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The musical lives of young children in Aotearoa New Zealand

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Abstract

Despite a global interest in the musical experiences of young children, the everyday musical lives of young New Zealanders remain unexamined. Using data collected through the *Growing Up in New Zealand* longitudinal study, we explore the early musical experiences of approximately 6,800 infants and toddlers. Data collected from the primary caregivers and their partners pre-birth, when the children were 9 months old, and 2 years old are used to explore five areas: parental singing; active musical play; music listening; involvement in music groups; and participation in wider cultural events. Musical engagement is analysed with respect to various child, parental and family characteristics, including parental education, socio-economic status, and parental knowledge of and appreciation for the arts. The results provide a holistic description of the musical environments of young children in Aotearoa New Zealand.

Keywords: Music; children; singing; listening; participation

Introduction

International research trends reflect a global interest in the everyday musical experiences of young children, but the musical lives of young children in Aotearoa New Zealand remain largely unexamined. A growing body of research shows that musical engagement can positively affect well-being, educational outcomes, and social and emotional competencies across the lifespan (Barrett, Flynn & Welch, 2018; Welch et al., 2020). It is therefore important that we understand factors and circumstances that may support parents and children to engage in active music-making and listening in early childhood.

It is well documented that the vast majority of research in early childhood music has been undertaken among largely White, middle-class populations in Europe and North America (Young, 2019). Many studies use small, self-selected samples, which, although convenient, are not representative of the population at large. In Aotearoa New Zealand, there has been very little research in the field of early childhood music. A small number of studies have explored music in early childhood education settings (e.g. Bodkin-Allen, 2009; Naughton & Lines, 2013; Trinick & Pohio, 2018) and music therapy settings (e.g. Wylie & Foster-Cohen, 2013), but not the musical experiences of young children at home or with their families.

Parents and caregivers across the world sing and play music with and for their children. Music is used to teach cultural conventions and values (Custodero, 2006), to gain attention, to soothe and calm (Corbeil, Trehub & Peretz, 2016; Young, 2008), to facilitate routines (Barrett, 2009; Young & Gillen, 2010), to regulate emotions (Young & Gillen, 2010), to strengthen social bonds (Trehub & Cirelli, 2018), to teach language, and to instinctively reinforce patterns of engagement that support

learning and communication (Malloch & Trevarthen, 2009). Evidence also suggests that shared parent-child musical engagement can improve developmental outcomes (Williams et al., 2015).

Several large-scale survey-based studies have examined aspects of musical parenting among families with children under 3 years old in the UK (Fancourt & Perkins, 2018), the USA (Custodero, Rebello Britto & Brooks-Gunn, 2003; Custodero & Johnston-Green, 2003; Yan et al., 2021) and Israel (Brodsky, Sulkin & Hefer, 2020). Based on responses from between 256 and 2250 participants, these studies show that most parents sing to their infants, with between 59% and 72% of mothers reporting that they sing to their infants on a daily basis (Custodero, Rebello Britto & Brooks-Gunn, 2003; Custodero & Johnson-Green, 2003; Fancourt & Perkins, 2018; Yan et al., 2021). Smaller studies of parents with children under 2 years have had similar findings (Ilari, Moura & Bourscheidt, 2011; Young, 2008). Yan and colleagues (2021) and Custodero and colleagues (2003) found that parents were more likely to sing to younger infants. However, both of these studies included children up to 3 years old, whereas Fancourt and Perkins (2018) and Custodero and Johnston-Green (2003) were reporting on infants aged up to 9 months and 4 to 6 months, respectively.

Parents sing to their infants regardless of the gender of the child (Yan et al., 2021; Brodsky et al., 2020), socio-economic status (Yan et al., 2021; Fancourt & Perkins, 2018; Custodero, Rebello Britto & Brooks-Gunn, 2003; Brodsky et al., 2020) and ethnicity (Yan et al., 2021; Custodero & Johnson-Green, 2003). While Custodero and colleagues (2003) found that parents with a level of education greater than high school were more likely to sing to their infants, this finding was not supported by either Fancourt and Perkins (2018) or Brodsky and colleagues (2020), who found that parental musical engagement was not influenced by level of education. Mothers were found to sing to their children more than fathers (Brodsky et al., 2020; Custodero, Rebello Britto & Brooks-Gunn, 2003; Yan et al., 2021). Custodero and Johnston-Green (2003) and Fancourt and Perkins (2018) found that musically experienced and musically active parents were more likely to sing to their infants.

There is some evidence that parents have a different level of musical engagement with second and subsequent children than they do with their first-born child (Custodero, Rebello Britto & Brooks-Gunn, 2003). Fancourt and Perkins (2018) found that mothers were only half as likely to sing to their second or subsequent child daily and were also half as likely to take them to a music class.

Along with singing, listening to music is the form of musical engagement most frequently reported by parents (Fancourt & Perkins, 2018). Custodero and colleagues (2003) and Yan and colleagues (2021) report, respectively, that 64% and 63% of parents use recorded music on a daily basis. Using a telephone survey of 1065 6-month- to 6-year-olds in the USA, Rideout, Vendewater and Wartella (2003) discovered that 69% of birth to 3-year-olds listened to recorded music on a daily basis, with those children listening for an average of 1 h and 24 min per day. In a smaller study of 88 under 2-year-olds, Young (2008) found that all but one heard music during the day. Using experience sampling, Lamont (2008) concluded that recorded music was present during 81% of the waking hours of 3.5-year-olds in the UK. Importantly, Young (2008) warns that music listening can no longer be considered a discrete activity, as it is very often part of a multimodal digital experience. Music and/or ambient sounds often permeate the plethora of digital content accessed through phones, computers, touchscreen devices and television screens.

