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EXPLORING THE MUSICALITY OF ADULT NON-MUSICIANS

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Exploring the Musicality of Adult Non-Musicians

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ABSTRACT

While the development of musicality, how one interacts with their socio-acoustic environment, is well-documented in musicians, its progression in adult non-musicians remains less explored. This study aims to understand how musicality develops and is expressed in adult non-musicians by employing a mixed-methods, multiple case study approach with five adult non-musicians. The main research question was 'what musical socio-cultural experiences are discernible in adult non-musicians and how could these experiences have affected participants' musicality levels? Musical aural skills were assessed using the mini-PROMS musicality test (Zentner & Strauss, 2017) and semi-structured interviews were conducted to uncover contributing socio-cultural experiences. All participants displayed at least a basic level of musical proficiency, with content analysis of the interviews revealing five overarching themes: the role of music in daily life; pivotal musical experiences; cognitive processes; key external influences; and acquired skills. These findings shed light on the significance of music in the lives of all adults and how musical abilities can still develop in non-formal educational environments. Future studies should compare the themes discovered in this study to elucidate their interrelationships in the development of musicality during the entire human lifespan, from childhood to old age.

Keywords musicality, adult non-musicians, mixed methods, case studies

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RESUMEN

Mientras que el desarrollo de la musicalidad, la forma en que una persona interactúa con su entorno socio-acústico, está bien documentado en los músicos, su progreso en adultos no músicos sigue siendo menos explorado. Este estudio tiene como objetivo comprender cómo se desarrolla y se expresa la musicalidad en adultos no músicos mediante un enfoque de estudio de casos múltiples y métodos mixtos con cinco adultos no músicos. La pregunta principal de investigación fue: "¿Qué experiencias socio-culturales musicales son discernibles en adultos no músicos y cómo podrían estas experiencias haber afectado los niveles de musicalidad de los participantes?" Las habilidades auditivas musicales se evaluaron utilizando la prueba de musicalidad mini-PROMS (Zentner & Strauss, 2017) y se realizaron entrevistas semiestructuradas para descubrir las experiencias socio-culturales que contribuyen. Todos los participantes mostraron al menos un nivel básico de destreza musical, y el análisis de contenido de las entrevistas reveló cinco temas generales: el papel de la música en la vida diaria; experiencias musicales clave; procesos cognitivos; influencias externas clave; y habilidades adquiridas. Estos hallazgos arrojan luz sobre la importancia de la música en la vida de todos los adultos y cómo las habilidades musicales aún pueden desarrollarse en entornos educativos no formales. Los estudios futuros deberían comparar los temas descubiertos en este estudio para dilucidar sus interrelaciones en el desarrollo de la musicalidad a lo largo de toda la vida humana, desde la infancia hasta la vejez.

Palabras Claves: métodos mixtos, estudios de caso, musicalidad, adultos no músicos

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INTRODUCTION

Musicality is defined by Khalass et al. (2019) as a person's inherent ability to perceive and reproduce music, which may be achieved through their rhythmic coordination and singing skills developed through an organic listening approach to music. Music has the potential to serve various purposes in people's lives, such as dancing, emotional regulation, daily activities, ceremonies, and performances (Henson & Wyke, 1982). These musical activities, coupled with a diverse array of musical styles, are prevalent in numerous societies and cultural practices and might influence listeners' musical skills. As Small (1998) notes, music is an activity enjoyed by both musicians and non-musicians and is mediated by a sense of musicality.

The idea that people's musicality is considered an inherent ability common to all humans (Jaffurs, 2004), permits the exploration of how it is expressed in adult non-musicians. This idea is consistent with Colwell and Davidson's work (1996) who stated that musical skills are not solely exclusive to musicians. Instead, it is argued that musicality is an organic human competence shaped and influenced by socio-cultural experiences (see also Hallam, 2017). Arising more academic criticism, this previous concept poses challenges the notion that formal music education, instrumental proficiency, and music theory are prerequisites for the development and expression of musicality in everyday life (Cohen, 1990).

While this research acknowledges empiric evidence related to the impact of specific music styles (e.g., Jazz and classical) in the life of non-musicians (Pramono, 2019), this study examines the development and expression of musicality in adult non-musicians, with a specific focus on the influence of various socio-cultural experiences. Hawkins et al. (2017) and Welch (1998) arguably support the notion that musicality experiences develop over a lifetime because of listening and exposure to any type of music, even when individuals lack interest in playing musical instruments or receiving formal music education. For example, individuals may manifest their natural sense of musicality through activities like singing and tapping along to the radio. It represents a common method for non-musicians to express their musicality naturally as they can engage with music in their environment purely by listening for melodic and rhythmic patterns (Swanwick, 2016).

