

## **Effects of Developmental Music Groups for Parents and Premature or Typical Infants Under Two Years on Parental Responsiveness and Infant Social Development**

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*The purpose of this study was to examine the effect of music therapy intervention on premature infants' and full term infants' developmental responses and parents' responsiveness. Subjects ( $n = 56$ ) were parent-infant dyads who attended developmental music groups or a control condition assessing responsiveness during toy play. All subjects were matched according to developmental age and were also matched by group for socioeconomic status and for maternal depression. Types of infant play and parent responsiveness were measured using observation of a standardized toy play for parent-infant dyads. Observations were coded with the number of seconds spent in each behavior using the SCRIBE observation program. Parents completed a questionnaire on the perception of their infant's general development, interpretations of their child's needs, the purpose of using music with their child, and their child's response to music. The infants attending the developmental music groups with their parents demonstrated significantly more social toy play ( $p < .05$ ) during the standardized parent-infant toy play than infants who did not attend the music groups. While not significant, graphic analysis of parent responsiveness showed parents who attended the developmental music groups engaged in more positive and less negative play behaviors with their infants than parents who did not attend the music groups. This study demon-*

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*strates the first findings of positive effects of developmental music groups on social behaviors for both premature and full term infants under 2 years old.*

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### Introduction and Review of Literature

Interest is continually growing in the variables affecting developmental milestone achievement during infancy and early childhood. As existing child development theories are modified and new theories are created, many teachers and clinicians are using aspects of multiple theories to form their foundation for teaching and interventions. When assessing the developmental ability of a child, domains typically evaluated include cognition, communication, motor, social, emotional, vision, hearing, and self-regulation. Professionals providing services for children with special needs are encouraged to actively involve parents and siblings in the process to create a partnership of responsibility for the child's development (Cook, Klein, Tessier, & Daley, 2004). The mother-infant relationship affects development across domains largely due to the continuing reciprocity present in the relationship (Bronfenbrenner & Morris, 1998).

Research on how music affects developmental domains of the infant is commonly domain specific. To date, most research focuses on an infant's cognitive awareness of musical features. Yet, research on maternal and paternal interaction and music is very limited and is an area necessitating further investigation. It has been demonstrated that through music and other aesthetic activities children develop social, language and communication skills (Broström, 2001). Littleton (1999) researched mother and infant interactions during an unstructured home observation and found a pattern of up to 20-minute musical interactions occurring, which involved vocalizations and physical movement. Infants also responded by gazing, smiling, vocalizing, cooing, kicking, tapping, waving, and reaching out to touch the mother's face or musical toy when the mothers initiated music-play actions. After reviewing research on music and infant development, Fox (2000) recommended young children be active participants in making music through movement, singing, and playing instruments. Other recommendations for music groups for very young

children stress the importance of empowering parents by giving them the ability and knowledge to make music with their children in the home environment (Fox, 2000; Ilari, 2003).

When investigating the effects of music on very young children, parents have been thought to be the most important factor in determining the child's level of exposure and development that is impacted by music interactions or music exploration. Because most very young children's time is spent with a parent, the parent has been viewed as playing the primary role in creating an environment in which music is prevalent and the child can create, explore, and manipulate sounds (Scott-Kassner, 1999). However, Levinowitz (1999) discusses how current society has moved away from active music making experiences that were formerly common within households, such as playing piano, guitar, and singing. The impact of this cultural shift has resulted in parents viewing themselves as passive consumers of music and not capable of being their child's first music teacher to provide active music guidance in the home (Levinowitz, 1999).

The impact of music on the development of premature infants in the first 2 years of life is an area that requires special attention. The preterm delivery rate has increased 16 percent since 1990 and by more than 30 percent since 1981 (Martin et al., 2005). The developmental impact of surviving premature birth has been investigated, as well as the impact for caregivers providing increased levels of care for these infants. Overall, when compared to full term controls, children born prematurely have higher rates of impairments in language, visual-perceptual areas, learning disabilities, some minor neuromotor dysfunctions, hyperactivity, and behavioral problems (Allen, 2002). There is currently little ongoing focused research for effective prevention of premature birth and little hope for premature rates to decline in the coming years (Alexander & Slay, 2002). Therefore, early detection and treatment of developmental disabilities for preterm survivors is important. Research on the impact of music on developmental milestones or mother-infant interaction in the first 2 years of life for babies born prematurely is exiguous. Discovering how music can impact childhood development as early as infancy may benefit children born full term as well as premature infants. The purpose of the study was to ascertain the effect of music therapy

intervention on premature infants' and full term infants' developmental responses and parent responsiveness.