Music groups and classes are a popular activity for parents with young children outside the home in Australia, the UK and the USA (Abad & Barrett, 2020; Pitt & Hargreaves, 2017; Rodriguez, 2019). Families report attending music groups and early childhood music programmes to support their child's development (Abad & Barrett, 2020) and musical development (Rodríguez, 2019), to facilitate their child's social interactions (Pitt & Hargreaves, 2017; Rodríguez, 2019), and to connect with other families as a means of social support (Abad & Barrett, 2020; Rodríguez, 2019). Additionally, attendance at a music group is reported

to support music-making practices in the home (Abad & Barrett, 2020; Barrett, 2009; Pitt & Hargreaves, 2017).

The Aotearoa New Zealand context

The *Growing Up in New Zealand* (GUiNZ) data presents us with a unique opportunity to describe the musical environments and musical engagement of young *tamariki* (children) in New Zealand, until now untapped amongst researchers in the *Growing Up* team. As described in the methods section below, the GUiNZ cohort included roughly 10% of children born in New Zealand between 2008 and 2009 and the demographic of the cohort closely represents those of all children born in Aotearoa New Zealand at that time (Morton *et al.*, 2013). This means we have the opportunity to study a group of children who are growing up in a highly digitalised world and who will engage with music in ways that have yet to be documented. Additionally, the recent release of data collected from participants as they turned 8 – when children were asked to contribute with their own voices for the first time – opens up the possibility for further analyses exploring changes in musical experiences over time, as well as educational, social and cultural outcomes of their experiences.

In this article, we draw on data collected when the children were 9 months and 2 years old. Although there is a large body of existing research on infant musicality and musical interactions between mothers and infants, the musical experiences of 2-year-olds outside of early childhood education settings are not well covered by research (Young, 2019), and as previously mentioned, young children in New Zealand are absent from such research. Additionally, because participants were recruited for a large population-based study exploring child health and development more generally, utilising this data mitigates any potential bias otherwise present if this had been a music-focused study alone.

Aotearoa New Zealand has rich musical traditions: music festivals across the country attract national and international artists; a successful recorded music scene exports internationally; and a thriving local music scene reflects our multicultural population with a hybrid of styles and influences. There are strong ties to our Pacific Island neighbours, and Auckland's *Pasifika Festival* attracts around 60,000 people each year to celebrate the many nations of the Pacific through cuisine, art, song and dance. Music, incorporating song, dance and traditional instruments, is an essential part of *te ao Māori* (the Māori world) and plays a key role in *tikanga* (cultural protocol) during formal and informal events both on and off *marae* (the centre of the community for Māori *hāpu*/extended family and *iwi*/tribal groups). The traditional art form of *kapa haka* (a practice involving song, chant and dance) has come to be considered by many as a unique part of the identity of New Zealanders.

The GUiNZ datasets include information about participation in community events and activities such as those described above. We are able to explore attendance at the *Pasifika Festival*, *marae* events, concerts/plays/live shows and *Polyfest* (the Auckland secondary schools Māori and Pacific Islands Cultural Festival featuring traditional music, dance, costume and speech competitions and celebrations). For younger children, there are a variety of music groups and classes available across the country, including private preschool music classes, church-based groups such as *Mainly Music*, and regular, free, song and rhyme sessions at public libraries.

Musical behaviours are both universal across human populations and highly diverse in their structures, roles and cultural interpretations (Trehub, Becker & Morley, 2015). As musical conventions are culturally specific – learned and transmitted across generations – we expect that some aspects of musical engagement may present differently across ethnic groups represented in the GUiNZ study. And yet, academic enquiry into natural music settings requires an approach that acknowledges the natural and potentially universal origins of musical experience and creativity: indeed, parents and loved ones intuitively provide infants with a 'natural pedagogy' for musical expression (Gratier & Filippa, 2018).

The musical lives of infants and toddlers in New Zealand outside of early childhood education and care settings have not previously been examined. Research has shown that music is ubiquitous in the lives of young children (e.g. Barrett, 2009; Dean, 2021; Koops, 2012; Young & Gillen, 2007). Musical engagement supports a young child's development (Williams et al, 2015; Welch et al, 2020) and offers a joyful learning experience, nourishing imagination and creativity. Considering a broader picture of patterns of engagement and exploring children's music-making, listening and participating in wider cultural events can provide us with a holistic description of the musical environments of young *tamariki* (children).

Using data collected through the GUiNZ study, we set out to answer the following research questions: 1) How are young children engaging with music in Aotearoa today? and 2) What factors and opportunities influence children's musical environments and engagement?

Method

Study design and participants

This research uses data from the GUiNZ study, New Zealand's largest contemporary child cohort study. Pregnant women whose due dates were expected between 25 April 2009 and 25 March 2010 were recruited from three regional districts (Auckland, counties Manukau and Waikato). The sample of children born to these mothers is ethnically and socio-economically diverse, and representative of all births in New Zealand from 2007 to 2010 (Morton et al., 2013). Written, informed consent for participation in the study was provided by each mother at enrolment. Ethics approval for the study was granted by the NZ Ministry of Health Northern Regional Health and Disability Ethics Committee.

In this study, we report on data collected from three of the data collection waves (DCWs), gathered from the mothers (or primary caregivers) and their partners during the antenatal period, when the children were approximately 9 months old, and again at 2 years old (Antenatal, 9M and 2Y DCWs). Interviews were conducted face to face by trained interviewers. Further information about the study and its procedures for data collection can be found at www.growingup.co.nz/about-growing.

A total of 6822 mothers completed antenatal questionnaires; subsequent final numbers of mothers, children and partners depend on missing data due to participants leaving the study or skipping one or more DCWs. The initial sample of young children totalled 6843, of whom 3318 (48.5%) were girls. Our demographic variables of interest, described as child, parental and family characteristics, are shown in Tables 1, 2 and 3.

