ARTICLE

Music – shelter for the frazzled mind?

Pam Heaton on what the understanding of emotion in music amongst those with autism could tell us about its functions and role in general

Theoretical accounts have often assumed that emotion recognition abilities in music are the same as those in understanding social-emotional cues, for example in faces and voices. Individuals with autism experience difficulties in understanding social affective cues and in line with domain-general models of emotion recognition, it has been suggested that these will generalise to an inability to appreciate emotions in music. However, such reasoning is not supported by empirical evidence, and rests on basic misconceptions about autism as a disorder. This article argues that whilst the study of music cognition in intellectual impairment may enable researchers to refine models of music cognition, the main lesson we can learn from autism is that music provides a source of emotional experience when other sources are inaccessible.

questions

Although Down's and Williams syndromes are associated with intellectual impairment individuals with these disorders report a strong affinity for music. What factors might explain this?

resources

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Our ability to experience and understand expressed emotions is something we take for granted. Whilst we may be aware that the feelings we experience in response to a spring morning, or a heavy day at the office, differ in quality from those we experience when listening to a Bach fugue, our capacity to experience emotions generalises so seamlessly across emotion-evoking phenomena that it is not always easy for us to appreciate that this might not be true for everyone. Such rich and divergent experiences colour our lives and appear to us to be part of what makes us human.

However, when we consider individuals with autism, we become aware that sensitivity to emotion-invoking phenomena can be more or less constrained across different domains. Whilst individuals with this disorder often find other people's expressed emotions exceedingly hard to decipher, these difficulties do not appear to generalise to music. Craig Romkema, a poet with autism has written of music as 'the regulator of my nervous system, the shelter for my frazzled mind, the delight of my heart.'

Findings from studies into musical appreciation in autism unequivocally show that Romkema's feelings about music are by no means unique amongst autistic people, and this challenges our views about how musical experience can be situated in domain-general models of emotion recognition.

Misconceptions about musical appreciation in autism

In 2006, writing about autism spectrum disorder, Levitin noted: 'Although some people with ASD play music, and some of them have reached a high level of technical proficiency, they do not report being emotionally moved by music.' Such a claim may be plausible given experimental findings highlighting the difficulties individuals with autism have in understanding the emotions expressed in faces and voices. However, a similar impairment has also been noted in Williams syndrome (Plesa-Skwerer et al., 2006), and at the same time it has been proposed that this disorder is characterised by *increased* levels of musicality (Sachs, 2007). So why are such difficulties assumed to impoverish perception of emotion in music in the one group, but not in the other? I believe the key lies in a distinction between an autistic person's *experience* of emotion and their ability to *describe* their emotions.

The importance of this distinction was nicely illustrated in a recent study into alexithymia carried out by Berthoz and Hill (2005). Alexithymia is a term that refers to abnormalities in emotional experience and expression. Individuals with type I alexithymia do not experience emotions, whilst individuals with type II alexithymia experience emotions but find it difficult to describe them in words. This

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Musical enrichment increases young children's ability to associate depictions of affective states

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distinction enables us to draw clear predictions about musical deficits in alexithymic individuals, namely that those with type I will not appreciate the affective qualities of music, whilst those with type II will appreciate these qualities but may be unable to talk about them. In Berthoz and Hill's study, autistic participants met criteria for type II but not type I alexithymia, so an inability to appreciate emotions in music would not be predicted in this group.

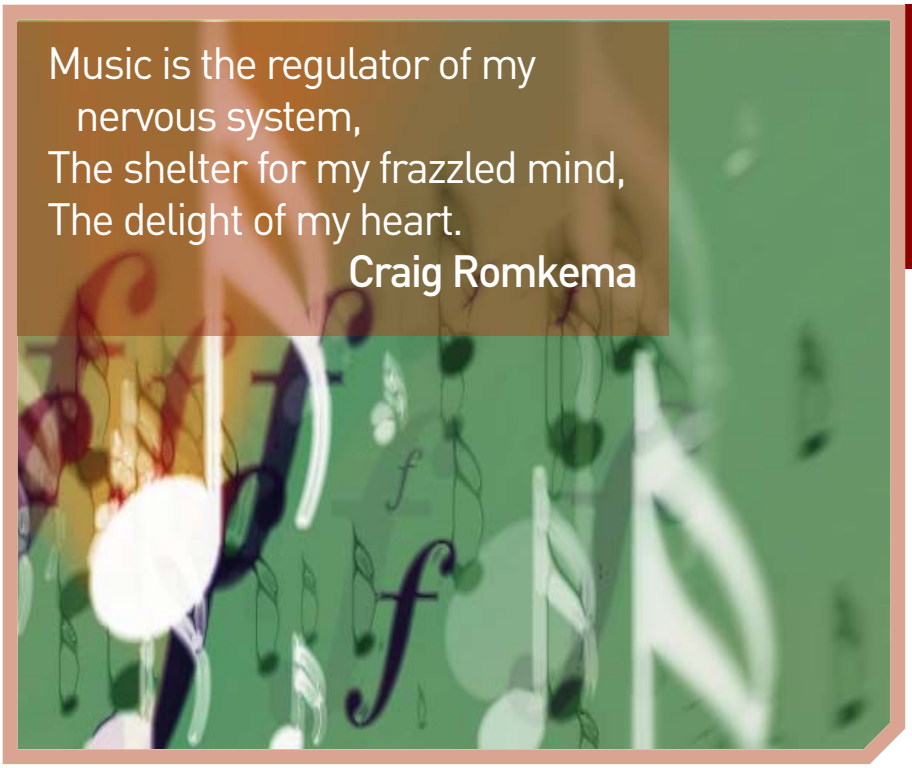
In the music or in the person?