## Method

### *Study Design*

The investigator used a quasi-experimental matched subjects design with posttest only. Due to the difficulty associated with infants leaving the home environment, this design served as a viable alternative to randomly assigned groups. Infants and young children, whose parents provided informed consent for themselves as well as their child, chose to participate in at least three 30-minute developmental music groups followed by a developmental assessment or chose to complete a one time developmental assessment. Developmental music groups occurred once a week on a recurring basis for 5 months.

### *Subjects*

This study solicited the participation of 70 parents/infants and young children dyads. All children admitted to the regional hospital Newborn Intensive Care Unit for a 1-year period were mailed a flyer advertising the beginning of a developmental music group for children 6–24 months old (corrected ages) and their caregivers. An email advertising the study was sent to several preschools, daycares, community mom and baby groups, churches, and home school email lists. Children enrolled in the study were between the ages of 7 and 24 months and their caregivers included mothers, fathers, grandparents, and nannies. Due to the differing types of caregivers enrolled in the study, when describing caregivers the words parent and caregiver will be used interchangeably. Of those 70 caregiver/infant dyads, 56 dyads were matched by infant developmental age.

Parents were asked to complete the Ages and Stages Questionnaire (ASQ) to determine the developmental age of each child (Bricker et al., 1999). The ASQ measures a child's functional ability for communication, gross motor, fine motor, problem solving, and personal social domain areas. If a child fell below the cutoff score for more than one domain, they were determined to not be functioning at that developmental age. Therefore, one subject in the experimental group and one subject in the control

group were not included in the analysis. In order to determine if there were pre-study developmental differences between groups, separate *t* tests were conducted on each developmental domain of the ASQ. No significant differences were found for communication,  $t(54) = .33, p = > .05$ , gross motor,  $t(54) = -.14, p = > .05$ , fine motor,  $t(54) = -.32, p = > .05$ , problem solving,  $t(54) = .36, p = > .05$ , or personal-social domains,  $t(54) = .06, p = > .05$ .

The Barratt Simplified Measure of Social Status (BSMSS) was completed by each parent to determine similarity between groups on the measure of social status (Barratt, 2006). The BSMSS is built on the work of the Hollingshead Four Factor Measure (1975) and provides an updated list of occupations to better address current occupations as they relate to social status. No significant differences were found between groups on the BSMSS,  $t(54) = .78, p = > .05$ .

The Beck Depression Inventory (BDI) was also completed by parents due to the vast amount of literature findings related to the impact of maternal depression on maternal infant interaction (Beck, Steer, & Brown, 1996). The BDI is designed to screen for depression in male and female adults. The caregiver attending the music groups with the child was asked to complete the BDI to determine if depression was a factor in the interaction style between the caregiver and child. No significant differences were found between groups on the BDI,  $t(54) = 1.01, p = > .05$ .

Typically developing infants and young children were included in the study in addition to infants and children with varying diagnoses. Diagnoses included premature birth, visual impairment, and developmental delay. Parents were informed of the general purpose of the study prior to participation and informed of the specific purposes after completing the developmental assessment with their child to avoid compromising internal validity. While most participants self-selected into either the experimental music group or control group, 7 parent/infant dyads were wait-listed and completed the control assessment before attending the music group. These 7 dyads were not included in the experimental music group analysis, but were allowed to attend the music group after completing the requirements for control subjects. The parents in this situation wanted to attend the music groups and were asked to first

participate in the study as a control subject to lessen the internal threat of validity that occurs when subjects self select into groups (Campbell & Stanley, 1963).

Parent/infant dyads that attended 3 music groups were given a \$40.00 Target gift card as an incentive for study enrollment. Parent/infant dyads that completed the one time control assessment were given a \$10.00 Target gift card as an incentive for study participation.