Cognitive, affective and behavioural engagement with music is crucial for individuals to explore and develop their musicality because it contributes to positive experiences that operate on a sub-conscious level (Hallam, 2017). According to Welch et al. (2019), this musical engagement is possible because many individuals have the ability to be musical through body synchronization skills. Measuring the musical skills of adult non-musicians, including their melodic, temporal, and rhythmic abilities, is an objective complementing the study's aim which is exploring the development of musicality and how socio-cultural experiences influence it in adulthood as justified by Trehub et al. (2019) ''Musicality is a uniquely human and spontaneously developing trait that allows us to perceive, move in time to it and sing; it is influenced by biological, cognitive, and cultural factors, and its expression varies across the lifespan'' (p.265). Hence, what musical socio-cultural experiences are discernible in adult non-musicians and how could these experiences have affected participants' musicality levels?

Literature Review

Critical analysis: Musicality as an organic ability that serves different functions in people's life

Adopting a critical stance, musicality is not just the domain of professional musicians, as many researchers have suggested. The functions of musicality in the lives of adult non-musicians have clear implications for them, which serve as fundamental assumptions in this manuscript. For example, musicality is a biological ability possessed by all humans (Fitch, 2015) but is not limited to making sense of (Swanwick, 2016), enjoying (Jones, 2018), learning (Trehub et al., 2019), and performing music (Khalass et al., 2019). Young and Gillen (2007) consider musicality a set of skills that allows individuals to interpret and respond to musical elements, influenced by cognition and exposure to music within socio-cultural experiences. While Jones (2018) proposes that an academic approach might be the most appropriate way to explore musicality in adult non-musicians, the scientific approach to musicality formulated by Young and Gillen (2007) was chosen. This decision aligns with the assumption that musical skills naturally develop over time and are measurable, consistent with the study's objectives.

Why and how socio-cultural experiences are deterministic in developing musicality in non-musicians

As a standard definition of socio-cultural experiences adopted in the development of this study, Vygotsky offers an interesting perspective, conceptualising them as lived interactions between

individuals and their context, mediated by natural cognitive processes that guide the maturing of multiple skills (Mahn, 1999). Arguing for the relevance of socio-cultural experiences in discussions of musicality, Vygotsky also introduced the idea that individuals' development is also shaped by various factors, including musical traditions. Trehub et al. (2019) contributed to this musicality discussion, asserting that musicality is nurtured through continuous exposure to emotionally charged socio-cultural musical experiences (e.g., festivals), whether consciously or subconsciously, in both academic and non-academic settings. They note that even non-musicians without formal musical training can perceive, differentiate, compare, replicate, and sing diverse musical patterns.

Trehub and colleagues' findings also align with Welch's work (1998) evidencing that sustained engagement in musical practices, coupled with natural learning processes, plays a pivotal role in shaping musicality in non-musicians throughout their lives as many individuals, whether passively or actively, participate along their life span in various musical contexts such as pub gatherings, birthdays, and ceremonies, enabling them to create meaningful musical experiences (Cross & Morley, 2010).

From a critical perspective, the arguments discussed in this paper suggest how and why socio-cultural practices have the potential to influence the development of musicality in adult non-musicians. Nevertheless, a deeper understanding of the correlations between musical skills and musicality across the lifespan could further explain higher musicality levels in adulthood.

A non-inferential approach: Battery tests as a scientific trend to Measure Musicality Levels

The use of inferential statistical tools to generalise results in examining variables such as melody and rhythm in determining music aesthetics (e.g., see Bonneville-Roussy and Eerola, 2018) has been notable. However, battery tests remain reliable such the one used for this research because it is an accepted method among scholars (see, Zentner & Strauβ, 2017). Extending the critical academic discussion on quantifying musicality, various scholars (Gaston, 1970; Seashore et al., 1960) have employed musicality battery tests as quantitative tools to measure individuals' musical capabilities—one of the many aspects of musicality. For instance, Gordon (1970) and Karma (1976) devised musical tests aimed specifically at assessing auditory skills.

Critiquing this approach, these assessments are often characterised by their reliance on diverse musical tasks designed to numerically quantify musical ability, including gauging individuals' perceptions of

pitch, volume, and tempo (Hansen & Milligan, 2012). However, the discussion of musicality quantification in this paper does not solely theorise that individuals with high levels of musicality will discern temporal variations, harmonic structures, melodic sequences, and rhythmic patterns. Colwell and Davidson (1996) also caution that deficiencies in auditory skills can hinder individuals from experiencing and cultivating musicality, a valid point of consideration when selecting a reliable battery test for this research.