The number of first-born children was 2862 (41.8%), and the number of second- or subsequent-born children was 3978 (58.1%). In Tables 1 and 2, we describe the total responses for child ethnicity (as identified by the mother) and mother and partner ethnicity¹. More than a fifth of both mothers and partners (22.4% and 22.8%, respectively) identify with two or more ethnicities, which is indicative of the ethnic make-up of contemporary New Zealand. Additionally, 36.7% of mothers and 31.8% of partners speak two or more languages (for which they are able to have a conversation about a lot of everyday things). Parental characteristics are shown in Table 2. Also included were two measures of parental appreciation for and knowledge of the arts, based on participants' responses to the questions 'to what extent do you agree with the following: (1) doesn't like artistic things; and (2) knows a lot about art, music or books' (response options from strongly disagree to strongly agree).

In order to consider the family contexts of children's musical environments, we explored family demographics including household structure, household income and a measure of household deprivation (Table 3). All this information had been collected in the antenatal DCW. The majority of families consisted of two parents in the home (65.5%), but a significant portion (30.9%) were also living with other family members in their homes (either extended family members or non-kin

Table 1. Sample demographics of included child participants

Child characteristics	Children (total sample = 6843)	
	<i>n</i>	% ^b
Gender		
Female	3318	48.5
Male	3525	51.5
Child's birth order		
1 st born	2862	41.8
2 nd or subsequent birth	3978	58.2
Ethnicities ^a (do not sum to 100%)		
NZ European	4426	69.3
Māori	1528	23.9
Pacific	1364	21.4
Asian	1086	17
MELAA ^c	180	2.8
Other	14	0.2
New Zealander	251	3.9
Number of ethnicities		
1	3663	57.4
2	1977	31
3	539	8.4
4 or more	204	3.1
Number of siblings at 2 years		
None	2712	39.6
1	2280	33.3
2	1048	15.3
3	431	6.3
4 or more	377	5.5

^aMothers were asked to identify their child's ethnicity or ethnicities and could select one or more categories.

^bValid percentages are shown, accounting for missing data for each question.

^cMELAA = Middle Eastern, Latin American or African.

adults). There was a wide spread of economic conditions, with the largest group of households (23.2%) having an income of 70,000–100,000NZD per year.

'To be healthy and smart and to be multilingual and culturally competent and community oriented and musical'.²

Measures of musical experience

To date, GUiNZ has collected varied information about children's musical engagement and experiences using both mothers' and partners'³ reports of their activities, and later asking questions directly of the children. For this article, we focus on four questions available in the GUiNZ

Table 2. Sample demographics of mothers and partners

Parental characteristics	Mothers (total sample = 6848)		Partners (total sample = 4154)	
	<i>n</i>	% ^b	<i>n</i>	% ^b
Age (years)				
<20	326	4.8	84	1.9
20–24	994	14.5	321	7.2
25–29	1670	24.4	848	19.1
30–34	2126	31	1374	31
35–39	1439	21	1152	26
>= 40	292	4.3	655	14.8
Highest education				
No secondary school qualification	487	7.1	305	6.9
Secondary education/NCEA1-4	1627	23.8	903	20.4
Diploma/trade certificate/NCEA5-6	2093	30.7	1615	36.5
Bachelor's degree	1551	22.7	846	19.1
Higher degree	1070	15.7	761	17.2
Ethnicities ^a (do not sum to 100%)				
NZ European	4246	62	3000	67.6
Māori	1264	18.5	656	14.8
Pacific	1154	16.9	582	13.1
Asian	1090	15.9	637	14.4
MELAA	168	2.5	107	2.4
Other	31	0.5	12	0.3
New Zealander	115	1.7	151	3.4

^aMothers and partners were asked to identify their ethnicity or ethnicities and could choose one or more categories.

^bValid percentages are shown, accounting for missing data for each question.

datasets. These questions were developed by the research team at GUINZ as part of several groups of questions investigating factors that contribute to child wellbeing (including parents' interactions with their children, cultural engagement and technology use) and designed to explore these factors longitudinally. The four selected questions probe the musical environments of young children: their experiences of parental singing (Q1), their active musical play experiences (Q2), their experiences of music listening (Q3), their involvement in music groups and other cultural environments (Q4). Questions and response options are shown in Table 4.

Findings

Singing songs and telling stories

Mothers who participated when their children were 9 months old ($N = 6384$) regularly sang songs and told stories to their infants. The largest single group of participant mothers sang songs and told stories 'several times a day' (52.7%). Regrouping these findings to align with previous research shows that 80.2% of mothers sang songs or told stories at least once a day, while only 19.8% sang or told stories less than once a day. Among partners³ ($N = 4151$), 49.4% sang songs at least once a

Table 3. Sample family demographics

Family characteristics	Mothers (total sample = 6848)	
	N	%
Household structure		
Parent alone	237	3.5
Two parents	4487	65.5
Parent(s) with extended family	1753	25.6
Parent(s) living with non-kin (and extended family if applicable)	363	5.3
Household income groups (NZD)		
<= 20K	220	4.2
>20K <= 30K	291	5.6
>30K <= 50K	731	14.0
>50K <= 70K	861	16.5
>70K <= 100K	1212	23.2
>100K <= 150K	1162	22.2
>150K	753	14.4
Household deprivation index (NZDep2006) ^a		
1. <=3: low	1707	24.9
2. 4-7: medium	2504	36.6
3. 8-10: high	2634	38.5

^aThe New Zealand Deprivation Index combines nine socio-economic variables from the 2006 census capturing eight dimensions of household deprivation. In this table, the original deprivation scores (measured in deciles) have been collapsed into three groups. Group 1 (Deciles 1, 2 and 3) represents the households in the least deprived 30% areas, whereas Group 3 (Deciles 8, 9 and 10) represents the households in the most deprived 30% areas.

