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Article

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Abstract

Music communications and interactions are important to child development. Yet modern day technology may have caused social modifications of musical engagement for parents and their children. Today, music-based electronic devices seem too often to be used in place of human musical interactions. The current investigation developed an alternative music based on pre-language sounds (for devices and playthings) that we assume can engage babies, and presented these to parents for their judgment. In Study 1, parents of babies in waiting rooms of child development centers completed a survey after listening to three different music genres (classical music themes, well-known folk tunes, and paralanguage songs). Study 2 replicated Study 1 but within home settings. Study 3 engaged mothers and babies in a music-movement group. The results indicate that not only are parents open to alternatives, but they can envision purchasing devices and playthings which employ new more adaptive music genres that might be more age appropriate and developmentally sound.

Keywords

background music, infants, mobiles & toys, paralanguage songs, parental preferences

Music communications and interactions are important to child development (Brodsky & Sulkin, 2011; Longhi, 2009; Milligan, Atkinson, Trehub, Benoit, & Poulton 2003; O'Gorman, 2006). Some music experience occurs simply thorough everyday random exposure to televised media, while background music is often heard in other locations like malls, restaurants, and even in the car. However, babies[1] also experience music through direct intent of a caregiver – such as singing to the child, operating a musical toy at playtime, or listening to music during daily activities (Custodero, Britto, & Brooks-Gunn, 2003; Custodero & Johnson-Green, 2008; Shehan, 1998). This latter type of experience is often referred to as *baby-directed music*, and in fact targets several aspects of child development including sensory-motor, language, communication, emotion, social, and cognitive modalities (Bower, 2010; de l'Etoile, 2006b; Ilari, 2005; Sulkin & Brodsky, 2013).

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Throughout human history, across all cultures, the use of tonal expression has been an important natural spontaneous platform to support child development and to create emotional communication (de l'Etoile, 2006a; Conrad, Walsh, Allen, & Tsang, 2011; Young, 2004). The primal and most common natural expression of adults used with babies has been vocal utterances (Mampe, Friederici, Christophe, & Wermke 2009); these forward meaningful communications are directed at establishing a mutual discourse (Trehub, 2002). Nakata and Trehub (2004) point out that many studies that target vocal communication of this type use the label 'Motherese' (Maternal Speech). But in light of studies exploring fathers (such as O'Neill, Trainor, & Trehub, 2001), the more politically correct 'Parentese' has surfaced (Christakis, 2010). Moreover, the literature uses the term 'Songese' for infant-directed singing (Longhi, 2009). Among the characteristics of these communication formats are traits that can also be defined as music qualities, such as high-pitched tones, slow rhythmic patterns, clear accentuations, and repetitions. These characteristics play an important role for babies experiencing temporal structures that construct future frames of communication, as well as contribute to the regulation of attention and arousal levels that assist emotional adjustment and mood control; all of these are seen as supporting an optimal development (de l'Etoile, 2006b; Longhi, 2009; Malloch, 1999–2000; Nakata & Trehub, 2004; Shenfield, Trehub, & Nakata, 2003). Certainly, baby-caregiver interactions play an important role in the baby's future development. For example, caregivers are responsible for exposing the baby to sensory-motor stimuli (Sroufe, Cooper, & Dehart, 1996). Further, vocal and music-like utterances are an important powerful vehicle to create significant interactions and reciprocity. While performing such utterances, caregivers adjust and modify their behaviors to meet the baby's needs and attention (Longhi, 2009), which involve lengthening duration of the upbeats, slowing down tempo, and adapting to tonal centers. Such flexibility may help to construct positive interactions and dyadic bonding between the caregiver and the baby (Custodero & Johnson-Green, 2008; de l'Etoile, 2006b; Longhi, 2009; Malloch, 1999–2000). It should be pointed out that engaging in vocal activities with babies is also beneficial for the adult caregivers themselves as these actions promote intimacy and emotional expression, as well as enhance positive mood states (Baker & Mackinlay, 2006). Finally, Bower (2010) contends that Songese functions as a prelude to learning cultural practices; in essence, these are the natural spontaneous behaviors that accompany everyday actions and familial routines.

