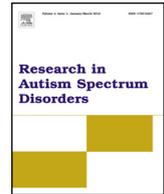




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The use of music to engage children with autism in a receptive labelling task

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ABSTRACT

Children with autism are less engaged with social and non-social objects and activities than their typically developing peers, resulting in reduced learning opportunities. There is some support for the use of music to enhance the engagement of children with autism but there has been little research investigating the use of music to engage children in language learning tasks and determining if this impacts on learning outcomes. This study investigated the use of music to engage children with autism in a receptive labelling intervention. Twenty two children (mean age 5.9 yrs) participated in a randomised controlled cross-over design comparing sung and spoken conditions embedded into a computer based intervention. Child performance and observational data were analysed to determine relationships between music, engagement and learning outcomes. The findings from this research showed children with autism were more engaged in the sung condition compared to the spoken condition although there was considerable variability in levels of engagement between participants. Furthermore, a correlation between engagement and learning was found. Implications of these findings are discussed and recommendations made for future research.

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1. Introduction

Promoting and supporting engagement for children with Autism Spectrum Disorder (ASD) is viewed as a critical feature of effective learning interventions (Corsello, 2005; National Research Council, 2001). Children with ASD spend less time engaged in social and non-social activities than their typically developing peers and children with other developmental disabilities resulting in reduced learning opportunities (Kishida & Kemp, 2006; McWilliam & Bailey, 1995; Ruble & Robson, 2007). Identifying ways to promote engagement has been complicated by the variety of interpretations and definitions of engagement in the research literature. This is possibly due to the multidimensional construct of engagement combining behavioural, emotional and cognitive components (Fredricks, Blumenfeldm, & Paris, 2004; Keen, 2009). In learning programmes, engagement is generally assessed in behavioural terms and refers to an individual's sustained attention or appropriate interaction with people or objects in their environment (Hurth, Shaw, Izeman, Whaley, & Rogers, 1999; McWilliam & Bailey, 1995).

Engaging individuals with ASD in learning programmes may require deliberate manipulation of materials, activities and the environment. These include the use of activity schedules (Bryan & Gast, 2000); using motivational variables including the child's interests and preferences (Hurth et al., 1999; Rispoli et al., 2011) and providing choices (Ulke-Kurkcuoglu &

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Kircaali-Iftar, 2010); and treatment packages incorporating motivational variables (Koegel, Singh, & Koegel, 2010; Pelios, MacDuff, & Axelrod, 2003). Despite this there is still a limited understanding of engagement and how this can be promoted in learning tasks for children with ASD.

One way of increasing engagement that has been investigated is the use of music. When provided with auditory stimuli individuals with ASD have shown a preference for music over verbal stimuli (Blackstock, 1978; Buday, 1995). The use of music to target individual goals or skills has been classified as an emerging evidence-based practice in the USA National Standards Project (National Autism Center, 2009).

Literature pertaining to the use of music to facilitate engagement in children with ASD has focused predominantly in the area of social-communicative behaviours (Edgerton, 1994; Stephens, 2008; Wimpory, Chadwick, & Nash, 1995; Wimpory, Hobson, & Nash, 2007). Interventions have included the use of music to increase peer interactions (Kern & Aldridge, 2006) and to increase responsivity and the initiation and duration of social engagement between children with ASD and adults (Finnigan & Starr, 2010; Kim, Wigram, & Gold, 2009).

Music has also been used in interventions to decrease challenging behaviours that may interfere with learning and to increase task engagement. For example, music has been used effectively with one child with ASD to reduce problem behaviour and increase on task behaviour during stressful situations (Orr, Smith Myles, & Carlson, 1998). Improvement in on task behaviour has also been achieved by using music as a reinforcer (Gunter & Fox, 1993). The effectiveness of music as a reinforcer for on task behaviour may, however, be dependent on the characteristics of the task as Gunter and Fox (1993) found task performance improved on vocational but not academic tasks. It may be that academic tasks were considered less desirable than vocational tasks by participants in this study and that music was not sufficiently reinforcing in this context. While music may provide a more engaging learning environment for children with ASD, there has been little research into the use of music to engage children with ASD in language learning activities.