Table 4. Questions in the GUINZ datasets

Question	Participants	Response options
1) <i>How often do you sing songs or tell stories to your baby [babies]? Do not include reading books.</i>	Mothers & Partners	[1] Seldom or never [2] Once a week [3] Several times a week [4] Once a day [5] Several times a day
2) <i>How often does [your child/do your children] play with musical instruments, either toy or real versions?</i>	Mothers & Partners	[1] Seldom Or Never [2] Once A Week [3] Several Times A Week [4] Once A Day [5] Several Times A Day
3) <i>Thinking about that last weekday, how much time did {NAME} spend listening to music on CDs, iPods, MP3 players, etc.?</i>	Mothers	Total time entered manually
4) <i>Please indicate which of these activities {NAME} has done, or places {NAME} has been at any time since [HE/SHE] was born?</i> – Music groups – Concert/play/live show? – Pasifika festival – Polyfest – Marae event	Mothers	Yes/No

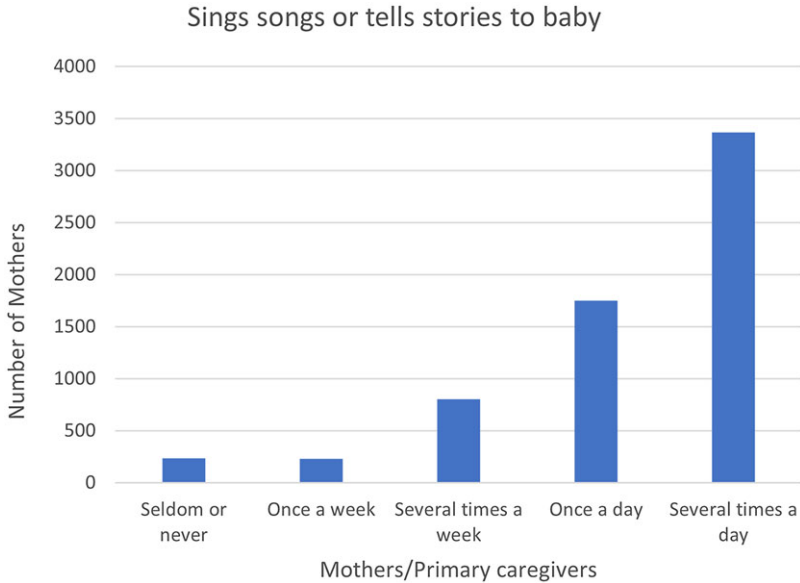


Figure 1. Frequency of singing and story-telling for mothers.

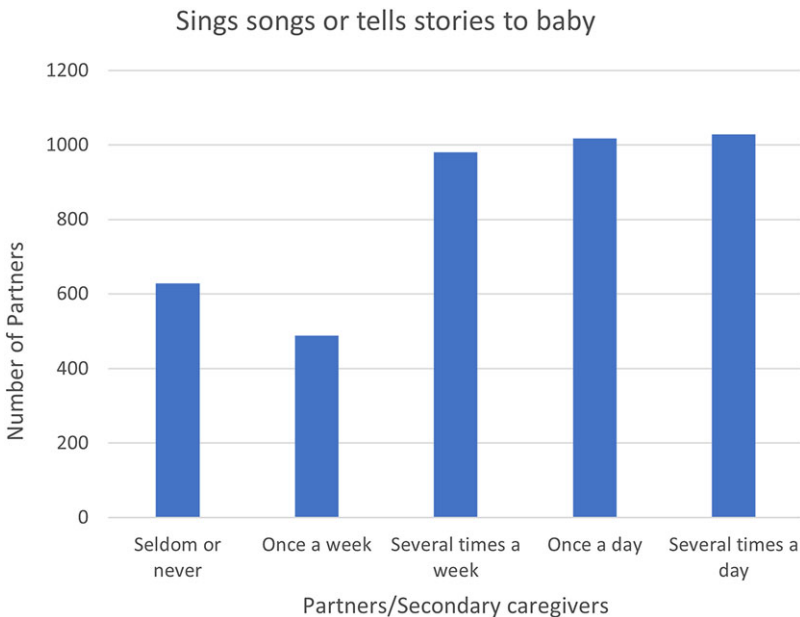


Figure 2. Frequency of singing and story-telling for partners.

day and 50.6% sang less than once a day. The gender of the infant did not influence the frequency with which either mothers or partners sang to their child. Figures above show frequency of singing and story-telling for mothers (Figure 1) and partners (Figure 2).

We found a significant relationship between the frequency of singing to a child and their birth order ($\chi^2 = 73.71, p < 0.001$). Post hoc analyses indicated that first-born children were more likely to be sung to several times a day than second or subsequent children (using adjusted standardised

residuals and Bonferroni corrections). This finding was confirmed by further analyses (Spearman's rho $r(6377) = -.105, p < 0.001$).

There was a significant association between mother's age and frequency of singing to their children ($\chi^2 = 60.13, p < 0.001$): older mothers (30 years+) were slightly more likely to sing daily or more to their children, than younger mothers (less than 30 years), and vice versa. This positive correlation was very slight however ($r(6384) = .062, p < 0.001$). In addition, there was a significant relationship between mothers' education and frequency of singing ($\chi^2 = 104.74, p < 0.001$): mothers with a bachelor's degree or higher more often reported singing several times a day and were less likely to report singing less than daily. Again this positive, significant correlation was only slight ($r(6366) = .078, p < 0.001$).

A mother's attitude to the arts, including the extent to which she reported she likes 'artistic things' (plays, music), influenced how frequently she sang to her infant. This appreciation for the arts showed a slight, significant positive correlation with singing songs ($r(6078) = .089, p < 0.001$), as did knowledge about the arts ($r(6078) = .083, p < 0.001$).