#### *Post Observation*

The researcher videotaped 10 minutes of parent and child toy play with a standard set of toys used in a previous mother responsiveness experiment (Baumwell, Tamis-LeMonda, & Bornstein, 1997) to facilitate the collection of behavioral data. Toys included a baby doll, blanket, bottle, 4 cups, plates, and spoons, teapot, bus with people, wooden blocks, soft blocks, phone, stacking cups, and sponges. Toys were spread out on the floor in a semicircle in front of the camera. Parents and children were positioned in front of the toy and facing the camera with the parent beside the child or holding the child in their lap. Parents and children were observed individually or in groups of two parents and children.

The SCRIBE 4.0.4 (Duke & Stammen, 2006) software program for behavioral observation was used to code all video data in a continuous time format. Therefore, the amount of time spent in each behavior was recorded for each parent and child. Coded videotape times ranged from 8.43 minutes to 11.66 minutes.

Based on a review of related literature, the investigator identified seven parent behaviors and eight child behaviors that indicate parent responsiveness and child engagement. The seven parent behaviors included responsive to toy play, responsive to distress, focus, prohibition, interrupting, miss, and no parent involvement. The eight child behaviors included parent/child toy play, alone toy play, parent/child vocal/gesture toy play, alone vocal/gesture toy play, parent/child vocal/gesture, alone vocal/gesture, parent/child no toy or vocalizations, and alone no toy or vocalizations. The researcher created coding definitions prior to videos being evaluated (Baumwell et al., 1997). Parent coding definitions included:

- Responsive to toy play- A positive and meaningful change in the parent's verbal or physical behavior subsequent to, and dependent on, a child's exhibiting a vocal or exploratory act. This change had to occur within 5 seconds of the child's initiation of play with a toy.
- Responsive to distress- A positive and meaningful change in the parent's verbal or physical behavior subsequent to, and dependent on, a child's exhibiting signs of distress, such as crying or screaming. This change had to occur within 5 seconds of the child's signs of distress.
- Focus- A parent attempting to verbally or physically focus an unfocused child on a toy.
- Prohibition- A parent negating or discouraging a child's behavior.
- Interrupting- A parent attempting to verbally or physically direct child's attention to a different toy when a child was focused on a toy or group of toys for at least 2 seconds.
- Miss- A parent failed to respond verbally or physically to a new child activity within a 5 second period or before the child shifted focus to a different toy.
- No parent involvement- A parent did not engage with the child or interact in any way.

The eight child behaviors included:

- Parent/child toy play- Child is engaged socially with a parent while engaged with a toy.
- Alone toy play-Child is engaged with a toy and no socialization.
- Parent/child vocal/gesture toy play- Child is engaged with a parent socially while engaged with a toy and vocalizing or gesturing.
- Alone vocal/gesture toy play- Child is engaged with a toy and vocalizing or gesturing while alone with no socialization. The vocal/gesture act is not directed to a parent.
- Parent/child vocal/gesture- Child's vocalizations or gestures are directed to a parent. Child is not engaged in toy play.
- Alone vocal/gesture- Child's vocalizations or gestures are not directed to a parent. Child is not engaged in toy play.
- Parent/child no toy or vocalizations- Child is socializing with a parent while not engaged in toy play and no

vocalizations or gestures occur. For example, child is sitting in parent's lap.

- Alone no toy or vocalizations- Child is sitting alone.

Social infant behaviors consisted of an infant engaged with the caregiver/parent through vocalizations/gestures, vocalizations/gestures with a toy, toy play, or no toy or vocalizations/gestures. Definitions for social behaviors included:

- Social behaviors occurred when a child attempted to convey a message to a partner.
- Social behaviors could last as long as a single behavior such as an initiation to play, or as long as an episode/exchange of social behaviors involving several turns (an initiation that is responded to by a parent, that is responded to by the child).
- Social responding was considered ended after 3 seconds of no responding. Nonsocial infant behaviors consisted of the same categories without any caregiver/parent interaction. Definitions for toy engagement included:
- Toy engagement was signaled when the child visually oriented to a target toy or group of toys for a minimum of 2 seconds.
- Disengagement with a toy was signaled when the child turned away from the toy or group of toys for more than 2 seconds.
- Toy engagement included picking up, reaching for, mouthing toy, etc.

Definitions for gestures included:

- Giving or showing object, pushing away or rejecting an object, reaching toward a parent or object the parent is holding, pointing toward an object or person, nodding or shaking head to indicate "yes" or "no", shrugging shoulders, and gestures made in conjunction with vocalizations, single- or multiple-words.

