University of Roehampton London

My Child and Music:
A survey exploration of the musical abilities and interests of children and young people diagnosed with Autism Spectrum Conditions

A dissertation presented in partial fulfilment of the
Applied Music Psychology MSc degree

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'Music is a space where people with ASC and neurotypicals truly meet.'

- Francesca Happé (in Ockelford, 2013)

The Image used for the cover of this dissertation belongs to Rula Vamvakari: *Music for the Brain*, May 2013, Dublin.

Abstract

This dissertation presents the findings of an exploratory study concerning the musical interests and abilities of children and young people with Autism Spectrum Conditions (ASC). This study was prompted by the lack of research concerning the role and importance of music in the everyday lives of this population. It builds upon the Focus on Music studies (Ockelford et al., 2006; Ockelford & Matawa, 2009), adopting a mixed-methods approach and employing an online survey to collect data from parents and carers. The survey was distributed internationally, with a participant group of 126 young people with ASC. Issues explored are the participants' musical interests, abilities and talents and the use of music in everyday life.

Through the presentation of the quantitative data this report succeeds in suggesting group tendencies, but also highlights individual experience, integrating extensive qualitative data and direct quotes in the discussion. The research findings, in accordance with relevant research, support the multifaceted beneficial role of music in everyday life; it is seen as offering comfort and relaxation, functioning as motivation, supporting socialisation and promoting understanding. The main outcomes reveal an exceptionally high reported interest in music within the participant group and a comparatively low degree of perceived music talent and ability, as well as significantly limited access to music provision.

While this study is preliminary, the findings may provide foundation for a wide range of further research. The need for improvement of music provision and efforts to increase awareness is highlighted, the findings suggesting that music may be exceptionally important in the everyday life of young people with ASC. Music is seen as a medium that can positively affect general development, but also provide great pleasure, significantly enhancing the well-being and life quality of disadvantaged individuals, as highlighted through the stories of this study's participants.

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Chapter 1. Introduction

1.1. Background and purpose

This dissertation presents and discusses an exploratory study which investigated the musical abilities and interests of children and young people[1] diagnosed with Autism Spectrum Conditions (ASC)[2]. This research built upon the Focus on Music studies[3] (Ockelford et al.[4], 2006; Ockelford & Matawa, 2009) and extended them into the domain of ASC, adding to the increasing body of research on the relationship between ASC and Music. For this purpose, a mixed methods approach was adopted, employing an online parental survey adapted from the Focus on Music studies (ibid). This survey explored the experiences of parents or carers of children and young people with ASC, collecting data from this diverse target population and investigating potential general trends. The research findings offer insight into the role and importance of music within the everyday lives of young people with ASC, especially concerning musical activity taking place on a casual and unplanned basis (Ockelford, 2000). This study specifically touched on topics such as musical talent, motivation to engage with music, the affect of

[1] "Person-first" language is used throughout the text, in an effort not to minimize or deny disability, but to highlight that the individual's attributes supersede the symptoms of ASC.

[2] Within and throughout the context of this study, Autism Spectrum Conditions will be referred to as ASC, including Asperger Syndrome and PDD-NOS, following the changes in the DSM-V (American Psychiatric Association [APA], 2013). Autism Spectrum Disorders and Asperger Syndrome are discussed specifically in chapter 2. Furthermore, the term Autism Spectrum Conditions is chosen as it is seen as more inclusive and representative of the great diversity in conditions included under the Autism umbrella. The use of "ASC" as an umbrella term is in no way a presentation of the researcher's personal views on the matter and by no means intends to dismiss the great heterogeneity of the participant group.

[3] The Focus on Music studies were undertaken in 2006 and 2009 and explored the music interests and abilities of children and young people with sight difficulties. This study directly builds upon these research projects, adapting and employing the questionnaire created for the Focus on Music research.

[4] "et al." is used in references of over 3 authors, for ease of communication. Full references are included in the reference list, at the end of the document.

music on emotion, access to music provision and absolute pitch (AP)[5]. The idea for this study was born out of the researcher's interest in the relationship between music and well-being, particularly in the area of special needs. ASC became the focus of this study, due to the lack of relevant research and the heterogeneity of the target population. The exploration of the role and importance of music in the everyday lives of young people with ASC was seen as a relatively new and exciting area of inquiry, expanding on existing theoretical knowledge in an area of personal academic interest. Furthermore, this study was seen as aiming to enrich current knowledge regarding the function and importance of music in general, for neurotypical[6] individuals or people with other diagnoses, as these findings may not necessarily be restricted to young people diagnosed with ASC.

1.1. Dissertation outline

This dissertation consists of 6 sections. Chapter 1 is a brief introduction, followed by Chapter 2, which discusses the wide range of relevant literature sources and empirical research. The issue of ASC and their relationship to music is also discussed in this section, providing the context for this study and highlighting the gap in current knowledge. Chapter 3 outlines the philosophical approach and methodology adopted in this study and discusses the research tools used, the process followed and all relevant ethical issues, explaining the rationales for all decisions involved in the implementation of the research. Chapter 4 presents and discusses the main results that emerged from this study. Finally, Chapter 5 discusses the limitations and implications of this study, as well as suggestions for further research, followed by Chapter 6, a brief conclusion.

[5] Absolute pitch and its relationship to ASC is discussed in appendix 8. Furthermore, absolute pitch throughout the text will be referred to as AP for ease of communication. A definition of absolute pitch is included in chapter 2.

[6] The term "neurotypical" is used throughout this text for typically developing individuals who have not been diagnosed with an Autism Spectrum Condition.

Chapter 2. Literature review

2.1. Introduction

This chapter presents a review of a wide range of literature and empirical research related to the research topic, providing a context for the study and conveying its rationale, in regards to current knowledge and efficient methodology. It supports the study's importance through highlighting the gap in current knowledge and identifying principle areas of dispute. In addition, the main topics are introduced, discussed and defined.

The topics discuss in this chapter are:

- Autism Spectrum Conditions (ASC), their definition, diagnosis, causation and prevalence
- The relationship between ASC and music
- The importance and role of music in everyday life.

2.2. Autism Spectrum Conditions

2.2.1. What are ASC

ASC, first observed by Kanner (1943) and Asperger (1944), are currently seen as situated on a spectrum. The ASC spectrum, originally proposed by Wing (1981), consists of high, medium and low functioning Autism, as well as Asperger Syndrome (Baron-Cohen, 2006) and includes a broad range of symptoms of varying severity (Fang, 2009). ASC are described as lifelong congenital conditions (Huron, 2011), often manifested as withdrawal into the self (Frith, 2003). They are seen as pervasive, complex developmental and neurobiological disorders characterised by qualitatively impaired social interaction and communication, as well as restricted and stereotyped behaviour and interests

(Ockelford, 2013; American Psychiatric Association [APA], 1994, 2013; Frith, 2003; Swanson, 2009; Fang, 2009; Hill & Frith, 2003; Adamek & Darrow, 2005; World Health Organisation [WHO], 2010). Abnormalities may also be present in affective and cognitive development (Heaton, Hermelin & Pring, 1998; Swanson, 2009), with research suggesting a link between intellectual difficulties and severity of "autistic" symptoms (Vivanti et al., 2013). Limited imagination (APA[7], 1994) and language difficulties (Heaton & Wallace, 2004; Volkmar & Lord, 1999) also adversely affect educational performance (Darrow & Armstrong, 1999; Hourigan & Hourigan, 2009). Furthermore, people with ASC face difficulties in forming personal relationships and making sense of the world can be challenging due to impaired imagination (Ockelford & Matawa, 2009). ASC have also been described as empathy disorders (Baron-Cohen, 1995; Gillberg, 1992; Yirmiya et al., 1992; Baron-Cohen & Wheelwright, 2004).

Asperger Syndrome (AS) specifically, first described as autistic psychopathy by Asperger in 1944 (Ghaziuddin, Tsai & Ghaziuddin, 1992), is currently included on the Autism Spectrum (APA, 2013). AS was only recognised as a developmental disability by the APA fifty years later (APA, 1994) and since then has been seen as closely linked to Autism. Due to its recent "discovery", the specific ways in which individuals are affected are not yet fully known (Ghaziuddin, Tsai & Ghaziuddin, 1992). AS is described as a congenital developmental disorder, milder, however, in nature (Attwood, 2000; Tantam, 1991; Frith, 2004), as individuals diagnosed with AS are high-functioning (Frith, 1991; Wing, 1998). Verbal and non-verbal communication and imagination impairments are present, as well as repetitive patterns and restrictive interests (APA, 1994, Barnhill, 2001). Contrary to Autism, however, there is no cognitive or language delay[8] (Baron-Cohen, et al., 2001; Frith, 2003) and individuals can possess high IQ measures

[7] The American Psychiatric Association is referred to throughout this text as APA for ease of communication.

[8] Language delay is defined as the non-use of single words by the child is 2 years old and/or phrases by the age of 3 (Baron-Cohen, et al., 2001). However, diagnosis of ASC or AS, relies on retrospective reports, where speech development is often reported as atypical in many different ways (Attwood, 2000).

(Attwood, 2000), performing at normal or high levels in science-related subjects (Baron-Cohen, 2006).

Despite AS being described as a milder condition, individuals' lives are often significantly affected (Tantam, 1991), especially in adolescence, when the social aspect of life is essential towards development (ibid). Social integration, peer relationships and interaction pose a great challenge (Asperger, 1991; Attwood, 2000), often leaving the individual unable to fully participate in the process of growing up (Szatmari, 1991), or even vulnerable to depression and anxiety (Attwood, 1998; Ghaziuddin et al., 1998; Tantam, 1991; Wing, 1981; Barnhill, 2001). Individuals with AS are said to perceive the world differently (Attwood, 1998), often feeling out of context and alienated (Barnhill, 2001). Given that social behaviour is one of the most important characteristics of human beings, AS can result in greatly disadvantaging the individual (Barnhill, 2001).

While currently Autism and AS are seen as situated on the ASC spectrum, the link and diagnostic boundaries between these conditions remain highly controversial (Szatmari, 1992). Despite behavioural similarities, there is insufficient knowledge and empirical research on the conditions and their symptomatology (Howlin & Asgharian, 1999). AS and Autism are considered as parts of a wide spectrum with no clear boundaries, variants of the same underlying developmental disorder (Frith, 2003, Wing & Potter, 2002) placed on a continuum (Baron-Cohen, 1995; Frith, 1991; Wing, 1981, 1988), as currently presented in the DSM-V (APA, 2013). Others, however, argue that there are significant behavioural and neurological differences between Autism and AS (Wing, 2002; Duffy et al., 2013); research suggests that individuals with AS have greater development of language and social and communication skills, showing less "autistic" symptoms than people with high-functioning Autism (Szatmari et al., 1997). These conditions have also been seen as clinically and neurobiologically separate (Rhinehart et al., 2002), due to additional difficulties in motor coordination and specific learning found in people with AS (Green et al., 2002, Reitzel & Szatmari, 2003). As a result, diagnosis often poses a great

challenge, as discussed below, with individuals who fulfil the diagnostic criteria for AS and Autism receiving a diagnosis of Autism (Miller & Ozonoff, 1997; Szatmari et al., 1995; Kim et al., 2000). In spite of the current lack of consensus, the currently prevailing view, however, is that AS is a variant of Autism positioned at the milder end of the Autism Spectrum, possibly even seen as the bridge between Autism and normality (Baron-Cohen, 1995; Frith, 1991; Wing, 1981, 1998).

2.2.2. Main theories related to ASC

Despite the fact that Autism is often evident within the first years of childhood, its nature remains elusive (Ockelford, 2013). Given the diversity within the ASC population, as well as the varying level of resulting impairment, a number of different theories discussing the nature and effect of ASC on the individual have been developed. The tree following main theories were suggested in relation to the main three domains of impairment associated with ASC, communication, socialisation and stereotyped behaviour. Baron-Cohen (1995), suggested that ASC were associated with impaired development of theory of mind[9], resulting in difficulties in social interaction, as mindreading deficits prevent from understanding mental states and participating in "normal" socialisation acts (Baron-Cohen, 2001; Baron-Cohen et al., 2000; Baron-Cohen et al., 1997). The Executive dysfunction theory concerned difficulties in processing and controlling cognitive functions, thought to lead to obsessive and repetitive behaviour (Hill, 2004; South et al., 2007; Russel, 1997). The Weak Central Coherence (WCC) theory, proposed by Frith (1989), suggests that ASC are characterized by a cognitive style that favours high-level local processing over the processing of global, context-dependent information and gestalt meaning (Happé, 1994; Castelli et al., 2002), possibly leading to communication difficulties (Frith, 1989).

[9] Theory of mind is the ability to attribute mental states to oneself and others, and to understand that others may have ideas that differ from one's own (Baron-Cohen, 1995, 2000, 2009; Baron-Cohen, Leslie & Frith, 1985; Frith, 2001).

The WCC theory, however, can be seen as the first theory to highlight the skills of individuals with ASC. Despite the severity and breadth of impairments associated with ASC, 10% of the ASC population have been found to possess a higher-level skill than expected (Heaton et al., 2008). In fact, an uneven profile of cognitive ability often co-exists with ASC (ibid) while Frith (1989) claims that the coexistence of multiple deficits and enhanced domain-specific abilities is characteristic of the condition. Subsequently, she was the first to introduce a theory highlighting the skills of individuals with ASC. According to the WCC theory, the tendency of individuals with ASC to focus on detail, results in enhanced performance on tasks requiring featural processing (Heaton & Wallace, 2004; Heaton, 2005). The WCC approach can provide insight when discussing the preservation of certain skills alongside difficulties in global processing; individuals with ASC have indeed been reported to have difficulty processing gestalt meaning, especially illustrated during visual perception tasks (Happé, 1994; Plaisted et al., 1998; Joliffe & Baron-Cohen, 1997; Shah & Frith, 1983, 1993; Mottron et al., 2003).

This view is further supported by Plaidsted (2001), who claims that the difficulties in categorization and generalization faced by people with ASC are a result of a heightened sensitivity towards unique elements and reduced sensitivity to shared elements. The WCC theory, however, has not been undisputed. For example, Heaton and Wallace (2004) argue that autism does not necessarily effect global processing, since people with ASC have been shown to efficiently process information locally, as well as produce a globally intact output (Quintin et al., 2011). Despite this debate, the WCC theory of autism has been widely adopted, with the relationship between deficits, exceptional abilities and global processing being a subject of much current research (Heaton, 2005).

Concerning music specifically, Ockelford (2013) suggests that ASC supports the creation of Exceptional Early Cognitive Environments (EECE), due to challenges in sensory processing and integration. In this context, EECE may result in difficulties in language development and understanding of semantics, but can

also lead the brain to focus on sound, enabling the development of high levels of musical interest and ability, as well as AP (ibid).

2.2.3 Diagnosis

The diagnosis of ASC relies on behavioural rather than physical manifestations (Carruthers & Foreman, 1989), with abnormalities in play, socialisation and communication the first to be noted by parents (Gillberg et al., 1990; Howlin & Moore, 1997; De Giacomo & Fombonne, 1998). In this context, it is known that early identification by health professionals can ensure appropriate support and provision[10], significantly enhancing the child's quality of life (Department of Education, 2011).

Early diagnosis, however, is still relatively rare (Baron-Cohen, 1996), despite great concern shown by parents of children diagnosed with ASC about their child's development (Volkmar et al., 1985; Gillberg et al., 1990; Howlin & Moore, 1997), leaving parents of children with ASC far from satisfied (Howlin & Moore, 1997). In fact, 14% of children aged 14-17 in the U.S.A were diagnosed significantly later than the presentation of the symptoms (Center for Disease Control and prevention [CDC], 2013).

Diagnosis itself seems to pose a great challenge, duly following the change of diagnostic criteria[11] over time, in an effort to enhance diagnostic practices and aiming to increase the quality of provision and better the everyday lives of children with ASC and their parents. According to McPartland, Reichow and Volkmar (2012), the current DSM-V (APA, 2013) criteria have improved specificity. Furthermore, as a result of recent study (Warren et al., 2013**)** community paediatricians are being further trained to identify and potentially diagnose children with ASC (Heasley, 2013).

[10] Provision for children and young people with ASC is discussed in appendix 8.

[11] The change in diagnostic criteria is discussed extensively in appendix 5.

2.2.4. ASC prevalence and causation

In the past, ASC were perceived as rare (Rice et al., 2012), affecting one in 2000 individuals (Rice et al., 2013; Fombonne, 2009). During the 90s, however, concern arose in regards to increased autism-related diagnoses (Cavagnaro, 2009; Newschaffer, Falb & Gurney, 2005; Bertrand et al., 2001; Yeargin-Allsopp et al., 2003) and there has since been extensive research suggesting increasing prevalence of ASC (Kim et al., 2000).[12]

Currently, ASC are believed to affect 1 in 50 individuals (CDC, 2013 p.1). According to the National Autistic Society (2013), and based on research by Brugha et al. (2012) and Baird et al., (2006) there are currently at least 700,000 people in the UK diagnosed with ASC, affecting them and their families, in sum potentially 2.7 million people. This increase in numbers must not be fully attributed to an increase in prevalence, however, since statistics are inevitably influenced by greater awareness, identification, access to diagnostic services and the broadening of diagnostic criteria (ibid)[13]. The largest increase over time has been identified among Hispanic children (110% increase) and black children (91%), possibly due again to increased awareness (CDC, 2008). An actual increase in prevalence may also be present (Rutter, 2005; Rice et al., 2012), its true size, however, is currently unknown. A large-scale study was recently commissioned in the UK in order to obtain accurate figures of ASC prevalence, however, due to challenges concerning the diversity within ASC populations and

[12] In 1997 ASC were found to be present in one in 10000 live births (Fombonne, 1997), In 2009 ASC were shown to affect 1 in every 91 people in the U.S. and 1 in 58 boys (Autism Speaks, 2009), as the prevalence of ASC in males is significantly higher (CDC, 2008). Furthermore, in 2012, 1 in 88 people and 1 in 54 boys in the U.S.A were reported as having an autism related condition (ibid), while currently, in 2013, ASC are believed to affect 1 in 50 individuals (ibid).

[13] As discussed, despite much ongoing research aiming to obtain better understanding of the syndrome and its potential causes (Fang, 2009; Hill & Frith, 2003), there are still difficulties in the definition of ASC. Furthermore, increased recognition of severe and mild forms and the widening of the spectrum boundaries have resulted in an increased number of ASC diagnoses (Frith, 2003; Fang, 2009; Allgood, 2005; Charman, 2002; Wing & Potter, 2002), possibly also altering the nature of the ASC population.

disparity in diagnostic judgement, its findings remain unknown (Jones et al., 2008).

Concerning the causation of ASC, developments in research take place every day, the main two pathways currently in examination concerning genetic origin and environmental influence, potentially including heritability (Bailey et al., 1995; Bolton & Rutter, 1990; Folstein & Rutter, 1977, 1988; Gillberg, 1991). According to the British Medical Research Council (MRC, 2001), there is currently overwhelming evidence for a biological and genetic component in ASC, possibly affecting brain systems, which acting together with environmental factors lead to ASC (Rutter et al., 1997; Bolton et al., 1994; Bailey et al., 1996; LeCouteur et al., 1996). Several environmental triggers are being studied, such as illness during pregnancy, child illness, food intolerance, reaction to vaccination and pollutants, it is difficult, however, to separate true causes from concurrent events. Recent research (Poelmans et al., 2013) suggests that specific antibodies in maternal blood interfere with development during pregnancy, their presence possibly able to predict ASC with 99% certainty. Specific brain regions, such as the cerebellar cortex and areas dominated by granule cell neurons, are also being explored as implicated in the pathology of ASC (Cold Spring Harbour Laboratory, 2013). Causation may possibly be related to the significantly higher prevalence of ASC in males as well, with research currently exploring gender differences in ASC (CDC, 2008).

Following the discussion concerning the definition, diagnosis, prevalence and causation of ASC, it becomes clear that this is a subject which requires much further research. While diversity in the ASC population and disparity in diagnoses comprise obstacles for future research, the significant increase in prevalence and the lack in current understanding of ASC dictate the need for longitudinal scientific efforts in order to enhance knowledge and practices related to ASC.

2.3. Music and ASC

Music is a multisensory form of stimulation that can potentially function as a common ground for people with ASC and neurotypical individuals, due to the sharing of similar emotional recognition and response (Ockelford, 2013). It has been said to be able to reach children with ASC more than other stimuli (Fang, 2009; Grandin & Panek, 2013), with a proposed predisposition for individuals with ASC to engage with music (Kanner, 1943; Rimland & Hill, 1984), independently of age (Graham, 2006). Musical understanding seems unaffected in individuals with ASC, possibly resulting in a disproportionally large interest in music (Rimland & Fein, 1988). Furthermore, research suggests that children with ASC are more attracted to music than to speech (Jarvinen-Pasley & Heaton, 2007; Finnigan & Starr, 2010; Simpson & Keen, 2010; Buday, 1995).

Music can provide a safe and structured context to support understanding of the world and themselves, offering similarity and predictability through pattern and structure (Ockelford, 2013; Grandin & Panek, 2013; Gadberry, 2005). It can also help organise their perceptions of the chaotic world (Darrow & Armstrong, 1999) and provide a bridge to prevent alienation (Fang, 2009; Aldridge et al., 2000), reducing, in addition, tendencies towards aggression, meltdowns or inappropriate behaviour (Orr, Myles & Carlson, 1999; O'Neill, 2001; Whipple, 2004) and enhancing joint attention (Reitman, 2005). Engagement with music can also lead to enhancement of self-worth, provide means of expression, communication and control (Bunt, 2009; Alvin & Warwick, 1992) and support the building of relationships (Peters, 1987).

In the context of studies investigating the relationship of music with congenital disorders, such as ASC, it has been suggested that music activity is distinct from other cognitive functions, using specialized neural networks (Heaton, 2005; Peretz, 2001). In agreement, Heaton & Wallace (2004), maintain that many of the information processing mechanisms required for musical performance are spared in ASC; despite the severity of symptoms discussed above, specific, isolated abilities are frequently present (Rimland, 1978), such as excellent memory,

precise recollection of patterns and sequences (Frith, 2003). Abilities that may be required for the development of musical or language skills, such as recognition of patterns, seem to be unaffected (Klinger et al., 2001), while individuals with ASC may hold the benefit of being able to focus on detail when processing information, a process which would otherwise be developed during specialist music training (Happé, 1999; Heaton & Wallace, 2004); if true, this could provide another explanation for the overrepresentation of people with ASC in savant populations (Heaton & Wallace, 2004)[14].

The link between ASC and music is supported as individuals with ASC tend to show a natural aptitude towards music (Fang, 2009) and often exceptional musical interest and ability (O' Connell, 1974; Kolko, Anderson & Campbell, 1980), unusual sensitivity, attentiveness and responsiveness to music (Fang, 2009; Darrow & Armstrong, 1999; Blackstock, 1978). Accordingly, many current research findings support the presence of enhanced musical processing abilities and musical interest of individuals with ASC (Swanson, 2009; Applebaum et al., 1979; Bonnel et al., 2003; Mottron, Peretz, & Menard, 2000), whilst some researchers, such as Hoelzley (1993) and Rimland, (1964) suggest that musical ability may be a fundamental component of ASC. For example, Thaut (1988) found that children with ASC performed exceptionally in music compared to other subjects and "typically developing" populations. His findings agree with many further studies, which highlighted the enhanced musical abilities of individuals with ASC (Applebaum et al., 1979), Hairston (1990) and Oppenheim (1974), while Kim (2006) supports the existence of clear intentionality in the music-making activity of individuals with ASC.

Moreover, Miller (1989) suggested that up to 10% of individuals with ASC can be considered musicians. In agreement, research suggests that children with ASC

[14] Savants are intellectually impaired individuals who show contrasting outstanding abilities within specific domains, such as music, art, calculation, or memory (Heaton, 2003; Hill, 1974; Brink, 1980; Hoffman & Reeves, 1979; Dowker, Hermelin & Pring, 1996; Smith & Tsimpli, 1995, Peretz, 2001; Heaton & Wallace, 2004). The issue of savantism is further discussed in detail in appendix 7.

have enhanced and more stable pitch processing and memory and highly developed discrimination skills (Heaton, 2009; Bonnel et al, 2003; Heaton, 2003; O' Riordan & Pasetti, 2006; Applebaum et al., 1979; Heaton, Hermelin & Pring, 1998; Heaton, Pring & Hermelin, 1999; Heaton, Pring & Hermelin, 2001; Ferri et al., 2003; Dakin & Frith, 2005; Lepisto, 2008). It is suggested that individuals with ASC take advantage of high-level discrimination skills and long-term memory in order to process pitch information very differently than neurotypical populations (Heaton, 2003), leading to high-level pitch processing (Heaton et al., 2008) and successful recognition of small pitch distances (Heaton, 2005; DePape et al., 2012).) Furthermore, individuals with ASC have been suggested to process music holistically as well, with intact disembedding and reformulation abilities supporting both local processing and the production of a globally intact output (Heaton & Wallace, 2004; Heaton, Pring & Hermelin (2001).

More specifically, when individuals with ASC engage in musical tasks, research proposes that chords tend to be perceived holistically unless a segmentation strategy is suggested (Heaton, 2005). In other words, people with ASC are able to disembed individual musical tones from chords using enhanced pitch memory and labelling when required to do so (Heaton, 2003), but are also able to perceive chords as a whole, adopting a gestalt[15] perspective (Heaton & Wallace, 2004; Heaton, 2003).

In addition, despite the reported lack of expressiveness in populations with ASC (O' Connell, 1974; Hobson, 1989), this may not always the case, if affect is seen as important in their area of interest (Hermelin & O' Connor, 1990). In agreement, Heaton et al. (2003) propose that children with ASC can be equally successful with typically developing children in matching audio stimuli to affective categories and Heaton et al. (2008) found unimpaired performance and understanding of affective connotations of music in children with ASC.

[15] Gestalt perception is the ability of the brain to perceive patterns in groups of see pattern in a group of isolated objects (Ockelford, 2013).

Moreover, ASC is seen as related to savantism and absolute pitch. Musical savantism having been described as inextricably linked to ASC (Heaton & Wallace, 2004; Rimland & Fein, 1988). However, it is not yet know if savants use similar cognition processes used by mainstream populations to process music (Heaton & Wallace, 2004; Allen, Hill & Heaton, 2009; Quintin et al., 2011; DePape et al., 2012), without facing difficulties in global processing within this domain (Heaton, Pring & Hermelin, 2001). Furthermore, even though ASC populations are more likely to possess absolute pitch, the relationship remains elusive.

Despite contrasting research outcomes, individuals with ASC may have an advantage in processing musical stimuli, possibly processing musical information both locally and globally (Heaton, Pring & Hermelin (2001). WCC may potentially have no negative effect on musical perception, allowing efficient performance and understanding of musical emotion (Ockelford, 2013). The studies discussed, nevertheless, provide little insight into the nature of the participants' experience of music (Allen, Hill & Heaton, 2009) nor touch on the role and importance of music in their lives, often attributing the musical engagement of individuals with ASC solely to natural tendencies. Furthermore, musical savantism, in particular is a highly complex subject that many studies have examined mostly in a one-dimensional way. Through reviewing relevant literature, thus, it becomes clear that further research is needed to explore the development of musical skills in ASC savant and non-savant populations, including their relationship to motivation, provision, importance of music and talent.

2.4. The effect and role of music in everyday life

As this study explored the importance, function and effect of music in the everyday lives of young people with ASC, alongside their musical abilities and interests, an overview of these issues is required.

Music is seen as a symbolic and physical medium (Denora & Batt-Rawden, 2007), the soundtrack to everyday life (Frith, 2003), whose effect and function in everyday life has been extensively discussed in the last decades. Given music's ubiquity and antiquity, the importance of music for all cultures must be multiple. No known culture lacks music (Huron, 2001; Sloboda & Juslin, 2001), exposing individuals to musical sound from the beginning of life (Trehub, 2003). Music is a dynamic form of expression, emotion being its essence (Dowling & Harwood, 1986; Helmholtz, 1954; Langer, 1951; Meyer, 1956; Nietzsche, 1993), with music listening taking up much of people's everyday lives (Juslin & Sloboda, 2001).

Concerning the effect of music in everyday life, music listening and engagement has been extensively claimed to activate a number of regions throughout the brain (Levitin, 2012) and evoke strong emotions and pleasure (Krumhansl, 1997; Sloboda & Juslin, 2001; Helsing, 2012), induce relaxation and support concentration, alertness and vigilance (Levitin & Mcgill, 2007). With music engaging and activating limbic and paralimibc areas involved in affective processing (Brown, Martinez & Parsons, 2004) and the autonomic nervous system (Levitin & McGill, 2007), listening to music is often also accompanied by physical or physiological responses (Panksepp, 1995; Menon & Levitin, 2005), such as shivers, sweat or change in heart rate (Goldstein, 1980). Respiration, blood pressure and galvanic skin responses have also been shown to be effected by music listening, as well as the levels of dopamine, adrenalin and serotonin, influencing a person's mood and well-being (Levitin & McGill, 2007; Menon & Levitin, 2005).

The effect of music listening also seems to be directly related to personal music preferences. When listening to preferred music, brain areas involved in the processing of rewarding emotions, such as the prefrontal cortex, are activated Brown, Martinez & Parsons, 2004; Menon & Levitin, 2005), as well as regions of the brain relevant to motor and emotional processing Brown, Martinez & Parsons, 2004). Even passive listening to chosen music seems to widely activate the brain (ibid); highly complex musical stimuli seem to further activate the temporal pole

and the hippocampus (ibid), with higher cognitive and more primitive areas of the brain being engaged, such as areas related to motivation, memory and attention (Levitin & McGill, 2007).