New and non-inferential quantitative approaches to measuring musicality have emerged, which have been employed to gauge musical aptitude in both musicians (e.g., Law and Zentner, 2012) and non-musicians (e.g., Müllensiefen et al., 2014). These tests facilitate grading levels, classification, and comparisons between these groups. However, contributing to academic criticism of battery tests, psychometric tools, while effective in assessing and comparing musical proficiency in adult non-musicians, keep possessing notable limitations. These tools primarily yield numerical scores and often fail to account for musical engagement or the impact of individuals' prior socio-cultural musical experiences.

Establishing the validity of results derived from these battery tests remains a topic of debate in the ongoing scholarly discussion of musicality. Such tests results may be influenced by the intensity of adult non-musicians' socio-cultural engagement with music and their daily music-related activities (Wagemaker et al., 2020). For this reason, a mixed-methods methodology was adopted in this study. The qualitative approach (semi-structured interviews) was designed to illuminate the impact of key socio-cultural experiences on musicality, examining and analysing potential relationships between musicality levels and the intensity of musical experiences throughout participants' lifespans.

METHODOLOGY

A convergent mixed methods approach (Tashakkori and Creswell, 2007) was employed to address the research questions, what musical socio-cultural experiences are discernible in adult non-musicians and how could these experiences have affected participants' musicality levels? This necessitated the measurement of musicality using quantitative means, while the qualitative portion consisted of multiple case studies (Meriam, 2009) designed to explore the musicality in adulthood providing a richer description than say a single case study approach.

Participants

This study implemented a transversal approach, enabling the researcher to measure and capture detailed aspects of the phenomenon within a specific period (Creswell, 2014). Five adult participants were selected through purposive sampling (Alkassim et al., 2016), an appropriate method given the exploratory nature of the research and the goal of providing rich descriptions of the phenomenon—the development of musicality in non-musicians—without requiring generalisability. Participants were screened to ensure they were non-musicians: the inability to read, recognise, and interpret musical symbolic and elements (Gaser & Schlaug, 2003); the inability to compose music (Carlow, 2015); the inability to play any musical instrument (Hallam, 2015); and a self-declaration of being a non-musician (Hoshino, 2017). The participants ranged in ages from 31 to 58, 2 males and 3 females, and all met the stated criteria above of being non-musicians.

The mini-PROMS

The mini-PROMS (Profile of Music Perception Skills) (Zentner & Strauβ, 2017) is a computer-based test that was used to measure participants' aural skills in relation to melody, rhythm, pitch and tempo in which they had to identify the similarities and differences within each skill. Participants engaged in four tests in which each took approximately 8 minutes to complete. Melodic and temporal aspects are assessed and rated on a 10-point scale, while pitch and accent were used on an 8-point scale. These subcomponents were combined to produce the 'Comprehensive Musicality Score' on a 0 to 36 scale. The numerical musical achievement is determined by the mini-PROMS and participants' performances ranges are categorised as Outstanding (scores above 28), Excellent (scores between 23 and 27.5), Good (scores between 18 and 22.5), or Basic (scores below 18). The mini-PROMS was used instead of the full version due to the reduction in time (1 hour versus 15 minutes) whilst maintaining high test-retest reliability (r=.087) with the full version, the PROMS-S.

The semi-structured interview

A semi-structured interview protocol was the socio-cultural experiences that have impacted on the development of their musicality. Questions were developed around themes of: the importance of music, significant musical experiences, music preferences and social and cultural influences (see **¡Error! No se encuentra el origen de la referencia.**). Interviews typically lasted 30 minutes. As it

will be seen in the findings section, the themes used to create the questions are quite different to the emergent themes as a result of the thematic analysis described in Data Analysis.

Table 1. Themes, main questions and promptings of the semi-structured interview protocol

Theme	Main question	Prompting questions
Importance of music	How important is music in your life, on a scale of 'extremely important' to 'extremely unimportant'?	Why? What does this look like in your everyday life now? Do you sing or whistle your favourite music melodies or songs? Did you learn your favourite songs deliberately? Do you think that music impacts your daily life? How?
The most significant experience	What is your most memorable (positive and negative) musical experience?	How old were you? Where were you? Were you with other significant people? How did it effect you? What was the lasting impact of that memory?
Other significant experiences	Were there any other memorable musical experiences?	When? Where? How do you think that experience affects your musicality? Does it help to explore music? Does it make you want to study music or not?
Music preferences	What is your favourite song and how does it affect you?	Did you learn it deliberately? Can you recognise the next musical elements of your favourite song timbre, rhythm patterns, melody and the harmonic characteristics? Does it help you to easily desire to play music instrument? Do you feel that your music preferences were influenced by you parents or someone else? Do your music preferences help you to live a better life? Why? Does it make you more musical and responsive by singing, dancing or even try to play a music instrument?
Social influences	Socially, do you think that your family, or friends influence your favourite music?	Most of the music that you know or like, where did you learn it from? Does your family, friends or any place-institution affected to react musically? Is music important for you and social purposes? For