Definitions for vocalizations included:

- Laughing out loud, animal sounds, transportation/motor sounds, sounds such as "ah," "da," "eee," vocalizations that serve as fillers, such as "mm," or "huh", standard sign language, and any complete word.



TABLE 1  
*Pearson Correlations for Interobserver Reliability*

Subject behavior	Initial correlation	Drift correlation
Infants		
<i>Social</i>	.91	.87
<i>Nonsocial</i>	.88	.86
Parents		
<i>Positive</i>	.85	.96
<i>Negative</i>	.92	.89

- Vocalizations excluded crying and involuntary noises such as hiccups.

Two observers, blind to the purpose of the study, were trained in the use of SCRIBE on sample videos by the researcher. Training continued until intraobserver reliability with the researcher reached a minimum Pearson correlation coefficient of .80 for each of the eight child and seven parent behavior category times recorded in SCRIBE. Reliability means were collapsed into the two social or alone child categories and two parent positive or negative categories used for data analysis and reported in Table 1. To ensure consistency for both observers, interobserver reliability checks were conducted on 20% of both experimental and control group developmental assessment videos. Pearson correlation coefficients for the coded videos remained above .85. To ensure observers did not drift over time as observations were completed, every 8<sup>th</sup> coded video was checked for reliability. Pearson correlation coefficients remained above .86 for the drift videos (see Table 1).

#### *Parent Perception Questionnaire*

A Parent Perception/Music Use Questionnaire (PPQ) developed by the researcher was completed by parents to determine their child's reactions to music and the use of music in the home environment. The questionnaire contained four sections. The first section addressed the parent's perception of their child's general development. The second section identified parent's ability to perceive what their child wanted. The third section addressed the parent's purpose of using music in the home. And

the last section identified the behavioral responses of the child when music is played.

### *Music Curriculum*

The investigator designed a 36-session developmental music curriculum based on the Hawaii Early Learning Profile (HELP) (Parks, 1997) for parents and infants ages 6–24 months old. The HELP strand goals for each age that are naturally addressed through music are incorporated into the curriculum. The curriculum is designed in three sections according to developmental age: 6–11 months, 12–17 months, and 18–24 months (Walworth, 2006).

### *Music Group Setting*

Participation in the weekly music group was completely voluntary and caregivers were allowed to continue coming after completing the attendance requirement and posttests for the current study. Therefore, groups varied in size from week to week. Parent/infant dyads sat on padded mats on a carpeted floor. The group met in a large room with enough space for children to crawl, walk, and run, depending on the level of their mobility. For the current study, music therapists leading the sessions used all live music and usually accompanied songs with classical guitar. After instruments and manipulatives were used, they were stored for the remainder of the session behind a table laid on its side to act as a visual and physical barrier to prevent children from being distracted during the session.

### *Procedures*

Experimental group music parents responded to mail sent to all infants admitted into the regional hospital Newborn Intensive Care Unit the previous calendar year, advertisements in various community baby and mom groups, church nurseries, preschools, and daycares, and home school email lists. Upon arrival to the first music group, parents completed a consent form to participate in the study and filled out the registration information including their child's corrected age if born prematurely. After attending a minimum of 3 developmental music groups within an 8-week period, parent/infant dyads in the experimental group ( $n = 28$ ) completed a videotaped developmental assessment. Parents were

given the option of completing the assessment either immediately following the third music group or before a future music group if the parent elected to continue attending the music groups. The developmental assessment consisted of 10 minutes of structured toy play between the child and parent. The researcher provided the standard set of toys previously discussed. At the completion of the toy play, parents filled out the ASQ, the BDI, and the PPQ while the researcher supervised the child. Parents received a \$40.00 Target gift card after returning all completed forms to the researcher.

Control parents responded to advertisements in various community baby and mom groups, church nurseries, preschools, and daycares, and home school email lists. Control dyads ( $n = 28$ ) completed only the developmental assessment without attending the developmental music groups. The control group developmental assessment was the same assessment the music parents completed and consisted of 10 minutes of structured toy play between the child and parent. The researcher provided the same set of standard toys previously discussed. At the completion of the toy play, parents filled out the ASQ, the BDI, and the PPQ while the researcher supervised the child. Parents received a \$10.00 Target gift card after returning all completed forms to the researcher.