Modern-day technologies widely available to parent-consumers have greatly modified the quantity and quality of everyday music interactions with babies. On the one hand, the frequency of music engagement has been greatly amplified with music-based electronic devices, toys and videos, while on the other hand, these seem to be often used to enhance stimulation as a substitute for human presence and live music interactions (de Vries, 2009; Levin & Rosenquest, 2001; Young, 2008). For example, in an interesting study, Young (2008) found that only 38% of mothers reported a regular usage of music to soothe babies to sleep, and even these employed various media. Baker and Mackinlay (2006) state that more than anything else, crib-side mobiles provide a replacement for a mother's lullaby. To further complicate the issue, popular concepts such as the 'Mozart Effect' (Crncec, Wilson, & Prior, 2006a, 2006b; Rauscher, Shaw, & Ky 1993, 1995) have lead to an over-abundance of appliances, gadgets, devices and soft toys that incorporate instrumental music. In addition, highly popular movies (seen on cable/satellite TV, VHS videos, or DVDs) and digital games (PC-based computer programs, or 'apps' for iPad™-type tablet devices), are all branded as appropriately supporting child development – especially as they employ musical stimuli that are either classical music themes or well-known folk tunes (Christakis, Zimmerman, DiGiuseppe, & McCarty, 2004;

Zimmerman & Christakis, 2005; Zimmerman, Christakis, & Meltzoff, 2007). Yet, none of the above encourage verbal reproduction by babies, or human interactions with babies, both of which have been seen as paramount for infant development (Baker & Mackinlay, 2006; Papousek, 1996). It is important to note that the incentive behind the use of classical music or folk tunes stems from commercial considerations and global marketing interests rather than developmental issues. For example, instrumental musics have few cultural barriers, and therefore such devices and media do not need to be adapted when a range of geographical provinces are targeted.

Considering contemporary society's reliance on digital technologies in all aspects of human life including child rearing, and bearing in mind the vital primary role that music plays in babies' and infants' lives, it would seem that we are challenged to seek alternative musical genres that are more befitting to innate perceptual abilities and developmental needs – but yet can also serve as commercial applications for music-based electronic devices and playthings (including mobiles, toys and infant-directed videos). An approach that seems feasible as an option for further exploration takes into account two overriding factors: (1) the use of a restricted number of syllables and consonants that reflect the initial utterances of children's first verbal expressions; and (2) the natural universal characteristics of baby songs. The first factor emphasizes 'soft-gibberish' sounds such as '*ba*' '*da*' '*ma*' '*na*' that are common to all languages and constitute the primary linguistic utterances of children in all cultures (Dromi, Ringelwood, & Bar-Lev, 2000; Dromi & Ringwald Frimerman, 1996; Sulkin, 2003). In their first year of life, babies produce a pre-linguistic vocalization which can be divided to five general phases: (a) Crying begins at the first day of living; (b) Cooing appears at about 2 months and is usually related to satisfaction and joy; (c) At approximately 4 months, babies start a vocal play, in which they experience and explore the range of their vocal abilities, and produce simple random syllables assembled of consonants and vowels such as '*ba*' '*da*' '*ma*' '*na*'; (d) At 6 months, babies begin 'canonical babbling,' namely vocal utterances that sound more and more speech-like in the sense that they produce syllable sequences in a repetitive syllable (for example, '*ma-ma-ma-ma-ma*'). Subsequently, the sequences change to combinations of consonants and vowels (for example, '*ma-ma-ba-ba*' and '*na-na-oooo*'); and (e) About 10–12 months, the baby starts to reproduce certain sounds, more often found in the localized speech of the language they are most exposed to by their caregiver – i.e., their 'mother-tongue' (Sroufe et al., 1996). Our second factor that ties in to the natural universal characteristics of baby songs, stresses the use of simple repetitive structures, short song length, narrow pitch range, tight step-wise intervals, and melody lines with unadorned harmony (Sulkin, 2003, 2009). We refer to music stimuli based on these two factors as *Paralanguage Songs*.

Pre-study development: Paralanguage songs

In general the kind of music examined in the study targets a soothing experience. It can reach the baby in various fashions – among them through audio media, mixed audio-visual media, and even via devices and playthings such as mobile toys. For the study, two pieces were composed by the first author (a well-known Israeli writer of children's play songs), and recorded in a sound studio. One piece was written in a major key, while the other was in a Dorian (minor) mode. We point out that modal songs are not necessarily a special representation of Israeli musical culture, and currently most Israeli children's songs appear in major and minor tonalities. We do, however, consider modal songs to be a more fitting genre for baby music targeting multicultural families and parents in countries worldwide. The two music segments employed

female timbre vocals, and were accompanied by an electronic keyboard using *new-age* world-music textures. While there was no specific research-driven motive for using a female voice, it is important to note that vocal singing of caregivers is for the most part female as mothers are more commonly found in the daily care of babies, and that auditory experiences before birth account for an overall aural perceptual learning linked to the female voice. Each item was approximately 75 seconds in length. A sampler of the songs can be found at http://in.bgu.ac.il/humsos/art/Pages/Scientific-Publications-warren.aspx (#32). In addition, we present the musical notation, see Figure 1.