With such a wide range of effect and the pervasiveness of music listening in most people's lives, fulfilling social, emotional and cognitive needs (North, Hargreaves & O'Neill, 2000), especially for young people, research has extensively explored how people use music in their everyday lives. Music has been seen as a personal tool, a "technology of self" (Frith, 2003) related to established personality traits (Chamorro-Premuzic & Furnham, 2007). Mood enhancement and management seems to be one of the chief functions of music in contemporary society (Levitin & McGill, (2007). Enjoyment is another main use of music listening, as are emotional regulation and comfort, expression of feelings, motivation during boring or physically difficult activities, help with pain and social affiliation (Mitchell et al., 2007; Levitin & McGill, 2007; DeNora & Batt-Rawden, 2005). Music listening has also been reported to relieve tension and promote relaxation, reduce anxiety and increase wellbeing (Hillier et al., 2012; Helsing, 2012), distract from worries, reduce loneliness and function as a cue to reminiscence (North, Hargreaves & O' Neill, 2000; Gantz et al., 1978; Sloboda, O'Neill & Ivaldi, 2001).

Music listening in adolescents specifically, was initiated to pass time, express identity and present an external image to others (North, Hargreaves, & O'Neill, 2000; Tarrant et al., 2000; Zillman & Gan, 1997), while occurring mostly in isolation (North, Hargreaves & O'Neill, 2000). Music is also used as a background activity, (Tekman & Hortac¸su, 2002; Sloboda, O'Neill & Ivaldi, 2001), as it is now widely accessible and portable, possibly resulting in a much wider use of music in everyday life (North, Hargreaves & Hargreaves, 2004). Music activity on the whole has been found to enrich everyday life, supporting regulation of self and well-being (DeNora, 2000; Ruud, 1997) and providing hope and consolation as an important means of self-healing or therapy (Gabrielsson & Linstrom, 1995; Sloboda, 1992; Batt-Rawden, DeNora &Ruud, 2009 p131).

Concerning the therapeutic effect of music, research on the effect and use of music listening by hospital patients suggests that music listening can be self-initiated for therapeutic purposes, with results depending on the personal importance of music for the individual patient (Fritz, 1988). Music listening has also been found to be related to quality of life among pain sufferers, with higher frequency of listening and personal importance of music related to higher overall quality of life (Mitchell et al., 2007). For hospital patients or people dealing with illness or disability specifically, distraction and relaxation were the primary reasons for listening to music, followed by mood enhancement, reduction of anxiety and boredom and provoking thankfulness (ibid; Batt-Rawden, DeNora &Ruud, 2009).

While a seemingly large number of studies have explored the use of music, however, most research was based on questionnaires, interviews or observation (Sloboda, O'Neill & Ivaldi, 2001) and excluded active musical engagement, such as playing music or singing in a choir (Frith, 2003). Most research on this subject has been conducted in laboratories, providing significant but inconsistent information on the use of music (North, Hargreaves & Hargreaves, 2004), possibly due to the diversity of ways music is used in situations and by different people.

Concerning the importance and role of music in the everyday lives of people with ASC specifically, and with the exception of research conducted with focus on music therapy, there is highly limited and insufficient research. Most relevant studies concerning music and ASC are qualitative with a small number of participants, taking place mainly in the UK and US. For example, in a study by Allen et al. (2009) the use of music by individuals with ASC was examined, investigating the nature of the subjective experience of music in adults with ASC. A qualitative approach was adopted; personal experiences were collected through open-ended interviews and a semi-structured questionnaire in the form of an online survey. In this study (ibid), the experiences of twelve high-functioning adults with ASC were noted, who used music to achieve personal aims such as

mood management, personal development and social inclusion. Allen et al. (2009) claim in accordance that relevant research is highly limited, not offering much insight into the musical experiences of individuals with ASC and their potential differences or similarities with neurotypical populations. In their study, while claiming to offer a deeper insight through subjective experiences, it is possible that language difficulties may have posed a challenge for the self-report of musical experience, possibly producing unreliable data (ibid).

Fang (2009) also examined the role of music in the lives of individuals with ASC. She also adopted a qualitative approach, conducting case studies of two children with ASC. Her findings suggested that the children found music pleasurable and were able to succeed in this area, with music holding an important role in their everyday life (ibid). She provided space for the voices of the children and their families to be heard, whilst focusing on the informal use of music (ibid).

These studies have provided great insight into the relationship between ASC and music. Concerning, however, the effect, importance and function of music in the everyday lives of people with ASC, these studies have limited impact. Due to their qualitative approach, they contribute towards the understanding of subjective musical experience within ASC populations, without, however, being able to make more wide-spread suggestions due to their highly limited sample size. Similar research on neurotypical populations can indeed be helpful through potential comparison, but specialized research is undoubtedly needed to consider and begin to understand the relationship between music and ASC. For this reason, this research adopted a mixed-methods approach, discussed in chapter 3, and employed a sample size of more than 100 respondents. The research also included qualitative elements, in order to allow for individual voices to be heard and provide rich descriptions of the subjective musical experiences. The quantitative and qualitative data were combined, aiming to provide insight both in depth and breadth, highlighting the diversity and richness of the musical experience in ASC populations through the research findings, further discussed in chapter 4.

2.5. Conclusion

Through the discussion of relevant literature and research on ASC and their relationship to music, as well as the role of music in everyday life, the lack in specific research examining the musical talents and interests and the function of music in the everyday lives of young people with ASC is highlighted. All issues relevant to the study were comprehensively discussed, in order to provide the context in which this research took place. The following chapter discusses the methodology employed in this research, as well as the rationale supporting all methodological and other decisions and the relevant ethical issues.

Chapter 3. Methodology

3.1. Introduction

This study brings together existing knowledge on Autism Spectrum Conditions and the role of music in everyday life, aiming to bridge the gap between these fields and provide insight into the experience of music for young people with ASC. The researcher collected data from over 100 respondents, sufficient to point towards general trends but also highlight the individual everyday experience of music. For this purpose, a mixed methods approach was adopted, employing a structured online parental survey to collect quantitative and qualitative data, which was then analysed and discussed. The methodological background, philosophical approach, and research tools chosen, as well as the research process followed and the relevant ethical considerations are discussed in the following section.

3.2. Methodology background and philosophical approach

This study adopted a mixed-methods approach in order to explore and describe issues related to the musical abilities and interests of young people with ASC. The researcher adopted a pragmatic perspective, espousing specific elements of post-positivism and relativism; a neutral dialogical space was created, in which components of both perspectives were combined, each approach's weaknesses supported by the strengths of the other (Meltzoff, 2010) for better understanding (Onwuengbuzie & Johnson, 2004; Robson, 2011).

A quantitative approach would adopt a positivist or post-positivist perspective, following the paradigm of the natural sciences and seeing reality as objective (Robson, 2011), even if taking into account the influence of socio-political factors and the researcher's subjectivity (Reichardt & Rallis, 1994; Phillips & Burbules, 2000). Such research would aim to create causal laws based on reliable and valid

measurement, replication and generalisation (Robson, 2011). In real life research, however, the requirement for strict rules and fully fixed design traditionally necessary for quantitative research can be challenging or even impossible (ibid). A qualitative approach, on the other hand, would adopt a relativist or constructivist approach, arguing that reality is in no way objective, but multiple (Schwandt, 2007), constructed (Wilson, 1999) and complex (Kvale, 1995). Such research would employ a flexible design with a small sample size (Robson, 2011), aiming towards understanding, with a focus on subjective, individual experience (ibid). In reality, however, this perspective could result in limited replicability and generalisability (ibid).

This research, as abovementioned, adopts a more pragmatic perspective and a mixed-method approach in order to better explore the topic studied. While the dilemma between quantitative and qualitative approaches is still present and supported by the frequently addressed philosophical incompatibility thesis (Bryman, 2006; Kuhn, 1996), it is argued that either type of research can be carried out from a range of philosophical viewpoints (Maxwell & Mittapalli, 2010), the extent to which philosophical approaches influence research practices in reality being questionable (Robson, 2011). Furthermore, the distinctions between these two methods seem to dissolve under scrutiny (Brannen, 2005), often caused by oversimplification (Robson, 2011).

Quantitative and qualitative methods are currently increasingly combined in practice (ibid), with over 40% of research blending quantitative and qualitative methodologies (Gueulette, Newgent & Newman, 1999) and only 6% of research making reference to philosophical incompatibility (Bryman, 2006). This practice, now the third main approach to research (Johnson, Onwuegbuzie & Turner, 2007), is supported by a pragmatic approach, which occupies a middle ground and common-sense viewpoint between this dualism (Robson, 2011). Pragmatism recognizes the importance of the natural world, as well as the social and psychological world (ibid). Action, however, is preferred over philosophizing and focusing on ideological dilemmas (ibid), attention being redirected to

methodological concerns (ibid), and reductionism is rejected (Johnson & Onwuegbuzie, 2004). The current increase in mixed-methods research, thus, may result from an enhanced appreciation for combining diverse elements towards obtaining richer outcomes.

Concerning this study, as required in mixed-method research (Robson, 2011), a pre-decided design was employed. All methodological tools were assigned clear-cut roles (Meltzoff, 2010), while there was a realistic and manageable focus and a clear sense of purpose for the combination of methods (Robson, 2011). Specific, yet broad, research questions were decided in order to define the study's design, set boundaries, and give direction (O' Leary, 2004) and qualitative and quantitative data were integrated during the discussion of findings, as suggested (Bryman, 2006; Mason, 2006).

A fixed non-experimental research design was employed, as the subject of study was not meant to be manipulated or altered during data collection, the study's purpose being to describe and increase understanding of a phenomenon (Robson, 2011). While fixed research has been described as unable to capture the subtleties of human behaviour (ibid), it can help, however, to identify patterns and processes. Furthermore, the researcher believes that the qualitative open-ended questions embedded in the data collection tool provided sufficient space for personal expression and description of the abovementioned subtleties and complexities of human behaviour. Accordingly, the research findings take the form both of averages and group tendencies, but also espouse a more descriptive and subjective viewpoint, without aiming towards generalization, but suggesting the possibility of existing wider trends.

This study's research questions concerned the everyday lives of children and young people with ASC and the degree and nature of their interest in music, as well as their musical engagement and abilities. The importance and use of music in their everyday lives was also explored, as well as their access to relevant provision. Lastly, the potential relationships between these elements were considered. Furthermore, despite the fact that potential outcomes were held in

mind due to the study building on previous research, no explicit hypothesis was expressed and the research maintained its exploratory and descriptive character throughout the process. Equal priority was given to quantitative and qualitative elements, as neither set of data alone was seen as able to effectively represent the subjective experience voiced by the study's participants, especially given the great diversity of the ASC population and the non pre-specified nature of the research sample. Whilst identification of characteristic trends and qualities for the target population was sought to a certain degree, this research did not aim to generalise, but to explore the research topics in a deeper and non-intrusive way. Variables were mainly explored through subjective perception and experience and reality was seen through the inter-subjectivity of the participants and researcher.

Adopting a mixed-methods approach, procedures typically applied in both quantitative and qualitative studies were employed (Gay, Mills & Airasian, 2009), with both sets of data collected concurrently and integrated during the data interpretation and discussion (Creswell, 2003), in order to access multiple perspectives and dimensions of experience in the same group of people (Mason, 2006; Barbour, 2008). The quantitative questions included in the survey take the form of Likert scales mainly, a tool widely used in surveys (Robson, 2011). This set of data was statistically analysed, in order to explore the potential general trends and relationships between various elements, whilst also focusing on emerging themes and tendencies. The qualitative data, on the other hand, were collected through open-ended questions embedded in the survey; they were integrated in this study to provide richness and depth, as a means of expanding, explaining and further exploring the quantitative information collected. The researcher believes that this approach has been successful in allowing different voices to be heard, including those of the parents or carers and the young people themselves. This set of data was thematically analysed and coded, in order to discover recurring themes and offer a rich context and description of the quantitative data.

3.3. Procedure

3.3.1. Research tool: the online parental survey

Whilst adopting a mixed-methods approach, this research employed a structured, online, website-based, parental survey consisting of 28 closed or open-ended questions. The questionnaire used in the survey was adapted from the Focus on Music studies (Ockelford et al. 2006; Ockelford & Matawa, 2009) with the authors' consent and was chosen for its validity and reliability, as it had been previously peer-reviewed and used in two highly esteemed and innovative research studies. Using an online survey was seen as the most efficient way to explore the research topics and collect both standardized and non-standardised data from a highly diverse participant group coming from a range of backgrounds, especially within the limited time scope of the study.

Surveys have been claimed to be superior against other methods of data collection, especially when measuring relationships and aiming to capture a snapshot of situations at a particular point in time (Robson, 2011; Byrne, 2002). They can also be cost effective, allowing the implementation of unfunded research, as well as eliminate part of the time-consuming data entry process (Robson, 2011; Sure & Ritter, 2007; Andrews, Nonnecke, & Preece, 2003; Greenlaw & Brown-Welty, 2009). Furthermore, despite views that surveys are mostly used in quantitative research, it has been proposed that they stand at an intersection between qualitative and quantitative approaches (Druckman, 2005; Marsh, 1982). Data collected by surveys has also been described as highly influential and accessible (Lindblohm & Cohen, 1979), given the necessary transparency in the outcome presentation (Robson, 2011).

Online surveys, specifically, are an increasingly popular form of non-experimental, cross-sectional, fixed research design (Duffy & Smith, 2005; Sue & Ritter, 2007), due to their advantages concerning timescale, large sample size and increased accessibility (Robson, 2011; Mertens, 2005; Duffy & Smith, 2005;

Hisako et al., 2004), with online research estimated to comprise up to 20% of quantitative research in the USA (Comley, 2003). The use of an online parental survey was chosen due to its advantages, which were seen as outweighing the disadvantages. As the main purpose of this study was descriptive, the online survey was employed in order to explore specific issues, while permitting wide dissemination (Brewer & Miller, 2003).

It is recognized, however, that this form of data collection may hold significant drawbacks which should be acknowledged. When using a survey, especially when online, representativeness of the participant group, as well as identification of membership regarding specific target groups, are of great significance and could result in enhanced or highly problematic external validity (Robson, 2011). Consequently, three explicit qualifying questions were embedded within the integrated consent form, to ensure that all participants were indeed members of the target population, namely parents or primary caregivers of children of young people diagnosed with ASC. A number of specific questions were in place, relating to diagnosis and personal details, in order to further ascertain group membership and avoid duplicate responses. In addition, the researcher is in agreement with Mertens (2005) when proposing that limited understanding of race, gender or disability, in regards to group membership, should not discourage research that may reveal inequities in resources and important educational, social and psychological outcomes.

Through the use of this online survey, a pool of diverse, cross-national participants was accessible (Robson, 2011; Hisako et al., 2004). As with all online surveys, however, a response bias must be taken into consideration. Internet access remains limited, despite its rapid growth[16], with only 2/3 of UK households having internet access in 2008 (Goddard, 2008). As a result, despite studies indicating that internet samples are becoming more representative (Gosling et al.,

[16] There is currently rapid growth concerning access to the internet, which may possibly result in 100% access for western populations in the near future. More specifically, while in 1998 only 9% of British adults had access to the internet, this number quickly grew, reaching 52% by 2004 and 59% in 2005 (National Statistics Omnibus Survey, 2005).

2004; Kraut et al., 2004; Hisako et al., 2004), online research has been demonstrated to favour middle to upper class, educated, computer literate respondents with no reading or writing difficulties (Lee, 2000; Sue & Ritter, 2007). Furthermore, as the target group was accessed through specialist discussion groups and ASC-related organizations and charities, it is possible that the participation of parents or carers who are not aware or are in denial of their child's condition (Papadimitriou-Varsou, 2013)[17], was possibly prevented.

A further issue concerning online surveys is the suggested low response rate (Fricker & Schonlau, 2002; Hughes, 2012; Wright, 2005) and lack of response situation control (Czaja & Blair, 2004; Brewer & Miller, 2003). More specifically, a decreased response rate in developed countries has been noted (Tougangeau, 2006), with a potentially large number of incomplete, biased, or even false returns (Robson, 2011). Potential undetected ambiguity, lack of participant commitment and inconsistency in replying must also be taken into consideration (ibid). The collected data may be affected by the characteristics of the respondents, their memory or knowledge, as well as a potential social desirability bias (ibid). Therefore, despite explicit requests to the contrary, and due to the participant group being self-selected, it is possible that an undue proportion of respondents whose children were particularly musical or interested in music chose to participate in this study.

Furthermore, reported characteristics may not be strictly related to ASC and the respondents may have unintentionally given unduly positive accounts of their child's engagement with music. As the survey was completed by the carers themselves, no direct contact took place and the researcher was not able to determine their commitment or other factors that may have influenced their

[17] According to Dr Papadimitriou-Varsou (2013), denial is highly widespread internationally and has a detrimental effect on families dealing with ASC. Denial is caused, among others, by lack of awareness, stigmatisation and discrimination. She claims that the impact of parental denial concerning ASC is underestimated in research and proposes that all relevant studies should include and evaluate the factor of denial in each individual case (Papadimitriou-Varsou, 2013)

responses (ibid). As a result, the data collected could be seen as a product of uninvolved respondents of questionable motivation (ibid).

In an effort to engage respondents, the researcher endeavoured to present the questions in an appealing way, using subtle background graphics and colour and clear fonts. The questions were intended to be neutrally phrased and self-explanatory, aiming to elicit rich and relevant responses and allowing for different levels of commitment[18]. As the survey was self-completed, it also allowed the respondents to seek out required information (ibid), such as specific diagnosis details. Acknowledgment of participation occurred immediately after survey completion, to reward participant commitment.

As discussed, the questionnaire employed was originally used in the Focus on Music studies (Ockelford & Matawa, 2009; Ockelford et al., 2006), to explore the musical interests and abilities of children and young people with sight difficulties. For the purpose of this study, thus, certain sections of the original questionnaire had to be removed or adapted to the target population. More specifically, the questions in this survey[19] explored the importance and role of music in the everyday lives of young people with ASC, their musical abilities and talents, the presence of AP and the way music may affect emotions during everyday activities. The subject of motivation, as well as access to music education and therapy, were examined. Description of medical diagnoses and basic personal and biographical details were also sought, mainly on an optional basis. Most questions were designed to include both a quantitative and a qualitative section, measuring the variable in question and offering space for the expression of related subjective experience. This strategy was employed in order for the two sets of data to be directly related and to facilitate their integration (Bergman, 2008).

[18] Different levels of commitment were allowed, as respondents could choose to only complete the compulsory and quantitative sections of the questions, or also offer extensive optional qualitative information.

[19] A comprehensive list of the questions used within this survey is provided in appendix 4, alongside details about which questions were compulsory to complete.

The questionnaire used in the survey was not time-consuming and was to be completed voluntarily on the respondent's own time. It took the form of a parental survey, both in order to draw on the experiences of parents and carers, as they are seen as the people mostly involved in the lives of young people with ASC, but also in order to surpass possible difficulties in obtaining rich data in written form by a large number of the young people themselves, as well as difficulties regarding their age, understanding and ability to provide consent. Great effort was made to avoid leading or ambiguous questions and increase usability (Fielding, Lee & Blank, 2008). Furthermore, the questions were based on the individual's personal experience, while fixed responses, where provided, were exhaustive and mutually exclusive to ensure clarity of understanding. In order to enhance accessibility, usability and understanding, the survey was briefly piloted by colleagues[20], with all feedback taken into immediate consideration and application.

Subsequently, the survey was distributed internationally, collecting data from a number of countries. The text remained in its original English format in all cases, apart from being translated into Greek, in an endeavour to enhance accessibility for Greek-speaking participants. Due to the extreme lack of research in the field of ASC and music in the country (Psaltopoulou, Micheli & Kavardinas, 2012), as well as Greece being the home-country of the researcher, accessibility for Greek participants was a topic of concern. For this purpose, the survey was translated into Greek as a whole by the researcher, who is bi-lingual herself and attended formal education in Greece and English-speaking countries. The translation was further cross-checked and confirmed by a number of colleagues and discipline-specific academics based in Greece, who have extensive practical and academic experience in the United Kingdom. The Greek version of the survey was also briefly piloted before distribution, in order to ensure enhanced accessibility, understanding and face validity (Andrews, Nonnecke & Preece, 2003).

[20] More specifically, the survey was piloted through engaging colleagues from the University of Roehampton Applied Music Studies MSc programme, as well as students of the University of Athens Music Studies BA programme as respondents.

This survey was intended to be simple and straightforward, enhancing participation and collecting information about the relevant experiences of a highly diverse population. It was low-cost and time-efficient and allowed great anonymity and confidentiality (Lavrakas, 2008), since supplying specific personal details was mainly optional. This was also intended to encourage honesty and decrease the effect of the social desirability bias (Fielding, Lee & Blank, 2008), especially when discussing a sensitive topic such as disability (Coomber, 1997). External validity was supported through the use of a highly diverse participant group (Borg & Gall, 1989; Mertens, 2005) and the collection of over 100 completed questionnaires, also seeking to balance the heterogeneity of the participant group.

Despite the challenges in regards to using online surveys, the researcher supports the effectiveness of this research tool within the context of this study. Research comparing traditional and online research methods suggests that there is no significant difference in the quality of collected data (Carini et al., 2003; Manfreda, Batagelj & Vehovar, 2002; Sethuraman, Kerin & Cron, 2005; Hughes, 2012; Gosling, Vazire & Srivastava, 2004). In addition, great effort was made during this study to satisfy the resulting increased need for transparency and justification of methodological decisions, with great emphasis on clarity when explaining the research outcomes.

The data collected within this study presented a high degree of reflection, care and commitment on behalf of the respondents and the survey seemed to have been completed comprehensively, resulting in detailed and intrinsically valid data. In the majority and where details were provided, it was mainly mothers who responded on behalf of their children with ASC, who it can be presumed are their main, deeply involved carers. Therefore, it can be suggested that most responses resulted from sustained interaction with the children, providing rich and insightful views that may supersede the subjectivity of their evaluations (Psaltopoulou, Micheli & Kavardinas, 2012). On the whole and due to great effort on behalf of the respondents, the survey was successful in collecting interesting and hopefully valuable data, discussed further in chapter 4.

3.3.2. Data collection

As abovementioned, the survey used for this research was website-based and distributed online. Data collection took place between the 5/6/13 and the 15/7/13. Pre-notification and initial contact with organizations and individuals was made through email[21], in order to increase the response rate (Andrews, Nonnecke & Preece, 2003). The email messages sent out explained the purpose and nature of the study and included a link to the online survey. The data collection tool was not directly included in the message, in order to enhance respondents' anonymity (Fielding, Lee & Blank, 2008). Further organizations and individuals were contacted through the use of social media, especially through ASC-related social media[22] parental groups.

In detail, 296 notification messages were sent out gradually via email or social media during the survey distribution. Individuals contacted were parents and carers of children with ASC, their details obtained through referrals from professionals, as well as professionals and relevant academics themselves. Organisations contacted were located online through ASC-related websites. As a result, 126 questionnaires were completed in total, on behalf of children with ASC by their parents or primary carers, 9 of which were partially completed.

3.3.3. Data analysis

During data analysis, a separate process of analysis was undertaken for both quantitative and qualitative data, with data integration, comparison and interpretation taking place after all analysis was completed. Results are reported and discussed in an integrated form in chapter 4.

[21] The email message sent out in order to establish initial contact with individuals and organisations for the purpose of this research can be found in appendix 3.

[22] The main form of social media used was Facebook, due to increased accessibility and engagement on an international level.

All data was coded and analysed after the completion of the data collection process. Relevant research was used as guidance in the data analysis, with the data itself, however, functioning as the primary point of reference. All quantitative data was analysed using IBM SPSS v.19 statistical software, in order to generate descriptive statistics and explore general trends and relationships between variables. The qualitative data[23] was thematically analysed, with the researcher obtaining familiarity with the whole body of data and employing a process of identifying and coding the emerging themes.

Thematic analysis was used as an efficient and quick method of qualitative analysis which does not require extensive training or experience on behalf of the researcher, while it is seen as ideal for descriptive or exploration purposes (Braun & Clark, 2006). During this process, the researcher remained aware of her subjectivity, the data existing in an inter-subjective space between subjective views of the respondents and the researcher's subjective interpretation and analysis. This, by no means, lessens the impact of the data collected, however, since great effort was made during both data collection and analysis to minimize methodological inconsistency. Throughout the study all data was treated as equally important and valid, with the qualitative data allowing the expression of the caregivers' voices and supporting the quantitative data discussed. Following the data analysis process, the two sets of data were integrated, a discussion of which takes place in chapter 4.

[23] The qualitative data collected through the Greek version of the survey was in Greek, as expected. Therefore, a brief translation process was required before this set of data was added to the qualitative data collected through the English version of the survey. This translation was undertaken by the researcher and was then cross-checked and confirmed by the colleagues who had also assisted in the translation of the original survey. This process took place before the analysis of the qualitative data began, therefore enabling all qualitative data to be taken into consideration concurrently.

3.4. Ethics

During the preparation and implementation of this research great effort was made to follow the ethical guidelines suggested by the Ethics committee of the British Psychological Society, with reference to its four main principles, respect, competence, responsibility and integrity (British Psychological Society [BPS], 2009). Particular attention was paid, as online research has been seen as posing unfamiliar ethical questions and being vulnerable to ethical breaches (*Economic and Social Research Council* [*ESRC*], 2010; Hughes, 2012). Therefore, a detailed ethical approval application was submitted[24] and approved beforehand by the University of Roehampton Ethics committee.

More specifically, the ethical issues relevant to this study are participant consent, anonymity and confidentiality. This study, as discussed, employs a parental survey; while the parents and carers respond directly to the survey, they act as "gatekeepers" (Robson, 2011, p.211) for the participant group. The parental survey was used in order to gain access to the children and young people with ASC, as a way of conducting research regardless of the abilities of the participants (Wiles et al., 2005). These young people are members of a sensitive population, namely that of individuals with ASC, may be minors and could possibly be unaware of the study taking place or unable to express consent. For this reason, great attention was given for the study to be as non intrusive as possible, allowing the respondents to provide as little or as much information as they wished. In addition, it was anticipated that the respondents, as involved carers of these young people, would be able to ascertain whether or not and how to participate in this study.

In regards to consent by the respondents, a short and concise (Robson, 2011; Crow et al., 2006) consent form[25] was embedded within the online survey, providing information on the background, purpose and research topic of the

[24] The complete ethical approval application can be found in appendix 1.

[25] The consent form which was integrated within the survey can be found in appendix 2.

study, as well as the time required for completion. The respondents were free to consider their participation with no time limit (*ESRC,* 2010) and no information was withheld. The contact details of the researcher and her supervisor were also available, in order for the respondents to address any relevant inquiries. Within this integrated consent form, respondents were asked to confirm their group membership, namely that they are indeed the parent or carer of a child or young person with ASC. They also had to verify that they wished to voluntarily participate in this research, providing informed consent and completing the survey in honesty and without submitting duplicate responses. Respondents were also informed of their right to withdraw at any time (BPS, 2009; ESRC, 2010). The researcher's contact details were presented once more after the completion of the survey, in order for respondents to express any potential concerns or effects of the study. However, neither the researcher nor her supervisor determined any need for a specific debriefing process to take place, as the research itself should not cause any physical or mental stress or violate personal privacy (Robson, 2011).

Anonymity and confidentiality were also guaranteed. For this reason, pseudonyms[26] and unique participant numbers were used; all contact and personal details were removed from the collected data and are held separately for future reference. All data and relevant document files have been password protected and encoded, and copies are kept on online databases, to ensure safekeeping. Lastly, effort was made to minimize the time and commitment required of the respondents (Druckman, 2005) The researcher, as a further step in expressing her respect and gratitude towards the participants, has enabled the respondents to request, if they wish, a short report on the research findings, which will be sent out in September 2013.

[26] To ensure anonymity, pseudonyms were used when referring to the participants and no personal details, which could reveal a participant's identity, are presented at any time. The pseudonyms used took into consideration the participant's gender as well as the initial of their first name, in order to provide a point of reference.

3.5. Conclusion

This chapter, in discussing in detail the philosophical approach, methodological background and research design and process, has endeavoured to provide the required transparency in regards to all methodological decisions. Furthermore, through the detailed description of the research tool and the arising ethical considerations, the researcher aims to offer clarity concerning the research undertaken and allow for future replication as well as informed review.

Chapter 4. Research findings and discussion

4.1. Introduction

This chapter will present and discuss the musical interests and abilities of the participant group[27], explored through the observations of their parents and carers, elicited through the online survey used for this study. As this study followed a mixed-method approach, quantitative and qualitative data are integrated during interpretation and are discussed alongside each other. More specifically, while the outcomes of the quantitative questions are presented mainly in a numerical form, the qualitative data, in the form of direct quotes, will provide descriptive detail and context to the variables examined and function as an immediate expression of the voices both of the respondents and the participants themselves[28].

4.2. Participants

During the data collection period, 126 responses to the online survey were collected; 117 of the collected questionnaires were fully completed and 9 were partially completed.

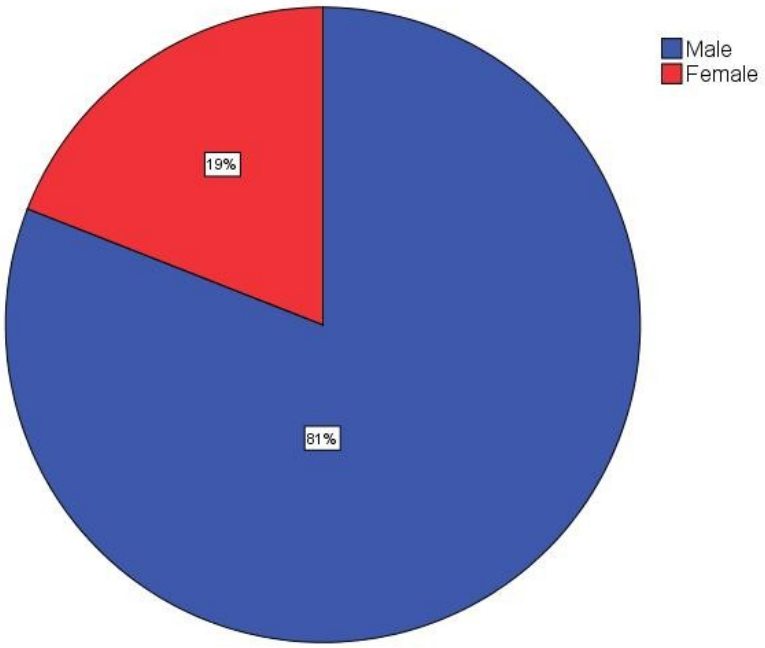
[27] As discussed in chapter 3, throughout this text, the terms “participants” and “participant group” refer to the children and young people whose abilities and interests are explored through the parents and carers, as discussed in chapter 3.