		example: driving to work, working out at the gym, family dinners? Socially, do you feel that music ceremonies, music concerts, and the music at the pub contribute to learning new melodies, music rhythms or singing new things?
Cultural influences	Culturally, what particular events contributed to learning your favourite music?	Do you remember any carnival, religious ceremony, patriotic celebration melody, rhythm or melody? Did you learn that consciously or unconsciously? When you listen to music, do you pay attention to the technical elements or just how good it sounds like? Is it important for your music representative cultural songs such as the national anthem or the hymn of your favourite rugby team because you can easily engage musically?

Methods Procedure

Potential participants were invited to take part in the research via email or personal invitation. Five participants were deemed suitable for inclusion and consented to participation. After written consent was obtained, the interview was conducted followed by the administration of the mini-PROMS, both activities lasting approximately 30 minutes. Ethical approval was sought and granted by Griffith University's academic ethics committee reference no. 2021/679.

Data Analysis

The interviews were transcribed, helping the researchers become familiar with the content of the conversations (Hashimov, 2015) and emergent coding was used to allow themes to emerge naturally out of the data, without prejudice (Latendresse et al., 2020). The emergent codes were grouped and regrouped to eventually generated five major themes (Connelly & Peltzer, 2016). Leximancer was then used to establish the validity of the five themes (Morse, 2015).

Participants' musicality was determined (basic, good or excellent) using the mini-PROMS and then used to provide a finer grained analysis, allowing for the integration of the quantitative and qualitative findings, using Leximancer. Participants were identified in the concept map (See Figure 1) by their musicality description (the words in red, called nodes) to explore common themes by level of musicality. Understanding critically how Leximancer was used in this study, it employed thematic

analysis to extract concepts, with groups of concepts forming themes, from the interviews and then present the prominence of themes (the coloured bubbles) through heatmapping – the most dominant theme in red and down through the spectrum to purple. The relatedness of concepts and themes are shown through spatial proximity, i.e., the closer a theme or a concept is to a node, the more significant the theme is to that participant.

Findings

The case studies were delineated, categorised, and systematically analysed based on their musicality (i.e., basic, good, excellent) as determined by the mini-PROMS. The final thematic analysis report was written down based on the Clarke and Braun's (2017, p. 297) concept as a method for identifying, analysing and interpreting patterns of meaning ('themes') within qualitative and quantitative data. Following a thematic analysis, five distinct themes emerged, offering a more comprehensive insight into the musicality of the participants. The five themes are: Music in daily life; Musical experiences; Musical cognition; Musical influences; and Musical skills.

Table 2 shows results from the mini-PROMs and the themes from the semi-structured interviews. Lu, Jo and Pippin were assessed by the mini-PROMS has basic musicality, Maria with good musicality and Richie has having excellent musicality. All participants listened to music every day and singing their favourite songs but only Maria stated she would dance, clap or tap along to the music. Richie and Maria stated that funerals, concerts and festivals were times and places where music played significant roles and birthdays and religious events for Maria. All participants shared common and different musical activities and experiences across diverse contexts. Musical cognition´s insights represented for all the participants an involuntary approach activated in public places, but Pippin, Maria and Richie mentioned they try to learn their favourite songs. Jo and Pippin were the only two participants who did not have any type of music class or lessons in their youth age. Musical influences were associated with family members and music artists for all the participants, although Lu, Jo and Pippin did not mention friends were a potential musical influence. All participants stated they can identify music timbre and possess abilities to recognise and distinguish rhythm, melody and harmony (piano chords differences).