An initial trial exploration demonstrated that the songs were very easy for mothers to imitate. Further, both mothers and babysitter-caregivers claimed that these songs were used to stimulate babies' and toddlers' first verbal utterances. Finally, several mothers reported that they could perform these songs *a cappella* (i.e., without using devices for accompaniment), and therefore they envisioned that such pieces would help them mediate interactions and communication with their baby.

But, given the ever-present background music found in devices and playthings that are classical music themes, folk tunes, and popular hits, we question if parents could view a new alternative genre (such as *Paralanguage Songs*) in a positive manner. Could they even envision their own consumer behavior (i.e., intent to purchase) targeting devices and playthings that utilize this new music genre? After all, actions related to parenthood are no doubt based on both age-old traditions found in one's personal family history as well as on advice given by professional experts. Hence, we were not sure if parents would be open-minded towards new alternatives that do not reflect what has been previously passed on to them. Moreover, as the information age has clearly brought learning and counsel about raising children directly to the home (Johanson-Green & Custodero, 2002), much implicit knowledge has been acquired without communication from a physician or child development specialist. Yet most parents are indeed unaware that such 'common knowledge' as passed on to them through the media – even when presented by an Ellen, Geraldo, Oprah, Phil, or Ricki – may have been somewhat modified in the best interests of a network sponsor who expects positive exposure for their marketing campaign and specific brand. Hence, after creating and recording two prototypes, we designed an investigation to explore parental attitudes and preferences towards music genres. Study 1 recruited parents in waiting rooms of child development clinics; Study 2 scheduled meetings with parents in their own residential home setting; and Study 3 targeted mothers in a Mom-To-Mom *Mother&Baby* Music-Movement Group.

Social economic details

In general, our research focuses on locations in central Israel to ensure that the sample is representative of Israeli middle-class communities. We point out that Israel is characterized as an immigration country. The State of Israel Central Bureau of Statistics (2009) reports that only 35% of the Jewish inhabitants in Israel are Israeli-born, while the other 65% have immigrated from various countries and ethnicities, including: 35% for European and American descent (Argentina & Latin America; Bulgaria & Greece; Canada & Oceana; Czech Republic, Slovakia & Hungry; France; Germany & Austria; Poland; Romania; UK; USA; Russia); 15% for African origins (Algeria & Tunisia; Egypt; Ethiopia; Libya; Morocco; Other); and 12% for Asian derivations (India & Pakistan; Iran; Iraq; Syria & Lebanon; Turkey; Yemen; Other). Unfortunately, details of the individual families that participated in the study, such as ethnicity and income, are not available for reasons of confidentiality. That is, we could not ascertain such information