[28] While the respondents of this study are parents and carers of children and young people with Autism Spectrun Conditions, the participants of this study are the young people themselves, as the respondents provide data on their music interests and abilities. All data collected concerns the young people and no questions were asked about the parents or carers. However, all information must be seen as accessed through the insight of the parents.

4.2.1. Age and gender

This study had an overall participant group[29] of 126 children and young people with ASC. Within this group, 102 (81%) participants were male and 24 (19%) were female (*N*=126). This large discrepancy concerning gender balance, as shown in figure 1, was to be expected and may be seen as a reflection of the wider ASC population in this aspect, as there were nearly 5 times more male than female participants (Autism Speaks, 2009)[30]. Furthermore, statistical analysis suggested a potential impact of gender on the variables measured, which are discussed below.

Figure 1. Gender profile of participants



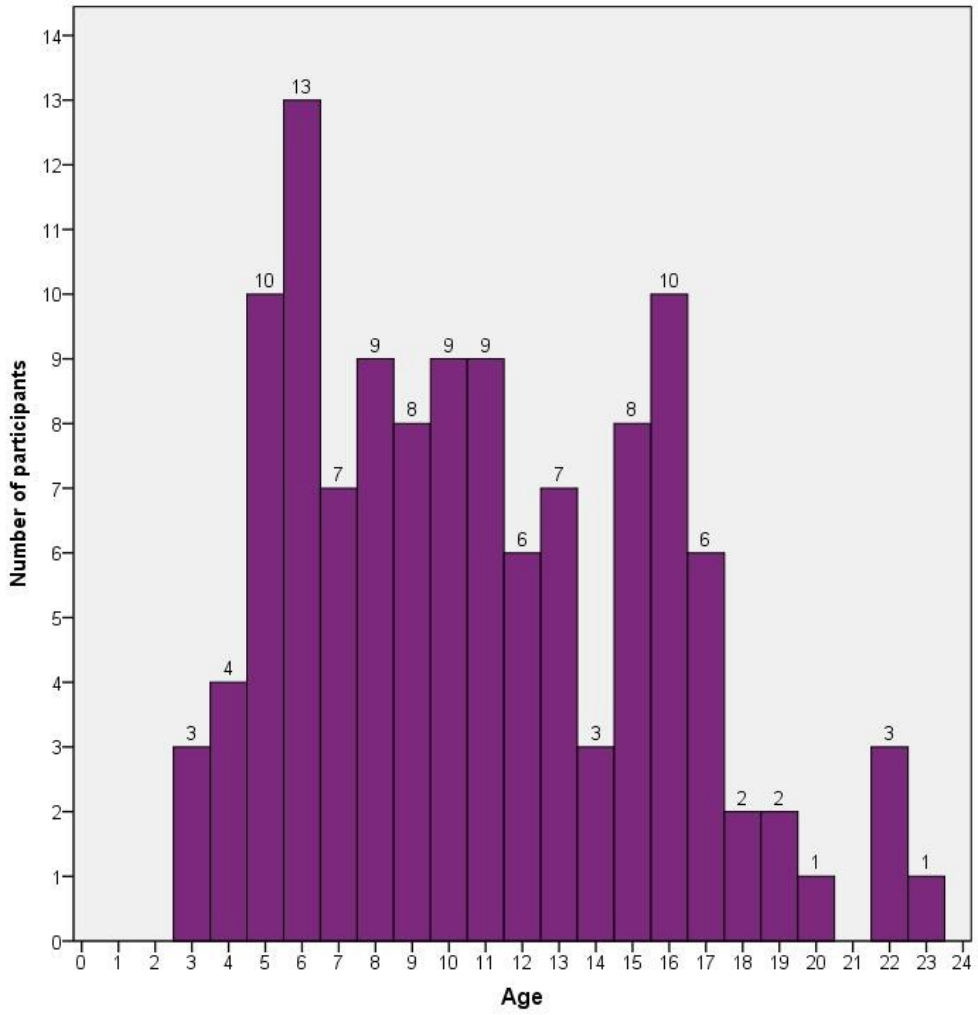
The distribution of the participants' age at the time of completion is illustrated in figure 2. Their ages ranged between 3 and 23 years, with a mean age of 10.79

[29] As discussed in chapter 3, the participant group of this study were the children and young people with ASC, while the respondents, namely their parents or carers, were used in order to gain access to the participants through their subjective everyday experience with them.

[30] The issue of higher prevalence in male than female populations is discussed in chapter 2.

and a standard deviation of 4.8 (*N*=121)[31]. Statistical analysis suggested no significant relationship between age and the variables measured, thus, the findings presented in this chapter can be seen as independent of age.

Figure 2. Age profile of participants



[31] There were only 121 valid responses to the question regarding participant age. While the question was compulsory, some respondents used invalid dates of birth. Furthermore, within chapter 4, when quotes are presented, age is estimated for the 5 participants who did not provide such information.

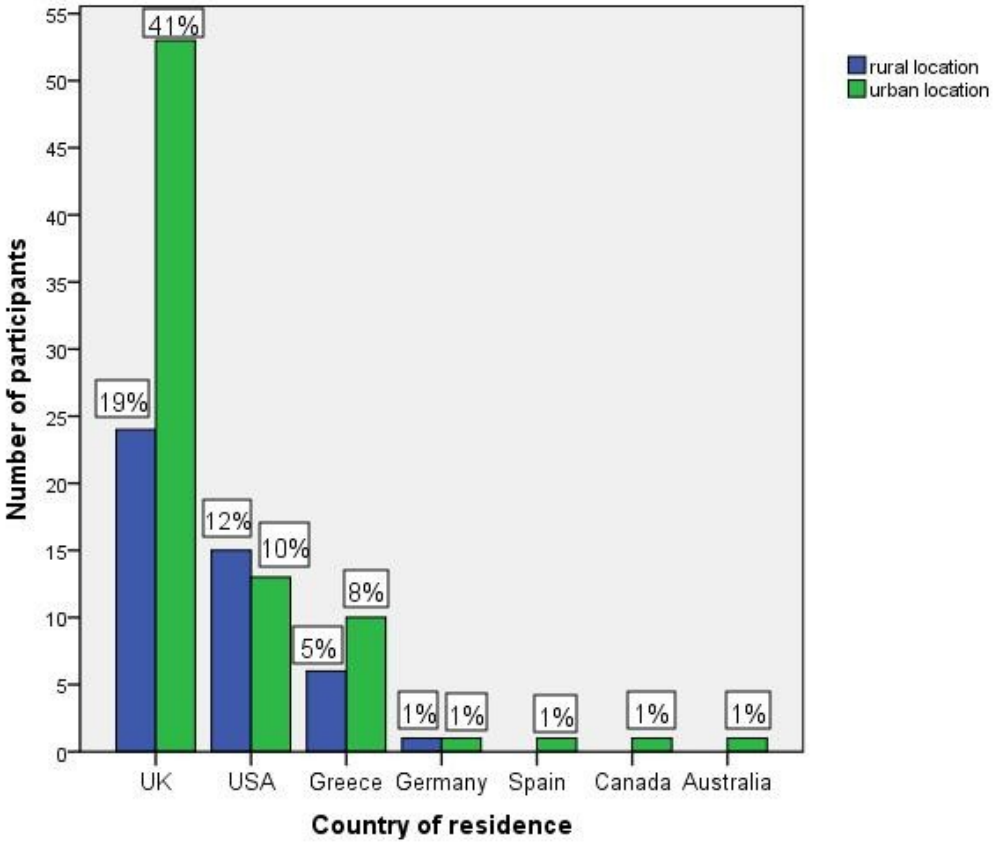
4.2.2. Location

The research participants were residents in a number of countries, as shown in figure 3, since access to an international group was facilitated by the online the survey that was used. Most participants, however, were residents in the United Kingdom (77 participants, 60%), the United States of America (28, 22%) and Greece (16, 13%), with a small number of participants from Germany (2, 2%), Canada (1, 1%), Spain (1, 1%) and Australia (1, 1%) (*N*=126). In addition, 46 (37%) of the respondents were currently residents of a rural area and 80 (63%) of an urban area (*N*=126).

The larger number of respondents living in urban areas was expected, as access to the online survey may have been problematic in rural areas due to limited internet access, as discussed in chapter 3, and due to parents of children with ASC possibly choosing to reside in urban areas in order to access better or a wider range of provision[32]. In addition, geographical location or surroundings did not seem to have a statistically significant impact on the variables measured, apart from diagnoses which are discussed below.

[32] The issue of provision is discussed in appendix 8.

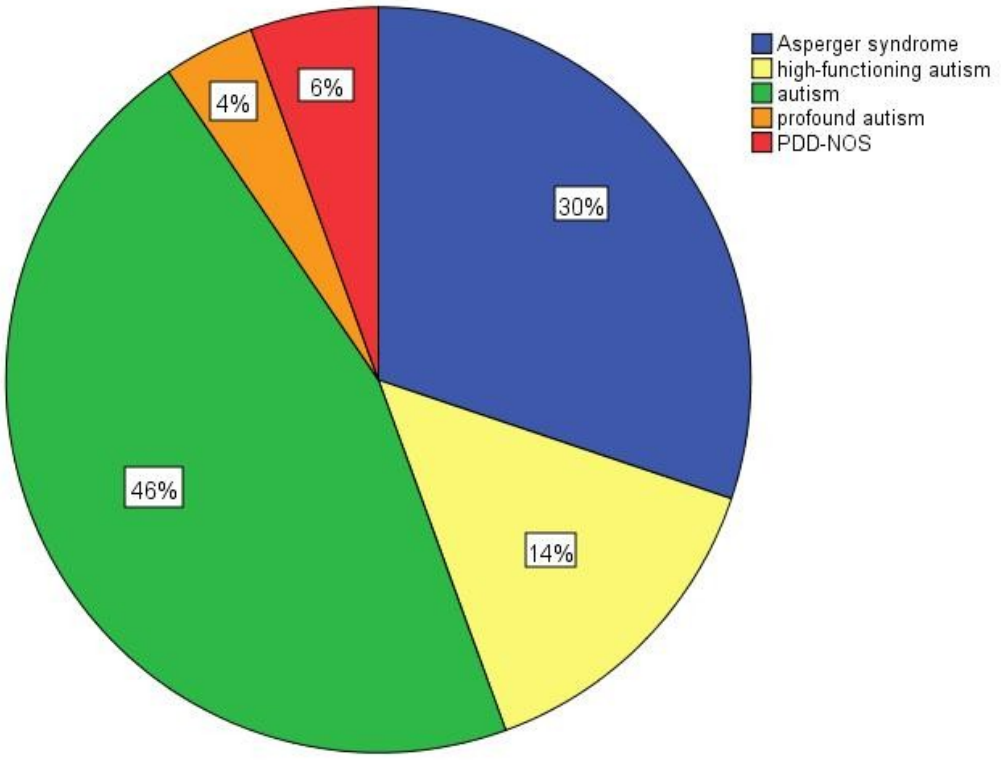
Figure 3. Geographical profile of participants



4.2.3. Diagnosis and additional needs

With regard to the participants' diagnoses, 58 (46%) participants reported a diagnosis of autism, 38 (30%) of Asperger syndrome, 18 (14%) of high-functioning Autism, 5 (4%) of profound autism and 7 (6%) of PDD-NOS (*N*=126).

Figure 4. Diagnostic profile of participants



The diagnostic process was reported to take place and continue from 2 until 22 years old, with a mean of *M*=7,77 and standard deviation of *SD*=4,310. The most common age for diagnosis (mode), however, was 4 years old (*N*=121)[33]. These diagnoses were all obtained before 2013 and the change in the DSM-V diagnostic criteria (APA, 2013), discussed extensively in chapter 2 and appendix 5, is not reflected. Furthermore, the responses concerning diagnosis in many cases revealed confusion between diagnostic categories, especially when regarding High-functioning Autism and Asperger Syndrome. In effect, Anthony's (10) mother argues that he was "diagnosed as being on the autistic spectrum by a psychiatrist, but as a psychologist myself, I would say he has Aspergers and it is mild", while Kyle (5) is reported to have "Asperger Syndrome, which was described to me as "Highly Functioning" Autistic Spectrum Condition".

[33] There were only 121 valid responses to the question regarding participant age during diagnosis. While the question was compulsory, some respondents used invalid dates.

While the participant's diagnoses were found to have a statistically significant impact on a number of the variables measured and discussed below, a cross-tabulation chi-square test suggested a significant relationship between country of residence and diagnosis (χ^2=45.90, *df*=24, *p*=.005). According to the collected data, a diagnosis of Asperger Syndrome is more likely to be given in Germany, high-functioning autism less likely to be diagnosed in Greece and more likely in the UK, autism is found less often in the USA and more frequently in the UK and Greece, and PDD-NOS is diagnosed less in the UK and more often in the USA. This is highlighted by the discrepancies between expected and actual count, displayed in the following tables.

DiagnosisCategoryCoded * Q7Country Crosstabulation

			Q7Country							
			UK	USA	Greece	Spain	Canada	Germany	Australia	Total
DiagnosisCategoryCoded	Asperger syndrome	Count	23	8	5	0	0	2	0	38
		Expected Count	23,2	8,4	4,8	,3	,3	,6	,3	38,0
		% within DiagnosisCategoryCoded	60,5%	21,1%	13,2%	,0%	,0%	5,3%	,0%	100,0%
		% within Q7Country	29,9%	28,6%	31,3%	,0%	,0%	100,0%	,0%	30,2%
		% of Total	18,3%	6,3%	4,0%	,0%	,0%	1,6%	,0%	30,2%
	highfunctioning autism	Count	13	4	0	0	0	0	1	18
		Expected Count	11,0	4,0	2,3	,1	,1	,3	,1	18,0
		% within DiagnosisCategoryCoded	72,2%	22,2%	,0%	,0%	,0%	,0%	5,6%	100,0%
		% within Q7Country	16,9%	14,3%	,0%	,0%	,0%	,0%	100,0%	14,3%
		% of Total	10,3%	3,2%	,0%	,0%	,0%	,0%	,8%	14,3%
	autism	Count	38	7	11	1	1	0	0	58
		Expected Count	35,4	12,9	7,4	,5	,5	,9	,5	58,0
		% within DiagnosisCategoryCoded	65,5%	12,1%	19,0%	1,7%	1,7%	,0%	,0%	100,0%
		% within Q7Country	49,4%	25,0%	68,8%	100,0%	100,0%	,0%	,0%	46,0%
		% of Total	30,2%	5,6%	8,7%	,8%	,8%	,0%	,0%	46,0%
	profound autism	Count	3	2	0	0	0	0	0	5
		Expected Count	3,1	1,1	,6	,0	,0	,1	,0	5,0
		% within DiagnosisCategoryCoded	60,0%	40,0%	,0%	,0%	,0%	,0%	,0%	100,0%
		% within Q7Country	3,9%	7,1%	,0%	,0%	,0%	,0%	,0%	4,0%
		% of Total	2,4%	1,6%	,0%	,0%	,0%	,0%	,0%	4,0%
	PDD-NOS	Count	0	7	0	0	0	0	0	7
		Expected Count	4,3	1,6	,9	,1	,1	,1	,1	7,0
		% within DiagnosisCategoryCoded	,0%	100,0%	,0%	,0%	,0%	,0%	,0%	100,0%
		% within Q7Country	,0%	25,0%	,0%	,0%	,0%	,0%	,0%	5,6%
		% of Total	,0%	5,6%	,0%	,0%	,0%	,0%	,0%	5,6%
Total		Count	77	28	16	1	1	2	1	126
		Expected Count	77,0	28,0	16,0	1,0	1,0	2,0	1,0	126,0
		% within DiagnosisCategoryCoded	61,1%	22,2%	12,7%	,8%	,8%	1,6%	,8%	100,0%
		% within Q7Country	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	61,1%	22,2%	12,7%	,8%	,8%	1,6%	,8%	100,0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	45,896[a]	24	,005
Likelihood Ratio	44,049	24	,008
Linear-by-Linear Association	,002	1	,965
N of Valid Cases	126		

a. 29 cells (82,9%) have expected count less than 5. The minimum expected count is ,04.

Among the participants, a wide range of additional needs was reported[34]. Specifically, 85 (67%) participants reported having further special needs (*N*=126). The conditions identified most frequently[35] were attention and hyperactivity difficulties (23, 18%)[36], sensory processing difficulties (20, 16%)[37], language and communication difficulties (19, 15%)[38] and learning difficulties (15, 12%)[39] (*N*=126).

The wide variety and large number of symptoms reported was to be expected, as further conditions are increasingly associated with ASC, the severity of which

[34] Further information on the special needs reported by the respondents is available in appendix 9, alongside a description of the needs that were included in each further special need category during the data analysis. Furthermore, the further issues reported may not be based on official diagnosis or represent fully discrete categories.

[35] Other conditions reported included a wide range of physical difficulties or illnesses (27, 21%), motor difficulties (12, 10%), anxiety (10, 8%), developmental or cognitive delay (10, 8%), impulse control and behavioural difficulties (9, 7%), such as , diet related issues (6, 5%), Obsessive Compulsive Disorder (5, 4%), epilepsy and seizures (4, 3%), sleep-related difficulties (4, 3%), and other further learning support needs (3, 2%), while 9 (7%) participants were said to be completely non verbal (*N*=126).

[36] Attention and hyperactivity difficulties included conditions such as ADD, ADHD, hyperactivity.

[37] Sensory processing difficulties included conditions such as sensory processing disorder, sensory modulation disorder and oversensitivity.

[38] Language and communication difficulties included conditions such as language delay, lack of verbal communication or speech impediments.

[39] Learning difficulties reported ranged from mild learning difficulties to profound and multiple learning difficulties.

most possibly relating to the severity of the "autistic" symptoms (Vivanti, Barbaro, Hudry, Dissanayake & Prior, 2013, p5). Learning difficulties, attention disorders, sensory issues and anxiety have been found to be frequent in individuals with ASC (Jones et al., 2008; ACER, 2012).

While the range of further special need categories reported is too large and heterogenous to investigate their relationship to the variables measured, especially given the limited participant sample, the presence of further special needs was not found to have any significant impact on the variables tested. In addition, gender and age were not seen as significant factors for the existence of additional needs.

4.3. The musical interests and abilities of the participating children and young people with ASC, through the perceptions of their parents and carers

4.3.1. Interests and talents of the participants

Interests

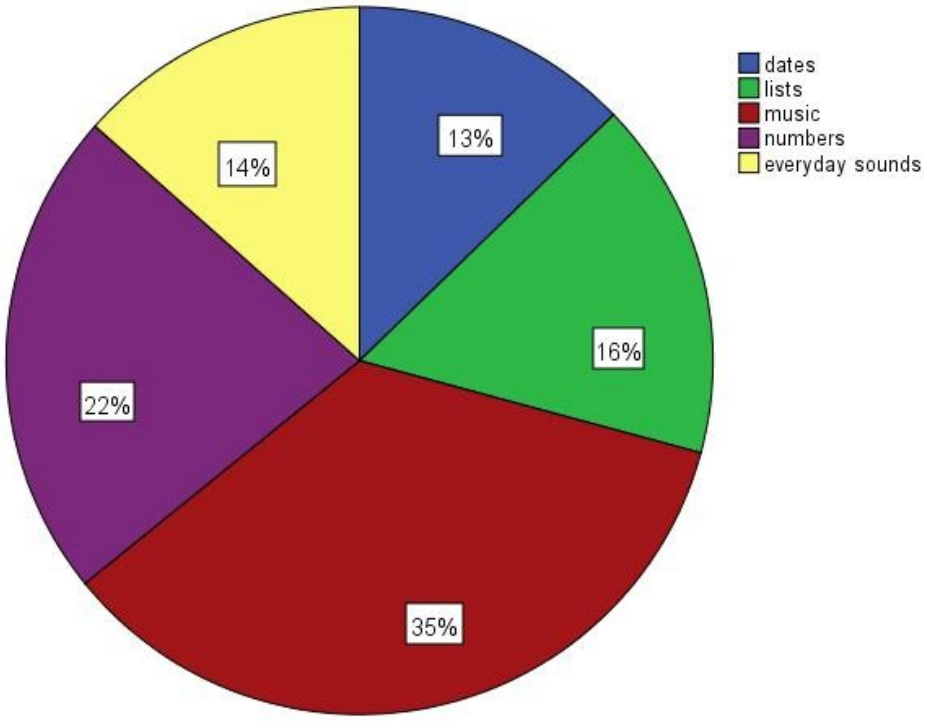
The respondents were asked about the participants' interests, which they described drawing on their everyday experience with the young people. Categories of interest were provided, with the answers available being "a lot", "a little" and "not at all". An "other" category was also available, which respondents could describe in the qualitative section of the question.

The young people were reported to be most interested[40] in music ("a lot": 83, 66%, "a little": 34, 27%) and numbers ("a lot": 43, 34%, "a little": 42, 34%) (*N*=125). On the other hand, they were said to be least interested in dates ("not at

[40] In order to measure which categories the participants were overall most interested in, the categories of interest were coded, giving 2 points to each "a lot" response and 1 point to each "a little" response. These results are presented in figure 5. Percentages were calculated with the sum *N*=572.

all": 76, 61%), everyday sounds ("not at all": 72, 58%) and lists ("not at all": 61, 49%) (*N*=125). Participants' interests are presented in figure 5.

Figure 5. Interests of participants



Percentages used in this figure represent each subject of interest within overall interest reported and not the percentage of people interested in this topic. The percentage of participants interested in each area is reported within the main text above.

Furthermore, the respondents reported a wide range of further interests[41] within the "other" category. The most prevalent additional interests were TV and movies (31, 25%), transport-related (24, 19%), internet use and videogames (23, 18%) and creative activity (21, 17%) (*N*=125).

Despite the wide range of interests described by the respondents, interest in music remains the most popular category of interest, as evident in figure 5. Moreover, a Mann-Whitney test indicated that interest in music was more

[41] Details on all further interests reported within this question are available in appendix 10, alongside descriptions on what each category included during the data analysis.

prevalent in female participants, who had an average rank of 78.91, than in males, who had a Mean rank of 59.41 (*U*=807, *Z*=2.81, *p*=.005).

Ranks

	ChildGender	N	Mean Rank	Sum of Ranks
Q12Interests Music	Male	102	59,41	6060,00
	Female	23	78,91	1815,00
	Total	125		

Test Statistics[a]

	Q12InterestsMusic
Mann-Whitney U	807,000
Wilcoxon W	6060,000
Z	-2,814
Asymp. Sig. (2-tailed)	,005

a. Grouping Variable: ChildGender

High interest in music was partly expected, due to this research focusing specifically on music. This response bias, further discussed in chapter 3, could result in respondent's whose children are interested in music being more inclined to participate. Nonetheless, the fact that the participants seem to be interested in music significantly more compared to the other categories should be taken into consideration. Furthermore, while this study aimed to explore the interests and abilities of a wide participant group, the fact that there is interest in music by 107 participants is considered highly important; interest in music may not be present within the whole ASC population, however, the researcher suggests that music may be of interest to quite a considerable part of the population.

A further interesting finding was the comparatively low interest in everyday sounds in comparison to interest in music. Interest in everyday sounds has been suggested as frequent in ASC populations, possibly due to sounds being perceived musically instead of functionally within EECE[42] contexts (Ockelford,

[42] EECE is further discussed in chapter 2.

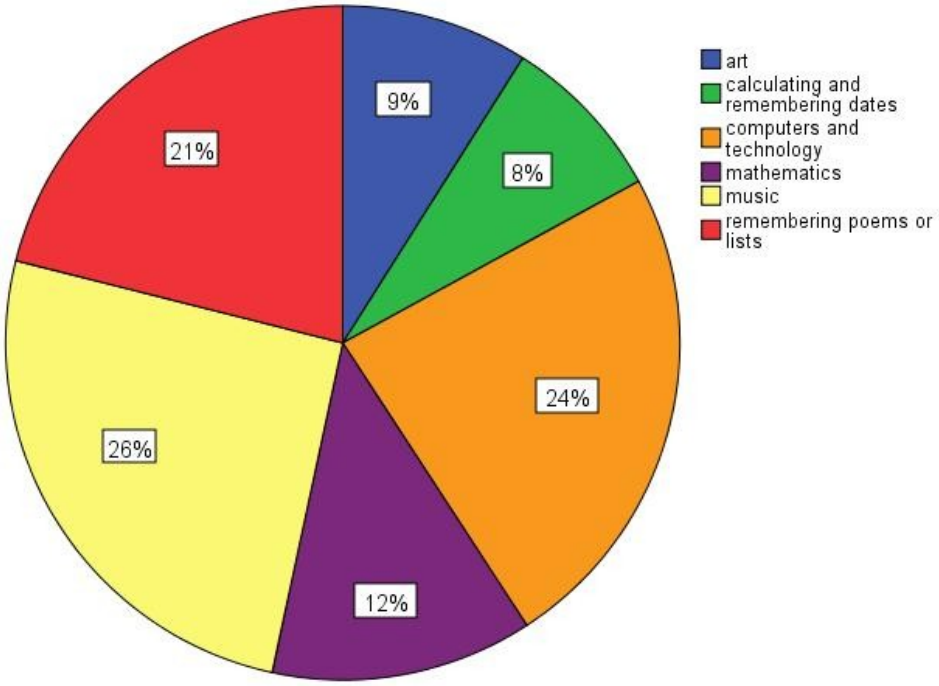
2013). This finding is of great interest and could possibly highlight the diversity within ASC populations. As Fang (2009) notes, each person on the spectrum is unique and inconsistencies may appear between people with the same diagnosis. Further comprehensive research is required in order to explore the potential relationship between interest in everyday sounds and music, or indeed its absence, in a wider ASC population.

Talents

The respondents were also asked about the participants' talents. Areas of talent were supplied, alongside an "other" category, which respondents could describe in the qualitative section of the question. Available replies were "yes" and "no". The most reported talents, as shown in figure 6, were music (57, 46%), computers and technology (53, 42%) and remembering (47, 38%), with the least reported talents being calculating and reporting dates (18, 14%) and art (20, 16%)(*N*=125). In addition, 23 (18%) respondents claimed that their child has not yet shown a specific talent (*N*=125). Further talents[43] mostly mentioned were memory-related (12, 10%) or creative (12, 10%) (*N*=125).

[43] Details on all further talents reported within this question are available in appendix 11, alongside descriptions on what each category included during the data analysis.

Figure 6. Talents of participants



Percentages used in this figure represent eacharea of talent within overall talent reported and not the percentage of people of are reported to have a talent in this area. The percentage of participants who possess each talent is reported within the main text above.

Interestingly, when concerning talent, the researcher found that, despite initial concerns about potential overestimation of talent by the respondents, this question received more than twice as many negative than positive replies[44]. While 23 (18%) respondents suggested that their child had not yet shown any talent, possibly expressing their openness to this happening in the future, the overall pattern in response to this question could be suggesting a negative view of the participants' talents. This matter could potentially be related to the issues of parental expectations and expectations of society on the whole, as well as the ways in which talent is discovered, evaluated, dismissed or overlooked, requiring further relevant large-scale research.

[44] To the 7 sub-questions concerning talent, 627 replied "no" and 266 replied "yes".

As shown above, talent in music was the most prevalent. As above, a Mann-Whitney test also indicated that talent in music is reported more often in female participants, who had a Mean rank of 75.26, than male participants, who had a Mean rank of 60.24 (*U*=891, *Z*=2.08, *p*=.037).

Ranks

	ChildGender	N	Mean Rank	Sum of Ranks
Q13Talent Music	Male	102	60,24	6144,00
	Female	23	75,26	1731,00
	Total	125		

Test Statistics[a]

	Q13TalentMusic
Mann-Whitney U	891,000
Wilcoxon W	6144,000
Z	-2,083
Asymp. Sig. (2-tailed)	,037

a. Grouping Variable: ChildGender

Furthermore, while talent in music was suggested as the most prevalent within the participant group, negative replies to this question numbered more than positive replies, possibly indicating that talent in music may be more prevalent than other talents, but not seen as frequent either.

Moreover, interest in music, discussed above, was much more prevalent than talent in music, possibly highlighting the perceived difference between being interested in a field and possessing a specific talent for it. The relationship between interest in music and perceived talent in music was investigated further using Spearman's correlation, finding a medium positive correlation between the two variables, as seen in the table below (*r*=.486, *p*=.000, *n*=125), meaning that interest in music may lead to increased perceived music talent.

Correlations

			Q13TalentMusic	Q12InterestsMusic
Spearman's rho	Q13TalentMusic	Correlation Coefficient	1,000	,486**
		Sig. (2-tailed)	.	,000
		N	125	125
	Q12InterestsMusic	Correlation Coefficient	,486**	1,000
		Sig. (2-tailed)	,000	.
		N	125	125

**. Correlation is significant at the 0.01 level (2-tailed).

In addition, particular interest in music[45], discussed in the following section, was also found to have a strong positive correlation to talent in music, through a bivariate Spearman correlation (r=501, p=.000, n=121), indicating that depending on how prominent the interest in music is in one's life, it could lead to development of exceptional music talent.

Correlations

			Q13TalentMusic	Q14ParticularInterestMusic
Spearman's rho	Q13TalentMusic	Correlation Coefficient	1,000	,501**
		Sig. (2-tailed)	.	,000
		N	125	121
	Q14ParticularInterestMusic	Correlation Coefficient	,501**	1,000
		Sig. (2-tailed)	,000	.
		N	121	121

**. Correlation is significant at the 0.01 level (2-tailed).

It seems therefore, that interest in music could possibly be seen as required in order to demonstrate musical talent. However, as talent is not demonstrated by all individuals interested in music, it cannot be seen as sufficient. These findings

[45] Particular interest in music, discussed in the section below, is whether the participants demonstrate specific interest for music which is more prevalent than other interests in their everyday life, as opposed to interest in music, discussed above, which is included in a section inquiring about general interests without comparing degree of involvement.