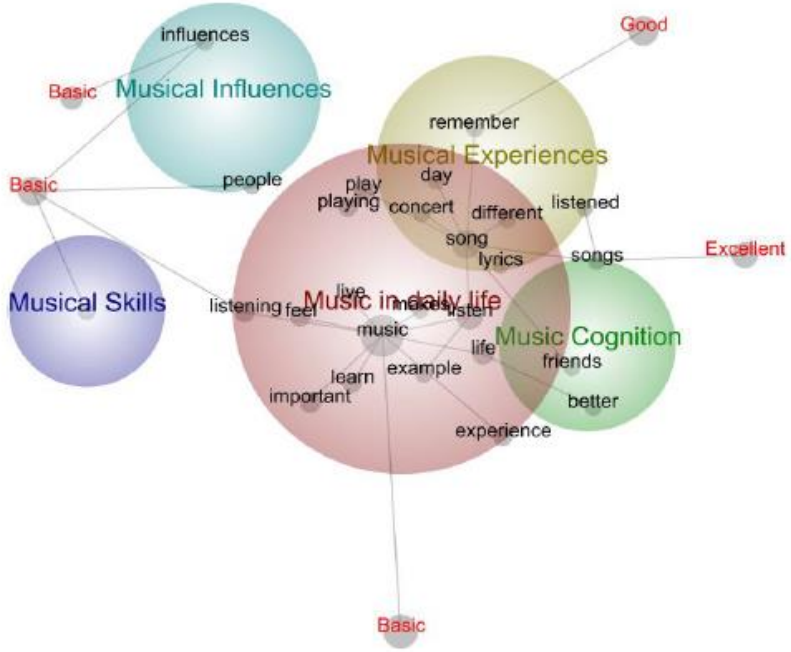
Table 2. Mini-PROMS musicality scores and coding against the 5 themes

Participants		Lu	Jo	Pippin	Maria	Richie
Mini-PROMS overall score		10.5	12	15.5	19.5	26.5
Musicality description		Basic	Basic	Basic	Good	Excellent
Relevance of music to their lives		Not very important	Very important	Important	Very important	Extremely important
Music in daily life	Listening to music daily	✓	✓	✓	✓	✓
	Dancing	☐	☐	☐	✓	☐
	Clapping or tapping	☐	☐	☐	✓	☐
	Singing favourite songs	✓	✓	✓	✓	✓
Musical experiences	Funerals	☐	☐	☐	✓	✓
	Concerts and festivals	✓	✓	☐	✓	✓
	Birthdays	☐	☐	✓	☐	☐
	Religious events	☐	☐	✓	☐	☐
Musical cognition	Public sites	✓	✓	✓	✓	✓
	Unconscious learning	✓	✓	✓	✓	✓
	Song lyrics and music research (conscious learning)	☐	☐	✓	✓	✓
	Music/theory lessons	✓	☐	☐	✓	✓
Musical influences	Family	✓	✓	✓	✓	✓
	Friends	☐	☐	☐	✓	✓
	Music	✓	✓	✓	✓	✓

	artists/styles					
	Timbre recognition	✓	✓	✓	✓	✓
Musical skills	Musical elements recognition (rhythm, melody, harmony)	✓	✓	✓	✓	✓

Figure 1 shows a Leximancer concept map where the analysis merges participants musicality as measured by the mini-PROMS and the thematic analysis of the interviews. See section 2.6 Data analysis for an explanation of how to interpret the concept map. The theme, Music in daily life, was the most prominent theme and due to its central placement in relation to the participant nodes shows its relevance to all participants irrespective of level of musicality. The themes of Musical Influences and Musical Skills were more significant for participants with basic musicality whilst Musical Experiences and Music Cognition were more significant for participants with good and excellent musicality. These themes are more fully explored in the following sections.

Figure 1. Leximancer concept map showing 5 themes as they relate to participants with basic, good and excellent musicality



Note: The prominence of themes in Leximancer maps are heat mapped with the most prominent theme shown in red (Music in daily life) through the spectrum to the least prominent theme shown in purple (Musical Skills)

Non-musicians with basic Musicality

Lu, Jo and Pippin achieved ***basic*** musicality levels based on their battery test results of 10.5, 12 and 15.5 respectively. These three participants had no prior exposure to formal music education and lacked any proficiency in playing musical instruments or musical skills. Participants' sense of musicality in their daily life was manifested and evidenced in everyday behaviours such as listening to music to improve their mood, general home activities, or just starting their daily routines by listening to their favourite song/s on the radio.

> **Lu**: In my life, at home, the radio is on all the time, and it's easy listening. I could be washing up an hour here and a song playing on the radio.
>
> **Jo**: It helps with your emotions, and I have a wide variety of music I listen to.
>
> **Pippin**: Sometimes I listen to music … it depends on my mood. Like, I don't know if I feel stressed or something like that, sometimes I listen to music to be happier.

The *music in daily life* theme captured a routine activity and the benefit of simultaneously listening to music. For example, listening to the radio at home for general housekeeping activities purposes, starting daily duties, and controlling and regulating their moods were meaningful musicality behaviours in participants with *Basic* musicality levels.

The *Musical influences* of adult non-musicians were associated with different people and musical artists that had the power to impact what participants liked to listen to the most in adulthood. Two participants noted:

> **Jo**: Billy Joel was a big influence, Guns and Roses um, Led Zeppelin, the Doors and I stand out, so I find I get influenced easily from that, yeah.
>
> **Researcher**: Do you feel that your music preferences were influenced by your parents or someone else?
>
> **Jo**: Definitely my parents.
>
> **Pippin**: When I was with my mom, I used to listen to a specific kind of music or style of music that affected me like now I'm listening to this kind of music. Maybe because of my mom.