While there was a weak association between family structure and singing ($\chi^2 = 43.06, p = 0.001$), and between household income and singing ($\chi^2 = 81.01, p < 0.001$), post hoc analyses did not confirm any specific relationship. There was also no significant relationship between household deprivation and frequency of singing and telling stories.

We did not find any relationship between singing songs/telling stories and the number of languages spoken by the mother, her ethnicity or whether she had multiple ethnicities. Māori mothers (77.3%), Pasifika mothers (79.8%) and Asian mothers (81.4%) sang songs and told stories at least once a day to their young infants. Partners displayed a similar pattern of influences as mothers on the amount of singing and story-telling. A significant but small linear correlation suggests that partners also sang more often to their first-born children ($r(4146) = -.146, p < 0.001$), and their attitude to the arts influenced the frequency with which they sang/told stories to their child. Appreciation for the arts showed a slight, significant positive correlation with singing songs ($r(4091) = .122, p < 0.001$), as did knowledge about the arts ($r(4091) = .168, p < 0.001$).

Playing with musical instruments

The majority of children played with instruments, either real and/or toy versions, at least several times a week (75.5%); only 7.2% of children played 'seldom' or 'never' with musical instruments in their homes. Instrument playing was not significantly influenced by gender; however, there was a significant association between a child's birth order and how often they played with musical instruments ($\chi^2 = 43.48, p < 0.01$) (see Figure 3). Second or subsequent children were significantly less likely to play with instruments often ($r(6316) = -.08, p < 0.001$); however, this correlation was very weak. If we consider the child's siblings (reported later), there was still a significant association between the two ($\chi^2 = 114.91, p < 0.001$)⁴ highlighting that children with no other siblings were more likely to play with instruments (but the number of subsequent siblings had no effect).

As with singing, there was a significant association between the extent to which mothers reported 'knowing a lot' about the arts and the amount of instrument playing by their children ($\chi^2 = 409.5, p < 0.001$). Post hoc comparisons confirmed that the children of mothers who reported knowing a lot about music, art or books were more likely to play daily or more with instruments, and vice versa. Mothers' appreciation for the arts was also associated with instrument playing ($\chi^2 = 313.7, p < 0.001$), but post hoc comparisons did not confirm where the differences lay.

We also found a relationship between playing with instruments and ethnicity ($\chi^2 = 190.52, p < 0.001$). European participants were less likely to report that their children played with instruments several times a day; and both Pacific and Asian participants were more likely to report their children as playing with instruments several times a day.

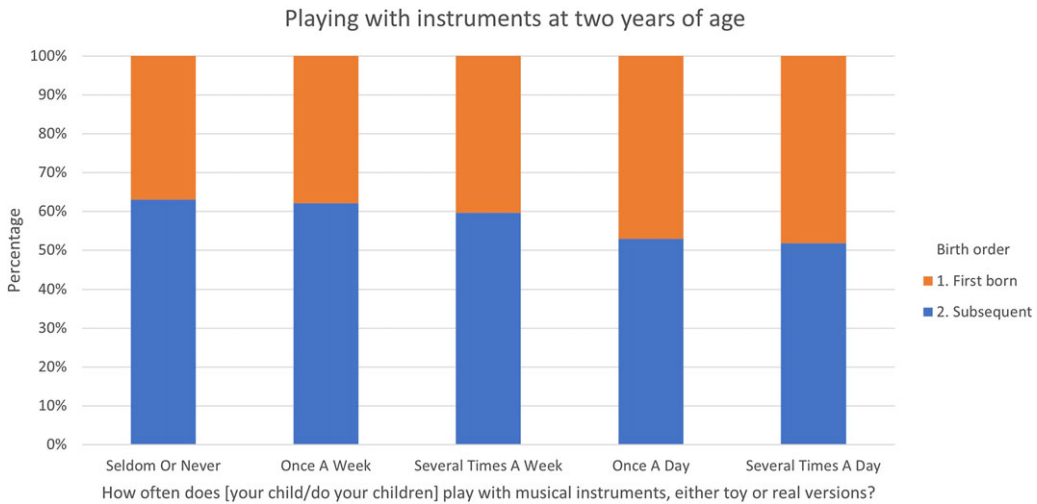


Figure 3. Frequency of playing musical instruments, either toy or real versions.

With regard to family demographics, we found that the associations between instrument playing and household structure, as well as with household income, were negligible. However, families from low-deprivation areas were slightly more likely to report their children playing with instruments less than daily, and families from high-deprivation areas were more likely to report daily or more ($r(6307) = .06, p < 0.001$).

Listening to music

We examined the amount of time 2-year-old children listen to music, using CDs, iPods, MP3 players, etc., on any given weekday (mother's report), and found that just under a third of children were reported to have not listened to music (29.4%) and 68.9% listened to music. Of those who listened to music, the average amount of time spent listening to music was 1.29 h ($sd = 1.39$).

When examining our demographic variables of interest, we found no significant associations between the amount of music listening and child birth order, number of siblings, or a parent's attitude to the arts (appreciation or knowledge). Other independent demographic variables showed weak, but significant test results ($\chi^2 p < 0.001$) when compared with the amount of listening to music. These included maternal age and education, maternal ethnicity, household structure, household income, and household deprivation area; however, post hoc tests did not find significant differences in any particular area, and the pattern of variation was inconclusive. These demographic variables do not appear to relate to the amount of young children's music listening in any meaningful way.

Music groups, events and concerts

Roughly half ($N = 3227, 51\%$) of children by the age of 2 years had attended a music group at least once since they were born. Participation in other events with a strong musical component was much lower, and only 1.2% of all children had been taken to a concert, play or live show by the time they were 2 years old (see Table 5).