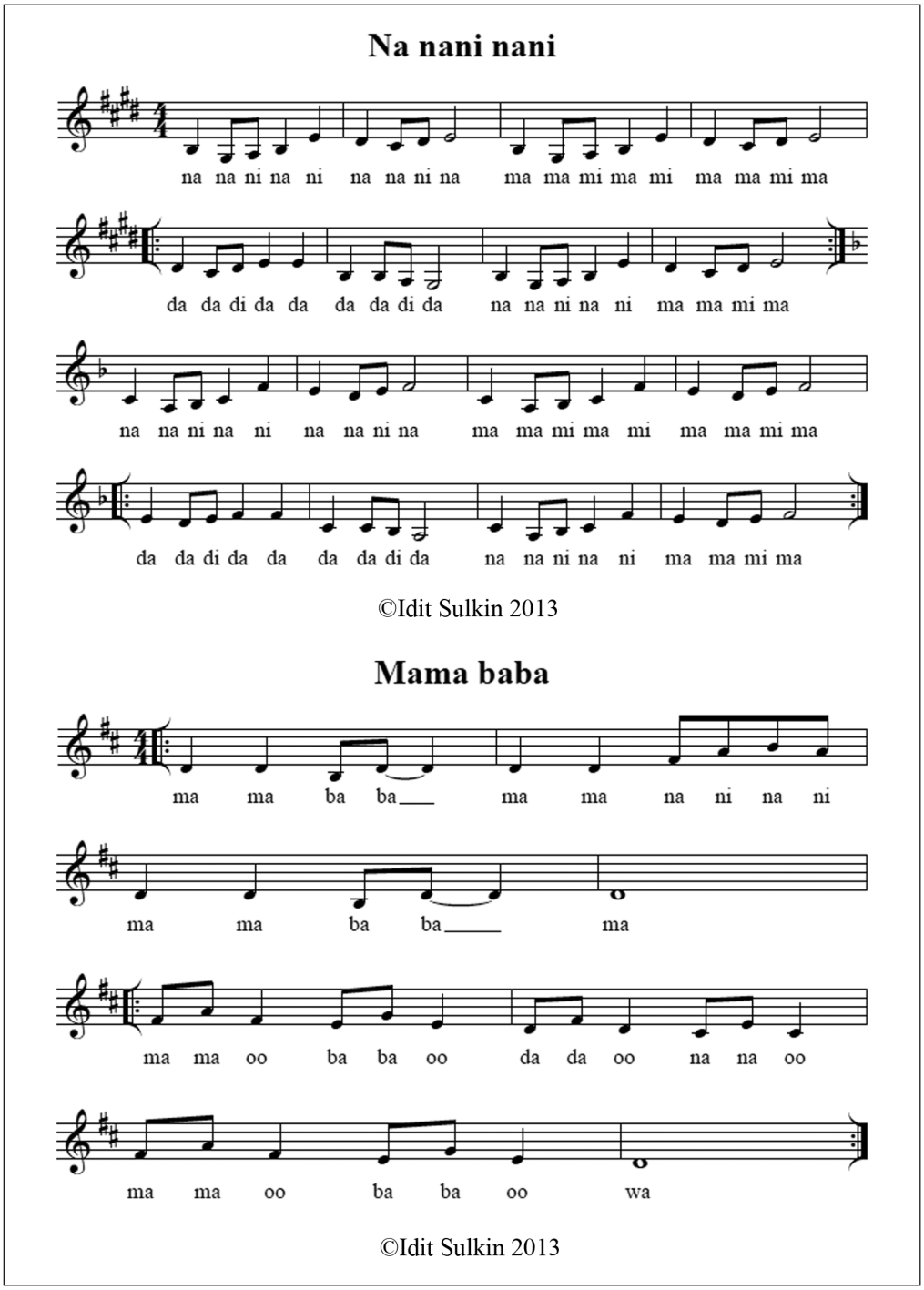

Figure 1. Paralanguage songs used in the study

at child development centers and *Mother&Baby* groups as the supervisors of these institutions would not concede to the collection of such information. Suffice it to say that the participants resided in catchment areas of families from middle-class socio-economic levels as seen through ownership of 1–2 automobiles, 1–2 computers, satellite/cable TV, and 1–2 mobile phones.

Study 1

Method

Participants. Parents of 90 babies, seated in waiting rooms at four child development centers, agreed to participate. Twenty-eight did not complete the task as their medical appointment or consultation occurred earlier than planned. The final sample ($n = 62$) includes 61 mothers and one father, who were on average 33 years old ($SD = 4.09$). For the most part, they had completed 16 years of formal study ($SD = 3.36$), and were engaged in a range of daily pre-occupations (housewife, secretary, marketing, teacher, engineer, journalist, lawyer, artist, etc). The babies in the waiting rooms of the child development centers ranged from 1–18 months ($M = 8$, $SD = 6.2$), with a gender split of 32 females, 30 males. Although these ages may seem far too wide a range to be considered a homogeneous sample, we point out that manufacturers of crib mobiles (tinylove.com) do recommend usage of devices and playthings through to 18 months, suggesting removing the attachment clamp and mobile center arm in the later stages, and dangling toys such that the music box can be employed separately for the sake of listening.

Stimuli. A 6-item test-set covering three music genres was employed. There were two items per genre: Folk Tunes selected from a commercially available music disk for babies (*Baby Music* by Clasikaletet Pub., Holon, Israel); Classical Music Themes selected from a commercially available toy for babies (*Symphony In Motion* by Tiny Love®; the current version is marketed under name *Classic Developmental Mobile*; http://www.tinylove.com/Product/English/Classic_Developmental_Mobile.html); and Paralanguage Songs (newly composed and recorded for the study). The Folk Tunes included *Sleep Bayushka* (traditional) and *Beloved Child* (traditional); the Classical Music Themes included *Partita No. 2 in C Minor* (BWV 826, by J. S. Bach) and *Sonata for Piano in C* (Eschenbach, K. 545, 1st Movement, by W. A. Mozart). All music items were roughly 70 seconds in duration.

Equipment. The parents listened to the 6-item test-set via an iPod (Apple) with K271 Studio (AKG Acoustics) circumaural closed-back professional headphones.

