-14.2 (200)	.000
Parent engagement	201	2.90 (.771)	3.75 (.780)	-15.8 (200)	.000
Parent acceptance	201	2.99 (.822)	3.80 (.742)	-15.4 (200)	.000
Child responsiveness	200	2.81 (.739)	3.61 (.728)	-16.5 (199)	.000
Child interest	201	3.04 (.845)	3.96 (.838)	-16.2 (200)	.000
Child social engagement	199	2.66 (.802)	3.66 (.872)	-7.6 (198)	.000

health symptoms from pre to post but no change in parental ratings of parenting self-efficacy. There was no change in any of the parent-reported parenting skills of warmth, irritable parenting or use of home learning activities. There were statistically significant pre to post improvements in parent-reported child communication and social skills over time but no improvement in parent-reported child behavior ratings.

Statistically significant pre to post improvements were found for each of the three clinician observed parenting behaviors: sensitivity to child, effective engagement of the child, and acceptance of the child. There were also significant improvements in each of the three clinician observed child behaviors: responsiveness to parent, interest and participation, and social engagement. However, these results should be interpreted with caution given the potential for observer bias. This is discussed further below.

Reliable Change scores were calculated for each of the constructs which improved from pre to post. For parental mental health, 48% of participants made reliable improvement from pre

to post intervention; for child communication skills (by parent report), 42% made a reliable improvement; for child social skills (by parent report) 42% of children also made a reliable improvement. Percentages of participants who showed a reliable improvement on the clinician observation measures were 73% for parent sensitivity, 77% for parent engagement of child, 76% for parent acceptance of child, 77% for child responsiveness to parent, 78% for child interest and participation, and 81% for child social engagement. As this kind of analysis typically yields overall rates of improvement for programs between 30% and 40% (Campbell, 2008), these latter results are strong.

### **Social Support, Satisfaction and Benefits**

Social support was measured by several items that measured parental access to informal and formal sources of social support as a result of participation in *Sing & Grow*. In reporting contact with other parents from the *Sing & Grow* program outside of the sessions, 44.6% of parents ( $n = 91$ ) indicated that they had such contact. Of these parents, 89% ( $n = 81$ ) indicated that they would continue with this contact after the completion of the program. In the post questionnaire, parents were asked if their participation in *Sing & Grow* had facilitated their contact with other professionals. Most commonly, participants indicated professional contact with speech pathologists (57.2%,  $n = 119$ ) and occupational therapists (46.8%,  $n = 96$ ). These data indicate that the intervention was successful in increasing social connectedness between participating parents as well as between parents and other support professionals.

Previous studies have found high levels of satisfaction with services to be correlated with decreased parental stress for families with a child with a disability (Margalit & Kleithman, 2006). It has also been suggested that if parents are satisfied with the nature of the intervention, they will be more likely to maintain their involvement and potentially enhance their chances of benefiting from the experience (Nicholson et al., 2008). Parents showed high levels of satisfaction: 99% were very satisfied or satisfied with the program; 99.5% were very satisfied or satisfied with the music therapy staff; 97% indicated they would attend another *Sing & Grow* program; and all parents indicated that they would recommend the program to other parents.

A scale with four items was used to measure the benefits that parents had experienced from the *Sing & Grow* program with results presented in Table 2. The results indicate that parents gained knowledge (understanding of children's development) that was endorsed to some extent by 98.4% of parents. Skills to engage in new ways with their child was also endorsed by 99% of parents. The high level of social support that *Sing & Grow* provided to parents was also evident in that 99.5% of parents indicated that the program enabled them to talk with other parents. These findings indicate that parents valued the program and perceived a number of benefits to participation, for themselves and their family.