When we explored potential influences on children's participation in music groups, we found a significant relationship between music group attendance and child birth order ($\chi^2 = 47.2, p < 0.001$): first-born children were more likely to have been taken to music groups. When examining number of siblings and music group attendance, we found a significant relationship also

Table 5. Frequency of participation in music groups and events

Frequency of participation in events	Children (N = 6326)	
	Yes (%)	No (%)
Music groups	3227 (51)	3094 (48.9)
Polyfest	484 (7.7)	5837 (92.3)
Pasifika festival	697 (11)	5624 (88.9)
Marae event	986 (15.6)	5335 (84.3)
Concert/play/live show	74 (1.2)	6247 (98.8)

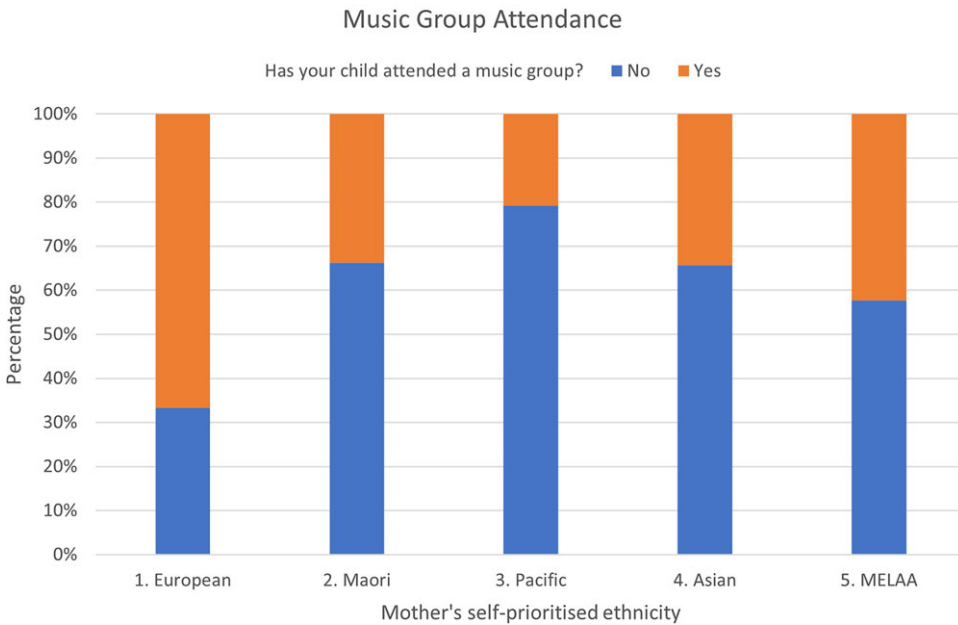


Figure 4. Music group attendance and mother's ethnicity.

($\chi^2 = 166.78, p < 0.001$), with a highly significant ($p = 0.0014$) post hoc comparison showing an increase in music group attendance for those who had no siblings.

There was a significant relationship between mothers' education and her child's participation in music groups ($\chi^2 = 343.05, p < 0.001$): higher education was significantly correlated with higher participation in music groups, and vice versa. If mothers liked artistic things, they were also more likely to take their children to music groups ($\chi^2 = 379.36, p < 0.001$). In addition, mothers who were of European ethnicity were more likely to take their children to music groups; Asian, Pacific and Māori participants were all less likely to attend music groups ($\chi^2 = 861.68, p < 0.001$) (see Figure 4).

There was a significant association between music group attendance and household structure ($\chi^2 = 366.17, p < 0.001$); households with two parents were more likely, and households with either one parent, or parents and extended family, were less likely to have taken their children to music groups. In addition, there were consistently significant post hoc comparisons ($p < 0.001$) showing that households with a lower income bracket were less likely to have attended music groups, and households with a higher income bracket were more likely to have attended

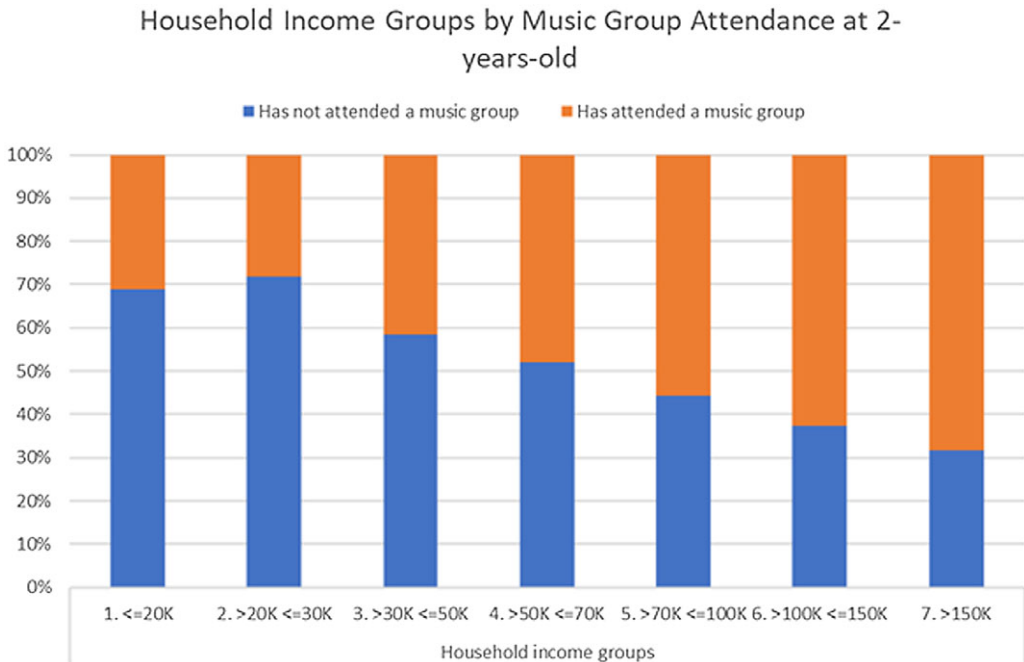


Figure 5. Household income groups and music group attendance.