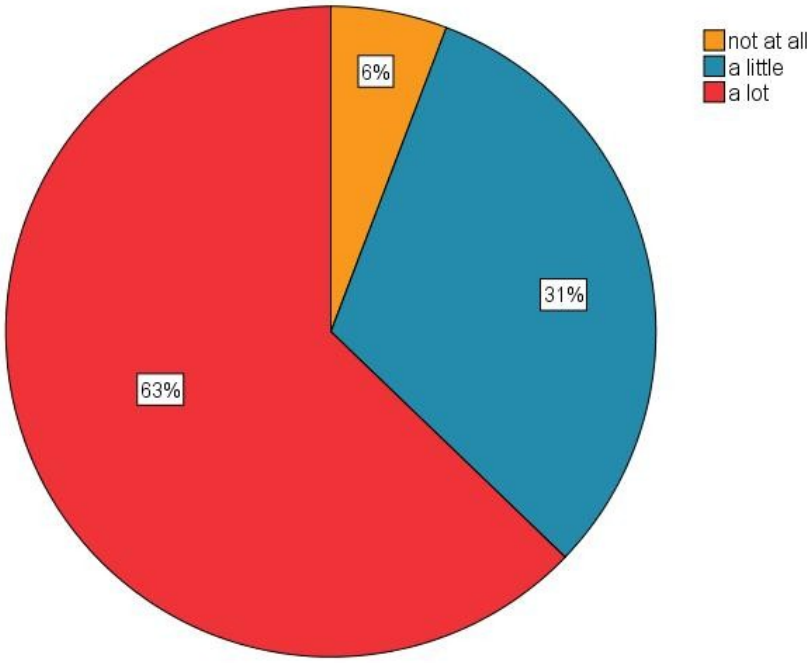
also agree with relevant literature suggesting that interest in music is a necessary but not sufficient factor for the existence of talent or the development of ability (Ockelford, 2006).

4.3.2. Particular interest, importance and function of music in everyday life

Particular interest in music

In this section, respondents were asked whether the participants have a particular interest in music, compared to other interests in their lives[46]. 76 (63%) respondents replied “a lot”, 38 (31%) replied “a little” and 7 (6%) “not at all” (*N*=121).

Figure 7. Particular interest in music by participants



[46] In the previous question concerning interest in music, data was collected in regards to whether participants are interested in various topics, without comparing their interest in the subjects mentioned. This question, however, focuses on whether music may be one of their main or the main interest in their everyday lives.

As above, a Mann-Whitney test reported particular interest in music to be more frequent in female participants, with a Mean rank of 76.07 (*U*=780.5, *Z*=2.70, *p*=.007), as shown by the tables below.

Ranks

	ChildGender	N	Mean Rank	Sum of Ranks
Q14ParticularInterestMusic	Male	98	57,46	5631,50
	Female	23	76,07	1749,50
	Total	121		

Test Statistics[a]

	Q14ParticularInterestMusic
Mann-Whitney U	780,500
Wilcoxon W	5631,500
Z	-2,696
Asymp. Sig. (2-tailed)	,007

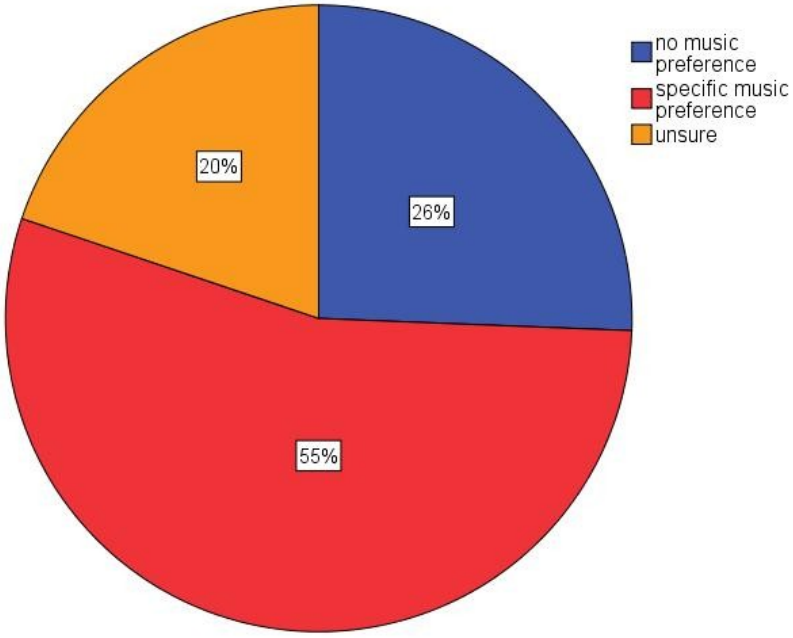
a. Grouping Variable: ChildGender

It is interesting, also, to note that, while 76 participants seem to be highly and particularly interested in music, only 7 are not interested at all, with 38 participants being moderately interested. This could possibly suggest that, even though music may not be the most prevalent interest for all young people with ASC, it could function as an activity of interest for most. It certainly seems that for the 63% who reported exceptionally high particular interest in music, it could potentially comprise a very important piece of their everyday life, as for Xenia (15) “Music and singing are as necessary to her as the air she breathes!” and for Rosy (13) “It is her world!”.

Music preference

Within this section, respondents were also asked about the participants' music preferences, with 66 (55%) reporting that their child indeed had a type of favourite music, 31 (26%) saying that they did not, and 24 (20%) being unsure (*N*=121).

Figure 8. Music preference of the participants



When describing the participants' musical preference[47], the most prevalent type of music was current and pop music (41, 45%)(*N*=92), possibly related to the participants' abovementioned high interest in TV, movies and the internet, through which pop music is widely available. It certainly seems that for some participants internet and TV provide a medium to access music. Specifically, Jonathan (18) who has profound autism enjoys "singing along to songs which have no meaning to him beyond an association with a particular favourite film or TV programme. This is a kid who spoke fluent Pingu by the age of 5" and John

[47] Further details on reported musical preference are available in appendix 12, alongside descriptions on what each category included during the data analysis. Stylistically, preferences varied greatly and specific works were also mentioned.

(18) “especially loves music paired with his favourite cartoons that kids produce on youtube”.

Furthermore, for 27 (29%) participants, their music preference was related to a specific person or activity, such as for Christina (7) who likes songs that are “connected to situations of people, e.g. the family’s favourite songs”. 19 (21%) participants seemed to favour specific musical elements; Ella (5) likes “music she can sing along to. Such as songs like the wiggles and nursery rhymes” and Xenia (15) prefers music that is “usually gentle, melodic, [...], it has a vast range of notes and has specific highish keys. It is often sad although it is the notes rather than the words that make it interesting”. Raymond (7) also prefers music “with clear 'singing' parts (instrumental or voice) and any other genres of music which are bright, tuneful, warm in tone”. 14 (15%) respondents also suggested broad or changing preferences, such as Zane (16), who will “really love a piece of music and want to listen to it all the time and then go off it and get very annoyed when you want to play it”, and 5 (5%) indicated dislikes (*N*=92).

The wide range of styles reported, as well as the different ways by which respondents described musical preference, seems to be in accordance to neurotypical populations, as was also suggested by the Focus on Music studies (Ockelford et al., 2006). This was also to be expected, as musical preference draws on various factors, such as cultural background and exposure (Tarrant, Hargreaves & North, 2002) and may also rely on many more factors apart from music genre. In addition, as described by North, Hargreaves and Hargreaves (2004), individuals choose to listen to different music for different reasons, depending on the intended effect, as highlighted by Alan’s (5) mother when saying “music is important in EVERY context for myself and my child, each different situation requires a different context and a different band, artist or genre”.

The effect of musical engagement has also been linked to preference, with favoured self-chosen music producing more rewarding and intense emotions (Brown, Martinez & Parsons, 2004; Menon & Levitin, 2005) and resulting in

higher increase of memory and attention (Levitin & McGill, 2007; Helsing, 2012). For example, with Panagiotis (23), this is evident as “when he listens to a song he like a lot he will show it by standing up and walking up and down, smiling with satisfaction”. Strong emotions, however, may not always be positive emotions; Jack (18) sometimes “connects emotions with certain songs. For example, for a time he would play Vanessa Carlton's A Thousand Miles and cry while singing it” and Jim (9) “sometimes becomes very emotional about certain music, particularly sad ballads and some classical music”.

Despite most respondents being aware of the participants’ favourite music, the large number who were unsure or did not think that the young people have a favourite type of music could possibly indicate that preference towards specific music may be ignored or unnoticed, or that the young people were not yet given the chance to develop and express preference. It must be kept in mind, of course, that some participants may indeed dislike music, have no specific preference or, indeed, keep it to themselves, as the case with John (13), whose parents “don't really know as he is very withdrawn and doesn't like us to be aware of his taste in music”. The researcher, however, suggests that it is not probable that such a large number of participants fall into this category. Nonetheless, the large number of respondents who are aware of their child’s music preferences in great detail suggests an ongoing relationship and mutual investment between the parents/carer and the young people.

The subject of musical preference can also be related to the use of music as control within everyday life (North, Hargreaves, & Hargreaves, 2004). It is possible that participants may choose to engage with specific types of music, as a way to exercise control in their everyday lives, an element that they may feel is lacking. This, however, could also be linked to the characteristic stereotypical patterns of behaviour in ASC populations; for example, Jonathan (15) “obsessively plays the same tracks over and over, at the moment it is 'Gangnam Style' which he also sings obsessively, to our dog” and Sarah (13) “ gets to chose a track, choice is important, and repeat as often as she likes, and she does, when

listening in her bedroom". The extent to which specific music preference can be used in order to exercise control and the exact point at which this becomes part of "obsessive" behaviour is questionable and requires further research.

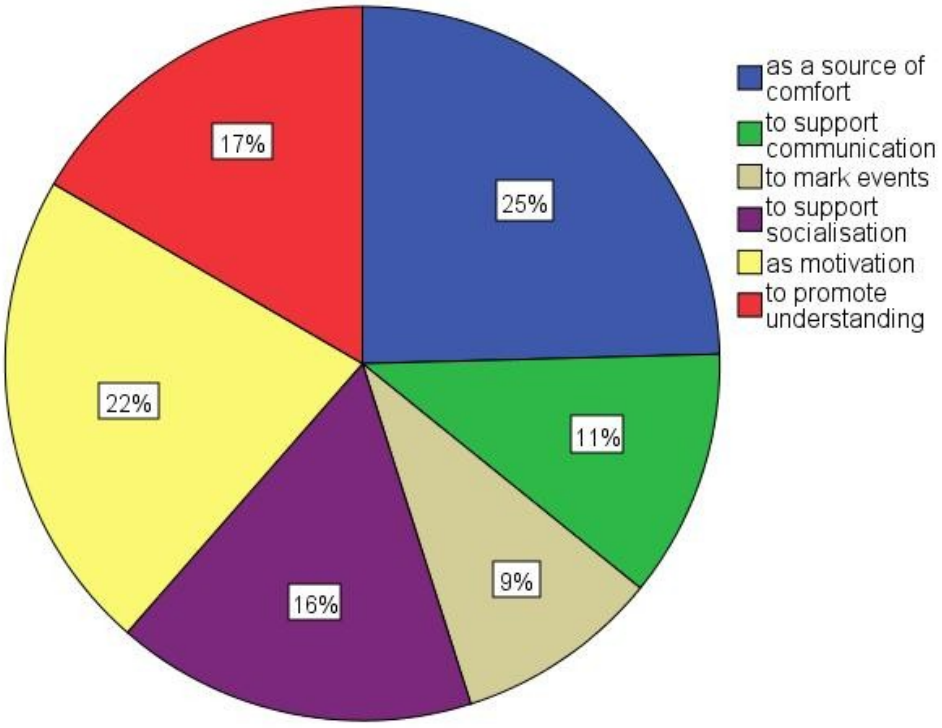
Importance of music in everyday life

Within this section, the respondents were also asked about the importance of music within a range of suggested everyday uses; an "other" category was also included that could be described in the qualitative section of the question. The respondents could select between the replies "not at all", "a little" and "a lot". The most prevalent ways[48] that music seemed to be important for the participants were as a source of comfort ("a lot":76, 63%, "a little": 36, 30%), as motivation ("a lot": 66, 55%, "a little": 36, 30%), to promote understanding ("a lot": 43, 34%, "a little": 41, 34%) and to promote socialisation ("a lot": 38, 31%, "a little": 49, 41%)(*N*=121). The least important function[49] of music was suggested to be to mark out events in the daily routine ("not at all": 66, 55%). Further purposes of music engagement introduced by the respondents themselves were enjoyment (22, 18%), relaxation (19, 16%), and expression (14, 12%)(*N*=121).

[48] In order to calculate the most important ways that music is important, each "a little" response was assigned with 1 point and each "a lot" with 2 points, for each of the seven categories. The points were then calculated by the number of responses that were given and the sums of the categories were compared.

[49] The function of music to mark out events in everyday life and to promote understanding and communication, received the most negative responses. However, the positive responses they received are significant, so they are considered as less prevalent, but not dismissed on the whole.

Figure 8. The use of music in everyday life by the participants



Percentages used in this figure represent each use of music within all roles reported and not the percentage of people which supported each use of music. The percentage of participants that support the use of music for each purpose is reported within the main text above.

While these results may seem inconclusive, this was to be expected, due to the high heterogeneity of the participant group, the wide age and interest range, and the ability of music to be adapted and used in diverse situations and for different purposes. In accordance to North, Hargreaves and Hargreaves (2004) and Kim (2006), the intentional and conscious use of music as a resource within various interpersonal and social contexts is indicated by these findings

The most prevalent use of music was as a source of comfort, directly linked to supporting relaxation, as introduced by the respondents. The use of music for this purpose has been greatly indicated in past research (Levitin & Mcgill, 2007; Mitchell et al., 2007; Hillier et al., 2012; Helsing, 2012) and can be related to the enjoyment felt by the listener, an element that was introduced by the respondents themselves, agreeing with past research (Mitchell et al, 2007; Levitin & McGill,

2007; DeNora & Batt-Rawden, 2005) and highlighting music's ability to evoke strong emotions and pleasure (Krumhansl, 1997; Sloboda & Juslin, 2001; Helsing, 2012).

Jack (4) "loves to hear you sing to him. He gets a great big grin on his face when you do and he watches your mouth when you are singing!". For Rosy (13), her father says "I did notice a change in her when she started playing piano, as it seemed to give her a sense of inner peace that was not there before. She plays for no one but herself. She writes music for no one but herself. I think that without music, she would be much more stressed", while Charles's (6) parents say "It doesn't matter to us how good Christopher is at me piano, the vital thing is that it makes him happy; his 'piano smile' as we call it, [...], we don't see it with anything else that he does". For Jacob (18), "it comforts and calms him to sing a song he knows", Daniel (12) "If he's stressed in class, he can take a music break and that helps him relax" and for Brian (13) music "helps him calm down or work out issues in his head".

Music has also been said to be used for mood management and self-regulation, (DeNora, 2000; Ruud, 1997), both in ASC populations (Allen et al., 2009) and for neurotypical individuals (Levitin & McGill, (2007; Mitchell et al., 2007)., possibly due to its influence on the body's levels of dopamine, adrenaline, serotonin and oxytocin which can influence one's mood (Levitin & McGill, 2007; Menon & Levitin, 2005). In accordance, the use of music for mood management was also introduced by the respondents. For example, Wallace (20), uses music "to regulate emotions when dysregulated" and for Jack (6) "sometimes the right song can bring an end to a meltdown in the car". In addition, music was also reported to be used in order to control sensory input and regulate stimulation, in accordance to Grandin (Grandin & Panek, 2013), who uses music to control auditory input and block out external sound. Likewise, Peter (15) "will put earphones in to listen to music in some situations to avoid sensory overload" and Jason (13) will listen to music "through headphones to shut out unwanted noise and reduce the stress from noisy environments".

Concerning the role of music in supporting learning and understanding, music and other organised sound has been suggested to promote the acquisition of transferable skills and knowledge (Ockelford, 2000). This is further supported by Brian's (13) mother who says her son "learned to read with a karaoke machine". Xenia's (15) "music teacher believes that if her revision was put into musical form, she would remember it straight away - perhaps because she would be able to relate to the particular musical notes/keys for specific information she needed to remember". For Sarah (13) music gives "an opportunity to discuss the difference between the words of the song and what you would say in real life", while Peter (8) "first sang and then spoke. Music was not only encouraging in his development but determinant".

During musical activity, there may be increased focus and memory, possibly enhancing the individual's overall attention span and concentration (Ockelford, 2000; Alvin & Warwick, 1992), as also indicated by the research participants. Tyler (9) is "more animated and therefore more engaged". For Alan (8) "music makes him happier, and improves his ability to focus on the task at hand" and if Jim (9) "plays the piano for a little bit before a writing task,, it settles him down to begin his work".

The ability of music to facilitate language acquisition has also been extensively discussed and studied (Ockelford, 2013), supporting language imitation and memorisation (Buday, 1995), and possibly directly linked to enhanced communication, as highlighted by the following responses. Allison's (6) parents have "noticed that music has helped her verbal skills and language. She loves to make up lyrics to different songs or melodies she has heard" and Liam (4) "LOVES the radio, all the songs have prompted him in his speech that was very behind - he sings along to everything after hearing only once".

While supporting verbal communication, music also functions as a medium for communication and expression in its own right, potentially symbolising day-to-day information and evoking emotion (Ockelford, 2000). For people that are unable to express themselves verbally, music may allow expression of mood, attitudes and

feelings in a positive manner (Fang, 2009) potentially functioning as a “proxy language” (Ockelford, 2013, p.182). This important quality of music was also pointed out by the respondents. For Amy (17) “it is her way to express herself, through song” and Simon (6) “will sing; he won't have a conversation with anyone but he will sing any song that he hears”. Due to music and language employing different neurological processes, individuals may prove to be unable to speak but capable of communicating verbally within musical or rhythmic structure (Ockelford, 2013). In fact, research has indicated that children with ASC respond more positively to musical sound than verbal communication or appraisal (Armstrong & Darrow, 1999). Carrick’s (15) mother says that “he often sings a lot more than he speaks. Hearing his voice from another room is uplifting when you’ve heard silence for years” and Alana (6), whose speech was delayed and who mainly uses echolalia to communicate “has started to sing rather than say the sentences in some of her school reading books”.

Music can function as a complete language, in the absence of verbal communication. However, it can also be used as an alternative, and possibly more light-hearted, medium of communication. Such a situation is when, as Xenia’s (15) mother describes “where there is no verbal communication as such, either of us can burst into song [...] and this sometimes begins conversations. It opens up opportunities for verbal communication and lightens the air (almost brings relief). Sometimes it can bring laughter because of her reactions to my singing or because I know it will bring a reaction if I sing”.

Language and verbal communication can often be a source of great anxiety for young people with ASC (Ockelford, 2013; Fang, 2009) or even be perceived as a threat (Grandin & Panek, 2013). Music, however, can reinforce ability and minimize perceived weaknesses, enhancing confidence and self-esteem (Fang, 2009). Musical engagement can enhance feelings of self-worth and can provide means to success in multiple levels, allowing access to all (Fang, 2009). For Simone (11), who has performed in school assemblies, music has “given her a great sense of achievement and recognition from her peers, thus improving her

self-esteem". Carl (6) "has been learning piano [...] and he loves it. He clearly enjoys the music he plays, but also is very clearly pleased with himself when he tackles a new piece and gets it right. In his life, there are not many things that engage Christopher. [...] It has been important for him to learn that getting something wrong is ok". Alana (6) "is not more proficient than her peers, however as she is developmentally delayed in all other areas this is a strength to her" and, likewise, John (11) "likes that he can do something as well as or better than 'normal' or 'cleverer' kids. His processing delay does not really affect him when playing".

Music seems to require less conscious effort than other means of communication (Ockelford, 2013) and contains a high level of repetition and variation (ibid), which can make it favourable for young people with ASC. It is a multi-level form of communication, requiring limited shared understanding and which can be more forgiving and aesthetically pleasing (ibid). This is possibly why Mike (16) "prefers to listen to music he knows well that has no hidden 'surprises' in them", Timothy (10) finds "comfort in repetition, in knowing what comes next" and Kieran (5) loves listening to "Beyonce - Love on Top - it's a very repetitive song, in fact the chorus repeats 5 or 6 times each in the next key up, he loves the repetition of that song".

The use of music for socialisation, as an essentially social medium (Hargreaves & North, 1997), is a much studied subject. Music has been seen to support the development of socialisation and decrease anti-social or inappropriate behaviour (Whipple, 2004; Aldridge, 2000) and aggression (O' Neill, 2001; Orr, Myles & Carlson, 1999), as with Jonas (15) who "at school wears his headphones to stay relaxed and reduce melt downs and anger outbursts". Music has also been claimed to be equally beneficial for adults with ASC, helping them relate to the world around them (Graham, 2006). It can also help increase engagement and bonding between young people with ASC and neurotypical individuals, drawing them out from their preferred social isolation (Fang, 2009; Allen et al., 2009; Ockelford, 2013). Music has proven to be very efficient in helping individuals fit in

with their peers. Jonathan's (17) father says that "he has recently shown an interest in pop/rock music requesting an iPod,[...] as a way for him to socialise with his peers, [...] a common interest and something he can talk about, as he finds difficult to socialise and understanding non verbal signals". For Sarah's (13) father, "music is an interest where her tastes are the same as her peers, in many other aspects she is not on a par", while Jim (13) "likes angry songs and lyrics with swearing, maybe giving him a sense of belonging to 'teen' group and anti-parents". In the same way, Xenia (15) "is able to feel level with others when singing such as her own peer group".

Furthermore, musical activity may be able to enhance awareness of self and other and foster tolerance (Ockelford, 2000). Group music-making can also provide a safe context for socialisation, allowing individual contribution towards a larger whole (Ockelford, 2000). For Jordan (5) "music makes him happier in having to participate in socializing with people. If music is played, he will sing to people and with people" and with Jacob (18) "music is an "in" with him, gaining his social participation in appropriate ways".

Music can also function as motivation and stimulation, reinforcing movement, especially through rhythm (Ockelford, 2000), possibly supporting physical exercise and well-being, as indicated by Selena's (11) mother when saying that her "drumming lessons have helped her to strengthen her weak wrists and has helped with coordination". Enhanced engagement and increased response to auditory stimuli in comparison to language has been reported as well (Fang, 2009), indicating the possible use of music as a motivator to reinforce positive behaviour, eliminate stereotypic behaviours, encourage participation and improve motor function (ibid), maintaining, however, the element of enjoyment (ibid). In accordance, Liam's (4) mother says that "he will stand on the stool in the kitchen and will play a favourite pop tune. If he holds my hands and makes eye contact I will dance and spin him! [...] It works brilliantly encouraging proper contact and bonding" and for Jack (6) it is "used as reinforcement at school, [...] as there are

no toys that motivate him". For Peter (16) music "provides the motivation to do mundane tasks like housework with headphones in".

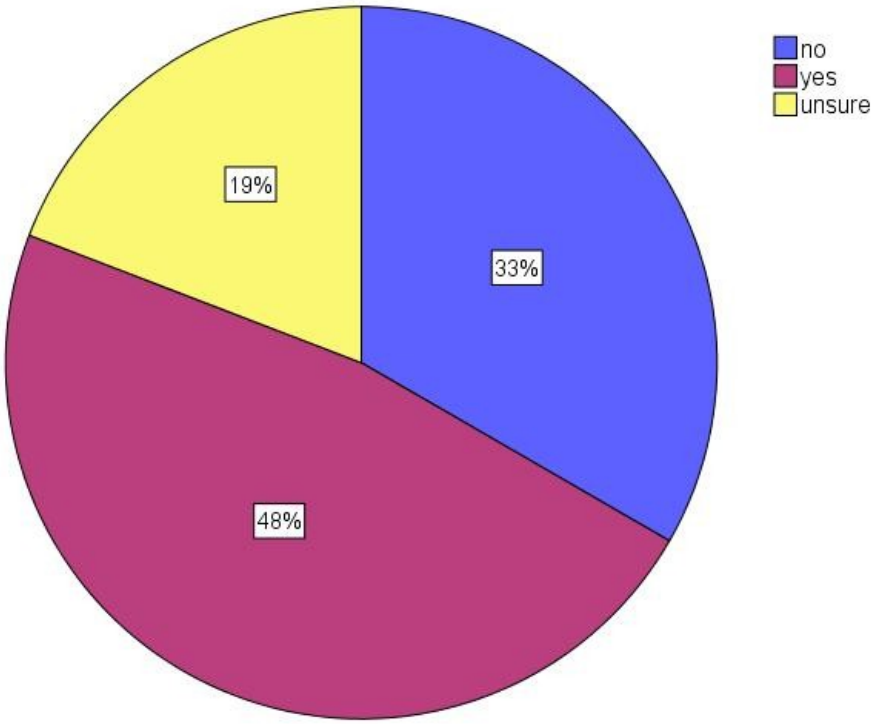
An additional use of music reported is the facilitation of transport and coping in public contexts. As times of change and transition may be particularly challenging for individuals with ASC (Sterling-Turner & Joran, 2007), this specific function of music could possibly be seen as characteristic for this target population. Jaden (16) "likes to play music in the car and on his transport bus" and Jonathan (18) "uses an MP3 player and large headphones, [...] blocking the world out" when travelling. Furthermore, for Harry (6) music is "useful when out and about to keep calm when having to wait or in a situation (crowds, journey) in a public place which would otherwise be very difficult".

When comparing these findings to relevant research involving neurotypical populations, there does not seem to be much discrepancy. Music seems highly important for most participants, widely used, accessible and portable (North, Hargreaves & Hargreaves, 2004). Music was described by the respondents as a background activity (Tekman & Hortac¸su, 2002; Sloboda, O'Neill & Ivaldi, 2001). Nonetheless, the uses of music indicated by the respondents seem to have a stronger correspondence with findings of studies relating to music listening in therapy-related settings. The participant group was suggested to engage with music principally for comfort purposes and relaxation, in accordance to hospital patients in the study undertaken by Mitchell, et al. (2007). Mood management and enjoyment through musical engagement, mainly reported in studies of neurotypical populations, maintain their importance for this participant group as well, but seem to be less prevalent. This could indicate that music is mainly used as a form of self-therapy by young people with ASC, as for Lana's (12) parents "music in itself is therapy", while for Liam (4) "music has been a massive influence for him and reaching him".

Importance of music within specific contexts

When discussing the importance of music within specific situations or contexts, 57 (48%) gave an affirmative response, with 40 (33%) responding negatively and 23 (19%) being unsure (*N*=120).

Figure 10. Importance of music in specific contexts

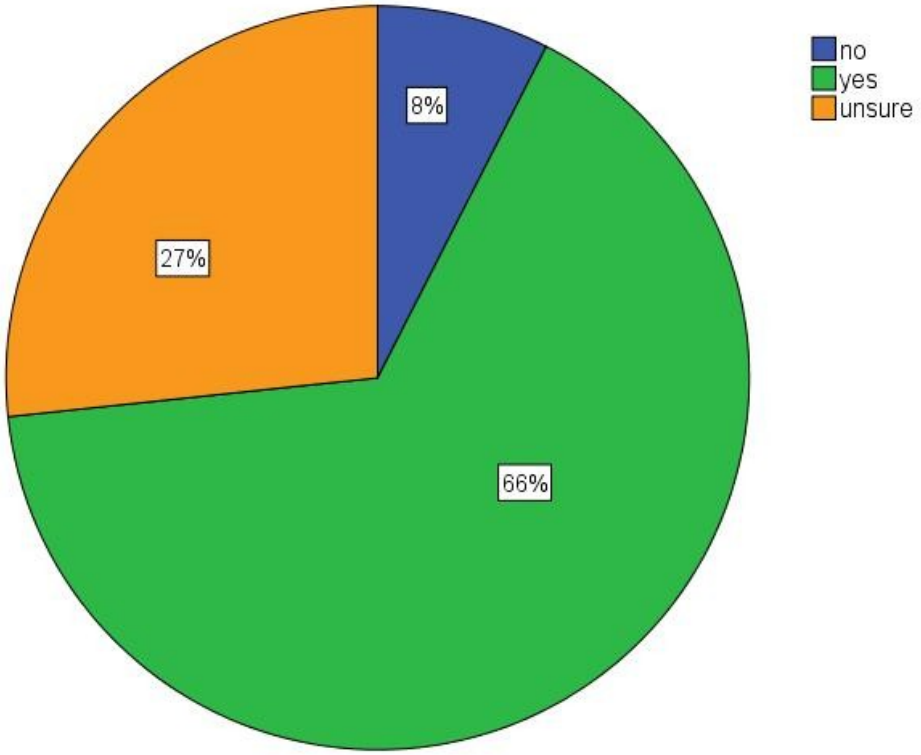


This indicates, as discussed above, that the role of music for this population may be multifold and complex. When describing these contexts, the most prevalent themes were situations which involved relaxation and comfort (19, 28%) and self-regulation (13, 19%) (*N*=69), in agreement to the responses in previous sections concerning the use of music. More specifically, when Michael (16) “visits the dentist he plays the History of Scotland Music, it helps to relax him and removes the stress from the visit” and Jonas (16) “likes to have his mp3 player if he is anywhere noisy or somewhere he doesn't like to be, such as the hospital”.

Effect of music on emotions in everyday activities

In this section respondents were also asked if they believed the presence of music affected both theirs and their child's emotions during everyday activities. Most respondents suggested that music indeed affects emotions in this context (79, 66%), with only 9 (8%) responding negatively and 32 (27%) being unsure.

Figure 11. Influence of music on emotions in everyday contexts



This high prevalence or responses supporting the potential influence of music on emotions during everyday life, further supports the importance of music within this context. When describing music's effect on emotion, it was mostly reported that music makes people happy and creates positive feelings (26, 35%), as for Leda's (12) mother, who says "seeing how happy music makes her, makes me happy". Music was also reported, once more, to calm and relax (24, 32%); Jennifer's (16) parents say "she must listen to music to fall asleep every night. We believe it helps relieve her constant chatter and worry in her head" and for Alana's (6) family "Music provides a sense of calm and peace in our environment. It brings

happiness". Dylan (12) "listens to the radio constantly, [resulting in] vast improvements in his anxiousness. It soothes everything...makes it easier for him to cope on a daily basis", while for Clark (15) music has a "calming influence when meltdowns are occurring".