### Overall Outcome Index and Associated Factors

The final part of the study used binary logistic regression to test a predictive model of the contributions of child and family characteristics and level of participation (number of sessions attended) to overall intervention outcomes. The dependent variable was participants' scores on an Overall Outcome Index. This index was created as an outcomes measure for this study. It used the Reliable Change scores for participants on the nine variables which were found to improve from pre to post across the sample. These variables were parent mental health, parent report of child communication and social skills, clinician observed parent sensitivity to child, engagement of child and acceptance of child, and clinician observed child responsiveness to parent, interest in the intervention, and social engagement.

TABLE 2  
*Parent Ratings on the Benefits of Participation in Sing & Grow*

<i>How well did Sing &amp; Grow ...</i>	Not at all % (n)	A little % (n)	A lot % (n)
Help you to understand about your child's development?	1.6 (3)	40.6 (76)	57.8 (108)
Help you to learn new ways to play with and teach your child?	1 (2)	28 (56)	71 (142)
Enable you to meet and talk with other parents?	0.5 (1)	33.2 (65)	66.3 (130)
Help you to find out about other services that might help your child or your family?	21.4 (37)	49.1 (85)	29.5 (51)

TABLE 3  
*Summary of Logistic Regression Model for Factors Associated with Higher Outcomes*

Variable	B	SE	p	Odds ratio	95% C.I.	
					Lower	Upper
Child age (months)	-.011	.015	.487	.989	.960	1.02
Child gender (male)	.012	.360	.974	1.012	.499	2.05
Main language at home other than English	-.194	.467	.678	.824	.330	2.06
Incomplete high school education	.925	.416	.026	2.52	1.16	5.70
Main income from government benefits	-.755	.700	.281	.470	.119	1.85
Single parent	.550	.832	.509	1.73	.339	8.85
High attendance (6 or more sessions)	1.707	.572	.003	5.51	1.80	16.9

Participants who achieved reliable change on a given variable (e.g., parental mental health) received a score of 1 and those participants who did not achieve reliable improvement received a score of zero. This created a binary variable of improved outcome from pre to post for each of the 9 selected variables. An overall improvement score was then created by summing across these derived variables to give each case an overall outcome score ranging from zero to 9. The distribution of scores on the Overall Outcome Index is displayed in Figure 1.

A further step was then taken to develop a binary outcome indicator for those parents who had a relatively high Overall Outcome score compared to those parents with a low to moderate Overall Outcome score, using a cut-off score of 6 on the Overall Outcome Index. This is a stringent cut off point requiring participants to achieve reliable change on at least two thirds of the measures included in the Overall Outcome Index to be considered as achieving significant improvement across the outcome measures. This resulted in 61% of the participants being designated as having high overall change and the remaining 39% as having low to moderate overall change. This variable was coded as 1 (high overall change) or zero (low to moderate overall change) for use as the dependent measure in the binary logistic regression conducted to examine the influence

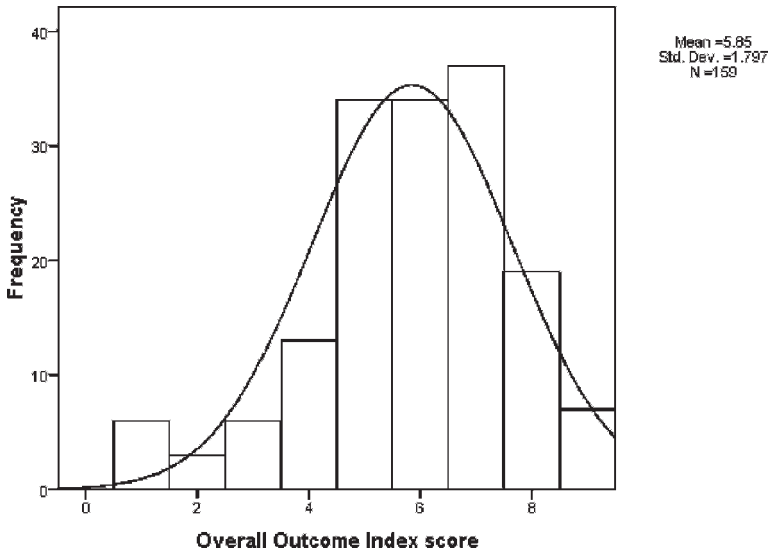


FIGURE 1.  
Distribution of scores on the Overall Outcome Index.

of child and family characteristics and level of attendance on outcomes as a result of participation in the intervention.