## Results

### *Parent Responsiveness*

Due to the high number of zero scores in the parent individual behavior categories, responsive to toy play, responsive to distress and focus behaviors were grouped together to form a positive behavior category. Similarly, the four behaviors of prohibition, interrupting, miss and no parental involvement were grouped together to form a negative behavior category. Therefore, a two-way analysis of variance was used to determine differences between groups for positive and negative parent behaviors. Results indicated a significant difference for the factor of behavior for both groups,  $p < .01$  (see Table 2). However, no significant difference was found between groups in the amount of positive versus negative interaction behaviors,  $p > .05$  (see Table 2). Additionally, no interaction for group by behavior was found  $p > .05$  (see Table 2).

TABLE 2

*2-way Analysis of Variance: Groups by Positive/Negative Behaviors of Parents*

Factor	SS	df	ms	F	p	$\eta^2$
Groups	231.15	1	231.15	.18	ns	
Error between	69134.78	54	1280.27			
Behaviors	591734.4	1	591734.4	16.82	< .01	.237
Groups $\times$ behaviors	85742.69	1	85742.69	2.44	ns	
Error $\times$ subjects within	1900187.12	54	35188.65			

Figures 1 and 2 show both groups of parents interacting with higher rates of positive than negative behaviors with their infants. The rate of each behavior in seconds for the experimental group shows the highest amount of time spent in responsive to toy play for experimental (see Figure 1) and control groups (see Figure 2) followed by no interaction for both groups. Parents in the experimental group engaged in more responsive to toy play time than the control parents while the control group parents disengaged and exhibited no interaction more than parents in the experimental group. Also, while not significant, the trend is clearly present (see Figure 3) of parents in the experimental group engaging in more positive interactions than the control group parents.

### *Infant Responses*

Due to the high number of zero scores in the infant individual behavior categories, the parent/child toy play, parent/child vocal/gesture toy play, parent/child vocal/gesture, and parent/child no toy or vocalizations behaviors were combined to form a social behavior category. Similarly, the alone toy play, alone vocal/gesture toy play, alone vocal/gesture, and alone no toy or vocalizations were combined to form a nonsocial behavior category. A two-way analysis of variance was then used to determine differences between groups for social and nonsocial infant behaviors. Results indicated significant differences for the factor of behavior ( $p < .05$ ) as well as an interaction for groups by behaviors ( $p < .05$ ) (see Table 3 and Figure 4). However, no significant differences were found for the factor of groups (see Table 3). Figure 5 shows experimental infants spending the most time engaged in toy play with the parent. Figure 6 shows control

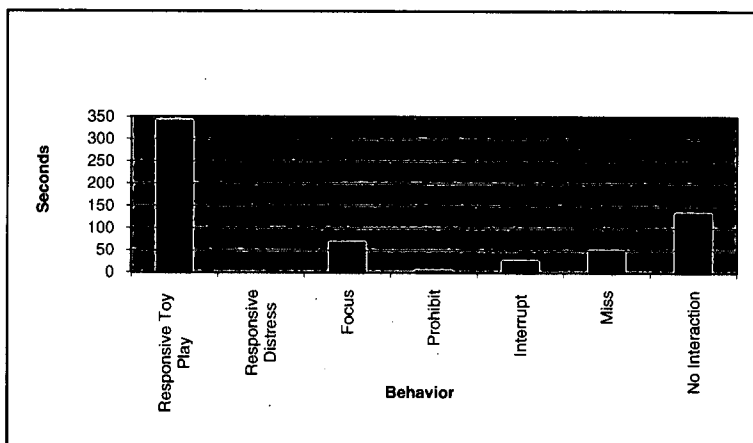


FIGURE 1.

Mean experimental parent behavior by type.

infants spending slightly more time engaged in alone toy play followed closely by toy play with the parent.

