In my thought paper I addressed the question of how music influences emotion. There are many aspects of this, including if there are concurrent visual stimuli which contribute, any cultural bias, and what brain structures are responsible for recognizing emotion in music. The question as relating to this article in particular is how music and a visual stimulus interact with each other, which has been a constant intellectual query as I analyze film scores and other types of sound design with visual components.

The authors of the study propose that the mechanisms involved with listening to music may be different when presented with visual information that agrees or disagrees with the emotion of the music. The independent variables in the study are the music played (Happy or Sad) and the face shown (Happy or Sad). The block-design of the experiment created eight “emotion blocks”, or four combinations of a type of music and a congruent or incongruent face and four blocks corresponding to each type of music and face alone. The dependent variable is the volume of interest obtained through functional magnetic resonance imaging (fMRI) and blood oxygenation level-dependent (BOLD) signal contrast.

The participants for the study were all right-handed, from the Detroit area, and they had no musical background or training. These participants each went through a test with the set of eight emotion blocks, in random order, alternated with off phases of a visual cross image for baseline comparison (beginning with the off phase) while having an fMRI scan. The scan for each of the emotion blocks was compared to the baseline to observe the volume of interest. These data underwent many statistical tests which correlate each emotion block to a level of increased activity in various brain regions. The participants also rated each emotion block on a scale from -7 for saddest to +7 for happiest.

The results revealed that with the Happy Music and Sad Music both activated many brain regions, with both activating the superior temporal gyrus. The Happy and Sad Faces the authors
discovered activation of visual areas and the fusiform gyrus. Emotion blocks with pairs of music and faces in agreement showed activation of both the superior temporal gyrus and the fusiform gyrus, with the activation not significantly more than the music or faces alone. The opposite pairs of Happy Face/Sad Music and Sad Face/Happy Music revealed lower amounts of activation in the superior temporal gyrus and higher activations in the fusiform gyrus than the other emotion blocks. The authors also compared happy and sad for both faces and music individually. They found that the superior temporal gyrus is activated more during Happy Music than Sad Music, and more response in left hippocampus, left lingual gyrus, and right calcarine cortex for Happy Faces than Sad Faces. The results also show that the participants rated Happy Faces as happier and Sad Faces as less sad when presented simultaneously with Happy Music. Likewise the participants rated Happy Faces as less happy and Sad Faces as sadder when they were presented with Sad Music.

The study suggests that there is a parallel between the perception of degrees of emotion and different activations in the superior temporal gyrus and the fusiform gyrus, especially in the cases of music and faces presented together. The authors also discuss that the difference in activation in the superior temporal gyrus between the pairs in agreement may be related to how each element is judged. Happy Faces and Happy and Sad Music are all positively judged, while only Sad Faces are negatively judged, resulting in greater activation with the Happy Face/Happy Music pairing than the Sad Face/Sad Music pairing. The authors also discuss how these results may lead to improved use of music as therapy.

The study concludes that audiovisual integration of emotions may be similar to the integration of lip reading and voice which was proposed in a 2010 study by Hertrich, Dietrich, and Ackermann, and also similar to the results of other studies of simultaneous audio and visual stimulation, which all support that audio and visual information are integrated in the superior temporal gyrus and the fusiform gyrus. I think that the conclusion of the superior temporal gyrus and the fusiform gyrus being responsible for audiovisual integration is feasible since such a distinct pattern of activity takes place in both areas when pairs of stimuli are presented. Without reading the other articles mentioned I cannot critique the authors’ conclusions in that regard, however I would include the articles in any further research.

Applying the results of the study further, it is easy to see why music is often said to have the ability to make or break a film. Since music can act on images (at least of faces) by further
polarizing emotions or by mellowing them—without delving into cultural context or overused film music themes—music is perhaps the most important addition to be made to visual performance. I’d like to further researching in this direction by exploring whether culture influences our perception of emotions, or whether music is truly a universal language.

Additional Articles

The 1999 article by Balkwill and Thompson focuses on sensitivity to emotion in music of the participant’s culture in a cross-cultural study using both Western and Hindi music. Whether or not participants could identify the emotions from a different tonal system’s music was studied, and then the study sought to determine if the perception ability was related to perceived psychological dimensions in the music. The study found that participants were able to identify the emotions of the music and that the perception was related to psychological dimensions and also instrument timber.

Omar et al (2011) identifies that patients with frontotemporal lobar degeneration (FTLD) have a deficient abilities to recognize emotions in music (in addition to the inability to recognize emotions in faces and voices) as compared to healthy subjects. This brain region has previously been linked to emotional value, behavior, and conceptual design.
References