Logistic regression analysis was undertaken to investigate the relationship between group allocation (high or low overall change) and 6 child and family demographic variables identified from previous research as risk factors affecting child outcomes. These were child age (in months) and gender (male, female); single parent status (single or not); main language at home other than English (yes, no); high school completion (yes, no); and, main income from government benefits (yes, no). Number of sessions attended was also included as a measure of level of participation in the intervention. As six sessions has previously been considered 'minimum dose' for this intervention to effect positive therapeutic change in families (Nicholson et al., 2008), this was dichotomized into high (6 or more sessions) or low attendance. Differences in child and family demographics variables between those who attended six or more sessions and those who attended fewer sessions were tested using *t*-tests and chi-square. No significant differences were found for parent age, cultural background, marital status,

level of education, employment status, and receiving income from government benefits; nor for child age, gender or cultural background. Forty-two families were excluded from the regression due to missing data on one or more of the nine variables included in the Overall Outcome Index or the socio-demographic variables used in the logistic regression model. Once again differences in child and family demographic variables between those included in the analysis and those not were tested. No significant differences were found for parent age, cultural background, marital status, level of education, employment status, and receiving income from government benefits; nor for child age, gender or cultural background.

A test of the model with all seven predictors, against a constant only model was statistically significant ( $\chi^2 = 17.53, p = 0.014$ ), indicating that the predictors as a set, reliably distinguished between participants with high overall change and those participants with low to moderate overall change. Table 3 presents the regression coefficients, standard errors, p-values, odds ratios, and 95% confidence intervals for each of the predictors in the model. More frequent attendance (6 or more sessions) and if the parent had not completed high school were associated with better outcomes for families (improved outcomes on 6 or more outcome variables). For families who attended 6 or more sessions, the odds of being in the better outcomes group were 5.5 times higher than for families who attended less frequently. Mothers who had not completed their high school education had 2.5 times higher odds of being in the better outcomes group than mothers who had completed high school. The other measures of child and parent characteristics included in the regression analysis were not associated with being in the better outcomes group.

### Discussion

The findings of this research indicate that the *Sing & Grow* intervention meets the criteria of a successful intervention for children with disabilities and their parents indicated by the existing evidence base (Barnett et al., 2003; Mahoney & Perales, 2005; Margalit & Kleithman, 2006). The program elicits high degrees of satisfaction, provides opportunities for enhanced social connection, and is associated with pre to post improvements in parent-child interactions, parent mental health and child communication



and social skills. Although there were no changes in parent-reported parenting behaviors, most parents were observed as having improved parenting behaviors by clinicians from pre to post. Improvements in children's social and communication skills, as reported by parents, were also reflected by the significant improvements in child behaviors observed by clinicians. However, without a control group comparison, it is not possible to conclude that these changes are a direct result of participating in the intervention rather than by child maturation over the period of participation. The finding indicating an association between high attendance and improvements across multiple outcomes provides some evidence that these changes may be due to the intervention.

As parents with a child with a disability are known to have increased exposure to the risk factors of social isolation and parenting stress, improvements in these areas are particularly important for this group of families. Furthermore, given the established links between parent mental health, parenting responsiveness and child communication skills, the positive results in these domains are encouraging to note but are likely to be linked in complex ways. Improvements may have been an antecedent and/or a consequence of other therapeutic gains. The pathway to change warrants further exploration in future research.