#### *Parent Perception Questionnaire*

Parents were given a Parent Perception/Music Use Questionnaire to determine group differences for the parent's perception

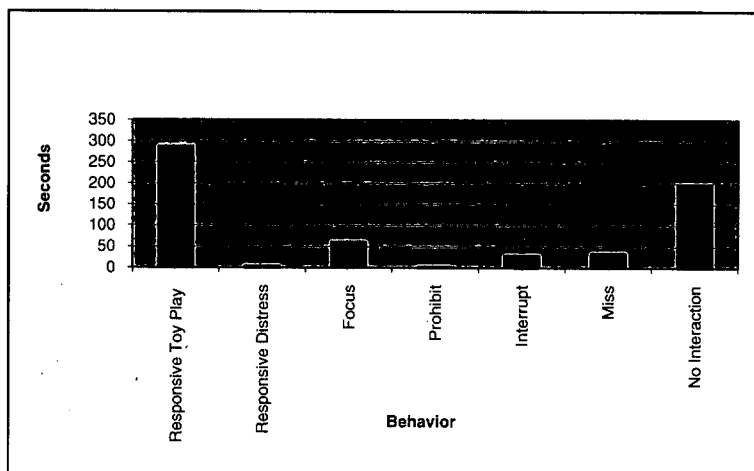


FIGURE 2.

Mean control parent behavior by type.

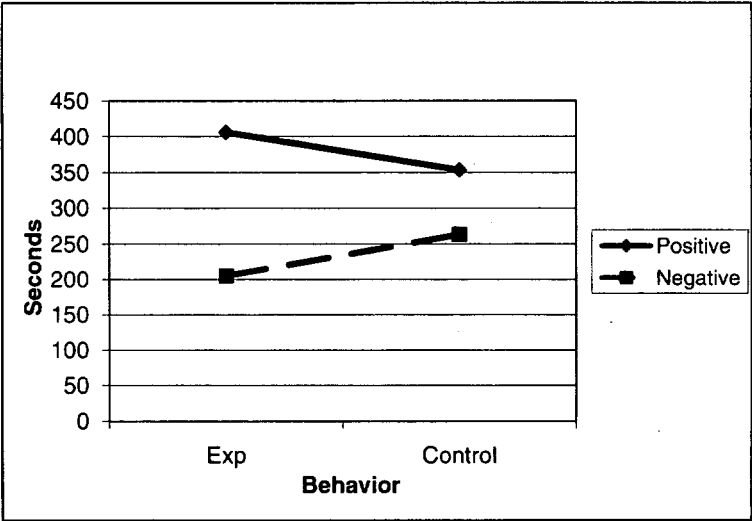


FIGURE 3.  
Parent positive versus negative means.

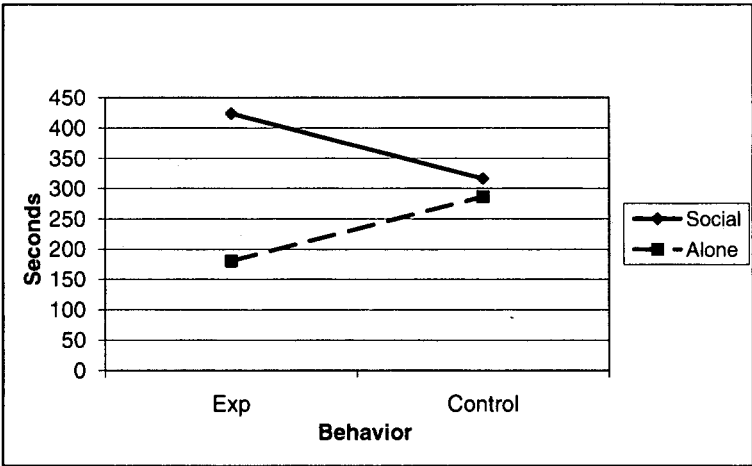


FIGURE 4.  
Infant social versus alone means.

TABLE 3

*2-way Analysis of Variance: Groups by Positive/Negative Behaviors of Children*

Factor	SS	df	MS	F	p	$\eta^2$
Groups	12.893	1	12.893	.042	ns	
Error between	16551.21	54	306.504			
Behaviors	521430.04	1	521430.04	7.63	< .01	.124
Groups $\times$ behaviors	316518.89	1	316518.89	4.63	< .05	.079
Error $\times$ subjects within	3689614.07	54	68326.19			

of their child's general development, their interpretations of their child's needs, the purpose of using music with their child, and their child's response to music. All parents in the control group completed the questionnaire ( $n = 28$ ) while one parent in the experimental group did not fill out the questionnaire ( $n = 27$ ). Questions were grouped by content area to allow for group analysis. All questions were scored in a positive direction. For example, "my child cries always" is a 7 score on the questionnaire and was inverted to a 1 score for the purpose of grouping answers in a positive direction. A Mann-Whitney  $U$  was used for analysis of the four groups of questionnaire answers. No significant differences were found between groups for parent's perception