Music can support engagement and focus (12, 16%) as well, and facilitate interpersonal bonding (10, 14%). Esther's (5) mother says that when she sings to her daughter she gets "more eye contact and she will join in with the actions" and Jared (4) "will stop what he is doing and give you amazing eye contact when you sing to him, which makes you both feel very connected with each other". These responses are in accordance to the previous responses on the use of music, presented in this section, but also agree with existing research, which suggests that music may facilitate connection between family members (Allgood, 2005), potentially supporting the development of joint attention and theory of mind (Ockelford, 2000). Ockelford (2000) and Gadberry (2005) further suggest that music may support meaningful interaction between children and adults, reinforcing awareness of "other" within a secure and structured framework ruled by mutually established boundaries (Ockelford, 2000). Moreover, music has been seen to facilitate/assist engagement between neurotypical populations and individuals with ASC, especially regarding children (Fang, 2009). Music "connects us, because we can sing together, and make up silly words. If I start a musical phrase, she will finish it" says Alyssa's (17) mother, in agreement, and for Jack's (15) mother, music provides "something to help us connect. We are able to discuss like this, but he struggles to have conversations with me around everyday topics."

Negative effects

When discussing the effects and uses of music, however, the respondents also provided descriptions of challenging situations, possibly due to various factors, such as sensory oversensitivity, as people with ASC seem to experience music more intensely and vividly, lacking the capacity to ignore sound (Ockelford,

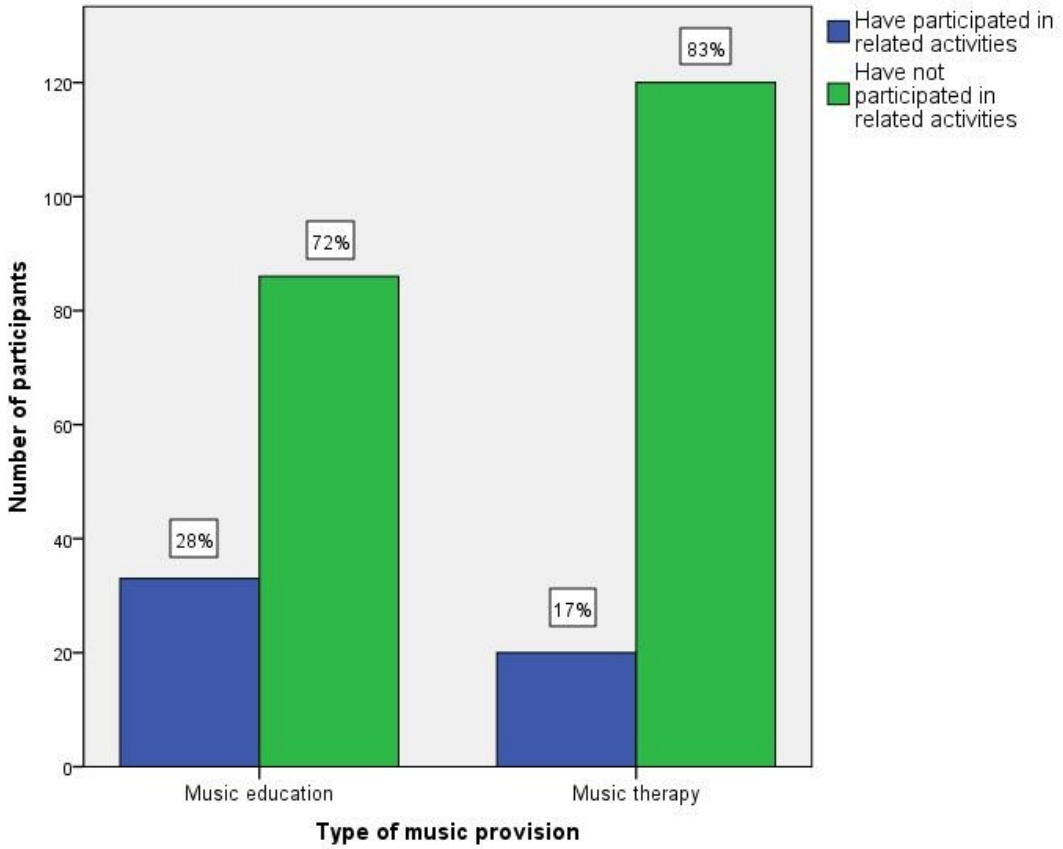
2013). Alan (14) “can't join the school choir as he hates music if it's not pitch perfect”, Joe (15) “cannot bear to have people singing around him, or whistling or humming. He cannot bear to have the radio on in the car” and Harold’s (8) mother say that he “is hypersensitive to noise and dislikes music. He would scream from a few days old when I turned the radio on in the car until I switched it off”. This was to be expected, due to not all participants being interested in music, the high heterogeneity of the participant group, and the wide range of contexts discussed. The participants involved can in no way be perceived as homogenous and individual character traits, personality and background must be taken into consideration. As abovementioned, music is not presented as favourable for the whole population, this fact highlighted by the respondents themselves.

These findings, while supporting existing knowledge concerning the diversity and importance of use of music in everyday contexts as discussed, indicate the need for further research in order to understand the complex role of music in the everyday lives of ASC populations, as well as highlight potential relevant differences or similarities with neurotypical or other populations.

4.3.3. Access to music provision

Concerning music education, only 33 (28%) participants reported having participated in music lessons, while 86 (72%) have never had a music lesson (*N*=119). In regards to music therapy, replies were similar, with only 20 (17%) participants having participated in music therapy sessions, with 100 (83%) never having attended such an activity (*N*=120).

Figure 12. Participation in music provision



When describing music education, most responses indicated that the lessons took place at school (18, 55%) and were mainly in regards to learning a musical instrument (21, 64%), with only 3 (9%) mentioning vocal training and 1 (3%) music theory (*N*=33).

While it seems that access to music provision, whether educational or therapeutic, may be restricted, these findings may also relate to parents having concerns about their child's participation and thus not pursuing it, or the young people themselves not being interested in this kind of activity. Furthermore, while location and age do not seem to influence access to music provision, a Kruskal-Wallis test suggested a significant difference in access to music education depending on diagnosis (χ^2=18.425, *df*=4, *p*=.001). A person with a diagnosis of

Asperger syndrome seems to be more likely to access music education than individuals with a different diagnosis, as shown in the tables below.

Ranks

	DiagnosisCategoryCoded	N	Mean Rank
Q26Music Lessons	Asperger syndrome	38	74,82
	highfunctioning autism	17	57,50
	autism	53	52,48
	profound autism	5	55,40
	PDD-NOS	6	43,50
	Total	119	

Test Statistics[a,b]

	Q26MusicLessons
Chi-Square	18,425
df	4
Asymp. Sig.	,001

In the 28[50] responses describing their child's music therapy sessions, increased socialisation and bonding, communication and learning was mentioned, in accordance to relevant literature (see Psaltopoulou et al., 2000). For example, for Adam (14) "has been involved in Nordoff-Robins music therapy for 6 years. It has helped enormously with communication". 5 (18%) respondents, however, explicitly referred to difficulties in accessing music therapy.

The most prevalent theme when discussing music provision regards concerns and challenges within the relationship between educator/therapist and the participants. Parents seem to be highly concerned with finding an appropriate teacher or therapist, concerns possibly reinforced by problematic music education

[50] The number of responses describing the music therapy sessions are more than the responses claiming that the participants have indeed attended music therapy sessions. Through the descriptions themselves, it becomes apparent that this is due to lack of clarity when distinguishing music therapy and music education practices and the respondents are mainly expressing their uncertainty. Details on these responses are available in appendix 16.

experiences. Aris (11), as reported, “did not have a good contact with the therapist so it did not last long”. It seems, thus, that interpersonal contact is an important factor in therapy and education. In addition it seems that problems may be caused when teachers are not flexible in regards to different learning styles and try to impose a predetermined way of learning (Ockelford & Matawa, 2009). Alana’s (6) mother worried about being able to find a teacher to “cater to her learning style” and Jake (9) “dislikes being told how to play and when [...] he dislikes the structure of how music is taught in school”. Moreover, Tim’s (11) mother feels that “if the people teaching him understood his needs he would learn quickly and it would increase his quality of life significantly” and, similarly, Leona’s (12) family say they are “currently trying to find her a guitar teacher with whom she can have the same kind of relationship because if she is not comfortable with a teacher, she is too nervous to play”. Moreover, Tony’s (10) parents express frustration; “we feel his musical ability is striking, and impressive, especially as he has taught himself, but we are frustrated that he seems unwilling to let anyone teach him. [...] We wish someone could help him develop his gifts further, but resources here are sadly lacking” they state.

Furthermore, when describing music education or music therapy sessions in which the participants were involved in, another issue arose, as was expected; 12 (43%) respondents seemed unsure of what constitutes music therapy (*N*=28), highlighting a lack of clarity in distinction between music therapy and music education. While in both cases, respondents described the positive effects of their child’s engagement, it was not always fully clear whether this activity constituted therapy or education, or if the aims and outcomes were mainly therapeutic or educational. In effect, Damian’s (10) mother writes “he has music lessons with other children from the autistic unit, but I'm not sure if they would be classed as 'therapy' lessons. I believe a wide range of instruments are used but [..] I am unsure what the impact is on him”. Raymond (7) has music therapy “at school (he goes to a specialist Autism Unit), once a week. There are 3 or 4 children in his session (his classmates) and one music therapist. [...] The sessions encourage

the children to play different instruments together, also copying sounds from a leader...basically teaching them communication, participation, listening to others, following instructions and working together" which could also be seen as music education. Lastly, Jack's (18) father says "he has a weekly piano lesson run by a music therapists, so it's more therapy than most lessons but more lesson than most therapy".

These findings are in accordance with relevant research which highlights the general ambiguity of what constitutes music education and therapy (Ockelford, 2000), especially for parents and carers and possibly for the participants themselves. The activities described by the respondents as music therapy varied greatly, as expected, this ambiguity also suggesting a lack of clarity that may be seen, according to Ockelford (2000), as characteristic in the field. Furthermore and despite related efforts and statements on equality of access to provision (ibid), it seems that difficulties are still experienced, independent of location or age. In addition, the relationship and communication between therapist/educator, parents and the participants seemed to be a source of great stress for the respondents

The importance of music provision, supporting the need for equal access, is highlighted through the suggested relationship found within this data. A statistically significant relationship was found between access to music education and a number of variables. Specifically, music education was found, through a bivariate Spearman correlation, to have a strong positive correlation with talent in music (*r*=.529, *p*=.000, *n*=119), suggesting that access to music education may result in increased perceived musical talent.

Correlations

		Q13TalentMusic	Q26MusicLessons
Q13TalentMusic	Pearson Correlation	1	,529**
	Sig. (2-tailed)		,000
	N	125	119
Q26MusicLessons	Pearson Correlation	,529**	1
	Sig. (2-tailed)	,000	
	N	119	119

**. Correlation is significant at the 0.01 level (2-tailed).

A Mann-Whitney test indicated the relationship of music education to musical ability (χ^2=570.00, *df*=5.274, *p*=.000) and the creation of music (χ^2=663.00, *df*=5.376, *p*=.000). It seems that participation in music education may result in increased music creativity and overall music ability, as shown in the following tables.

Ranks

	Q26MusicLessons	N	Mean Rank	Sum of Ranks
Q30CreateMusic	no	85	50,80	4318,00
	yes	33	81,91	2703,00
	Total	118		
Q20MusicalAbility	no	86	50,13	4311,00
	yes	33	85,73	2829,00
	Total	119		

Test Statistics[a]

	Q30CreateMusic	Q20MusicalAbility
Mann-Whitney U	663,000	570,000
Wilcoxon W	4318,000	4311,000
Z	-5,376	-5,274
Asymp. Sig. (2-tailed)	,000	,000

a. Grouping Variable: Q26MusicLessons

Accordingly, music lessons were associated with the time spent playing music, discussed below (χ^2=728.500, *df*=4.819, *p*=.000), with the ability to read music (χ^2=641.500, *df*=6.541, *p*=.000) and play musical instruments (χ^2=469.00, *df*=6.660, *p*=.000), resulting in those who received lessons being more likely to play an instrument, read music or spend more time on average playing music, as shown by the following tables.

Ranks

	Q26Music Lessons	N	Mean Rank	Sum of Ranks
Q27Average PlayMusic	no	85	51,57	4383,50
	yes	33	79,92	2637,50
	Total	118		
Q23Read Music	no	86	50,96	4382,50
	yes	33	83,56	2757,50
	Total	119		
Q21Musical Instruments	no	86	48,95	4210,00
	yes	33	88,79	2930,00
	Total	119		

Test Statistics[a]

	Q27Average PlayMusic	Q23Read Music	Q21Musical Instruments
Mann-Whitney U	728,500	641,500	469,000
Wilcoxon W	4383,500	4382,500	4210,000
Z	-4,319	-6,541	-6,660
Asymp. Sig. (2-tailed)	,000	,000	,000

a. Grouping Variable: Q26MusicLessons

It seems, thus, that while musical experience is said to take place mostly on an informal and unplanned basis (Ockelford, 2000) significantly influenced by factors such as the radio or TV, the data collected in this research suggests that access

to music provision could be determinant for the development of music and other abilities.

4.3.4. Musical abilities

Overall music ability

In this section, parents and carers were asked about the participants' musical abilities and engagement with music. 42 (35%) respondents reported that, in their opinion, their child's musical abilities were not as developed as one would expect for his/her age, 36 (30%) claimed they were about what one would expect for his/her age, 31 (26%) said they were more developed than would be expected, while 11 (9%) stated their child had exceptionally developed musical abilities (*N*=120). Therefore, it seems that that most respondents perceived the participants as less able than their peers.

Without overlooking the possibility that the young people's abilities may indeed be underdeveloped, this significant level of negative perception of their musical abilities could possibly be related to unrealistic parental, and social in general, expectations or comparisons. In addition, as suggested by Levitin (2012), certain aspects of musicality tend to be overlooked, such as intense receptive sensitivity to music, while he argues that an adequate theory of musicality should encompass all the different ways, productive and receptive, in which musical ability presents itself.

Thus, it is possible that within this participant group, high level engagement with music which is receptive or less evident may have been overlooked as well, as possibly with Jacob (16) who "knows what music he wants on his mp3 player. He knows the name of the artists and the songs. He also knows what CD he wants to buy. He knows the number of the tracks of his favourite songs on all his CDs." The number of participants reported having exceptional musical abilities is consistent with relevant literature, suggesting that approximately 10% of ASC populations can be found to demonstrate exceptional or savant skills (Hill, 1977;

Rimland, 1978; Heaton et al., 2008), with even severe difficulties not preventing exceptional musical development (Ockelford, 1988).

Perceived musical ability was found to be independent of age, gender, diagnosis and location. It was also seemed to be independent of time spent in engagement with music and the presence of absolute pitch, contrary to relevant literature. However, as shown in the table below, musical ability was suggested to have a statistically significantly relationship with access to music education, as discussed above. Particular interest in music also seems to be linked with musical ability, with a bivariate Spearman correlation indicating a strong positive correlation between these variables (r= 641, p=.000, n=120), as also with talent in music (r=.641, p=.000, n=120), highlighting that music education can lead to development of music ability and that perceived talent is mainly related to evident and "traditional" presentation of musical ability.

Correlations

			Q26Music Lessons	Q20Musical Ability	Q14Particular Interest Music	Q13Talent Music
Spearman's rho	Q26Music Lessons	Correlation Coefficient	1,000	,486**	,368**	,529**
		Sig. (2-tailed)	.	,000	,000	,000
		N	119	119	119	119
	Q20Musical Ability	Correlation Coefficient	,486**	1,000	,502**	,641**
		Sig. (2-tailed)	,000	.	,000	,000
		N	119	120	120	120
	Q14Particular Interest Music	Correlation Coefficient	,368**	,502**	1,000	,501**
		Sig. (2-tailed)	,000	,000	.	,000
		N	119	120	121	121
	Q13Talent Music	Correlation Coefficient	,529**	,641**	,501**	1,000
		Sig. (2-tailed)	,000	,000	,000	.
		N	119	120	121	125

**. Correlation is significant at the 0.01 level (2-tailed).

Following the significant difference in musical interest, a significant influence of gender on music ability was examined through a Mann-Whitney test, with female

participants reported to be more proficient (*U*=766, *Z*=2.22, *p*=.027), as shown in the following tables.

Ranks

	ChildGender	N	Mean Rank	Sum of Ranks
Q12Interests Music	Male	102	59,41	6060,00
	Female	23	78,91	1815,00
	Total	125		

Test Statistics[a]

	Q12Interests Music
Mann-Whitney U	807,000
Wilcoxon W	6060,000
Z	-2,814
Asymp. Sig. (2-tailed)	,005

a. Grouping Variable: ChildGender

In accordance to music education being influenced by diagnosis, it seems that musical ability may also be associated with diagnosis, an issue explored by a Kruskal-Wallis test (χ^2=17.999, *df*=4, *p*=.001). people with Asperger syndrome, as well as individuals diagnosed with PDD-NOS, seem to be more likely to show musical ability, as shown in the following tables.

Ranks

	DiagnosisCategoryCoded	N	Mean Rank
Q20Musical Ability	Asperger syndrome	38	77,61
	highfunctioning autism	17	54,94
	autism	54	50,23
	profound autism	5	43,80
	PDD-NOS	6	74,25
	Total	120	

Test Statistics[a,b]

	Q20MusicalAbility
Chi-Square	17,999
df	4
Asymp. Sig.	,001

a. Kruskal Wallis Test

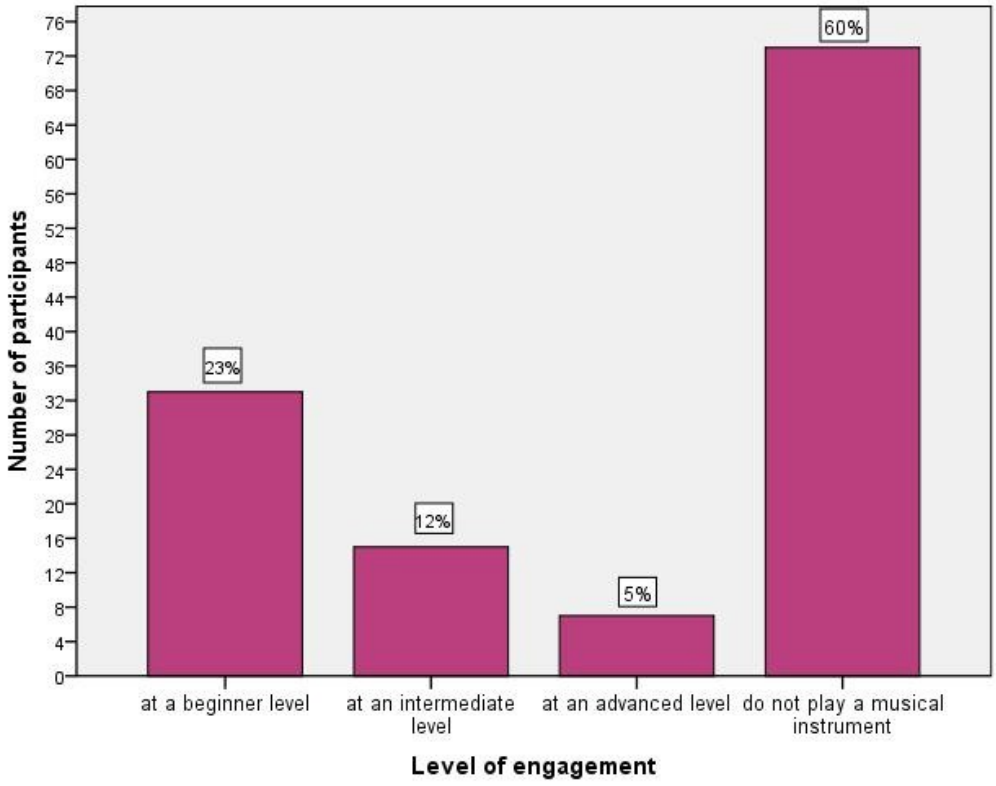
b. Grouping Variable: DiagnosisCategoryCoded

This relationship between diagnosis and perceived ability, could be seen as resulting, however, from a lack of guidance and reinforcement through education and not as a barrier to music development, language and learning difficulties, or developmental delay and should not be seen as an obstacle towards musical development (Ockelford et al., 2006; Ockelford & Matawa, 2009).

Ability to play a musical instrument

The respondents were also asked about whether the participants play musical instruments. Despite reported high interest in music, most participants (73, 60%) replied negatively, with only 48 (40%) claiming to play a musical instrument (*N*=121). From the participants who play a musical instrument, 28 (58%) play at a beginner's level, 14 (29%) at an intermediate level and 6 (13%) at an advanced level (*N*=48).

Figure 13. Musical instrument playing



The most prevalent musical instruments played were the piano and keyboards (22, 44%), as expected due to increased accessibility and immediacy and its symmetrical form (Ockelford, 2013). The guitar and other string instruments (15, 30%) and percussion (14, 28%) where also chosen by participants. When describing their child's playing, 21 (42%) seemed to play at school or during structured music lessons and 14 (28%) were self-taught.

Tony (1) "plays keyboard. He is resistant to being taught in the traditional way, but teaches himself through listening to a piece of music [...]. He will look it up on the web, watch it on you tube, listen to it and then replicate it until it is perfect", while he "did not enjoy learning at school, but this may have been due to him not having an appropriate teacher who understood autism". Xenia (15) taught herself as well, "she has had a guitar for just a fortnight [...] and has self-taught herself to tune all the strings and learned a whole song in an afternoon by herself using youtube".

In addition, 5 (10%) participants seem to have stopped playing due to external reasons or their own choice (N=50). For example, Ian (11) who "played violin at school from age 7-10 and stopped playing as no one else in his year played" and Jack (15) who had "clarinet lessons at primary school, he asked for them. When he had to move to a special school, access to music lessons stopped".

Despite reported high level of interest, few children were said to play musical instruments, as in the study of Ockelford et al. (2006). Furthermore, diagnosis seems to influence instrument-playing, suggested through a Kruskal-Wallis test (χ^2=14.415, df=4, p=.006), with individuals diagnosed with Asperger syndrome more likely to play a musical instrument, as indicated in the tables below.

Ranks

	DiagnosisCategoryCoded	N	Mean Rank
Q21Musical Instruments	Asperger syndrome	38	74,89
	highfunctioning autism	17	58,18
	autism	54	52,56
	profound autism	5	61,00
	PDD-NOS	6	47,00
	Total	120	

Test Statistics[a,b]

	Q21MusicalInstruments
Chi-Square	14,415
df	4
Asymp. Sig.	,006

a. Kruskal Wallis Test

b. Grouping Variable: DiagnosisCategoryCoded

A medium positive correlation was also found, suggesting that playing a musical instrument may result in increased perceived musical talent (*r*=.475, *p*=.000, *n*=120), as shown in the following table.

Correlations

		Q13TalentMusic	Q21MusicalInstruments
Q13TalentMusic	Pearson Correlation	1	,475**
	Sig. (2-tailed)		,000
	N	125	120
Q21MusicalInstruments	Pearson Correlation	,475**	1
	Sig. (2-tailed)	,000	
	N	120	120

**. Correlation is significant at the 0.01 level (2-tailed).

Talent in singing

Only 32 (27%) participants were reported to have a talent for singing, with 87 (73%) not having that ability (*N*=119), as shown in figure 14. When describing their child's talent for singing 23 (19%) were said to sing in tune, as Jack (18) who "always sings in tune and remembers a song upon hearing it once" and 8 (7%) who enjoy singing regardless of their ability (*N*=39)

Ability to create own music

When asked about music creativity, 41 (35%) participants seemed to create their own music, with 77 (65%) not having this ability (*N*=118). Describing their child's ability to create their own music, 23 (62%) participants were said to make up their own songs and pieces. Lana (12) "likes to make up her own songs to both help with school work and just for fun". Joshua (18) "would make up songs about people and things with very simple but original tunes" and "created music [...] to express emotions or rehearsing an event that happened every day, for example, his driver on the bus/van was named Sally, and he would sing, Sally, Sally, Wait for Sally, Wait for Sally's Bus!". 8 (22%) participants were said to create lyrics, such as Alana (6) who "writes songs with lyrics and chorus about various parts of her day or different topics she likes, like cats", and 7 (19%) to change known songs (*N*=37), such as Rosy (13), who can change and mix songs she has learnt on the piano. Add to them and join them together".

As most children typically and intuitively tend to experiment with music from a young age (Ockelford, 2013), like Joshua (18) who "has an almost intuitive ability to fill in gaps even in music he has never heard before", higher results regarding music creativity were expected. However, and as discussed in previous sections, musical engagement and creativity may take place in isolation or not be specifically evident, thus being overlooked.

Music creativity, as shown in the following table, was found to be positively correlated, at a medium strength, with talent in music, explored by a bivariate Spearman correlation (r=450, p=.000, n=118). There was also a medium positive correlation with musical ability (r=410, p=.000, n=118) and a strong positive correlation with playing musical instruments (r=497, p=.000, n=118) and access to music education (r=497, p=.000, n=118). It seems, therefore, that, while music creativity can be an intuitive activity, there are, however, many influencing factors.

Correlations

			Q20Musical Ability	Q13Talent Music	Q30Create Music	Q21Musical Instruments	Q26Music Lessons
Spearman's rho	Q20Musical Ability	Correlation Coefficient	1,000	,641**	,410**	,527**	,486**
		Sig. (2-tailed)	.	,000	,000	,000	,000
		N	120	120	118	120	119
	Q13Talent Music	Correlation Coefficient	,641**	1,000	,450**	,475**	,529**
		Sig. (2-tailed)	,000	.	,000	,000	,000
		N	120	125	118	120	119
	Q30Create Music	Correlation Coefficient	,410**	,450**	1,000	,497**	,497**
		Sig. (2-tailed)	,000	,000	.	,000	,000
		N	118	118	118	118	118
	Q21Musical Instruments	Correlation Coefficient	,527**	,475**	,497**	1,000	,613**
		Sig. (2-tailed)	,000	,000	,000	.	,000
		N	120	120	118	120	119
	Q26Music Lessons	Correlation Coefficient	,486**	,529**	,497**	,613**	1,000
		Sig. (2-tailed)	,000	,000	,000	,000	.
		N	119	119	118	119	119

**. Correlation is significant at the 0.01 level (2-tailed).

In summary, while the number of participants playing a musical instrument, singing or creating their own music seems small, this could possibly be due to age, access to music education or access to a musical instrument in general. Low expectations of musical learning and achievement within the context of disability could also be in place, influencing both participants' musical engagement and their access to music education.

Further music-related abilities

Concerning further musical abilities, only 25 (21%) participants were reported to be able to read music, with 94 (79%) not having that ability (*N*=119). In addition, 66 (56%) participants were said to learn by ear, while for the 53 (44%) that replied negatively, a different learning profile can be assumed (*N*=119). As

discussed above, these variables seem to be influenced by access to music education. The ability to read music was also shown to be positively correlated, to a medium degree, with talent in music (r=.400, p=.00, n=119) shown by a bivariate Spearman correlation.

Correlations

			Q13TalentMusic	Q23ReadMusic
Spearman's rho	Q13TalentMusic	Correlation Coefficient	1,000	,400**
		Sig. (2-tailed)	.	,000
		N	125	119
	Q23ReadMusic	Correlation Coefficient	,400**	1,000
		Sig. (2-tailed)	,000	.
		N	119	119

**. Correlation is significant at the 0.01 level (2-tailed).

Reading music also seems to be influenced by diagnosis, an issue explored by a Kruskal-Wallis test (χ^2=21.489, df=4, p=.000), with individuals with Asperger syndrome being more likely to have the ability to read music, as shown by the tables below.

Ranks

	DiagnosisCategoryCoded	N	Mean Rank
Q23Read Music	Asperger syndrome	38	74,12
	highfunctioning autism	17	61,50
	autism	53	51,99
	profound autism	5	47,50
	PDD-NOS	6	47,50
	Total	119	

Test Statistics[a,b]

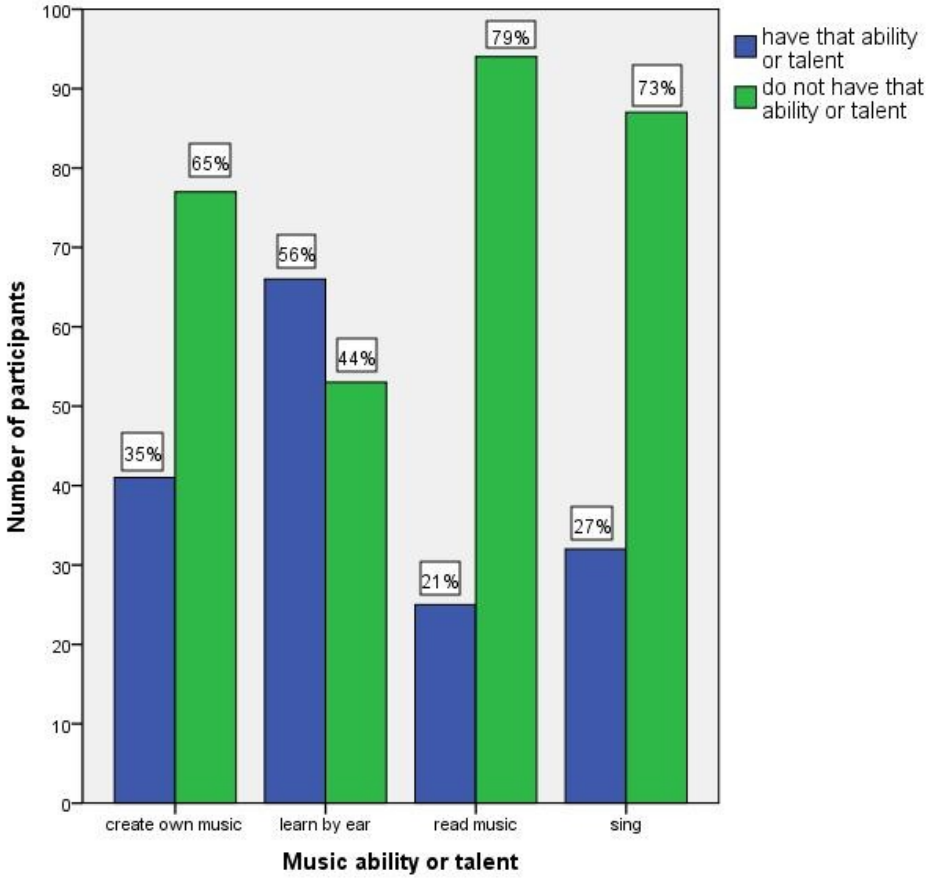
	Q23ReadMusic
Chi-Square	21,489
df	4
Asymp. Sig.	,000

a. Kruskal Wallis Test

b. Grouping Variable: DiagnosisCategoryCoded

The proportion of participants who possess other music-related abilities and talents is demonstrated in figure 14.