Insignificant results in the areas of self-reported parenting efficacy, responsiveness, irritability and home learning activities may have been a result of ceiling effects in the measurement. For participants who scored highly at pre on these measures there was little room for further improvement. Insignificant results may have been due to the inability of the measures to detect change over ten weeks or the inability of the intervention to affect change in these areas. Future research should consider how to improve the sensitivity of measurement of these constructs. It is interesting to note that while clinician observed levels of parenting sensitivity and acceptance of child pre to post did show statistically significant improvements, parent-reported warmth did not. Other studies in the field have also found discrepancies between parent reports and clinician observations on similar measures. A study of music therapy with groups of parent-child dyads found large discrepancies between mother's perception of child behavior (that it was poor), and actual video analysis of behavior that indicated that children were generally on-task (Oldfield et al., 2003).

The lack of improvement in parent-reported child behavior may have been related to the limited number of items in the measure. Additionally, the items could be considered to measure child temperament, that is, stable biological characteristics that relate to how children consistently respond to the environment and other people. If this is the case then it would be highly unlikely to show any change over a ten week period. Related results regarding the lack of improvement in child behavior or adjustment have also been found in other music therapy studies (Oldfield, 2006; Oldfield et al., 2003).

Logistic regression modeling found that families who attended more sessions had higher odds of achieving better outcomes and that lower parental education level was also associated with better outcomes. The results are promising as they provide evidence that the program is contributing to change (as higher dosage was associated with better outcomes) and that it is effective for typically hard to reach families. There is evidence that mothers with lower levels of education are less likely to access preventative health care and educational services for their children (Leventhal, Brooks-Gunn, McCormick, & McCarton, 2000) and so it is particularly encouraging that in this study these mothers not only participated but had higher odds of being in the better outcomes group. These findings align with research into the impact of early child care on child outcomes which has found that children from more disadvantaged backgrounds, including mothers with low levels of education, gain more from participating in early childhood programs than those from more advantaged backgrounds (Gregg, Washbrook, Propper, & Burgess, 2005; Hansen, & Hawkes, 2009). Given the links between lower maternal education and lower parenting skills, it is likely that the parents and children in these families have the most to gain from accessing early intervention. The fact that none of the other demographic factors included in the regression model were associated with better outcomes is a promising finding in itself. It suggests that the intervention may be equally effective for a range of different demographic groups.

There are a number of limitations that have been identified within this research. Firstly the lack of a control group prevents the conclusion that pre to post improvements found in families are a direct result of participation in the intervention. Without a

control group or randomization of participants to intervention or control conditions, conclusive evidence for the effectiveness of the intervention cannot be achieved.

The second area of limitation relates to the measures employed. While some of the self-report measures were derived from previously validated tools and collected pre and post, others were collected at post only, meaning no baseline was available for comparison. Further, the clinician observation measure was not blind and pre to post improvements found may have been a result of observer bias. However, inter-rater reliability was tested using independent observers and high agreement was found. Further, some of the findings are consistent across the clinician observations and parent self-report measures lending validity to the findings.

Finally, the research is limited by the sample and the self-selection bias present. Only parents who chose to complete the pre and post surveys and for whom pre and post observational measures were available were included. The study did not capture families who dropped out of the program or who chose not to participate in data collection. It would be of value to know the nature of the factors associated with attrition and why some parents, and not others, completed the pre and post questionnaires. As this sample also only included biological mothers, the results cannot be generalized to fathers or other carers. Future studies should seek to address these limitations and to also further investigate the mechanisms by which reliable change occurs for participants.

This research has contributed to the evidence base of 'what works' in early parenting interventions for parents with a child with a disability. The study has gone some way to addressing the gap in efficacy studies of early parenting interventions and music therapy programs. It has addressed some of the limitations of previous music therapy studies and included the largest sample to date for a music therapy intervention that includes families who have a child with a disability.

Given the well established associations between parental well-being, parent-child interactions and positive child development, these findings are important to families, practitioners, funding bodies and policy makers. They are a promising indication that early interventions such as *Sing & Grow* can be effective in stimulating positive change for at-risk families, contributing to the

development of positive life trajectories for young children. Continued dissemination of such interventions along with further research on their impact is a worthwhile endeavor.

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