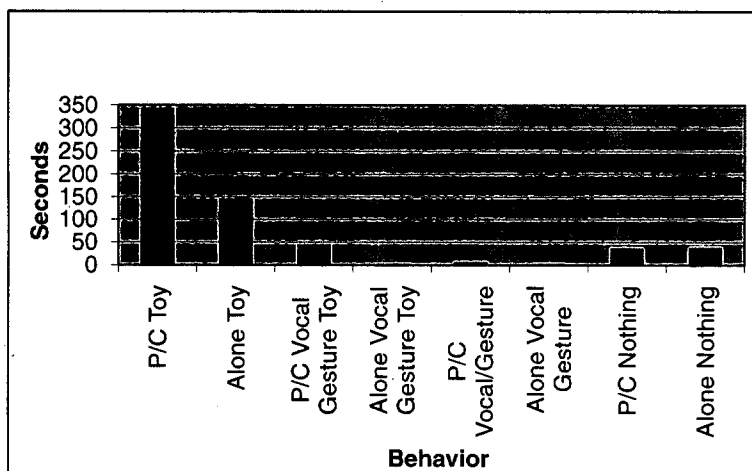


FIGURE 5.

Mean experimental infant behavior by type.

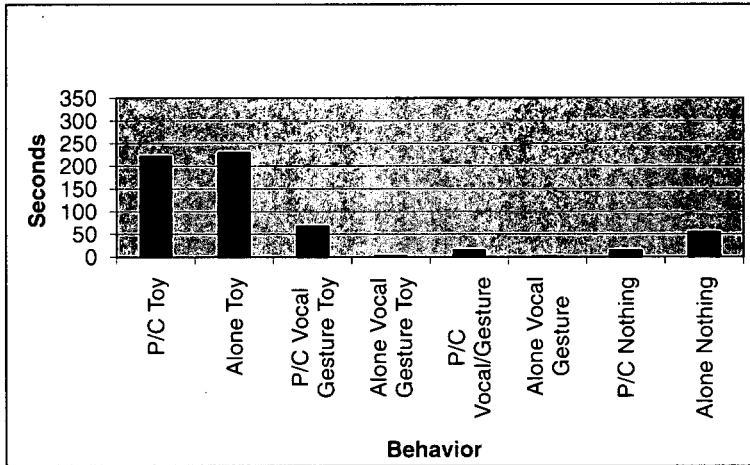


FIGURE 6.  
Mean control infant behavior by type.

of their infant's general development ( $n_1 = 27$ ;  $n_2 = 28$ ; obtained  $U = 383.5$ ;  $p > .05$ ), for their interpretations of their child's needs ( $n_1 = 27$ ;  $n_2 = 28$ ; obtained  $U = 289$ ;  $p > .05$ ), the purpose of using music with their child ( $n_1 = 27$ ;  $n_2 = 28$ ; obtained  $U = 306$ ;  $p > .05$ ), or for their child's response to music ( $n_1 = 27$ ;  $n_2 = 28$ ; obtained  $U = 297$ ;  $p > .05$ ).

#### *Child Toy Attention*

The amount of time spent in toy play was summed across the categories of parent/child toy, alone toy, parent/child vocal/gesture toy, and alone vocal/gesture toy. A  $t$ -test revealed no significant differences between music and non-music groups for time spent in seconds of toy play,  $t(54) = .33$ ,  $p = > .05$ .

#### *Premature Subjects Comparison*

No statistical analysis was conducted to determine group differences for premature versus full term children due to the low number of premature subjects. However, interesting trends are apparent when looking at descriptive findings. No difference was found between premature infants attending the music group ( $n = 7$ ) and matched age full term infants attending the music group ( $n = 7$ ) for time engaged in either social or alone



TABLE 4

*Means of Social and Alone Behaviors for Experimental Premature and Matched Age Experimental and Control Full Term Children*

	Experimental music full term	Experimental music premature	Control full term
Social behaviors (seconds)	513.6	470.6	354.4
Alone behaviors (seconds)	94	138	264.6

behaviors (see Table 4). Additionally, the premature infants attending the music groups engaged in more social and less alone behaviors than full term control infants ( $n = 7$ ) matched for developmental age (see Table 4).