Figure 14. Other music-related abilities and talents



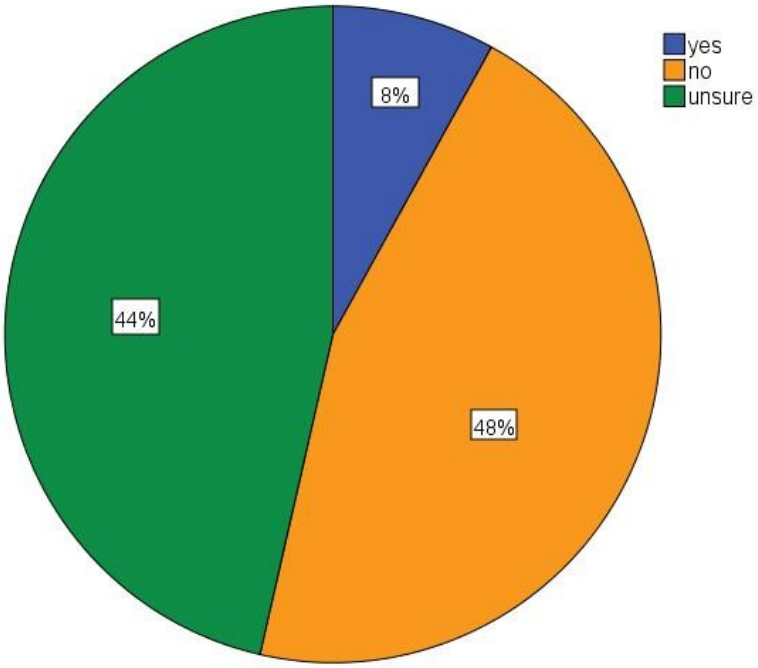
Absolute pitch

The final subject investigated in this section is the presence of absolute pitch. When discussing AP in the survey, it was described as one having an excellent memory for musical notes, possibly shown through ability to sing a given note on request without reference to any other note or being able to give the name of a note just by listening to it. In response, 21 (18%) participants were said to have this ability, like Abby (17) who "sings known songs starting on the same note each time, and always sings in tune", with 51 (43%) replying negatively and 46 (39%) being unsure (*N*=118).

While the percentage of participants reported to have absolute pitch may initially seem in accordance to relevant literature on ASC populations[51], when taking into account the respondents' description of their child's ability, these responses were reconsidered by the researcher, who suggests that 9 (8%) participants seem to demonstrate absolute pitch for certain, and 52 (44%) possibly having this ability to some extent, with the remaining 57 (48%) participants not demonstrating absolute pitch (*N*=118). The subject of AP remains ambiguous, mainly due to difficulties both in defining and recognising AP; while most definitions rely on the ability to "name" notes without reference, Miyazaki (2004) argues that pitch labelling is not an essential element. The current established views of AP, therefore, may lead to this ability remaining undetected (Ockelford, 2013).

[51] As discussed in chapter 2, individuals with ASC have a markedly higher probability of possessing AP than neurotypical populations.

Figure 15. Absolute pitch



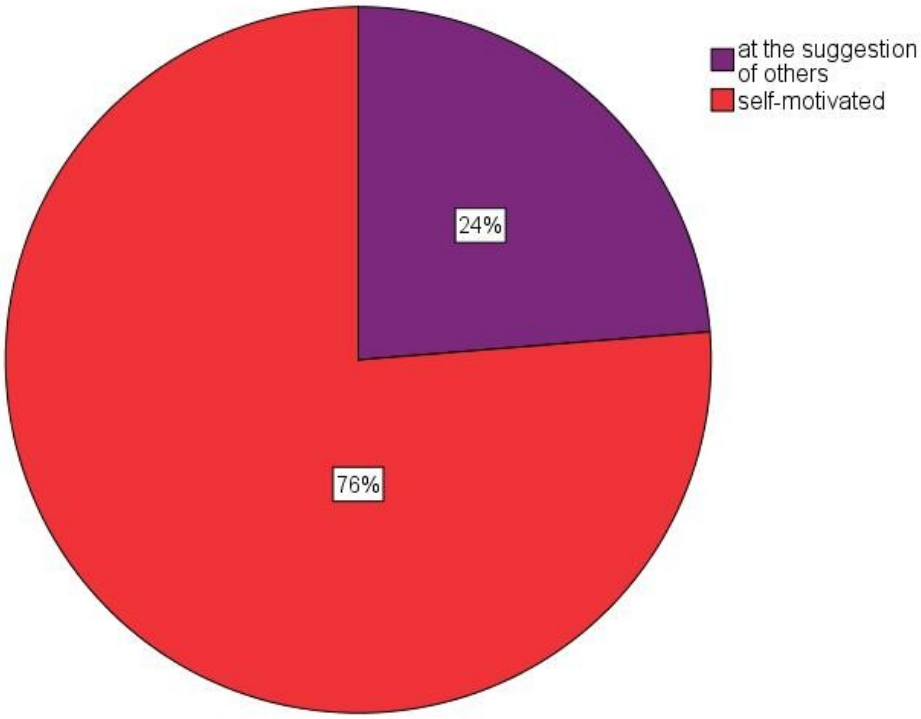
AP has been suggested to significantly impact other areas of musical development, facilitating playing by ear and learning to play an instrument (Ockelford, 2013). Despite AP being regarded as necessary for the musical development among people with learning difficulties (Miller, 1989), the presence of AP was not found to influence music ability, music creativity or perceived music talent, while it may neither be necessary nor sufficient (Ockelford & Matawa, 2009). Nonetheless, this possibility cannot be overlooked and further research is required to explore this subject in depth.

4.3.5. Engagement with music

Motivation

Motivation for engagement with music was an additional topic explored. The majority (90, 76%) of participants were said to be self-motivated, with only 28 (24%) engaging with music on the suggestion of others (*N*=118).

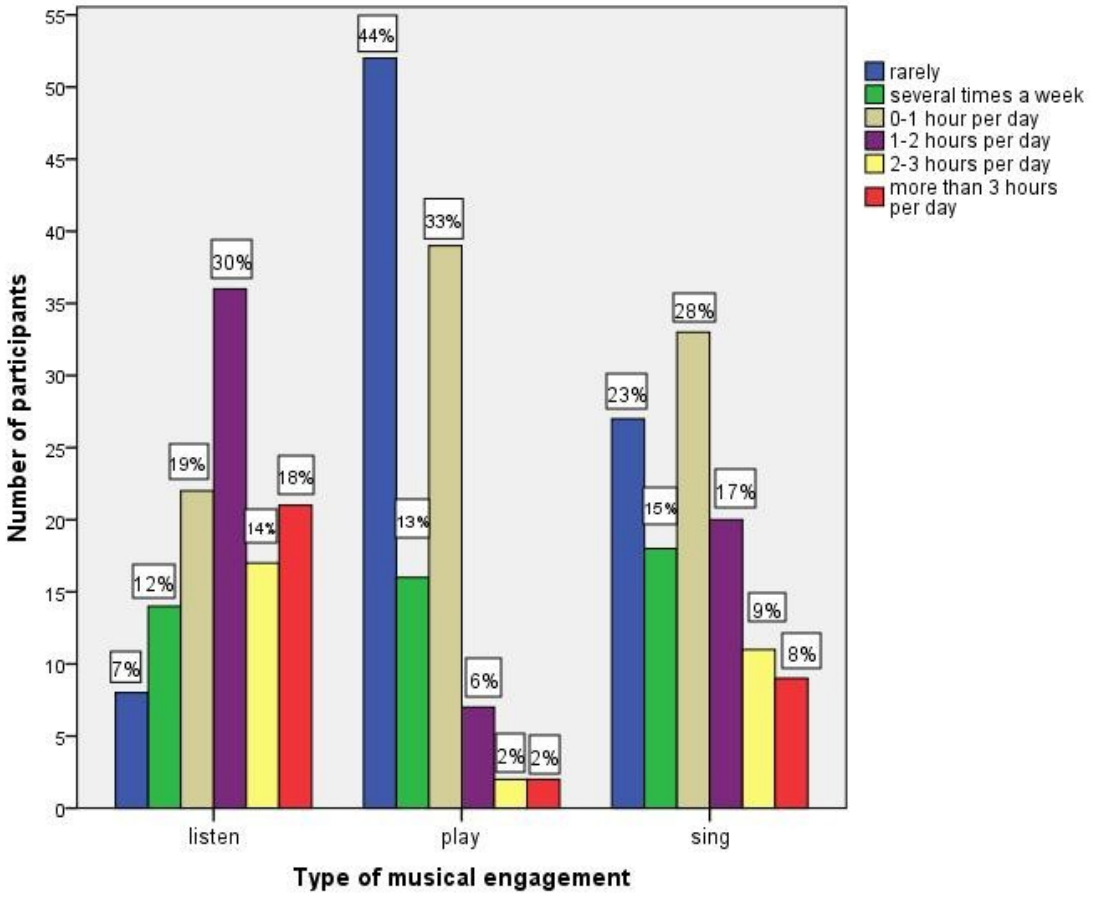
Figure 16. Motivation for engagement with music



Time spent in engagement with music

When asked about the approximate time spent on average by the participants on playing music, listening to music or singing, most participants played music rarely (52, 44%) and listened to music for 1-2 hours per day (36, 31%). Most participants reported singing for 0-1 hours per day (33, 28%) (*N*=118).

Figure 17. Time spent on average in engagement with music



Significantly more time was spent singing by female participants (*U*=685.5, *Z*=2.61, *p*=.009), as shown by a Mann-Whitney test, its results presented in the following tables. Responses to this question are further illustrated in figure 17.

Ranks

	ChildGender	N	Mean Rank	Sum of Ranks
Q27Average Sing	Male	96	55,64	5341,50
	Female	22	76,34	1679,50
	Total	118		

Test Statistics[a]

	Q27AverageSing
Mann-Whitney U	685,500
Wilcoxon W	5341,500
Z	-2,618
Asymp. Sig. (2-tailed)	,009

a. Grouping Variable: ChildGender

Interest in music, reported in this chapter, was found to have a medium positive correlation with playing music (*r*=259, *p*=.005, *n*=118), and a small positive correlation with the time spent listening to music (*r*=.455, *p*=.000, *n*=118,), and singing (*r*=.290, *p*=.001, *n*=118), through a bivariate Spearman correlation.

Correlations

			Q12Interests Music	Q27Average Listen Music	Q27Average Sing
Spearman's rho	Q12Interests Music	Correlation Coefficient	1,000	,455**	,290**
		Sig. (2-tailed)	.	,000	,001
		N	125	118	118
	Q27Average Listen Music	Correlation Coefficient	,455**	1,000	,368**
		Sig. (2-tailed)	,000	.	,000
		N	118	118	118
	Q27Average Sing	Correlation Coefficient	,290**	,368**	1,000
		Sig. (2-tailed)	,001	,000	.
		N	118	118	118

**. Correlation is significant at the 0.01 level (2-tailed).

Furthermore, a strong positive correlation was found, through a bivariate Spearman correlation, between the importance of music as stimulation and the time spent listening to music on average (*r*=.573, *p*=.000, *n*=118), possibly further highlighting the importance of music listening as stimulation and motivation.

Correlations

			Q15ImportantStimulationMotivation	Q27AverageListenMusic
Spearman's rho	Q15ImportantStimulationMotivation	Correlation Coefficient	1,000	,374**
		Sig. (2-tailed)	.	,000
		N	121	118
	Q27AverageListenMusic	Correlation Coefficient	,374**	1,000
		Sig. (2-tailed)	,000	.
		N	118	118

**. Correlation is significant at the 0.01 level (2-tailed).

Given the small number reported to play a musical instrument, the limited time spent on playing music was to be expected. This may also be the case when taking into account the low reports concerning talent in singing. However, listening to music was expected to occupy more time in the lives of the participants, especially given the stated significance of music for the majority of the target population, and the wide range of ways in which music is reportedly beneficial. For most participants, music listening seems to occupy 1-2 hours per day; in contrary, relevant studies have suggested that individuals listen to music between 2.5 (North & Hargreaves, 2000) to 4-6 (Steinberg, 1996) hours per day on average. While the this discrepancy may seem small, it is of great interest as there may be a possibility that young people with ASC indeed choose to listen to music less frequently than other populations, or this may be a result of lack of control over their personal environment or restricted access to music-listening mediums. Furthermore, these findings suggest the potential need for increase in engagement with singing and playing music, possibly through added encouragement and accessibility. Music listening, however, still remains the most frequent way of engaging with music for this population, with many respondents specifically referring to its beneficial effects, further highlighting its importance in the everyday lives of young people with ASC.

4.4. Conclusion

Following this discussion of the research findings, it becomes clear that, while only preliminary assumptions can be drawn, these initial outcomes offer insight into the complexities of musical perception when regarding children and young people with ASC. Given the high levels of reported musical interest, it is certain that access to music provision and extra-parental support could and should be increased. Music seems to be highly important to this population in multiple ways and a topic which requires further comprehensive research.

Chapter 5. Research evaluation: limitations, implications and suggestions for further study

5.1. Introduction

Following the presentation and discussion of the research findings, this chapter evaluates the study that took place, focusing on its limitations and implications, both in regards to the research topic, but also concerning the methodology used. Furthermore, taking these into consideration, suggestions for further study are made.

5.2. Research limitations

The limitations of this research have already been presented throughout text. However, they are discussed in this section for the purpose of further transparency. The findings of this study must be understood within the context of its limitations, including its limited time-frame. Accordingly, the outcomes, presented in chapter 4, should be seen as preliminary findings concerning a series of topics that require further research.

The sample of this study, while larger than past research which employed case studies, is still restricted. Given the heterogeneity of ASC populations, as well as the wide range of influencing factors and variables, the sample cannot be assumed as representative. Therefore, few assumptions can be made for the overall ASC population, mainly in the form of suggestions for further study and not broad generalisation. There was also a marked discrepancy in the participant sample in regards to gender, due to ASC prevalence in males, as discussed in chapter 2. Owing to the nature of the study, the findings concern young people and children with ASC, thus the behaviours reported may not be characteristic of adult populations. Moreover, whilst an ASC population was studied, these findings may not necessarily be characteristic or restricted to individuals with ASC.

As this was a study using parents and carers as "gatekeepers" to their childrens' experiences, the respondents were requested to present a subjective image of their child's musical development based on their experience, aiming to avoid using "traditional" music ability assessment criteria that require specialist knowledge and that could also be influenced by the participant's general development. All responses, thus, can only be seen as through their subjectivity and could, therefore, be influenced by various factors, such as parental expectation and awareness.

As discussed in chapter 3, a response bias, alongside lack of control over response situation, must also be taken into consideration when evaluating data quality. Due to the online nature of this study and the fact that the respondents were self-selected, individuals of certain demographic profile may have been favoured. In addition, the fact that the survey was available either in English or in Greek resulted in only English-speaking or Greek-speaking individuals participating.

Nonetheless, this study is seen by the researcher as highly relevant and important for the field of music psychology, as well as for people with ASC and their families, as it endeavoured to capture and explore the commonalities that emerged from this preliminary research. The reports given by parents and carers provided substantial information that, while subject to certain biases, provides initial insight into a largely under-studied field which can trigger future research.

5.3. Research implications

Concerning the issue of methodology, this study suggests that online research may be efficient in supporting data collection from diverse and hard-to-reach populations. As everyday family life with ASC is very demanding, this survey was successful in collecting data without requiring a high level of commitment. Furthermore, the mixed methods approach used was successful in offering a "snapshot" view of the subject explored, providing information concerning both

group tendencies and individual experience, offering meaningful insight into this topic.

As discussed in chapter 3, this study's research questions concerned the everyday lives of children and young people with ASC and the degree and nature of their interest in music, as well as their musical engagement and abilities, their use of music in everyday life, and access to music provision. Through the data collected, significant insight was provided into these topics. While the findings are indeed preliminary, the researcher believes that they may have important implications concerning the topic explored.

The main findings of this study are:

- The significant prevalence of interest in music
- The low level of reported music abilities in comparison to the high level of musical interest
- The lack of access to music provision
- The higher prevalence of music interest, talent and ability in female participants

While these points should not be generalised, they may indicate important commonalities that could influence our understanding of the relationship between music and ASC populations.

These findings may possibly also provide insight on the importance of music for non-ASC individuals who face similar personal challenges. Music may prove not to be important or helpful for all, but for some it could very possibly be "as necessary as the air they breathe", as Xenia's mother suggests. Therefore, music education and music therapy should be equally accessible, employing trained therapists and educators that are open-minded and willing to adapt to the needs of each ASC individual and communicate effectively with parents, in order to support increased awareness of their child's abilities, since, as Ockelford (2013)

suggests, appropriate provision could minimize the impact of disability and maximize musical potential.

5.4. Suggestions for further study

The relationship between music and ASC, despite significant efforts, remains elusive. Within this context, this study offers a foundation for a wide range of further studies, in the hope of triggering interest and similar efforts in this field.

Future study could aim to obtain more wide-spread data, using online research combined with postal surveys and interviews in person, as well as employ several longitudinal case studies in order to achieve deeper insight into individual experience. The surveys and materials used could be translated into a number of languages, in pursuance of extensive data collection on a global level, possibly supported by ASC-related charities and organizations.

The relationship between the elements discussed in chapter 4 could constitute topics for more focused research, such as the influence of interest in music or access to music education on perceived ability. The range of ways that music is used in everyday life comprises a very important subject of study in its own right, as does the relationship between music engagement and well-being. The higher prevalence of musical interest and ability in female participants is also a topic which deserves exploration. Data from ASC populations could, furthermore, be compared to neurotypical populations or people with other conditions, in order to ascertain similarities in behavior and perception related to music in everyday contexts.

Chapter 6. Conclusion

This exploratory study aimed to investigate the musical abilities and interests of children and young people with ASC, through the experience of their parents or carers. Building upon the Focus on Music studies[52], it adds to the increasing body of research on the subject of ASC and music, focusing on the participants' everyday musical experiences. The data, obtained through an online survey, highlights significant tendencies and strongly indicates the need for further related research.

While no general conclusions can be made, the researcher wishes to emphasize the importance of the participants' exceptionally high interest in music, as reported, in contrast to their limited involvement in music provision. The educational and therapeutic provision for young people with ASC could and should be improved, with non-discrimination in accessibility. Furthermore, the multifold way that music seems to be beneficial can be seen as a motive for further musical engagement. Lastly, this study constitutes an effort to ensure that the musical interests and abilities of these young people are taken into consideration and to highlight the need for appropriate support. Music is seen as a medium that can positively affect general development, but also provide great pleasure, significantly enhancing the well-being[53] and quality of life for disadvantaged individuals (MacDonald, Kreutz & Mitchell, 2012).

[52] Ockelford et al., 2006; Ockelford & Matawa, 2009.

[53] The relationship of music and well-being has been further highlighted due to the addition of access to music and art in the criteria for measuring national wellbeing and life quality in the UK (Self & Randall, 2013).

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Appendixes

Appendix 1. Ethical approval application form

University of Roehampton London

ETHICS APPLICATION FORM
(Nov 2011)

PLEASE CHECK THE RELEVANT BOX

(NB. double click on the check box and select 'checked')

MEMBER OF STAFF ☐ RESEARCH STUDENT ☒
(MPhil, PhD, EdD, PsychD)

EXTERNAL INVESTIGATOR ☐ STUDENT (Other)** ☐

*If you are a transfer student or conducting collaborative research you may not need to complete this form: please see Section 2.2. of the Guidelines. **If you are on a taught course you do not need to complete this form unless your project is worth more than 50% of your total credits or you have been asked to do so by your supervisor*

SECTION 1: PERSONAL DETAILS *Please complete the header with your name and Department*	
Name (lead):	Tzou Vamvakari
Other investigators:	-
Correspondence address:	W2C Walpole, Whitelands College, Holybourne Avenue, SW15 4JD, London
Telephone no:	07933654878
Email:*(all correspondence will be sent by email unless otherwise requested)*	vamvakat@roehampton.ac.uk
FOR STUDENTS ONLY:	
Programme of study & Department:	Applied Music Psychology MSc
Mode of study (full-time/part-time)	Full-time
Director of Studies: (If you are on a taught course please give the name of your supervisor)	Dr Adam Ockelford
FOR EXTERNAL INVESTIGATORS ONLY (please see Section 4.5 of the Ethical Guidelines):	
Name of Academic Assessor:	

SECTION 2: PROJECT DETAILS	
Title of project:	My child and Music: Exploring the Musical interests and abilities of children and young people with Autism Spectrum Disorders through the perception of their primary caregiver
Proposed start date: *Please note that approval can take some time. Please submit applications in a timely manner. Reasons should be given for late or retrospective submissions in order to secure approval.*	15/05/13 *(Applications should only be submitted retrospectively in exceptional circumstances. These will require the approval of the Chair of the Ethics Committee).*
Duration:	4 months

Purpose of the proposed investigation:
This section should include the material which outlines the rationale for the project, i.e. why this study needs to be done. This should be done in a way that is both accessible and scholarly, i.e. have proper cited sources.

This research aims to extend the Focus on Music studies (Ockelford, Pring, Welch & Treffert, 2006[54]; Ockelford & Matawa, 2009[55]) into the domain of Autism Spectrum Disorders (ASD), exploring the musical interests and abilities of children and young people who have been diagnosed with ASD (including Asperger Syndrome)[56], through the experiences and views of their parents, carers of guardians. The need for this study is a result of the lack of research into the issue of importance and function of music in the everyday lives of children and young people diagnosed with ASD, as well as their musical abilities, all reported through the perceptions of a third party, their primary caregivers. The study will be conducted through a questionnaire focusing on the children's and young people's interest and engagement with music and sound, the importance of music in their lives, their musical achievement and its recognition, and their access to specialist music education and music therapy. By focusing on these elements, this research endeavours to discover whether specific trends concerning musical engagement, interest and ability, musical development and absolute pitch may be seen to develop in children and young people with ASD. Additionally, the results will be statistically analyzed and compared to already existing data presenting the views of parents of blind/partially sighted or "typically developing" children and young people. This further step aims to discover whether a comparison of the importance and function of music in the lives of children and young people diagnosed with ASD, blind/partially sighted and "typically developing" children and young people may offer interesting and statistically significant results. Lastly, since sight difficulties and ASD seem to co-occur,

[54] Ockelford, A., Pring, L., Welch, G., Treffert, D. (2006). Focus on Music: Exploring the Musical interests and abilities of blind and partially-sighted children and young people with septo-optic dysplasia. London: Institute of Education.

[55] Ockelford, A., Matawa, C. (2009). Focus on Music 2: Exploring the musicality of children and young people with retinopathy and prematurity. London: Institute of Education.

[56] Within and throughout the context of this study, Asperger Syndrome is included in all references to Autistic Spectrum Disorders, even if not explicitly referred to.

the above-mentioned comparison may offer insight into the effect of ASD and sight difficulties concerning the abilities and engagement with music of children and young people who have received this double diagnosis.

Outline of the project:
This section should include the details of methodology i.e. what will be done and how.

This exploratory study will use a questionnaire in order to gather quantitative and qualitative data from the parents of children and young people that have been diagnosed with ASD. The questionnaire being used was originally developed for the Focus on Music studies (Ockelford et al., 2006; Ockelford & Matawa, 2009) and has been slightly modified with the permission of the authors in order to correspond to the aims and nature of the research. Specifically, the subjects explored are the children's and young people's medical diagnoses, their special interests and talents, their interest in music, the importance and role of music in their life, music therapy and specialist education provision, and their musical ability and absolute pitch.

The questionnaire will be distributed online. It will take the form of an online survey hosted by the website surveymonkey.com, while the researcher will contact the parents of children and young people who have been diagnosed with ASD via email, explaining the aim of the study and attaching the link of the online survey to be completed voluntarily and independently in their own time. The contact details of these parents will be obtained through and with the consent of Special Schools. The survey will be distributed mainly within the UK and Greece, but, through potential networking it may also be further distributed internationally.

For the facilitation of the research, the questionnaire and all accompanying texts will be translated into Greek by the researcher, who is bilingual (Greek-English) and cross-checked by Dr Christina Anagnostopoulou and Dr Angeliki Triantafyllaki, both Professors of Music Psychology and Music Education in the National and Kapodistrian University of Athens who have obtained their PhD degrees (from the University of Edinburgh and the University of Cambridge, respectively) and have taught within Higher Education in the UK.

After all data from the survey is collected, it will be statistically analysed in order to discover potential correlation between various elements and possible significant differences between others, whilst also focusing on emerging themes and tendencies. Par example, issues that will be examined include the potential relationship between diagnoses, musical abilities, importance of music and absolute pitch. Furthermore, the qualitative data, collected through open-ended questions, will be analysed by the researcher in order to discover potential recurring themes and trends in the musical engagement and behaviour of the children and young people.

Once conclusions are drawn concerning the data from this series of surveys, the data gathered will also be compared with existing data from parents of blind/partially sighted and "typically developing" children and young people who have completed the survey as part of the Focus on Music studies. The potential comparison of the effect of ASD and sight difficulties on the engagement of children and young people with music will be discussed, as well as its implications concerning the education, therapy and behaviour of children and young people diagnosed with ASD, sight difficulties, or both.

Ethical issues raised by the project and how these will be addressed:
Anonymity and confidentiality will be maintained through the use of the online survey template surveymonkey.com and the fact that the survey does not require information about specific location, name, profession or contact details. The questionnaire will only include a question on general location (country) and concerning urban/rural context. When contact details have been accessed through Special Schools or relevant organisations, particular attention will be given to ensure that these bodies are not associated with the study and that their name or specific location remains confidential. For the sake of anonymity and confidentiality, all data, including the children's and young people's age and diagnoses details, will be held securely by the researcher, allowing access only to her supervisor when needed. The participants of the research, namely the people completing the survey, are adults, over 18 years of age, who will have been fully informed through the online survey of the purpose and content of the study and will be voluntarily participating, giving their consent. Participants will also be free at any time to discontinue completing the survey, as its completion will be a fully independent process. Furthermore, after the completion of the study, the participants will be able to contact the researcher in order to be presented with a small number of key findings, as an appreciative gesture. Debriefing is not needed after or during this study, as it poses very minimal risk for the participants.

SECTION 3: USE OF PARTICIPANTS

- You should download the Participant Consent Form template and amend it if necessary
- You should also attach any other information to be given to participants
- You should consider carefully what information you provide to participants, e.g. scope of study, number of participants, duration of study, risks/benefits of the project. It is recommended that the participant has two copies of the consent form so they can retain one for information.
- If images or anything else which might allow the identification of participants is to be publicly accessible (e.g. on the web), further written consent must be secured

Give details of the method of recruitment, and potential benefits to participants if any (include any financial benefits where appropriate).

Please remember that ethics approval will have to be sought from any organisations where recruitment is carried out or posters placed (e.g. if you recruit in GP's surgeries you will require NHS approval):

As abovementioned, recruitment of participants will take place mostly online. Special Schools will be contacted by the researcher and her supervisor, in order to obtain contact details of parents whose children have been diagnosed with ASD, whilst they will be contacted via email. The online survey will also be distributed through relevant personal networks of the researcher, as well as through various social media directed to relevant organisations and societies, such as the Autism Awareness facebook page and the Autism speaks website.
Through participating in this studying the parents, guardians or carers of children and young people diagnosed with ASD will have no financial or other benefits. Their participation will be on a fully voluntary basis, with no material incentives offered. Furthermore, there will no direct family or close friends of the researcher will be participating in the study.

Will you be using participants who are aged under 18?
YES ☐ NO ☒
Will you be using participants who might be considered to be vulnerable (please give details if not addressed elsewhere on this form)?
YES ☐ NO ☒
If you have answered Yes please refer to the Ethics Guidelines (especially section 4.11 if using participants who are aged under 18) and highlight the particular issues raised by working with these participants and how these issues have been addressed.
Details of CRB check?

SECTION 4: HEALTH AND SAFETY

- **You must download and complete the Risk Assessment Form and attach this to your application.**
- You should be able to demonstrate that appropriate mechanisms are in place for the research to be carried out safely
- If necessary the Head of Health & Safety should be consulted before the application is submitted

Will any of your project take place outside the UK?
YES ☒ NO ☐

If you have answered yes please list the countries below and refer to Section 4.2 of the Ethics Guidelines, complete the Overseas Risk Assessment form (Venture Risk Assessment) and consult with the Head of Health and Safety. Applicants should adhere to University Guidelines on Foreign Travel. If you are conducting research out of the UK but in your home country or the country in which you reside you should still complete this form.