Measures. The Parents Preference Questionnaire (PPQ) was developed to evaluate parental attitudes and preferences towards baby-directed musical stimuli. Previous surveys have indeed focused on distinguishing song genres (O'Neill et al., 2001; Rock, Trainor, & Addison, 1999), or understanding parents' music-related behaviors and the repertoire they choose to employ with their children (Custodero, 2006; Custodero, Britto, & Xin, 2002; Custodero et al., 2003; Custodero & Johnson-Green, 2003; Young, 2008). Nevertheless, our attempt highlights parental openness toward a more unfamiliar adaptive alternative music stimuli. Therefore, we took on board eight components, as a package, to compare between music genres in an effort to evaluate parental preferences towards the music backgrounds: (a) *Suitability* of the music items for infant-directed listening; (b) *Appropriateness* of the music items as background music for babies; (c) *Comfortability* (aural ease) of the music items for babies; (d) *Usability* of the music items with

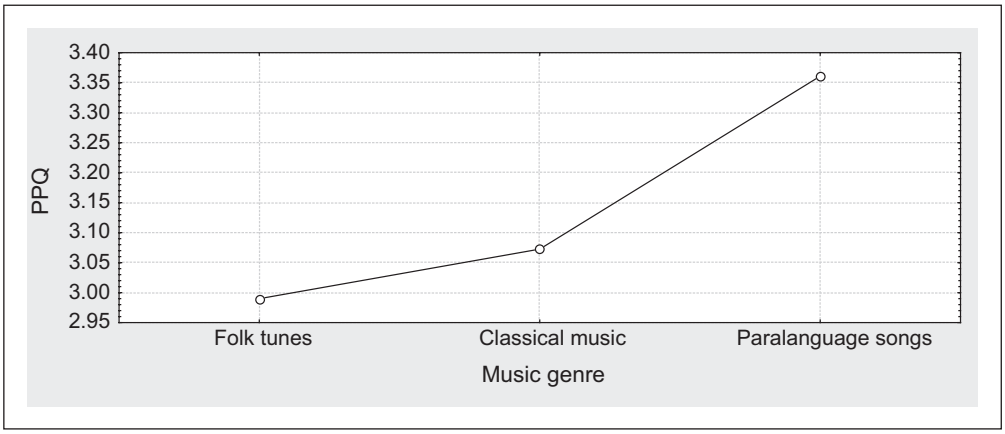

Figure 2. Study 1: Main effects of parent preferences for music genres.
Note. Y axis = parental preference questionnaire (total mean score).

babies for soothing bedtime; (e) *Usability* of the music items for active playtime; (f) *Usability* of the music items as stand-alone refrains for singing (without a support background from devices and playthings); (g) *Componentability* of the music items as features in the devices and playthings to support child development; and (h) *Purchasability* of devices and playthings for babies that incorporate the music items. The participants employed a 4-point Likert scale for their responses. A grand-means of all eight items served as a total score for each music genre. *PPQ* reliability analyses (Cronbach's α, Standardized α) for each aural condition demonstrated them to be above the acceptable level: Folk Tunes (α = .92, α = .93); Classical Music Themes (α = .88, α = .89); Paralanguage Songs (α = .92, α = .92).

Procedure. Prior to the onset, a formal application was submitted to the Central Supervisor and National Health Administrator of 'Tipat-Halav' Child Development Centers in Tel Aviv/Jaffa, Israel. Subsequently, the study was also approved by a university Human Subjects Research and Ethics Committee. Parents seated in waiting rooms (at four different sites) were recruited; after reading an information leaflet, each participant signed a consent form. Then, each completed a survey of descriptive data, and headphones were placed over their ears. Each parent was asked to listen to two short music segments of the same genre, and thereafter complete the *PPQ* 8-item questionnaire. Parents were not asked to relate their responses to babies at a certain age, nor to their own baby. We do, however, assume that their responses reflect their overall personal experiences in parenting. A second and third 2-item block commenced in the same fashion. The presentation order of all three blocks was counterbalanced. The complete procedure for each participant lasted approximately 15 minutes.

Results

PPQ data were tallied and entered into separate within-subjects repeated measures analysis of variance (ANOVA); main effects surfaced ($F_{(2, 122)} = 6.09$, $MSe = .39$, $p < .01$, $\eta_{\rho}^2 = .09$); see Figure 2. Contrast statistics indicated that mothers of babies and toddlers rated Paralanguage Songs significantly higher than Classical Music Themes or Folk Tunes ($M = 3.36$, $SD = .63$; M = 3.07, $SD = .66$; $M = 2.99$, $SD = .77$).

Discussion

Several studies (Custodero & Johnson-Green, 2003; Custodero et al., 2002, 2003) exploring parental preferences of music selections for their babies and toddlers demonstrate a mixed outlook; they found that musical exposure by parents contains diverse genres including lullabies, play songs, classical music, popular hits, and folk tunes. For the most part, these studies have employed surveys without the use of concrete musical stimuli for parents to experience. In view of this, Study 1 exposed parents to three music genres, and encouraged them to offer feedback as regards their envisioned usage of the items in everyday activities with their baby. In comparison to the two well-known genres (i.e., Folk Tunes and Classical Music Themes), a new alternative music genre was presented and evaluated by the parents. Although unfamiliar, and quite different from conventional popular music items found in most devices (crib mobiles), playthings (toys), and media promotions directed to parents of babies, the results show that parents rated *Paralanguage Songs* as their preferred first choice. Such a finding implies that although parents have been exposed to intensive marketing campaigns involving consumer-directed massages endorsing specific music genres, and have already become accustomed to the classical music themes and popular hits found in the devices and playthings they have purchased for home use, they are open-minded to alternative new music stimuli. Yet Study 1 involved preferences that surfaced via a listening task detached from an ecologically valid natural home setting. Therefore, Study 2 was implemented *as if* a replication study but within real home environments.