Parents and music artists held the capacity to exert influence on individuals characterised by basic musicality. This influence seemed to have a lasting impact on participants' musical development throughout their lives, contributing to their musical preferences.

The absence of formal musical training among participants with basic musical proficiency did not impede their self-reported ability to sing or reproduce music. Daily engagement with music was associated with performative actions:

> **Lu:** I sing when I can remember the lyrics of the song.
>
> **Jo:** Sometimes yes, I sing and whistle my favourite music.
>
> **P**ippin: Yeah, like in the bathroom when I'm showering myself, I think I like singing like not like a professional.

It is clear that the most frequently self-reported innate abilities for musical performance included singing and whistling. This is not surprising given the universality of singing, which is a natural extension of speaking (Nicolai et al., 2013).

Non-Musician with Good Musicality Levels

Maria, a 40-year-old participant, demonstrated good levels of musicality, as indicated by her musicality battery test score of 19.5. Distinguishing herself from prior participants, Maria received formal music theory education during her high school years. Nevertheless, she self-reported the inability to play any musical instrument and mentioned she does not possess musical competencies such as composition or improvisation. The most dominant theme from her interview was around musical experiences and she reflected upon all the meaningful memories that involved music in her life to date. The following experience was noted:

> **Maria**: The first one was when one relative passed away. It was with my grandfather. He passed away, and he was always saying to us, 'I don't want to see all of you crying. I prefer that you listen to music at the end of my days because you will remember me with that. That musical experience affects my life because even if I'm very happy at the moment, if I listen again to that song, or every time that I listen to that song, I'm gonna [sic] cry, for sure.

Maria's musical experience possesses a remarkable capacity to elicit a range of emotions and evoke ingrained memories. The lyrics seem to act as conduits, allowing her to connect with past experiences, both joyful and melancholic. Another aspect of her musicality is her musical cognition.

Maria's musical cognition is based on an integration of conscious and subconscious efforts to learn song lyrics and melodies. Singing within informal settings played a crucial role in her musical cognition but also constant repetition appears to help her subconscious musical cognition. For example:

> **Maria**: Sometimes I want to know exactly the lyrics meaning and I enjoy them. Sometimes I sing the songs I have just in my mind, like this song … [Maria sings] but if I want to say to you 'oh, I listen to this song' and I can tell you how it is.
>
> **Researcher**: How did you learn your favourite song?
>
> **Maria**: I mean, after listening to my favourite song over and over, I learned it unconsciously.

While memorising song lyrics may appear as a natural skill, this section discusses how Maria's musical cognition approach to learning music is influenced by it. The participant's intention to master song lyrics involved conscious cognition and subconscious absorption through song repetition.

Non-Musician with Excellent Musicality Levels

Richie, at 30, has shown exceptional musical aptitude by attaining a 26.5 overall score in his mini-PROMS assessment. He did so despite lacking musical skills such as improvisation as self-reported during his interview. Nevertheless, it is noteworthy that Richie is the sole participant who received piano instruction during his formative years and completed music theory courses during high school.

The musical cognition theme represented a relevant musicality aspect in the life of this participant, according to the Leximancer map (Figure 1). Concerning how this participant's musical cognition is actioned, the following interview quote is noted:

> **Researcher:** How do you learn music and songs?
>
> **Richie:** If there's a song playing that I've never heard of, and I'd quite like it, then yeah, I'll get into it. Now I get on Google and find out what lyrics are and learn them and all that kind of thing.

This participant's engagement with musical cognition is characterised by a sincere endeavour to explore music and lyrics on the internet. This deliberate initiative can be regarded as a behaviour that holds the potential to enhance the musical acumen of the participant. The life of this participant has been enriched by additional musical experiences, characterised by significant interactions during both concerts and funerals. These musical encounters are described by the participant in the following quotation:

> **Richie:** I went to a concert. I can't remember who was playing. It gave me like an idea of what a concert is like kind of thing'.
>
> **Researcher:** Did that experience impact your musicality?
>
> **Richie:** Yeah, absolutely. So, like, before I went to that concert, there were so many bands there that I didn't even know existed. What's the word? Put me in touch with the less mainstream stuff. So, I guess now I know that there's no mainstream stuff out there. It's good to actually go through iTunes and search up some random bands and artists and all that kind of thing.

Attending musical concerts and being exposed to music during funerals represent informal contexts that appear to have influenced Richie's musical development. These prior musical experiences lived in those informal environments may have also provided opportunities for exploring and discovering new music and music artists through virtual platforms.