Please provide translations of participant facing documentation, if required (for student applications, these should be checked by your supervisor prior to submission)

Is this a clinical trial or a project which may involve abnormal risk to participants?
YES ☐ NO ☒
Will 'human tissue' samples need to be stored?
YES ☐ NO ☒
If you have answered Yes please contact the Ethics Administrator who will be able to direct you to the appropriate member of staff dealing with this. Please also refer to Sections 3.5 and 4.2 of the Ethics Guidelines

SECTION 5: PUBLICATION OF RESULTS

How will you disseminate your findings? (e.g. publication)

The findings, their discussion and analysis constitute the main research project related to the researcher's dissertation required for the completion of the Applied Music Psychology MSc postgraduate course in the University of Roehampton. Depending on the findings and their significance, as this is an exploratory research, the researcher may also wish to incorporate them in a resulting article aiming towards publication in relevant peer-reviewed journals or a poster to be submitted in relevant conferences.

How will you ensure the anonymity of your participants?
(If your participants do not wish to remain anonymous you must obtain their written consent.)

Anonymity will be insured with all specific data, such as age, location and diagnoses, being securely stored separately from all other documents. Furthermore, this survey requires no reference to specific details such as name, address and profession. Contact details, when not provided through consenting bodies such as Special Schools and relevant organisations, will not be obtained through the survey, whilst the participants will be able to contact the researcher in order to be informed of the key findings of the study.

SECTION 7: EXTERNAL GUIDELINES, APPROVAL & FUNDING
Are there any relevant subject-specific ethics guidelines (e.g. from a professional society)? If so how will these inform your research process? There are no relevant subject-specific ethics guidelines.
Has/will the project be submitted for approval to the ethics committee of any other organisation, e.g. NHS ethics approval? (Please see Section 4.3, Ethics Guidelines) No What is the outcome of this?
Is your project externally funded? YES ☐ NO ☒ If you have answered yes you must complete a P1 form and submit this to RBDO before you complete your ethics application. Please state the name of the funding organisation/ company below and provide any other relevant information: Has your P1 form been approved by your Head of Department? YES ☐ NO ☐

SECTION 9: APPLICANT'S CONFIRMATION	
I confirm that the information supplied on this form is correct and confirm that the above checklist has been fully completed.	
Applicant's signature:	 *Please use an electronic signature or type your name*
Date:	10/02/2013

Appendix 2. Consent form

Appendix 2.1. English consent form

My Child and Music: Exploring the musical interests and abilities of children and young people with Autism Spectrum Disorders or Asperger Syndrome through the perception of their primary caregiver

This survey aims to explore the musical interests and abilities of children and young people who have been diagnosed with Autism Spectrum Disorder (ASD) or Asperger Syndrome (AS), through the experiences and views of their parents, carers or guardians. The survey requires approximately 10 minutes for its completion and data will be collected until the 10th of July 2013.

The need for this study is a result of the lack of research into the importance and function of music in the everyday lives of children and young people diagnosed with ASD, as well as their musical abilities, all reported through the perceptions of a third party, their primary caregivers. This survey focuses on the children's and young people's musical interests and abilities and will be distributed internationally.

The data collected will be analysed aiming to discover whether specific trends concerning musical engagement, interest and ability, musical development and absolute pitch may be seen to develop in children and young people with ASD. The findings from this questionnaire will also be compared to data collected from "typically developing" children and young people, hoping to discover statistically significant results.

Thus, it is very important that this survey is also completed on behalf of children and young people who do not currently demonstrate specific interest or musical ability, as well as on behalf of children who find music highly engaging and important.

This study has been developed under the supervision of Dr Adam Ockelford, is fully supported by the University of Roehampton and has been approved by the university's Ethical Committee.

* 1. I wish to take part in this research and am aware that I am free to withdraw at any point.

○ I agree

* 2. I understand that the information provided will be treated in strict confidence by the researcher and that all identities will be protected in the publication of any findings.

○ I agree

* 3. I confirm that I am a parent, carer or guardian of a child or young person diagnosed with Autism Spectrum Disorder or Asperger Syndrome and that I will be completing this questionnaire once, providing honest responses through my experience of my child. If there are further siblings in the family diagnosed with ASD or AS, then multiple questionnaires should be completed, one for each young person.

○ I agree

Appendix 2.2. Greek consent form

Το Παιδί μου και η Μουσική: Εξερευνώντας τα μουσικά ενδιαφέροντα και τις μουσικές ικανότητες παιδιών και νεαρών ατόμων με Αυτισμό ή Σύνδρομο Άσπεργκερ μέσα από την αντίληψη των κηδεμόνων τους

Η έρευνα αυτή στοχεύει στο να εξερευνήσει τα μουσικά ενδιαφέροντα και τις μουσικές ικανότητες παιδιών και νεαρών ατόμων με Αυτισμό ή Σύνδρομο Άσπεργκερ, μέσω της αντίληψης των γονέων και κηδεμόνων τους. Η έρευνα διεξάγεται μέσω αυτού του ερωτηματολογίου, για τη συμπλήρωση του οποίου απαιτούνται 10 λεπτά, ενώ η συλλογή δεδομένων θα διαρκέσει έως τις 10 Ιουλίου 2013.

Το ερωτηματολόγιο εξερευνά τις μουσικές δραστηριότητές, τα ενδιαφέροντα και τις ικανότητες των ατόμων αυτών στην καθημερινότητα τους. Τα αποτελέσματα θα μελετηθούν στατιστικά και θα συγκριθούν, επίσης, με δεδομένα που έχουν συλλεχθεί από άτομα «τυπικής ανάπτυξης».

Γι' αυτό το λόγο είναι πολύ σημαντικό το ερωτηματολόγιο αυτό να συμπληρωθεί και από άτομα που τα παιδιά τους δεν δείχνουν κάποιο ιδιαίτερο ενδιαφέρον για τη μουσική, ώστε τα δεδομένα που θα συλλεχθούν να είναι όσο το δυνατόν πιο αντιπροσωπευτικά.

Το ερωτηματολόγιο θα διανεμηθεί και διεθνώς, με σκοπό να γίνουν συγκρίσεις μεταξύ χωρών και πιθανώς συστάσεις σχετικά με την έλλειψη πρόνοιας και υποστήριξης των ατόμων με Αυτισμό και Σύνδρομο Άσπεργκερ στη χώρα μας. Η μελέτη στοχεύει στο να συμβάλλει σημαντικά στην κατανόηση της σχέσης του Αυτισμού και του Συνδρόμου ‘Ασπεργκερ με τη Μουσική.

Η έρευνα επιβλέπεται από τον Dr Adam Ockelford, ειδικό σε θέματα Αυτισμού και μουσικής, και έχει τη πλήρη έγκριση και υποστήριξη του Πανεπιστημίου του Roehampton.

***** 1. Επιθυμώ να συμμετάσχω στην έρευνα και γνωρίζω πως μπορώ να αποσύρω τη συμμετοχή μου όποτε το θελήσω.

Συμφωνώ

***** 2. Κατανοώ πως οι πληροφορίες που παρέχω θα αντιμετωπιστούν εμπιστευτικά και ότι όλα τα προσωπικά δεδομένα θα προστατευτούν κατά την έκδοση των ερευνητικών αποτελεσμάτων.

Συμφωνώ

***** 3. Επιβεβαιώνω πως είμαι γονέας ή κηδεμόνας παιδιού ή νεαρού ατόμου με Αυτισμό ή Σύνδρομο Άσπεργκερ και πως θα συμπληρώσω το ερωτηματολόγιο παρέχοντας ειλικρινείς απαντήσεις μέσα από την εμπειρία της καθημερινότητας του παιδιού μου. Εάν υπάρχουν παραπάνω απο ένα άτομα στην οικογένεια με Αυτισμό ή Σύνδρομο Άσπεργκερ, τότε απαιτείται να συμπληρωθεί ένα ερωτηματολόγιο κατά άτομο.

Συμφωνώ

Appendix 3. Initial contact messages sent via email (template)

Appendix 3.1. English message template

Dear Sir/Madam,

I am a postgraduate student of the Applied Music Psychology MSc postgraduate programme of the University of Roehampton, London, under the supervision of Dr Adam Ockelford. I am writing to you with regards to my research concerning the musical interests and abilities of children and young people with Autism or Asperger Syndrome, for which I am looking for participants.
This study is entitled "My child and Music: Exploring the Musical interests and abilities of children and young people with Autism Spectrum Disorders through the perception of their primary caregiver". It takes place through a short online questionnaire to be completed between 15/5/2013 and 30/6/2013 by the parents or caregivers of children and young people diagnosed with Autism Spectrum Disorders or Asperger syndrome, whilst the data obtained will be analysed and discussed in my dissertation, to be submitted in August 2013.
The questionnaire requires less than 10 minutes to be completed, with responses related to one individual person, and not to people with ASD in general. Additionally, it is of great importance that it is also completed on the behalf of children and young people who do not currently demonstrate specific interest or musical ability. I am also hoping to obtain responses from various countries and backgrounds. Any help in obtaining responses to this questionnaire would be very much appreciated, as I believe that this study will provide essential insight into the relationship of children and young people with ASD and AS and music.

A trial version of the questionnaire for you to see can be found here (no data is collected through this questionnaire):
https://www.smart-survey.co.uk/s/TRIALMyChildAndMusicTRIAL

The official 10-minute online questionnaire, from which data is collected, can be found here:
https://www.smart-survey.co.uk/s/MyChildAndMusic

Please do not hesitate to contact me if you require any further information.
Thanking you in advance for your valuable help.

Yours sincerely,

Tzou (Joy) Vamvakari
Postgraduate Research Student
Applied Music Psychology MSc
University of Roehampton, London, SW15 5PJ
vamvakat@roehampton.ac.uk

Appendix 3.2. Greek message template

Αγαπητέ Κύριε/Κυρία,

Είμαι μεταπτυχιακή φοιτήτρια Μουσικής Ψυχολογίας στο University of Roehampton και επικοινωνώ μαζί σας σχετικά με την έρευνα που κάνω πάνω στο θέμα Αυτισμού και Μουσικής.
Η έρευνα μου έχει τίτλο «Το παιδί μου και η Μουσική: Εξερευνώντας τα Μουσικά ενδιαφέροντα και τις Μουσικές ικανότητες παιδιών και νεαρών ατόμων με Αυτισμό μέσα από την αντίληψη των κηδεμόνων τους» και πραγματοποιείται μέσω ενός 10-λεπτου ηλεκτρονικού ερωτηματολογίου για συμπλήρωση από κηδεμόνες παιδιών με Αυτισμό ή Σύνδρομο Άσπεργκερ. Τα δεδομένα που θα συγκεντρωθούν θα αναλυθούν και θα συζητηθούν στην μεταπτυχιακή διατριβή μου, η οποία θα παραδοθεί τον Αύγουστο του 2013.
Συμπληρωματικά, η μελέτη μου επιβλέπεται από τον Dr Adam Ockelford, ειδικό σε θέματα περί Αυτισμού και Μουσικής, και έχει πλήρη υποστήριξη και έγκριση από τοUniversity of Roehampton.
Σας γράφω, λοιπόν, ελπίζοντας πως μέσω της πολύχρονης εμπειρίας σας ίσως έχετε να μου δώσετε κάποια συμβουλή σχετικά με το με ποιόν θα μπορούσα να επικοινωνήσω ώστε να έχω πρόσβαση σε γονείς παιδιών με Αυτισμό ή Σύνδρομο Άσπεργκερ για τη συμπλήρωση του ερωτηματολογίου. Έχω, βλέπετε, ήδη συλλέξει αρκετά δεδομένα, κυρίως από το Ηνωμένο Βασίλειο αλλά και άλλες ευρωπαϊκές χώρες, αλλά ευελπιστώ να καταφέρω να συλλέξω δεδομένα και από την Ελλάδα. Το θεωρώ υποχρέωση μου να συμπεριλάβω δεδομένα και από την Ελλάδα, ειδικά εφόσον η χώρα μας δυστυχώς έχει πολύ περιορισμένη αντιπροσώπευση ή συμμετοχή στον χώρο της έρευνας του Αυτισμού και της Μουσικής.
Εάν έχετε οποιαδήποτε παρατήρηση ή συμβουλή για το που θα έπρεπε να απευθυνθώ για να βρω συμμετέχοντες, θα ήμουν εξαιρετικά ευγνώμων, ή ακόμα εάν τυχαίνει να γνωρίζετε κι εσείς η ίδια κάποιους γονείς που ίσως θα ήθελαν να συμμετάσχουν.
Σας στέλνω το link για να δείτε το ερωτηματολόγιο μου, στην αγγλική και ελληνική έκδοση. Παρόλα αυτά, τονίζω, τα link αυτά οδηγούν σε δοκιμαστική μορφή του ερωτηματολογίου, από την οποία δεν συγκεντρώνω δεδομένα. Είναι για να ελέγξετε εσείς το ερωτηματολόγιο και να δείτε αν σας ενδιαφέρει.

Αγγλική εκδοχή ΔΟΚΙΜΑΣΤΙΚΗ: https://www.smart-survey.co.uk/s/TRIALMyChildAndMusicTRIAL
Ελληνική εκδοχή ΔΟΚΙΜΑΣΤΙΚΗ: https://www.smart-survey.co.uk/s/TRIALToPaidimoukaiiMousikiTRIAL
Εάν θα θέλατε να προωθήσετε το ερωτηματολόγιο σε πιθανούς συμμετέχοντες παρακαλώ χρησιμοποιείστε τα παρακάτω links από τα οποία συλλέγω δεδομένα.

Αγγλική εκδοχή ΕΠΙΣΗΜΗ: https://www.smart-survey.co.uk/s/MyChildAndMusic
Ελληνική εκδοχή ΕΠΙΣΗΜΗ: https://www.smart-survey.co.uk/s/Topaidimoukaihmoysiki
Ευχαριστώ πολύ εκ των προτέρων και κάθε σχόλιο σας είναι ευπρόσδεκτο.
Με εκτίμηση,
Τζόυ-Χαρά Βαμβακάρη
Μεταπτυχιακή ερευνήτρια και φοιτήτρια Εφαρμοσμένης Μουσικής Ψυχολογίας
University of Roehampton, London, SW15 5PJ
vamvakat@roehampton.ac.uk

Appendix 4. The questionnaire

Appendix 4.1. English version of the questionnaire

4. What is your child's name?[57]

* 5. What is your child's gender?[58]

- Male
- Female
- Prefer not to say

* 6. What is your child's date of birth?

* 7. What is your and your child's current country of residence?

* 8. Is your area of residence considered urban or rural?

- Urban
- Rural

* 9. Please summarise the diagnosis and psychological or other assessments you have for your child

* 10. When was the most recent diagnosis or assessment given?

11. Does your child have any further Special Needs and if so what?

* 12. Is your child particularly interested in

	Not at all	A little	A lot
Lists of items?	○	○	◉
Dates?	○	○	○
Numbers?	○	○	○
Everyday sounds (e.g. vacuum cleaners, car engines)?	○	○	○
Music?	○	○	○
Other?	○	○	○

[57] The first question is numbered 4 as the consent form presented above was embedded in the questionnaire and the 3 qualifying questions, which also functioned as written informed consent, comprised the 3 first questions in the questionnaire.

[58] All questions marked with an * were obligatory to complete during the data collection process

What other things is your child interested in?

* 13. Would you say your child has talent in

- [ ] Art
- [ ] Mathematics
- [ ] Computers and technology
- [ ] Calculating and remembering dates
- [ ] Remembering (e.g. poems or lists)
- [ ] Music
- [ ] Other
- [ ] My child has not yet shown a specific talent

What other talents does your child have?

* 14. Does your child show a particular interest in music?

- ○ A lot
- ○ A little
- ○ Not at all

* 15. Do you believe music is or has been important for your child

	Not at all	A little	A lot
as a source of stimulation and motivation?	○	○	○
as a source of comfort?	○	○	○
to promote communication?	○	○	○
to promote socialisation?	○	○	○
to promote understanding? (eg, through songs with numbers, counting, days of the week)	○	○	○
to mark out events in the daily routine?	○	○	○
in other ways?	○	○	○

In what other ways is music important for your child?

* 16. Does your child have a favourite piece or type of music?

- ○ Yes
- ○ No
- ○ Not sure

Please tell us about your child's music preferences

* 17. Is music important for your child at particular times, with particular activities, in particular places or with particular people?

- Yes
- No
- Not sure

Please describe the context within which music is particularly important for your child

* 18. When engaging in an everyday activity with your child, do you believe that the presence of music (listening, singing of playing music) changes how you and your child feel?

- Yes
- No
- Not sure

Please describe how music changes how you feel during activities between you and your child

* 19. Does your child have music therapy sessions?

- Yes
- No

Please tell us about your child's music therapy sessions

* 20. How would you describe your child's musical ability?

- Not as developed as you would expect of a child of his/her age
- About what you would expect of a child of his/her age
- More developed than you would expect of a child of his/her age
- Exceptionally developed for a child his/her age

22. What musical instruments does your child play and at what level?

At a beginner level	
At an intermediate level	
At an advanced level	

Please tell us about your child's playing and give examples

* 23. Does your child read music?

- Yes
- No

* 24. Does your child learn "by ear"?

- Yes
- No

* 25. Does your child have a special talent for singing?

- Yes
- No

Please tell us about your child's talent for singing

* 26. Does your child have music lessons?

- Yes
- No

Please tell us about your child's music lessons

* 27. Approximately how often on average does your child play music, listen to music or sing?

	for 0-1 hours a day	for 1-2 hours a day	for 2-3 hours a day	for more than 3 hours a day	several times a week	rarely
Play music						
Listen to music						
Sing						

* 28. Is your child self-motivated to play music and sing, or does he/she do so only when it is suggested?

- Self-motivated
- At the suggestion of others

* 29. Does your child have perfect pitch?

People with “perfect pitch” have an excellent memory for musical notes. This may be shown through their ability to sing a given note on request without reference to any other note. They may also be able to tell the name of a note just by listening to it.

- Yes
- No
- Not sure

Please tell us what your child can do (e.g. name notes, play notes back on a keyboard, sing or play known songs starting on the same note without accompaniment, always sing in tune)

* 30. Does your child create their own music?

- Yes
- No

Please tell us about your child's music

31. Is there anything else you would like to tell us about your child?

32. If you would like to receive the final report of the findings from this study or would like to be contacted by the researcher concerning other relevant research projects, please provide your contact details

First Name

Last Name

E-mail

Further contact details or relevant comments

You have completed this survey!

Thank you for taking the time to answer this survey! If you have any questions about this survey or you would like to be notified about the results of this study please do not hesitate to contact the researcher

Tzou Joy Vamvakari
Education Department University of Roehampton, Roehampton Lane, London, SW15 5PU
vamvakat@roehampton.ac.uk

Appendix 4.2. Greek version of the questionnaire

4. Πώς ονομάζεται το παιδί σας;

* 5. Ποιό είναι το φύλο του παιδιού σας;

- Αγόρι
- Κορίτσι
- Προτιμώ να μην απαντήσω

* 6. Ποιά είναι η ημερομηνία γέννησης του παιδιού σας;

* 7. Σε ποιά χώρα διαμένετε;

* 8. Κατοικείτε σε πόλη ή στην επαρχία;

- Σε πόλη
- Στην επαρχία

* 9. Παρακαλώ περιγράψτε περιληπτικά τα αποτελέσματα των ιατρικών, ψυχολογικών ή άλλων διαγνώσεων που έχει λάβει το παιδί σας

* 10. Πότε δόθηκε η πιο πρόσφατη διάγνωση;

11. Έχει το παιδί σας Ειδικές Ανάγκες εκτός των δυσκολιών που αντιμετωπίζει λόγω Αυτισμού ή Συνδρόμου Άσπεργκερ και, αν ναι, ποιές είναι αυτές;

* 12. Δείχνει το παιδί σας ιδιαίτερο ενδιαφέρον για κάτι από τα παρακάτω;

	Καθόλου	Λίγο	Πολύ
Λίστες αντικειμένων	◉	○	○
Ημερομηνίες	○	○	○
Αριθμούς	○	○	○
Καθημερινούς ήχους (π.χ. ήχος ηλεκτρικής σκούπας, ήχος μηχανής αυτοκινήτου)	○	○	○
Μουσική	○	○	○
Άλλο	○	○	○

Για τί άλλα πράγματα δείχνει ενδιαφέρον το παιδί σας;

* 13. Πιστεύετε πως το παιδί σας έχει ιδιαίτερο ταλέντο σε κάτι από τα παρακάτω;

- ☐ Στις Τέχνες
- ☐ Στα μαθηματικά
- ☐ Στους υπολογιστές και την τεχνολογία

- ☐ Στους υπολογισμούς και στο να θυμάται ημερομηνίες
- ☐ Στην απομνημόνευση (π.χ. ποιήματα, λίστες)
- ☐ Στην μουσική
- ☐ Σε κάτι άλλο
- ☐ Το παιδί μου, προς το παρόν, δεν παρουσιάζει κάποιο ιδιαίτερο ταλέντο

Τι άλλα ιδιαίτερα ταλέντα έχει το παιδί σας

***** 14. Δείχνει το παιδί σας ιδιαίτερο ενδιαφέρον για τη μουσική;

- ○ Πολύ
- ○ Λίγο
- ○ Καθόλου

***** 15. Πιστεύετε πως η μουσική ήταν ή είναι σημαντική για το παιδί με κάποιον από τους παρακάτω τρόπους;

	Καθόλου	λίγο	πολύ
ως κίνητρο	◉	○	○
ως πηγή ανακούφισης	○	○	○
για να ενθαρρύνει την επικοινωνία	○	○	○
για να ενθαρρύνει την κοινωνικοποίηση	○	○	○
για να υποστηρίξει την κατανόηση (π.χ. μέσω τραγουδιών που αναφέρονται σε αριθμούς, ημέρες της εβδομάδας κ.α.)	○	○	○
για τη σηματοδότηση γεγονότων της καθημερινής ρουτίνας	○	○	○
με άλλους τρόπους	○	○	○

Με ποιούς άλλους τρόπους είναι η μουσική σημαντική για το παιδί σας;

***** 16. Έχει το παιδί σας κάποιο αγαπημένο κομμάτι ή είδος μουσικής;

- ○ Ναι
- ○ Όχι
- ○ Δεν είμαι σίγουρος/η

Παρακαλώ πείτε μας για τις μουσικές προτιμήσεις του παιδιού σας

***** 17. Είναι η μουσική σημαντική για το παιδί σας σε συγκεκριμένες στιγμές, μαζί με συγκεκριμένες δραστηριότητες, σε συγκριμένα μέρη ή σε σχέση με συγκεκριμένα άτομα;

- ○ Ναι
- ○ Όχι
- ○ Δεν είμαι σίγουρος/η

* 18. Όταν συμμετέχετε σε κάποια καθημερινή δραστηριότητα με το παιδί σας, πιστεύετε πως η μουσική (ακρόαση μουσικής, τραγούδι ή παίξιμο μουσικής) αλλάζει το πώς νιώθετε εσείς και το παιδί σας;

- Ναι
- Όχι
- Δεν είμαι σίγουρος/η

Παρακαλώ περιγραψτε το πώς η παρουσία μουσικής επηρεάζει το πώς νιώθετε εσείς και το παιδί σας κατά τη διάρκεια καθημερινών δραστηριοτήτων

* 19. Έχει κάνει ποτέ το παιδί σας Μουσικοθεραπεία;

- Ναι
- Όχι

Παρακαλώ μιλήστε μας για την εμπειρία του παιδιού σας με την Μουσικοθεραπεία

* 20. Πώς θα περιγράφατε τις μουσικές δυνατότητες του παιδιού σας;

- Όχι όσο ανεπτυγμένες θα περιμένατε από ένα παιδί στην ηλικία του παιδιού σας
- Όπως θα περιμένατε από ένα παιδί στην ηλικία του παιδιού σας
- Περισσότερο ανεπτυγμένες από ότι θα περιμένατε από ένα παιδί στην ηλικία του παιδιού σας
- Εξαιρετικά ανεπτυγμένες για την ηλικία του παιδιού σας

* 21. Παίζει το παιδί σας κάποιο μουσικό όργανο;

- Ναι
- Όχι

22. Ποιά μουσικά όργανα παίζει το παιδί σας και σε τί επίπεδο;

Σε επίπεδο αρχάριου	
Σε μεσαίο επίπεδο	
Σε προχωρημένο επίπεδο	

Παρακαλώ μιλήστε μας για το παίξιμο του παιδιού σας και δώστε μας παραδείγματα

* 23. Το παιδί σας διαβάζει νότες;

- Ναι
- Όχι

* 24. Το παιδί σας μαθαίνει με το αυτί;

- Ναι
- Όχι

* 25. Έχει το παιδί σας ιδιαίτερο ταλέντο στο τραγούδι;

- Ναι
- Όχι

Παρακαλώ μιλήστε μας για το ταλέντο του παιδιού σας στο τραγούδι

* 26. Κάνει το παιδί σας μαθήματα μουσικής;

- Ναι
- Όχι

Παρακαλώ μιλήστε μας για τα μαθήματα μουσικής του παιδιού σας

* 27. Κατά μέσο όρο, κάθε πόσο κάνει το παιδί σας κάτι από τα παρακάτω;

	για 0-1 ώρα την ημέρα	για 1-2 ώρες την ημέρα	για 2-3 ώρες την ημέρα	για περισσότερο απο 3 ώρες την ημέρα	αρκετές φορές την εβδομάδα	σπάνια
Παίζει μουσική						
Ακούει μουσική						
Τραγουδά						

* 28. Το παιδί σας παίζει μουσική ή τραγουδά με δική του/της πρωτοβουλία ή μόνο όταν το προτείνει κάποιος;

- Με δική του/της πρωτοβουλία
- Όταν το προτείνει κάποιος

* 29. Έχει το παιδί σας απόλυτο αυτί;

Τα άτομα που έχουν απόλυτο αυτί έχουν εξαιρετική μνήμη για τις μουσικές νότες. Αυτό μπορεί να φανεί μέσω της ικανότητας τους να τραγουδούν μία νότα όταν τους ζητηθεί χωρίς να πρέπει να ακούσουν κάποια άλλη νότα. Επίσης, πιθανόν να γνωρίζουν το όνομα μιας νότας απλά ακούγοντας την.

- Ναι
- Όχι
- Δεν είμαι σίγουρος/η

Παρακαλώ πείτε μας τι μπορεί να κάνει το παιδί σας (π.χ. να ονομάζει τις νότες, να επαναλαμβάνει νότες πάνω στο μουσικό όργανο, να παίζει ή να τραγουδά τραγούδια ξεκινώντας από την ίδια νότα και χωρίς συνοδεία, να τραγουδά πάντα σωστά)

* 30. Δημιουργεί το παιδί σας τη δική του/της μουσική;

- Ναι
- Όχι

Παρακαλώ μιλήστε μας για τη μουσική του παιδιού σας

31. Θα θέλατε να προσθέσετε τίποτα ακόμη σχετικά με το παιδί σας;

32. Εάν επιθυμείτε να λάβετε τα αποτελέσματα της έρευνας ή θα θέλατε να ενημερωθείτε για άλλες σχετικές έρευνες, παρακαλώ αφήστε μας τα στοιχεία επικοινωνίας σας

Όνομα	
Επώνυμο	
E-mail	

Άλλα στοιχεία επικοινωνίας ή σχετικά σχόλια

Συγχαρητήρια, ολοκληρώσατε το ερωτηματολόγιο!

Ευχαριστούμε πολύ για τον χρόνο σας! Εάν έχετε οποιοδήποτε ερώτημα σε σχέση με το ερωτηματολόγιο ή θα θέλατε να ενημερωθείτε για τα αποτελέσματα αυτής της έρευνας, μην διστάσετε να επικοινωνήσετε με την ερευνήτρια

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Appendix 5. Diagnosis of ASC

Until recently, five distinct Autism Spectrum Conditions (ASC) were recognised; Autistic Disorder or Classic Autism, Asperger Disorder, Pervasive Developmental Disorder – Not otherwise Specified (PDD-NOS), Rett's syndrome and Childhood Disintegrative Disorder. In the DSM-V (APA, 2013), however, ASC are presented as situated on a single Autism Spectrum. Rett's Syndrome is now detached from ASC and the remaining four disorders are incorporated into the diagnosis of ASC. While previously, in the DSM-IV (APA, 1994) diagnostic criteria were based on language challenges, social deficits and repetitive behaviour, language delay does not comprise a diagnostic criterion in the DSM-V (APA, 2013) as the development team did not feel it was consistent throughout the spectrum (APA, 2013).

More specifically, diagnosis of ASC is based on symptoms displayed in early childhood which cause impairment in the individual's everyday function (APA, 2013).The diagnostic criteria, according to the DSM-V (APA, 2013) refer to difficulties reciprocating social or emotional interaction, severe problems maintaining relationships and difficulties in understanding non-verbal communication, such as eye-contact, voice tone, posture, gestures. Additionally, the person must present at least two of the following behaviours: extreme attachment to routines and patterns and resistance to change, repetitive speech or movements, intense and restrictive interests, or difficulty integrating sensory information or strong seeking or avoiding sensory stimuli (APA, 2013).

AS, not included as a distinct disorder within the DSM-III (APA, 1980) and its nature still unclear in the DSM-IV (APA, 1994), as discussed above, is now included in the diagnosis of ASC (APA, 2013). The ICD-10 (WHO, 2010) however, does include AS as a distinct pervasive developmental disorder, the narrow and restrictive diagnostic criteria being the closest to Asperger's work. The ICD-10 (WHO, 2010) can been seen as more helpful towards understanding Asperger Syndrome (Ghaziuddin, Tsai & Ghaziuddin, 1992), but its criteria seem to exclude most individuals that practitioners would diagnose as having Asperger Syndrome (Wing, 2002).
Banrhill (2001) suggests a range of diagnostic criteria used for AS alone, with no universal agreement on the characteristics of AS. Additionally, knowledge on AS has been argued to result from clinical impressions rather than rigorous scientific investigations (Attwood, 1998), with a diagnosis often more likely to be given in specific regions (Howlin & Asgharian, 2007). Wing (2002) argues that in AS it is not essential for the individual to portray all characteristics, clumsiness and early pedantic speech being major features (Burgoine & Wing, 1983; Tantam, 1988; Gillberg, 1989), in spite of the DSM (APA, 2013) and ICD (WHO, 2010) criteria (Ghaziuddin, Tsai & Ghaziuddin, 1992). The criteria that Wing (1981) suggests are flexible and allow for the dual diagnosis of AS and Autism, independently of language and speech impairment (Wing 1981; Ghaziuddin, Tsai & Ghaziuddin, 1992), making differentiation between high functioning Autism and AS very problematic (Ghaziuddin, Tsai & Ghaziuddin, 1992). Further diagnostic criteria focus on theory of mind

impairments (Baron-Cohen, Leslie & Frith; 1985) or refer to other difficulties such as poor concentration or emotional instability (Williams, 1995).