($\chi^2 = 263.45$, $p < 0.001$) (see Figure 5). Finally, household deprivation area was also highly associated ($\chi^2 = 351.16$, $p < 0.001$): high-deprivation area homes were less likely and lower deprivation area homes (both low and medium) were more likely to take their children to music groups.

To explore this further, a binary logistic regression model was constructed to analyse the relationship between music group attendance and the significantly associated covariates mentioned above. The model had an overall predictive accuracy of 67.4%, although the Nagelkerke R-square value of 0.176 suggests that there is a risk of coefficient bias in the model due to omitted variables. Nevertheless, it was found that the odds ratio of a child having attended a music group at 2 years of age increased by 2.464 times (95% CI [2.014, 3.013]) if the mother identified as 'European' – more than twice that found for moving one unit up the household income scale – suggesting that mother's ethnicity was the strongest predictor of music group attendance in the model.

Covariation

Finally, we wanted to explore whether there was any covariation between each of our dependent variables. Because singing to children was measured separately at 9 months, we only investigated the covariation between data collected at 2 years: playing with musical instruments, music listening, music group attendance and other event attendance.

The correlation between playing with musical instruments and attending music groups was significant ($\chi^2 = 106.2$, $p < 0.001$); post hoc comparisons showed specifically that children who attended music groups were less likely to 'seldom or never' play an instrument, and children who did not attend music groups were more likely to 'seldom or never' play an instrument. The effects were seen in the categories of 'seldom or never' playing with an instrument; however, the opposite was not true – those who played with instruments daily or more were not more or less likely to attend music groups. In addition, those who attended music groups were also more likely to have listened to music for 1–2 hours and less likely to have not listened to music ($\chi^2 = 19.37$, $p = 0.001$).

Discussion

Our findings show that most mothers sang regularly to their 9-month-old infants, irrespective of their child's gender or ethnicity. This aligns with current literature (Custodero, Rebello Britto & Brooks-Gunn, 2003; Custodero & Johnson-Green, 2003; Fancourt & Perkins, 2018; Yan *et al.*, 2021) and supports the idea that parent–infant singing is widespread. The high frequency of parents singing or telling stories to their infants shows that in a contemporary context, *tamariki* in New Zealand are engaging with live music on a regular basis. The high frequency of singing to children indicates the ubiquitous nature of music in the home and an implicit emphasis placed on the importance of singing and story-telling to young children.

It is clear that mothers sang or told stories more regularly than their partners. This reflects the findings reported in existing research (Brodsky *et al.*, 2020; Custodero, Rebello Britto & Brooks-Gunn, 2003; Yan *et al.*, 2021). Less frequent singing by partners might be expected because partners are likely to spend less time caring for their child than the primary caregiver and are more likely to work outside the home or for longer hours, or live elsewhere (again see Note 3). Further analysis of the GUiNZ data could examine circumstances of work, time spent at home and time spent caring for the child in relation to frequency of singing.

In line with Custodero and colleagues (2003) and Fancourt and Perkins (2018), we found that both mothers and partners were more likely to sing to their first-born child than their second or subsequent children. Our own experiences of parenting leads us to expect that this is due to a parent's need to divide their attention between the demands of two or more children. Further qualitative research could explore this in more detail, particularly whether parents continue to sing in some circumstances, for example, during nappy changing routines, but reduce singing at other times, such as during one-on-one 'play' time with their child.

Singing songs and telling stories do not appear to be significantly influenced by differing economic backgrounds. The same frequency of singing was seen across families from low-, mid- and high-deprivation areas. This is reassuring, as it indicates that most infants are experiencing musical interaction with their caregivers, regardless of their socio-economic situation. Given that musical engagement in early childhood has been shown to be beneficial to social and emotional development, it is important that children and families are able to continue on a journey of musical engagement beyond infancy no matter their financial resources.

Perhaps unsurprisingly, the more a mother considers herself to know about the arts (art, music or books), and the more she enjoys artistic things (such as plays or music), the more often she will likely sing to her child. This is the same for partners. Parents who value music and the arts may make a conscious effort to sing to their infants, or it may be something they find themselves doing instinctively.

At 2 years of age, the vast majority of children in this cohort played with musical instruments, either real or toy versions, at least several times a week, and we see the same pattern of effects in relation to birth order and parents' attitudes towards the arts as singing at 9 months. First-born children, children who had no siblings and whose parents valued the arts were more likely to play instruments more often. Interestingly, the data show that children from areas of higher deprivation played instruments slightly more often than children from areas of low-deprivation. As described in the findings section, this may in some part be linked to ethnicity. The ethnic groups that are over-represented in areas of higher deprivation may place a high cultural value on active musical engagement and participation and provide their children with access to instruments. Further research could look more closely at the patterns of musical engagement of children growing up in different ethnic communities in Aotearoa New Zealand.

An additional finding was that 2-year-old children in New Zealand listen to approximately 1 hour and 20 minutes of music on any given weekday. This is surprisingly similar to Rideout and colleague's (2003) finding that birth to 3-year-olds in the USA listen to an average of 1 hour and 24 minutes of music per day. The fact that there was no effect of child birth order or parental

attitude to the arts on music listening may reflect the ubiquitous nature of music listening in the 21st century. In 2011–2012 (when these children were 2 years old), recorded music was becoming increasingly accessible with MP3s, iPods and music sharing platforms; today's access has increased again with subscriptions to programmes such as Spotify and Apple Music. In a changing world of digital access and technological advances, this figure will be particularly important to track longitudinally.