DISCUSSION

This section is organised into answering critically two research questions: what musical socio-cultural experiences are discernible in adult non-musicians and how could these experiences have affected participants' musicality levels? Existing academic literature was also linked to confirm findings of the present study.

What musical socio-cultural experiences are discernible in adult non-musicians?

The study's findings support the notion of musicality as an innate human capability in adulthood, even among non-musicians. Various musical experiences occurred across diverse non-formal contexts. These findings align with the work of Kahn et al. (2021), which highlighted that engaging in daily music-related activities, such as listening to music during housekeeping, is associated with mood improvement and stress reduction (Beck et al., 2006). This study's empirical evidence also pointed

those non-formal contexts and socio-cultural experiences, like concerts and funerals, can foster higher musicality levels by providing rich experiences that evoke positive memories and cultivate an appreciation for musical artists, which is consistent with Burland and Pitts, (2016) work. Conversely to Baxter-Moore and Kitts (2016), negative musical experiences such as funerals, may lead to unpleasant memories that individuals seek to avoid. Liturgies are also a socio-cultural experience noted in the findings and Calvert's (2020) scholarly work claims that religious music experience has the power to influence the assistants' musicality through singing and learning the style of the worship. Participants' musical experiences, both enjoyable and displeasing, have been encapsulated in concerts and music festivals which might be seen as socio cultural practices as well. Following Burland and Pitts (2016), positive musical experiences were observed when participants attended live music events because they fostered social connections and enjoyment. This previous academic claim is consistent with the findings of Jensenius et al. (2009), because participants might have perceived pleasant music concerts as occasions where live music serves to establish a connection between the audience and performers, fostering the expression of personal emotions and appreciation.

The various socio-cultural activities identified likely allowed participants to cultivate their musicality levels through both active and passive engagement with their favourite music in private spaces, ceremonies, concerts, sentimental celebrations, festivals, religious practices, funerals, and public places. This array of informal contexts, coupled with personal positive and negative experiences, musical influences, and an innate cognitive sense, has the potential to nurture a natural musical skill set in participants, contributing to a musicality level development.

How could musical experiences have affected participants' musicality levels?

In this study, all participants had a minimum degree of basic musicality affected by their musical experiences through auditory and performative skills such as singing. This occurrence is scientifically elucidated by scholars who assert that the development of musicality levels is influenced significantly by a combination of various factors noted at the outset of this academic discussion, including cognition and musical influences.

The steady musicality levels observed in adult non-musicians in this study are consistent with Hallam's (2017) findings of musical experiences, which suggest that musical cognition is an inherent

and universal human trait. This inherent capability explains how individuals were able to recall and learn musical experiences, fostering the development of musicality and the ability to engage with music, whether consciously or subconsciously. On the other hand, Cate and Spierings (2019) noted that musicality not only stems from an innate capacity for musical cognition but is also mediated by natural auditory skills. These skills enable individuals to perceive and synthesize rhythms, melodies, lyrics, and harmonies into cohesive musical pieces. This concept of musical skills aligns with the natural musical abilities (e.g., singing) observed in the participants of this study, which likely enabled them to express their musicality in performative terms.

Expanding the musicality discussion, Corrigall and Schellenberg (2015) suggest that musical levels development and cognition may be correlated and influenced by factors such as exposure frequency to musical contexts and activities, along with general intelligence levels (e.g., Schellenberg, 2011). Although formal settings and educative experiences are not mandatory for musicality levels development (Green, 2017), participants with some degree of musical instruction or experience in formal musical settings such as Richie, tended to exhibit higher musicality levels, likely approaching the battery test from an implied theoretical standpoint (Maury and Rickard, 2016).

Another variable that contributed to a level development of musicality is musical influences. Cohen (1990) emphasizes that musical influences stem from factors like personal interests, social circles, family, and cultural behaviors, contributing to the formation of musical identities and individual preferences boosting a level of musicality. Family members played a significant role in facilitating musical engagement during youth but also, they represent a connection to be exposed to musical stimuli which can significatively develop musical experiences and musicality levels from early age (Zdzinski, 2014).

Considering the previous academics' claims, participants in the study were observed to possess a level of musicality which was exposed through the musicality test regardless of the absence of formal musical education experiences. Reported musical skills in this study such as singing and whistling are what enable participants to exert control over pitch and note durations (Nicolai et al., 2013, p. 143). Muntanyola-Saura's (2016) confirmed this study’s findings asserting that clapping and dancing indicate how bodily movements have the potential to enhance participants' rhythmic sense, as healthy

musicality levels can be demonstrated through the memorization and coordination of rhythmic patterns.