This exceedingly wide range of diagnostic criteria for ASC and AS pose a challenge in obtaining a definitive diagnosis (Ghaziuddin, Tsai & Ghaziuddin, 1992), professionals themselves often caught in disagreement (Howlin & Asgharian, 2007) and impacts negatively on the implementation of relevant research. With mild symptoms often not diagnosed early (Banrhill, 2001; Howlin & Asgharian, 2007), it is likely that the diagnosis takes place later in life (Howlin & Moore, 1997; CDC, 2008), despite previous problems (Gillberg & Ehlers, 1998). AS, specifically, is diagnosed later than Autism (Barnhill, 2001), with the symptoms for more than half of these individuals ignored during school years (Ehlers & Gillberg, 1993). Parents' anxieties are sometimes dismissed by professionals, since children with AS have precocious vocabulary, particular knowledge of certain topics and reach developmental milestones, giving the impression of advanced development (Howlin & Asgharian, 2007). Moreover, symptoms are often attributed to inadequate parenting or emotional problems and linked with diagnoses of ADD (Wolff & McGuire, 1995).

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Appendix 6. Prevalence and causation of ASC

In the past, ASC were perceived as rare (Rice, Rosannoff, Dawson, Durkin, Croen, Singer & Yeargin-Allsopp, 2012) affecting one in 2000 individuals (Fombonne, 2009). During the 90s, however, concern arose in regards to increase in autism-related diagnoses (Cavagnaro, 2009; Bertrand, Mars, Boyle, Bove, Yeargin-Allsopp & Decoufle, 2001; Yeargin-Allsopp, Rice, Karapurkar, Doernberg, Boyle & Murphy, 2003) and there has since been extensive research suggesting increasing prevalence of ASC (Kim, Szatmari, Bryson, Streiner & Wilson, 2000).

In 1998 ASC were found to be present in one in 10000 live births (Fombonne, 1997), In 2009 ASC were shown to affect 1 in every 91 people in the U.S. and 1 in 58 boys (Autism Speaks, 2009), as the prevalence of ASC in males is significantly higher (CDC, 2008). Furthermore, in 2012, 1 in 88 people and 1 in 54 boys in the U.S.A were reported as having an autism related condition (CDC, 2008), while currently, in 2013, ASC are believed to affect 1 in 50 individuals (CDC, 2008). According to the National Autistic Society (2013), and based on research by Baird G. et al., (2006) there are currently at least 700,000 people in the UK diagnosed with ASC, affecting them and their families, in sum potentially 2.7 million people. This increase in numbers must not be fully attributed to an increase in prevalence, however, since statistics are inevitably influenced by increased awareness, identification, access to diagnostic services and the broadening of diagnostic criteria (Baird et al., 2006). The largest increase over time has been identified among Hispanic children (110% increase) and black children (91%), possibly due again to enhanced awareness (CDC, 2008). An actual increase in prevalence may also be present (Rutter, 2005; Rice, Rosanoff, Dawson, Durkin, Croen, Singer & Yeargin-Allsopp, 2012), its true size, however, is currently unknown. A large-scale study was recently commissioned in the UK in order to obtain accurate figures of ASC prevalence, however, due to challenges concerning the diversity within ASC populations and disparity in diagnostic judgement its findings remain unknown (Jones, English, Gulberg, Jordan, Richardson & Waltz, 2008).

As discussed, despite much ongoing research aiming to obtain better understanding of the syndrome and its potential causes (Fang, 2009; Hill & Frith, 2003), there are still difficulties in the definition of ASC. Furthermore, increased recognition of severe and mild forms and the widening of the spectrum boundaries have resulted in an increased number of ASC diagnoses (Frith, 2003; Fang, 2009; Allgood, 2005; Charman, 2002; Wing & Potter, 2002), possibly also altering the nature of the ASC population.

Concerning the causation of ASC now, developments in research take place every day, the main two pathways being genetic origin and environmental influence, potentially including heritability (Bailey et al., 1995; Folstein & Rutter, 1977, 1988, Gillberg, 1991). There is currently also overwhelming evidence for a biological and genetic component in ASC, possibly affecting brain systems, which acting together with, yet unknown, environmental factors

lead to ASC (Bailey et al., 1996). Several environmental triggers are being studied, such as illness during pregnancy, child illness, food intolerance, reaction to vaccination and pollutants, it is difficult, however, to separate true causes from concurrent events. Recent research (Poelmans, Franke, Pauls, Glennon & Buitelaar, 2013) suggests that specific antibodies in maternal blood interfere with development during pregnancy, their presence possibly able to predict ASC with 99% certainty. Specific brain regions, such as the cerebellar cortex and areas dominated by granule cell neurons, are also being explored as implicated in the pathology of ASC (Cold spring harbour laboratory, 2013). Causation may possibly be related to the significantly higher prevalence of ASC in males as well, with research currently exploring gender differences in ASC (CDC, 2008).

Following the discussion concerning the definition, diagnosis, prevalence and causation of ASC, it becomes clear that this is a subject which requires much further research. While diversity in the ASC population and disparity in diagnoses comprise obstacles for future research, the significant increase in prevalence and the lack in current understanding of ASC dictate the need of long-scale scientific efforts to enhance knowledge and practices related to ASC.

Asperger Syndrome has been specifically said to be present in 36 per 10000 births (Ehlers and Gillberg 1993), or even 48 per 10000 (Kadesjo, Gillberg, & Nagberg, 1999), possibly more frequently diagnosed in older age groups due to the mild nature of related symptoms (Howlin &, Asgharian 2007).

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Appendix 7. Savant syndrome

When discussing the issue of ASC, one comes across extensive literature concerning what is currently described as the "Savant Syndrome". The subject of savantism, whilst present since the 18th century, only began to be studied empirically in the 1980s (Heaton & Wallace, 2004), with the great diversity of savant populations and abilities posing a challenge to researchers (Heaton & Wallace, 2004). Savants are described as intellectually impaired individuals (Peretz, 2001; Heaton & Wallace, 2004), who show contrasting outstanding abilities within specific domains, such as music, art, calculation, or memory (Heaton, 2003; Hill, 1974; Brink, 1980; Hoffman & Reeves, 1979; Dowker, Hermelin & Pring, 1996; Smith & Tsimpli, 1995). The initial term used was "idiot-savant" (Down, 1887), with Jebediah Buxton, born in 1702, being one of the first savants to be reported (Smith, 1983). More recent terms include "monosavant" (Charness, Clifton & MacDonald, 1988) and "savant syndrome" (Heaton & Wallace, 2004). All terms, however, according to Heaton and Wallace (2004), fail to adequately reflect the "paradoxical nature of this intriguing syndrome" (2004:899) and there is an ongoing debate about what constitutes a "savant skill" and how the juxtaposition of skills and disability should be assessed (Heaton & Wallace, 2004).

Savant abilities, such as those discussed above, can be seen to challenge current perceptions of intelligence (Nettelbeck & Young, 1996), despite being seen as reflecting purely localized knowledge (Heaton & Wallace, 2004) as opposed to general intelligence (Spitz, 1995). Many theories endeavour to explain the roots of these outstanding savant abilities. Treffert (1989), in his neuropsychological model proposed that savant skills are mediated by the right hemisphere of the mind, resulting in single-mindedness and high subject-specific interest. This single-mindedness of savants, accompanied by great investment of time and effort in their specific area of interest, could possibly explain their exceptional abilities (Ericsson & Faivre, 1988). The outstanding commitment that savants show towards their area of interest may possibly enhance the possibility for talent to emerge through extensive practice (Heaton & Wallace, 2004) and facilitate high-level skill development (Asperger, 1991).

Regarding the areas, now, in which savant skills flourish, Miller (1989) suggests that they are governed by high internal structure and apparent rules (Heavey, Pring & Hermelin, 1999; Miller, 1989; Nettelbeck & Young, 1996; O Connor & Hermelin, 1987; Sloboda, Hermelin & O' Connor, 1985). These rules seem to be understood, if only implicitly, by savants (Heaton & Wallace, 2004). One such area is music, with its harmonic structure being governed by predictable key relations (Sloboda, 1985), the knowledge of which underpins the musical savant's talent (Heaton & Wallace, 2004).
Even though savant skills seem to be, to some extent, independent from general intellectual functioning (Heaton & Wallace, 2004), empirical data has also shown that savant skills are supported by general memory and information processing mechanisms (Nettelbeck & Young, 1996; Anderson, O' Connor & Hermelin, 1999). Exceptional rote memory abilities have been noted

in savants by Hill (1978) and intact procedural memory, implicit memory and right-hemisphere functioning has been found in individuals with ASC (Kamio & Toichi, 2000; Renner, Klinger & Klinger, 2000; Toichi & Kamio, 2001; Treffert, 1989). Most importantly and moving away from exceptional memorizing talent, however, savantism reflects enhanced or spared ability to represent and manipulate domain-specific information towards generating new output (Heaton & Wallace, 2004; Treffert, 1989).

Mottron and Burack (2001), in their Enhanced Perceptual Functioning (EPF) theory, adopt a more developmental approach, suggesting that savant skill development is connected to the dichotomy between domain-specific low-level processing mechanisms and general higher-level processing mechanisms. They propose that individuals with ASC have overdeveloped low-level perceptual abilities through compensatory action, leading to restricted interests (Mottron & Burack, 2001) and deficiency in general higher-level cognitive mechanisms (Heaton, 2003). While this approach can possibly explain why savant skills mostly involve associating, combining and matching visual or auditory stimuli (Heaton & Wallace, 2004) and is supported by the various studies (Heaton, Hermelin & Pring, 1999; Mottron, Peretz & Menard, 2000) it, nevertheless, fails to account for several savant individuals and their abilities described in relevant literature (Heaton & Wallace, 2004).

Whilst savant skills are undoubtedly remarkable and out of the ordinary, Waterhouse (1988) goes further, suggesting that these skills may also be qualitatively different from those of non-savants. He believes that savantism is a result of a specific set of memory and processing mechanisms regarding sound and visual representations (Waterhouse, 1988). From this perspective, savants are seen to generate and elaborate on complex mental representations, which are governed by regularities or strong structural elements, as suggested by Miller (1989). Furthermore, it is claimed that the development of savant skills is genetically driven and based on a process of cortical rededication, which allows areas of the brain to be used for alternate purposes (Waterhouse, 1988), resulting in a rise in skill level.

Discussing, now, the relationship between ASC and the Savant Syndrome, the existence of a strong link between these two areas has been proposed, with savantism highly more prevalent in autistic populations than in those with other disorders or in typically developed persons (Heaton & Wallace, 2004). The true prevalence of savantism in populations with ASC, however, remains unknown (Heaton & Wallace, 2004). Savantism has been closely associated with ASC by many, such as Rimland and Hill (1984) and Young (1995), while the link between ASC and music savantism in particular has been described as inextricable (Heaton & Wallace, 2004). Research carried out by Rimland (1978) proposed that 9.8% of the autistic population studied were identified as savants, whilst in Hill's (1977) research on intellectually impaired populations, only .06% of the population could be considered savants. Even taking under consideration the probable difference in the definition of "savantism" and the possibility of bias, these findings are still indicative of a potential relationship between ASC and savantism. The abovementioned features and abilities of

ASC populations, such as to focus on detail when processing information (Happé, 1999; Heaton & Wallace, 2004), could provide an explanation for the overrepresentation of people with ASC in savant populations (Heaton & Wallace, 2004).

As expected, therefore, not all individuals with ASC can be considered savants (Rimland, 1978). Only 1 in 10 individuals with ASC has been found to posses savant skills (Hill, 1977; Rimland, 1978), only 10% of the population performing as well as expected (Heaton et al., 2008); this may suggest that savants represent a particular genetic group within ASC, whose members can perform independently of intelligence, training and experience (Nurmi et al., 2003; Heaton et al., 2008). Furthermore, the high heterogeneity within ASC populations may result in significant and uncontrolled variation in research concerning ASC and savantism (Heaton et al., 2008).

Links to ASC have not only been shown through savants diagnosed with ASC, but also in non-autistic savants and possibly typically developing musicians. Young (1995), suggests that "autistic-like" features and behavioural traits may also be present in non-autistic savants as well, possibly indicating the existence of an association between savant syndrome and autistic behaviour (Heaton & Wallace, 2004). In Young's (1995) large-scale study of non-autistic savants, many behaviours related to ASC were observed. Additionally, Miller (1989) claimed that there is frequent reference to autistic behavioural traits in case studies of savants with complex disabilities, while Brown et al. (2003) suggest that autistic features have also been noted in high achieving musicians.

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Appendix 8. Absolute pitch

ASC are also often associated with the presence of absolute pitch (AP), namely the ability to produce or identify specific pitches without reference to other notes (Baggaley, 1974). AP is observed once in 10 thousand people (Profita & Bidder, 1993) and in 1 in 20 professional musicians (Ockelford, 2013) and has been related to differences at a neurological level (Heaton, 2003) and early music instruction (Sergeant, 1969). People with ASC seem to have a distinctly higher probability of possessing AP, even as high as 1 in 20 (Ockelford, 2013), as AP has been associated with enhanced featural processing abilities (Happé, 1999). There is a growing body of research which explores the association of ASC and AP (Bonnel et al., 2003; Heaton et al., 1998); Frith (2003), for example suggests that AP in individuals with ASC can be seen as an example of unusual focus on the elements of melody, due to their exceptional local processing abilities discussed above. An important element in the musical abilities of savants is AP, and according to Heaton (2003), Miller (1989) and Mottron et al., (1999), musical savants always possess AP, which offers an advantage not only in remembering and naming individual tones, but also in recognising tones which are embedded in complex tone clusters (Miller, 1989).

AP has been said to have an important effect on musical cognition, with notes often processed outside the gestalt rules which support musical harmony (Krumhansl et al., 2000; Miller, 1989). However, as discussed above, people with ASC, have also been found to be able to process pitch within the context of gestalt musical harmony (Heaton & Wallace, 2004). Furthermore, aside from isolated cases of musical savants with ASC, individuals with ASC also have a more accurate pitch perception (Heaton, 2005; Jarvinen-Pasly & Heaton, 2007) and pitch memory (Heaton, 2003; Heaton, Hermelin & Pring, 1998) on average than the general population (Juslin & Sloboda, 2010), whether this is defined as AP or simply described as more efficient pitch processing.

AP in ASC populations has been extensively studied. However, most research examines pre-specified populations and specific musical components, taken out of context of everyday musical experiences or general

musical behaviour and engagement. This study seeks to explore the subject of AP in ASC populations, as well as its possible relationship with other musical behaviours, within the context of everyday musical engagement.

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Appendix 9. Current provision for children with ASC in the UK

Within this discussion of the development of musical abilities of children with ASC, a reference to educational provision is required, as formal and informal education undoubtedly influence a child's development, let alone a child diagnosed with ASC. According to the Equality Act of 2010, children with ASC, an approximate 6% of all children (Department of Education, 2011), are classified as disabled. Within the last 5 years a 23% increase of students with behavioural, emotional and social difficulties, and a 58% increase of pupils with further speech, language and communication needs have been noted (Department of Education, 2011).

Furthermore, following the increasing prevalence of ASC and the broadening of the diagnostic category, a 61% increase in pupils with ASC was found (Department of Education, 2011). Furthermore, it is estimated (ACER[59], 2012) that approximately 1/3 of pupils with ASC also face learning difficulties and 2/3 are of average or above average intellectual ability, with any additional difficulties effecting the pupils' ability to focus in class (ACER, 2012). Research has gone so far to suggest that there are more than 250 children with ASC and 200 children with learning difficulties at any one time within a local area in the UK (NIASA[60], 2003). To make matters worse, reports suggest an increase in disabled young people being excluded from education, employment and training, reaching 15% in 16 year-olds and 29% in 18 year-olds (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008).

In this context, provision is of great significance, as it can enhance well-being independently of diagnosis or abilities (Lawson, 2013). Given the appropriate support, children with special needs, or ASC specifically, can flourish, but otherwise may become depressed and isolated (Lawson, 2013). Children with ASC need explicit teaching in subjects which fall outside general curricular needs due to atypical development, increasing the need for staff understanding and acceptance, whilst sensory processing, transitions and contact with peers can pose a challenge (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008). Consequently, various reports have indicated that the current educational outcomes for children with special educational needs[61] (SEN) and ASC in particular, can and should be significantly improved. Therefore, there is a need for greater understanding and awareness amongst teaching staff, protecting from the risk of exclusion from school (Wittemeyer et

[59] Throughout this study the Autism Centre for Education and Research is referred to as ACER for ease of communication

[60] Throughout this study the National Initiative for Autism Screening and Assessment will be referred to as NIASA for ease of communication

[61] Special educational need categories are: specific learning difficulty, moderate learning difficulty, severe learning difficulty, profound and multiple learning difficulty, behavioural, emotional and social difficulties, speech, language and communications needs, hearing impairment, visual impairment, multi-sensory impairment, physical disability and autistic spectrum disorder.

al., 2011). School may be a challenging environment for children with ASC due to social demands and sensory overload (Jones, 2002), while, due to diversity within ASC populations, each individual has different levels of needs, such as in relation to communication, social understanding or help with basic everyday tasks (Department of Education, 2011). Each child with ASC has unique strengths and weaknesses, no one approach suitable for all children (Kern 2002). All, however, have the same need to be loved, stimulated and educated (Aldridge et al., 2000), despite potentially not possessing the pre-academic and social skills that are often required by formal education (Rostohar, 2006). Accordingly, it is suggested that staff focus on the needs of the individual pupil and not their diagnosis, whilst taking advantage of their great interest in specific areas (NIASA, 2003).

Following the abovementioned change in the profile of students going into education, further actions must be taken to ensure access to appropriate support and provision where needed, as children with ASC need an education that will enable them to learn what other children may acquire naturally and intuitively (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008).
In the UK, currently there exists a wide range of educational and other provision for children and young people with ASC, largely depending on the local authority involved (Jones, 2002). Educational provision, in particular, includes mainstream schools, generic special schools, schools or units specialised in ASC, schools for pupils with SEN, home-based programmes, outreach programmes and special individualised programmes for children not attending school (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008). While this wide range allows variation in provision and personalisation, but can lead to confusion and parental distress, resulting in a need for clear guidelines on local practices (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008). Furthermore, with support of people with ASC annually costing the British government at least £1 billion (Jarbrink & Knapp, 2001), it is essential for decisions to be made to ensure equal and fair access to provision and consider how resources could be spent more effectively and equitably across the ASC population (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008).

For this reason, The Specialist Schools and Academies Trust and the British Department of Education initiated a large-scale research project, engaging parents and teaching staff in devising and implementing new approaches to teaching pupils with complex needs (Department of Education, 2011). Furthermore, collaborations were set up between relevant voluntary sector Trusts, such as the Autism Trust and the Dyslexia Trust, to provide specialist advice and support to parents and educators (Department of Education, 2011). The Autism Education Trust (AET) was set up in 2007 to support better education for children with ASC.

Despite efforts to increase provision and support quality, research has shown that service planning for the needs of individuals with ASC is insufficient to meet the current prevalence, leaving many needs unmet (Jordan & Jones, 1996; Reid & Batten, 2006). Research conducted by the AET found that

pupils with ASC want a calm, structured and predictable education environment, clarity throughout the day and to be consulted about decisions on their education, while their parents wanted to have more information about ASC and their options for support, a better implementation of plans and advice, an open approach for parental involvement in school, and recognition that they know what their children need. Further studies found that the children themselves wish to have access to natural light, spacious classrooms and comfortable furniture, a clean, fun and "green" school with prepared, friendly and knowledgeable teachers, with low quality provision having an adverse impact on their well-being and mental health (Williams & Hanke, 2007).

At the moment, pupils can attend a mainstream school, a special school or one with a specific ASC unit (Department of Education, 2011; Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008). Given the numbers of pupils with ASC, however, 90% attend a mainstream or generic special school (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008) not always with success (Barratt & Thomas, 1999; Parker, 2000). Within mainstream schools, pupils with ASC are either included, inclusion being the process of identifying and understanding leading to participation and belonging or integrated, with crucial adjustments in order to address the student's needs (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008). Inclusion, though, requires staff training and effort to ensure genuine inclusion and building of relationships (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008), an effort needed on top of the significant challenge of meeting the needs of pupils with ASC within the context of the National Curriculum (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008).

Currently most educational establishments seem to focus on social and linguistic issues, using visual strategies and technology (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008), possibly overlooking the significant role of sound and music examined in this study. Specific schools or units for pupils with ASC have also been established and provide specialist support, however, separating pupils from typical peers may not always be beneficial or appropriate (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008). Specialist schools are also often located at a great distance from home and teach an often restricted curriculum (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008).

Consequently, local authorities have made extensive efforts to establish outreach advisory teams during the last decade, in order to provide support to mainstream, and special schools working with pupils with ASC (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008). Parent carer councils have also been formed by parents to support their child's progress, with parent participation bringing about positive change in how parents and statutory services work together (Department of Education, 2011). For example, the parent carer council set up in Wiltshire in 2008 has initiated the development of arrangements for multi-agency support for young people with ASC moving into adulthood (Department of Education, 2011).

Through this discussion, it becomes clear that the diversity and range of educational provision available for children with ASC is wide, possibly confusing parents and carers. Similarly, in regards to adults with ASC there are adult services and relevant provision (Department of Education, 2011). However, there seems to be a gap in service provision for adolescents and young adults with ASC, as well as a lack of clarity concerning early intervention for children under the age of 5 which becomes critical given the increase in prevalence of ASC (Waterhouse, 2008; Hillier, Greher, Poto & Dougherty, 2012).

Apart from educational provision, the access to therapy, both within educational settings and externally, is another importance issue. In regards to music therapy in particular, research suggests that there are many discrepancies. Access has been argued is dependent on location, with Northern Ireland having limited access (Bracefield, Michael Kirk-Smith, Slevin, Sutton & Thompson, 2000), despite high prevalence of learning difficulties in the country (Mallon, 2008). With London having the largest number of trained music therapists, Northern Ireland, Wales and Scotland are left with gaps in provision (Bracefield, Michael Kirk-Smith, Slevin, Sutton & Thompson, 2000), especially in rural areas, once more despite the high rates of people with learning difficulties (DHSS, 1995). It seems, thus, that areas which could possibly benefit more from music therapy are lacking this provision, possibly due to financial constraints (Bracefield, Michael Kirk-Smith, Slevin, Sutton & Thompson, 2000). This gap in provision seems to be covered partly by informal use of music by other professionals, health services or education, who feel music can be beneficial (Bracefield, Michael Kirk-Smith, Slevin, Sutton & Thompson, 2000).

Following this discussion of provision for children with ASC in the UK, it becomes clear that further research on potential models of provision is required, as well as an extensive exploration of what provision is needed, taking into serious consideration the views of professionals, carers and children with ASC. Extensive reports on the long-term efficiency of provision is required (Jones, English, Guldberg, Jordan, Richardson & Waltz, 2008), especially when concerning early years or young adulthood. Furthermore, comprehensive study of the use of alternative methods educational methods is needed, given the abovementioned discussion on musical interest in children with ASC. Music could provide a fun, engaging and efficient medium within educational provision, as well as therapy, and this study aims to provide relevant insight through exploring the children's musical abilities and interests.

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[62] Throughout this study the National Initiative for Autism Screening and Assessment will be referred to as NIASA for ease of communication.

Appendix 10. Further special needs

Category of special needs	Number of participants who reported having this further special need
motor difficulties	12
sensory processing difficulties	20
developmental or cognitive delay	10
learning difficulties	15
further learning support needs	3
attention or hyperactivity disorders	23
anxiety disorders	10
OCD	5
sleep related difficulties	4
impulse control and behavioural difficulties	9
diet related difficulties	6
language and communication difficulties	19
epilepsy	4
other difficulties or illnesses	27
non verbal	9

Appendix 11. Participant interests

Interested in:	Not at all	A little	A lot
Lists of items	61 (48,80%),	34 (27,20%)	30 (24,00%)
Dates	76 (60,80%)	25 (20,00%)	24 (19,20%)
Numbers	40 (32%)	42 (33,60%)	43 (34,40%)
Everyday sounds	72 (57,60%)	29 (23,20%)	24 (19,20%)
Music	8 (6,40%)	34 (27,20%)	83 (66,40%)
Other	22 (17,60%)	15 (12,00%)	88 (70,40%)

Categories of interest reported by respondents within the "other" category	How many participants demonstrate this interest
Movies and TV	31
Transport-related	24
Internet activity and video games	23
Creative/art	21
Science, natural environment, geography	20
Reading and literacy	19
Music and sound	17

Physical	17
Sensory	15
Technology, computers and gadgets	14
Repetitive	13
Toys and games	9
History and historical facts	8
Other people	5
Number-related	4
Machines and engines	4

Appendix 12. Participants' talents

Talent in:	**yes**	**No**
Art	20 (16,00%)	105 (84,00%)
Mathematics	28 (22,40%)	97 (77,60%)
Computers and technology	53 (42,20%)	72 (57, 60%)
Calculating and remembering dates	18 (14,40%)	107 (85,60%)
Remembering (e.g. poems or lists)	47 (37,60%)	78 (62,40%)
Music	57 (45, 60%)	68 (54, 40%)
other	25 (20%)	100 (80%)
My child has not yet shown a specific talent	23 (18,40%	102 (81,60%)

Talent category reported through the "other" category	**How many participants are seen to demonstrate this talent**
Memory-related talents	12
Creative	12
Language	8
Construction	7
Music	6
Literacy	6
Science, history, natural environment	5
Physical	4
General positive traits	4
Transport	2
Sensory	2

Appendix 13. Music preference

Theme emerging from responses concerning music preference	How many replies were given that highlighted this topic
Current popular music and classics	41
Classical	19
Traditional/national	7
Hard rock	7
Electronic music	6
Other	9
Other indications	
Specific element of music	19
Specific artist or song	28
Related to person or activity	27
Lyric-related	2
Internet-related	4
Obsession	6
Broad or changing preferences	14
Dislikes	5

Appendix 14. Ways that music is important in everyday life

music is important for your child	Not at all	A little	A lot
As a source of stimulation and motivation	19 (15,70%)	36 (29,80%)	66 (54,50%)
As a source of comfort	9 (7,40%)	36 (29,80%)	76 (62, 80%)
To promote communication	35 (28,90%)	42 (34,70%)	44 (36,40%)
To promote socialisation	34 (28,10%)	49 (40, 50%)	38 (31, 40%)
To promote understanding (e.g. through songs with numbers, counting, days of the week)	37 (30,60%)	41 (33,90%)	43 (33,50%)
To mark out events in the daily routine	66 (54,60%)	39 (32,20%)	16 (13,20%)
In other ways	53 (43,80%)	24 (19,80%)	44 (36,40%)

Themes emerging when analysing further responses on importance of music in everyday life	Number of relevant responses
For enjoyment and pleasure	22
Relaxation, reduction of anxiety, comfort	19
Communication and expression of feelings	14
For learning and understanding	10
Emotional regulation and mood enhancement	9
For socialisation and belonging	8
Play music	7
Sense of control	7
Accompanying or marking out other activities	7
To increase self-esteem and sense of achievement	6
Negative feelings caused	5
To pass time and fight boredom	5
For motivation	5
Repetitive/obsession	5
Distraction	4
In public or transport	3
In therapy	2

Appendix 15. Importance of music in specific situations

Theme emerging from responses	Number of relevant responses
Relax, calm and comfort	19
Regulation	13
structure/mark out events/routine	12
Transport/transition	11
In socialisation	11
At school/education contexts	11
Fun/enjoyment	10
Alone	7
With family and bonding	5
Negative	4
In groups	3
Motivation	2

Appendix 16. The effect of music on emotions in everyday activities

Theme emerging from responses	Number of relevant responses
Makes happy/positive feelings	26
Calms/relaxes	24
Negative/challenges/difficulties	13
Focuses/engagement	12
Helps Socialisation/bonding	10
Distracts	6
Helps communication/expression	6
Helps Motivation/enthusiasm	5
Transition/transport	3
Regulates mood	3

Appendix 17. Music provision

Themes emerging from description of music therapy	Number of relevant responses
Helps social skills, bonding and communication	4
Helps overall learning	2
Negative/challenges	5
Unsure/not therapy	12

Themes emerging from description of music education	Number of relevant responses
At school	18
External	8
Instrument-related	21
Vocal	3
Music theory	1
Unspecified	4

Appendix 18. Playing musical instruments

Themes emerging from description of playing musical instruments	Number of relevant responses
play independently or are self-taught	14
have stopped playing due to external reasons or own choice	5

enjoy playing independently of musical ability	16
face negative feelings or challenges related to playing	16
play at school or have structured music lessons	21

Appendix 19. Singing

Theme emerging from responses describing the participants' singing talent	**Number of relevant responses**
In tune and correct singers	23
Enjoy singing independently of ability	8
Singing is beneficial	2
Face challenges or negative feelings related to singing	10

Appendix 20. Music creation

Themes emerging from descriptions of music creation	**Number of relevant responses**
Make up songs, rhymes or pieces	23
Mostly create rhythms	3
Write lyrics	8
create music while playing on instruments	13
replicate and change known songs	7

Appendix 21. Time spent in engagement with music

Activity\time spent	For more than 3 hours a day	For 2-3 hours a day	For 1-2 hours a day	For 0-1 hours a day	Several times a week	Rarely
Play music	2 (1,70%)	2 (1,70%)	7 (5,90%)	39 (33%)	16 (13,60%)	52 (44,10%)
Listen to music	21 (17,80%)	17 (14,405)	36 (30,50%)	22 (18,60%)	14 (11,90%)	8 (6,80%)
sing	9 (7,60%)	11 (9,30%)	20 (16,90%)	33 (28%)	18 (15,30%)	27 (22,90%)