It is possible to recognise sadness from another person's facial expression without experiencing this emotion oneself. Similarly a listener can know that a musical composition 'sounds sad' without experiencing any feelings of sadness. For music, the listener's belief that music 'sounds sad' reflects their culturally shaped understanding about what musical events signify. The musical events that signify emotions vary in complexity, so whilst perception of happy and sad emotions in music might be largely dependent on musical mode or changes in specific rhythmic and articulatory parameters (Kratus, 1993), musical 'thrills' and 'shivers' result from perceived changes in harmony, syncopation and melodic appoggiatura (Sloboda, 1991, 1992).

In making the links between specific musical events and their affective associations explicit, these researchers enable us to make a clearer distinction between culturally determined and personal experiences of music. Individual differences in the musical listener's interpretation of musical events may reflect temperamental and experiential factors that interact with acculturation processes. Importantly, these research findings enable us to generate testable hypotheses about associations between specific aspects of musical understanding and the intellectual, social and communicative disabilities characteristic of autism and other neurodevelopmental disorders.

Learning about musical emotion

For typically developing individuals, the ability to understand what affective cues in music denote develops throughout early childhood. Research studies show that whilst three-year-old children can match extracts of music in major and minor modes with happy and sad faces (Kastner & Crowder, 1990), the ability to pair extracts of classical orchestral music with depictions of anger, fear, love, contemplation and triumph at similar levels to musically untrained adults is not observed until around eight years (Heaton et al., 2008).



The findings from this latter study provided some insights into the mechanisms implicated in the acquisition of this category of cultural knowledge. For typical four-year-olds, musical enrichment – measured by formal teaching and informal exposure to music – increased their ability to correctly associate musical and visual depictions of affective states. However, this was not observed for children at later developmental stages and chronological age was the best predictor of performance for six-, eight- and 10-year-olds.

When this study was replicated with children and adolescents with autism and Down's syndrome we observed that language level, measured in verbal mental-age scores, strongly predicted performance. Importantly, the analysis failed to reveal a significant effect of diagnosis, and intellectually able children with autism, whose language scores were age-appropriate performed as well as age-matched typical controls. In contrast, the Down's syndrome participants, for whom verbal mental-age scores were significantly lower than chronological-age scores, performed at very low levels on the task.

An interesting finding, supporting the suggestion that culturally shaped and intrapersonal responses to music may be distinguished, was the strong dissociation observed in the Down's syndrome group between the ability to understand what musical events signified, and intrapersonal responses to music. Whilst their emotion identification scores were not always significantly different to chance, parents and carers reported very high levels of positive affect in response to music. Based on our findings, showing strong correlations between verbal ability and performance on our task, we would predict that low-functioning individuals with autism will show similar patterns of performance to those of the Down's syndrome participants in our study. Hence, musical experiences will be positive and unaffected by their inability to acquire music-emotion associations. An alternative hypothesis, that draws on our findings of a dissociation between culturally determined and personal experiences of music, is that verbally able individuals with autism will readily make associations between musical cues and affective states but will not experience music in an emotionally fulfilling way.

The intrapersonal response

Temple Grandin, a high-functioning woman with autism, has described how she is emotionally unmoved by music. Although she readily acknowledges that

many autistic people possess good musical skills, she believes that this results from strength in mastering musical structure. In order to assess whether autistic people in general tend to be unmoved by music, Allen and his colleagues (2009) adopted a direct and novel approach; they interviewed a group of intellectually able adults with autism to find out why they listened to music. Whilst deficits in communication are core diagnostic features of autism, and emotional experiences are particularly difficult to describe (Bethoz & Hill, 2005), their responses were extremely informative.

When asked which characteristics of music motivated their listening, their responses were very wide ranging. Notable were references to musical structure, timbre, melody and harmony. Individuals also discussed music's expressive qualities and the excitement that technically good performances evoke.

However, it was in discussing their reasons for listening that they provided the keenest insights into their personal experiences of music. One participant highlighted music's ability to arouse them: 'As for exhilaration, I love Beethoven's 6th symphony – the thunderstorm – the calm after the storm – you can feel all the emotions you want in that music.' In contrast, other participants said that they listened to music because it made them feel calm: 'If you feel tense or whatever, you want something to calm you down, then you listen to Japanese music.' Some individuals cited aesthetic reasons for listening to music, whilst others said that it gave them a sense of belonging. Perhaps most interesting were those references to the therapeutic benefits of listening to music. 'When I have been feeling depressed, I have listened to certain music, and I would claim the music healed me'; 'With autism you tend to feel dead a lot of the time – music is the key that unlocks the emotions.' It was clear from these individuals' responses that their experience of listening to music is rich and rewarding.

Writing the symphony

Music theorists once believed that musical disabilities in autism could inform our understanding of music's functions and the role it plays in the lives of typical people. Even though empirical data has refuted the existence of any such musical disabilities, theorists should not despair. The study of music in autism may yet have things to teach us. Already we have learned that emotions in music are accessible when other forms of emotional expression are difficult to decipher. It also seems that music can be especially enriching and life-enhancing when everyday existence is hard. Small wonder then that Romkema tells us

> Someday I will write a symphony,
> from the chords I have collected
> in my mind.
> Someday, just for fun.
> In the meantime, I will listen
> and listen, and listen,
> 'Til I am filled to the brim
> with joy.

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