According to Janata and Grafton (2003), the levels of musicality observed in the participant group were evidenced by the musicality test. Even without musical expertise, participants achieved standard and non-deficient levels of musicality, showcasing inherent natural aural skills such as recognition, repetition, and distinction. Nevertheless, Porflitt and Díaz (2019) claim that earlier exposure to music classes and learning to play a musical instrument are elements that may enable participants to attain a higher level of musical proficiency. In simpler terms, it is clear how participants such as Richie who had premature exposure to musical experiences and underwent early musical cognitive processes achieved superior musicality scores due to the enhancement of executive mechanisms and functions, including working memory, monitoring, and recognition, which explains how he got facilitated responses to melodies, rhythms, and tune perception (Diamond, 2013).

Limitations, practical implications and directions for future research

This research study presents two potential limitations that are worth highlighting. Relying on self-reported data for assessing musical skills introduces the potential for bias and inaccuracies obtained from participants' perceptions (Krishna et al.,2010), although information obtained interviewing participants was confirmed twice as a strategy to gain more accurate responses (Yin, 2018). The study's generalisability to a broader population remains uncertain, as it predominantly focuses on a specifically reduced pool of participants. Contrasting the findings and evidence presented in this manuscript with existing literature served as a research strategy aimed at enhancing the reliability of the theoretical constructs and conclusions.

The practical significance and real-world impact of this study lie in promoting musical activities that enhance auditory abilities and foster robust musicality among children, juveniles and adults. This can be achieved by engaging them with basic musicality in activities such as karaoke, dancing, attending concerts, or participating in music-centered events. Exercises focused on body rhythm can further nurture their inner sense of music in adulthood. From a cognitive standpoint, and acknowledging that individuals, even if not musicians, possess basic musicality, music teachers can leverage this inherent

ability to integrate musical activities into various knowledge domains, helping students learn different subjects and topics through singing.

The study provides insights that contribute to an enhanced understanding of the musicality among adult non-musicians, in contrast to prior studies which primarily concentrated on children (Forrester & Borthwick-Hunter, 2015) and adolescents (Gordon, 1970; Karma, 1976). While there is a discernible understanding of how musical preferences evolve in older adults (Gibbons, 1977) and the advantages of engaging in musical activities (Varvarigou et al., 2011), future research may consider evaluating and appraising the musical aptitude of elderly non-musicians. Therefore, a more comprehensive mixed methods approach, specifically examining correlations of socio-cultural experiences and musicality levels among elderly non-musicians, could yield deeper insights into this phenomenon across the entire lifespan. Research on the musicality of elderly non-musicians is also expected to uncover new themes and concepts, shedding light on unforeseen aspects of musicality.

CONCLUSIONS

The conclusions of this exploratory study aim to contribute to a new theory building, suggesting that the five distinct themes identified from the participants, described and encapsulated essential components that characterised healthy musicality levels in adult non-musicians.

Music in daily life theme uncovered conclusive evidence to considering that the natural musicality sense of adult non-musicians not solely permits them to react to music but to obtain benefits out of it such as balancing up emotions and mood regulation.

Another conclusion related to musicality in adulthood highlights how socio-cultural experiences involving music can evoke unique memories. Specifically, music has incidental effects on the listener's musicality, helping to create connections with places and romantic relationships (Istvandity, 2019). This was evidenced in the theme of *musical experiences.*

The participants' musical cognition appeared to be mediated by an autonomous memory process requiring no deliberate effort. This conclusion is supported by the observation that musical elements such as tunes, melodic lines, and rhythm sequences were learned through repetition, a process known to enhance memory (Cheah et al., 2022). Additionally, participants like Maria and Richie, who

showed an active interest in learning and exploring their favourite music, appeared to achieve higher levels of musicality.

Family, friends and musical artists were considered by participants the primary *musical influences* that somehow shaped their musical preferences approaching them explore their musical sense. Listening to what others like, directly or indirectly, seems to build interactions with music that were vital for development of musicality from childhood across participants' life span.

It is also important to conclude that the absence of musicianship in the participants did not represent a lack of understanding of the battery test or deficient development musicality levels. Instead, *Musical Skills* in the adulthood of participants were evident being singing the most consistent approach to execute music elements such as rhythms and melodies of their favourite songs.

In conclusion, the empirical evidence presented in this study suggests that the five themes uncovered may be considered key components of adult non-musicians' musicality, as each theme encompassed a variety of elements that contributed to understanding its development. This phenomenon was naturally manifested in the participants' lives. Therefore, the assertion that basic, good and excellent musicality levels can be maintained in adulthood through exposure to music in diverse socio-cultural contexts since childhood (Welch, 1998) may be considered a valid hypothesis.

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