Carnahan and associates incorporated music in a daily small group language arts lesson to investigate engagement in a group of children including five children with ASD, over an eight-week period (Carnahan, Basham, & Musti-Rao, 2009; Carnahan, Musti-Rao, & Bailey, 2009). Lessons using interactive books with music led to higher levels of engagement compared to interactive books without music. Although engagement increased in the music context the authors did not report whether this impacted on the children's language learning during the activity. Buday (1995) found language learning increased when manual signs were taught in a song compared to a spoken context. Engagement was not measured in this study although the author made a personal observation that task engagement appeared to increase during the song condition. To date, research indicates that music may have the potential to facilitate engagement but no studies have considered the relationship between music, engagement levels and language learning outcomes.

The limited research investigating the use of music to engage children with ASD in interventions to facilitate language acquisition is perhaps surprising considering speech used during infancy is sometimes referred to as 'musical' (Malloch, 1999; Trainor, Clark, Huntley, & Adams, 1997; Trehub & Nakata, 2001–2002). Terms such as 'motherese', 'babytalk', or 'infant-directed speech', refer to the particular speech caregivers ubiquitously use with infants characterised by elevated pitch, wider pitch range, shorter and repetitive utterances (Fernald & Simon, 1984). This speech serves the function of gaining the infant's attention, conveying communicative intent and facilitating language acquisition (Fernald, 1989; Singh, Nestor, Parikh, & Yull, 2009; Trainor, Austin, & Desjardins, 2000). Infant-directed speech is more effective in engaging and maintaining the attention of infants than adult-directed speech and this pattern continues into their second year of life (Cooper & Aslin, 1994; McRoberts, McDonough, & Lakusta, 2009; Werker & McLeod, 1989). The affective and prosodic characteristics of infant-directed speech appear to serve an attention getting function (Papoušek, Bornstein, Nuzzo, Papoušek, & Symmes, 2000; Stern, Spieker, Barnett, & MacKain, 1983) with the exaggerated pitch aiding speech processing for the prelinguistic listeners (Fernald & Kuhl, 1987; Fernald & Mazzie, 1991). These features continue to be used by toddlers to aid in word recognition (Song, Demuth, & Morgan, 2010). Although children with ASD are less responsive to infant-directed speech than their typically developing peers, a relationship between the time children with ASD spend attending to audio presentations of infant-directed speech and their language performance has been reported (Kuhl, Coffey-Corina, Padden, & Dawson, 2005; Paul, Chawarska, Fowler, Cicchetti, & Volkmar, 2007). The relationship between attending to infant-directed material and language abilities may be dependent on the developmental age of the individual. Santarcangelo and Dyer (1988) found teenagers with ASD functioning at a developmental age below 3 yrs were more responsive to instructions delivered using speech characterised by infant-directed speech prosody compared to conversational speech. These studies raise the question of whether increasing the child's engagement with the affective and prosodic characteristics of infant-directed speech could result in improved language outcomes.

Characteristic features of infant-directed speech which include elevated pitch and slower tempo have also been noted in infant-directed song (Fernald, 1989; Trainor et al., 1997). Infant-directed song as with infant-directed speech also communicates affect and serves a function in regulating the young child's arousal state (Trainor, 1996; Trehub & Schellenberg, 1995; Trehub, Trainor, & Unyk, 1993). It would appear that pitch may impact on the infant's level of engagement with his/her external environment. Lullabies serve the purpose of soothing the infant and reducing their focus on the external world and tend to be sung at a lower pitch compared to playsongs that arouse the infant and increase their attention on their external world (Rock, Trainor, & Addison, 1999; Tsang & Conrad, 2010). In addition playsongs demonstrate a high rhythmicity highlighting the songs phrase structure (Trainor, 1996). Playsongs may therefore have the potential to increase engagement in learning activities and highlight linguistic structure.

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