## Discussion

### *Limitations*

One limitation of the study is that parents self-selected to participate in either the experimental music group or control group. Although random assignment is preferred in controlled studies, the ability to find a substantial subject base of participants willing to come on a recurring basis to the music group with their infants was challenging and warranted the quasi-experimental matched subjects design used for this study. The threat of internal validity posed by this factor is acknowledged by the investigator and should be considered for future study designs.

Behaviors were grouped for coding due to the limitations present in the SCRIBE software. Only one button can be activated at any time while capturing data information, making it impossible to know when multiple behaviors are being exhibited unless behaviors are grouped. For example, if a child was playing with a toy with a parent and vocalizing about the toy, three corresponding buttons for those behaviors could not be activated. Only one button labeled parent/child vocal/gesture toy play could be activated. While this is not the most straightforward way to collect data, it was necessary due to the software design.

### *Implications*

Infants who attended the experimental music group engaged in more social behaviors during toy play with their parents, a result that is not surprising. This result is in agreement with previous

findings that music maintains high attention levels significantly more during music based instruction groups when compared to play-based instruction groups for preschool age children (Robb, 2003). Research in infant social learning has interaction positively impacts the amount of attention and imitation infants display when copying a model's actions and outcomes (Nielsen, 2006). The music activities in the curriculum promoted social learning by providing a social context for the acquisition of new skills. As each developmental area was addressed throughout the music groups, children were given the opportunity to see new actions and object movements modeled by parents, music therapists, and other children. Children were given the opportunity within the structure of the curriculum to practice new skills as activities and songs repeated from week to week. Children were also reinforced for new skill development. For example, parents, music therapists and other children cheered for a child when he/she played the drum, ran during movement time, or played with his/her puppet.

While the differences found in social play between infant groups could have resulted from the group setting interaction, another focus of the group was parent instruction through music. Activities within the curriculum targeting developmental areas through music were modeled each week, and parents were able to see peer modeling as other parents interacted with their infants. Additionally, parents were given handouts to take home each week with ideas of developmentally appropriate interactions to do at home. Research has shown mothers who increased responsiveness to their infants resulted in increased infant social, emotional, communication, and cognitive competence (Landry, Smith, & Swank, 2006). The parent training could, therefore, have had a great influence on the increased social toy play exhibited by infants in the experimental group.

While the parents in the experimental group did not show significant differences from parents in the control group, the evident trend towards parents in the music group engaging in more positive interactions during toy play warrants further investigation. Parents were only required to attend three music sessions to be enrolled in the study, however many parents continued coming to the music groups after completion of the current study. Of the 28 parents attending the music groups, 20 continued coming after they completed the 3 required sessions as

a study participant. Of the 7 parents who completed the control subject requirements before attending the music group, 3 continued coming to the groups more than once. Investigating longer-term impact of the music sessions to see if the trend continues should be considered in future studies.

Although the number of premature infants in this study did not warrant separate group analysis, it is interesting to note that there was no difference between premature infants attending the music group and matched age full term infants attending the music group in time spent for both social and alone behaviors. Additionally, the premature infants attending the music groups displayed more social behaviors and less alone behaviors than full term control infants matched for developmental age. These general findings warrant investigation with more preterm infants participating in developmental music curricula. If premature infants attending the 3 experimental music groups were able to engage in social behaviors at a higher rate than full term infants matched for developmental age, skill development across other domains might be increased with more extended music time.

Because premature births and resulting risks for developmental delays continue to increase, knowledge about effective interventions across developmental domains is needed. Parent training for infant developmental interventions is an area needing further investigation. The maternal impact on infant responses is clear and yet programs training parents on how to address developmental milestone achievement are not prevalent. Finding a location to reach the greatest number of parents with premature infants is challenging. Issues such as lack of transportation to a community group, the time of day the group is scheduled so as not to interfere with work, infants' individual napping schedules, and finding childcare for other siblings all interfere with group participation.

This study confirms that infants 6–24 months old attending only 3 group developmental music therapy sessions engaged in significantly more social toy play behaviors than infants matched for developmental age not attending music sessions. Music parents were more positively engaged with their children, but not significantly so. These findings support the need for further investigation with both premature and full term infants from various socioeconomic backgrounds into the positive effects of

social music interventions utilizing peer modeling and parent training for developmental milestone achievement.

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