Study 2

Method

Participants. Fifty psychology undergraduates each recruited two parents, and scheduled home-visits to implement the study. Previously, the students underwent a pre-study training session regarding the procedures and materials to be implemented in the study. These compatriots were all 21 years old, mostly female (94%), with 11 students from the Moslem community. All 100 parents of babies and toddlers who agreed to participate read an information leaflet and signed a consent form; 20 parents were excluded from the analyses because of incomplete data. The final sample of participants ($n = 80$) was comprised of 69 mothers and 11 fathers with an average age of 33 years ($SD = 4.11$). The ages of their children ranged from 1–18 months ($M = 11$, $SD = 5.38$), with a gender split of 44 females, 36 males. On average, the parents had completed 15 years of formal study ($SD = 5.38$), and were engaged in a range of daily pre-occupations (secretary, administrator, engineer, housewife, teacher, student, lawyer, nurse, etc).

Stimuli and measure. The music stimuli were identical to Study 1, but the 6-item test-set was supplied on CDs. In total there were 50 CDs of three ordered versions (A, B, C); this method was employed to control for a counterbalanced presentation order. The *PPQ* was identical to Study 1. Reliability analyses (Cronbach's α, Standardized α) for each aural condition demonstrated to be above the acceptable level: Folk Tunes ($\alpha = .80$, $\alpha = .81$); Classical Music Themes ($\alpha = .71$, $\alpha = .73$); Paralanguage Songs ($\alpha = .82$, $\alpha = .82$).

Equipment. In an effort to maintain the home setting atmosphere as an ecological natural environment, Study 2 employed sound-reproduction equipment as found in each residence. While such a strategy might risk lowering empirical control of sound quality, it was assumed this approach would contribute to feeling more at-ease, and therefore assure more authentic responses.

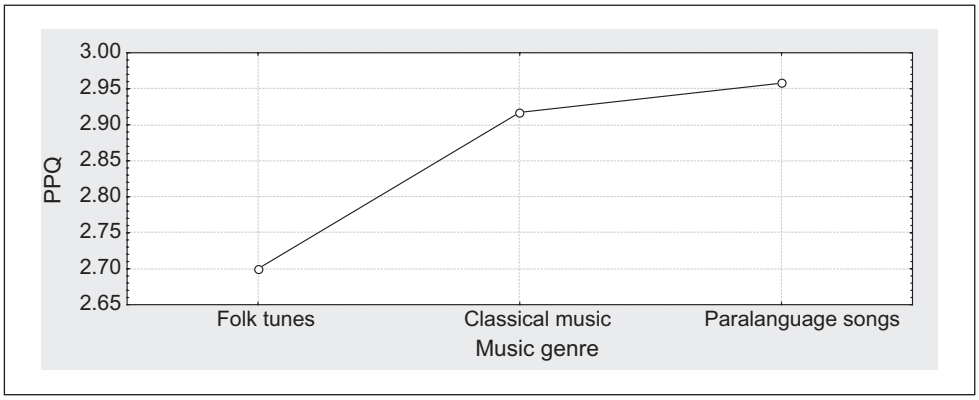

Figure 3. Study 2: Main effects of parent preferences for music genres.
Note. Y axis = parental preference questionnaire (total mean score).

Procedure. Prior to the onset, the study was approved by a university Human Subjects Research and Ethics Committee. Each student compatriot received a research packet; there was a music CD, as well as double sets of information letters, consent forms, and *PPQ* surveys. Each student recruited two parents, and scheduled home meetings independently. The procedure of Study 2 was identical to that of Study 1.

Results

PPQ data were tallied and entered into a within-subjects repeated measures ANOVA; main effects for Study 2 surfaced ($F_{(2, 158)} = 4.87$, $MSe = .32$, $p < .01$, $\eta_{\rho}^2 = .06$); see Figure 3. Contrast statistics indicated that parents of babies and toddlers rated Paralanguage Songs and Classical Music Themes in a similar fashion, and both of these were significantly higher in preference than Folk Tunes ($M = 2.96$, $SD = .58$; $M = 2.92$, $SD = .53$; $M = 2.70$, $SD = .60$).