As discussed earlier in the article, there is a lack of research that explores the musical lives of young children in the community, outside early childhood education settings. The data from the GUiNZ study give us a unique view of attendance at music groups and community locations where music is prominent – concerts, plays and live shows, Polyfest, Pasifika festivals, and events on a marae.

Half of the 2-year-olds in the GUiNZ study had attended a music group at least once. As mentioned earlier, there are a range of music groups aimed at toddlers and young children. We speculate that there are fewer private providers than in other, comparably affluent countries, with many options, such as *Mainly Music* and library sessions, being free or low cost. These are widely available in the main centres within the Auckland and Waikato regions from where the GUiNZ participants were drawn. Considering the assumed financial accessibility of music groups in New Zealand, it is interesting to look closely at the demographics of the children who attended.

It is perhaps not surprising that children who had no siblings were more likely to be taken to music groups, and that these children were from higher-income homes with two parents, living in areas of low deprivation, and with more highly educated mothers. However, as discussed in the findings, the strongest predictor of attendance at music groups was European ethnicity. This raises questions around the cultural inclusivity and relevance of today's music groups and leads us to question the extent to which music groups are accessible in all neighbourhoods. Are music groups, even free, community-based groups, considered to be the domain of middle-class White New Zealanders? If so, what are the barriers that people of other ethnicities experience in accessing these services? This is an important area for further research.

It is clear from the data that very few 2-year-olds have been taken to concerts, plays or live shows. Concerts specifically aimed at very young children are rare in New Zealand, with some notable exceptions such as the *Baby Barok* concerts presented by *NZ Barok*. A range of family music events and festivals take place, particularly in Auckland. We were interested to find that parents with very young children were not attending these events in any meaningful numbers. Parents may consider these events to be inappropriate or impractical for young toddlers. Alternatively, there may have been some bias in the way participants interpreted the wording of 'concerts, plays or live shows'. Finally, the correlation between music listening, attendance at music groups and playing instruments amongst young children indicates that parents support their children to engage with music in a variety of ways. We do not know how often children attended music groups, and therefore we cannot place too much emphasis on this; however, this finding seems to support Barrett's (2009) assertion that attending music groups strengthens music-making practices in the home.

Overall, the GUiNZ study shows that most young children in Aotearoa New Zealand experience a positive start to their musical lives. Parents typically sing to their infants on a regular basis and children have access to musical instruments at home. Children listen to music regularly and many are taken to music groups. However, our findings do raise some issues that require further research. Although most children appear to be engaging with music, it is important that we look more closely at the minority who do not. This would enable us to understand the factors that present barriers to musical engagement for families with young children. We also believe it is important to look more closely at the reasons behind the apparent correlation between ethnicity and attendance at music groups. Although the reasons for low attendance at music events in the community are unclear, there may be an opportunity for arts organisations and event organisers to improve their provision for young families.

Strengths and limitations

The GUiNZ study is the first cohort study in New Zealand that has included measures that allow us to examine young children's musical environments holistically. It is also a large cohort by international standards. With the GUiNZ data, we have been able to paint a unique and representative picture of the early musical environments of young children in New Zealand today.

One limitation to this study is that the exact question posed to parents regarding singing was about 'singing songs and telling stories' and is therefore not a direct comparison to other studies which have investigated singing specifically. However, as research suggests, singing and storytelling share many commonalities in practice – telling a story happens rarely without musical inflection and suspense, and singing happens rarely without words or meaning. Indeed, infants' earliest interactions are musical (Malloch & Trevarthen, 2009); before they can understand the meaning of words, infants understand the music of the voice (Delavenne *et al.*, 2008).

Another limitation is that measures of musical experience were based only on the mothers' and partners' reports – in the case of music listening, for example, we know that current listening practices are highly multimodal and parents may not be aware of the full extent to which children are being exposed to or are engaging with music on their own. In addition, the responses available for musical engagement have missed some of the main environments in which we would expect Māori children to engage with music, such as kohanga reo and church settings. The original questions were designed to capture common settings for all New Zealand children and therefore may underestimate engagement for Māori and other communities.

Finally, the selected parental characteristics and family demographics do not account for all the intricacies of a child's environment; in further analyses, it will be important to consider additional factors that contribute to parental and family wellbeing, including the socioemotional health of parents, as potential predictors of musical environments. With the longitudinal capabilities of the GUiNZ data, it will also be possible to explore associations between early music environments and later child outcomes such as language and socioemotional competencies, in order to more fully appreciate the implications and developmental trajectories of musical experience for young *tamariki* in New Zealand.

Notes

- 1 A participant who identified as both Māori and Pasifika for example was able to select both categories in the 'total response' ethnicity variable. However, when we report differences in musical engagement between ethnicities in our results section, the self-prioritised ethnicity variable was used (where participants chose only one ethnicity) (Statistics New Zealand, 2005).
- 2 A mother's report of 'hopes and dreams' for her child.
- 3 Throughout this article, the primary caregiver is referred to as the 'mother'. At the time of recruitment, all of the mothers in this study were female and became the primary caregivers of the children at the time of their birth. For those who completed the 'partner' questionnaires, they were together with the mother in a 'relationship like a marriage' (99.7% male and 0.3% female) and were living at least 50% of the time with the child. Although we use the terms 'mother' and 'partner' throughout this text, families in the study are representative of contemporary New Zealand with diverse familial configurations.
- 4 Note that the number of siblings was reported at 16 months, so there will have been changes for some families between this number and the number of siblings at 2 years of age when measures of instrument playing, music group attendance, music listening and event attendance were measured.

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