Discussion

Study 2 re-examined the findings of Study 1 but within real home settings rather than waiting rooms of health centers. The study was able to isolate 'researcher personality' by replacing a single presenter (the first author) with 50 young adults. Study 2 found that parents of babies favored Paralanguage Songs as much as the Classical Music Themes, and both of these were preferred over the Folk Tunes. This result reinforces the previous assumption that parents seem to be open to the use of a new alternative music style with their babies. Certainly, the home setting forced parents to reassess their consumer habits and product choices – which are literally physically present in adjacent living rooms and bedrooms. We wonder if this proximity perhaps had an influence on responses towards classical music themes, which scored higher in Study 2 than Study 1. Nonetheless, as music engagement by parents with their babies most often involves cross-modality sensory components, such as tactile (touching, caressing, cuddling) and movement (swinging, rocking), we felt it important to implement Study 3 in an effort to re-examine parents' preferences for alternative music stimuli within a more interactive environment rather than during passive listening.

Study 3

Method

Participants. Two psychology undergraduates served as activity leaders for a *Mother&Baby* group. The group meets on a weekly basis as part of on-going activity within the 'Mom-To-Mom' program at a Center for Women's Health Studies and Promotion (hosted by a university Department of Social Work). Both students were 26-year-old females. In the group there were 15 mothers of babies; they read an information leaflet and signed a consent form. The mothers were on average 32 years old ($SD = 5.06$). The ages of the babies ranged from 2–11 months ($M = 4.3$, $SD = 2.67$), and the majority were girls (12 females, 3 males). On average, the mothers had completed 16 years of formal study ($SD = 3.09$), and were engaged in a range of daily pre-occupations (social worker, student, secretary, computing, medical, etc).

Stimuli and measure. The music materials and *PPQ* evaluation measure were identical to the previous two studies. *PPQ* reliability analyses (Cronbach's α, Standardized α) for each aural condition demonstrated to be above the acceptable level: Folk Tunes ($\alpha = .91$, $\alpha = .93$); Classical Music Themes ($\alpha = .93$, $\alpha = .94$); Paralanguage Songs ($\alpha = .87$, $\alpha = .89$).

Equipment. Study 3 employed an *AZ1047* (Philips) portable CD stereo player.

Movement Sequences. Six movement sequences (otherwise seen as games) were designed to accompany the musical segments – one for each segment in the 6-item test-set. The sequences were intended to reflect the musical characteristics of each segment, as based on musical form, dynamic features, articulation, and tempo.

Procedure. Prior to the onset, the study was approved by a university Human Subjects Research and Ethics Committee. The two student activity leaders underwent eight individual 30-minute training sessions (with the first author also well-known as a facilitator of music-movement activities); they learned the music segments, practiced the movement sequences with baby mannequins, and rehearsed leadership communication skills. Then, three *Mother&Baby* group meetings were scheduled and implemented; five mothers and their babies attended each session. As a group activity, the mothers performed the movement sequences with accompaniment from the pre-recorded music stimuli (the same CDs as used in Study 2). After each 2-item music-movement activities of the same genre, each mother completed the PPQ. Thereafter, a second and third 2-item block commenced in the same fashion. The presentation order of all three blocks was counterbalanced between the group sessions (using versions A, B, and C, as in Study 2). The complete procedure for each group lasted approximately 30 minutes – the additional time frame occurred as a result of the activity having to deal with mothers and babies and not because of extended music exposure.

Results

PPQ data were tallied and entered into a within-subjects repeated measures ANOVA; no main effects for Study 3 surfaced ($F_{(2, 28)} = 1.80$, $MSe = .33$, $p < .18$, $\eta_p^2 = .11$). That is, the mothers participating in *Mother&Baby* Music-Movement group activities rated Paralanguage Songs, Classical Music Themes, and Folk Tunes in a similar fashion ($M = 2.95$, $SD = .63$; $M = 3.30$, $SD = .81$; $M = 3.31$, $SD = .67$). The activity leaders reported that most mothers in all three groups

spontaneously and proudly commented that they recognized the classic music segments from toys and media devices that they have at home.

Discussion

Study 3 examined whether mother–baby interaction mediates preference for listening to specific music genres. Group activities were designed to be enjoyable for both mothers and babies in a cozy environment. While the results of Study 3 show that there were no significant differences between the music genres, we cannot rule out that such findings resulted from decreased statistical power typically seen in small samples. Nevertheless, the results may also indicate that mothers have no preference for background music during active cuddling with their baby. Perhaps, we might recognize that when it comes to hugging babies, the more the better, and any interaction with a baby is just as enjoyable. In light of the findings we might suggest that *how* the music is used, namely live interaction versus passive listening, is far more important than *whichever* technology or musical style is employed. Yet, by finding no differentiation, such results do support our previous findings from Studies 1–2 that point to a new music genre as a feasible alternative. Especially considering the fact the mothers had had previous exposure with classical music themes from devices and toys they use at home with their baby, we would have expected a more profound preference for this musical genre above the other two.

General discussion

Music experiences are an important integral part of young children's everyday lives; music experiences have an impact on physical, emotional, social, and cognitive development. Music activities with babies are also profitable for adults because they provide an instinctive spontaneous vehicle for emotional expression and bonding, as well as paving the way for informal communication, positive mood and arousal, and intimacy. The most natural and perhaps humanly innate form of expression involves primal vocal utterances; with these, parents accompany infants and babies throughout the early stages of human maturation. Yet, the 21st-century lifestyle, with all its high-tech commodities and digitized gadgets, seems to have brought about far-reaching changes into childrearing. For example, for the most part, interactions between babies and caregivers based on live spontaneous utterances may have been altered, and in many cases even replaced, by electronic devices and playthings that incorporate recorded instrumental music covering melodies of lullabies, play songs, classical music, popular hits and folk tunes (Young, 2008).

One may only look at lullaby performance as an example by which the above observation can be demonstrated. Baker and Mackinlay (2006) found that lullabies were a prevalent phenomenon just a little more than a decade ago (now 20 years on), but have since been eclipsed by recorded music played from a host of sources including personal stereos (MP3 players and iPods), crib mobiles and soft toys, or other media drivers (that also provide visual stimulation via screens and monitors such as smart phones, laptops, DVDs, and tablet-computers). Accordingly, the natural spontaneous infant-directed exposure and interaction has been transformed by technological facilities (Sulkin, in press). This modification in human music behavior (Custodero & Johnson-Green, 2003; Young, 2008) must raise questions, and a search for new alternatives that serve developmental needs all-the-while fitting into today's lifestyle, seems to be a welcomed challenge. The current investigation, then, explored the validity of new music stimuli we refer to as *Paralanguage Songs*. This alternative genre, based on inborn human vocal

utterances, may be a more adaptive platform to facilitate and encourage infant-directed interactions between parents and their babies. The nature of Paralanguage Songs may also encourage babies take on a more active partnership in music-making employing spontaneous babbling sequences.

The current investigation implemented three studies in an effort to explore parental preferences towards two music genres that most commonly accompany devices and playthings (i.e., classical music themes and folk-tunes) with an additional new music stimulus as a third option. In total 159 parents participated; the majority (91%) were mothers of babies aged 1–18 months. In two passive listening studies, parents self-reported a preference for Paralanguage Songs. Yet no preference at all was found between the well-known music styles and the new alternative after a more active mother–baby music-movement experiential. One possible explanation for the latter might be that supplementing the listening task with movement sequences increased overall enjoyment equally for all music genres. Previous research (Phillips-Silver & Trainor, 2005) has reported that movement sequences cause a shift attention from the background music to the pleasure the baby is receiving in a parent–baby interaction. Clearly, the limitations of the current study lie in its focus: we did not explore the developmental implications of different musical genres, but rather we targeted parental openness and preference for new alternatives to see if, in the mind of a parent, such musics could be incorporated by commercial outfitters of baby devices and playthings.

Recorded music as experienced through electronic devices and other visual (screened) media most certainly leaves its marks on young brains (Baker & Mackinlay, 2006; Johanson-Green & Custodero, 2002; Sulkin, 2009, Young, 2008); these can enhance the development of both general and specific skills and abilities. Therefore we would argue that it is our *parental responsibility* to provide music stimuli that offer optimal support for developmental opportunities – and these are not necessarily the most common music genres found in highly popular electronic toys and media products. We point out that even the original researchers of the Mozart Effect, whose impetus spurred the industry to employ and market classical music, which snowballed into a multi-million dollar consumer fever, have themselves 13 years thereafter become disillusioned (Rauscher & Hinton, 2006; Steele, Bass, & Crook, 1999). Manufacturers and commercial marketing agencies account for various factors in their strategic decisions, and while child development may be among them, the appropriateness for 'young ears' is certainly not their main expertise. In light of the current findings, we would suggest that parents are in fact open to alternative options and choices, and seem to be more than willing to try new approaches regarding the music items and genres heard in their baby's room.

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Note

1. In general, the word *baby* may mean any child from birth to age 4. Nevertheless, *newborns* refers to babies less than 3 months of age, *infants* are babies from 3 months to 1 year old, and *toddlers* are babies from 1 year to 4 years of age. Throughout the article, we use the word 'baby' as a generic idiom reflecting all three categories.

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