Hearing in Color; Seeing in Sound:

Chromesthesia and Its Influences on Audio-Visual Work

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ART 4360

1 October 2015
The term *synesthesia* often gets thrown around without regard to its actual meaning. Though there are many different types of synesthesia, it is simply a neurological condition where a sensual stimulation causes the perception of another (Anderson). This can mean any number of things. Associating sounds with colors, tastes with colors, smells with physical touch, etc., would all be examples that define the phenomenon known as synesthesia.

One specific type of synesthesia in particular, the instance of associating sounds and colors, is known as *chromesthesia*. Aspects of chromesthesia have been a staple in audio and visual design, as demonstrated by the works of composers Scriabin and Messiaen (Berman 16-18). People like these, who maintain that they cannot necessarily separate their respective sensory experiences, are known as synesthetes (Galeyev et. al 357). Through research and exploration of studies and work centered on chromesthesia, one can illustrate the phenomenon to the non-synesthete by means of an audio-visual experience.

**Research**

The modern composer Alexander Scriabin is a prime example of a synesthete who began to showcase this concept. In his symphonic poem *Prometheus*, was written a part for the “*luce*”, or light organ, which had not been invented (Berman 16). This “light organ” would have literally converted sound into colored light, thus illuminating the musicians and the audience (all dressed in white) with corresponding colors. To the average audience member, this “*luce*” playing along with the symphony, is just like any light show or projected visual presented alongside music in order to enhance the experience. To sound-color synesthetes like Scriabin, however, these two elements of the
sensual experience are inseparable, and most likely presented together to demonstrate just that.

It is generally accepted that Scriabin was a synesthete based on his own writings from his personal archives, as well as the writings of Scriabin’s biographer and friend Leonid Sabanyev (Galeyev et. al 357). In 1911, Sabanyev published a table drawn from handwritten notes of Scriabin’s “color-sound” correspondences alongside a table of ones Rimsky-Korsakov, another widely-regarded, synesthetic composer, had published earlier. Almost unsurprisingly, the correspondences of note value (e.g. C major) and perceived color (e.g. red in the case of Scriabin and white in the case of Rimsky-Korsakov) were completely different between the composers (Galeyev et. al 385, 359).

Herein lies a pitfall in explaining synesthesia scientifically. It is not uniform in nature, and it is solely a subjective psychological perception, varying with the individual. This issue makes clinical synesthesia difficult to pinpoint, as well as determining its exact cause. Simply put, psychology maintains that everyone experiences and perceives sensory information differently, and that there is no precise way to standardize feeling as shown by the (Baron-Cohen et. al) study. French poet René Ghil’s work, in which he detailed the theory that there was in fact a universal symbolist sensory-language that could be interpreted across all artistic disciplines, comes to mind. This idea and similar ones have essentially marginalized the integrity of chromesthetic theory (Marvick).

So how is it that a phenomenon that is often either presented with scientific legitimacy (Baron-Cohen et. al) (Asgerisson et. al) (Goller et. al) or demonstrated in an archaic and esoteric manner, as Ghil attempted to do, is still relevant and timeless? It has to do with chromesthesia’s elements, sound, color, and the human mind: three
extensively complex and beautiful components that have yet to be completely understood in terms of how they work together. However, current research now shows to some degree how the process of audio-visual synesthesia works in the brain. Tracking electrical current paths, it has been determined that those who possess audio-visual synesthesia, have more complex, indirect current paths used in processing audio-visuals (Goller et. al 1879). This research points to synesthetes possessing more functionally active brains, specifically in the corpus callosum region.

It is the desire to understand, to share and to demonstrate, to marvel at these things most everyone experiences and perceives, that make chromesthesia a relatable topic. How they are perceived is not nearly as important as the fact that these elements are being constantly observed in the mind.

That is why synesthesia, and chromesthesia in particular, is still a timeless and important influence in the production of meaningful work. The best examples of this are allusions to color symbolism in musical work. Albums like Miles Davis’s: *Kind of Blue*, Between the Buried and Me’s: *Colors*, and possibly to a lesser extent Pink Floyd’s *Dark Side of the Moon* draw inspiration from cultural perceptions of the emotion of color. While this is completely different from musical work created from the understandings of chromesthesia (Scriabin, Rimsky-Korsakov, Kandinsky, etc.), it is not far off base in its underlying purpose: to be a sensory engaging and emotional experience for the audience.

At this point, it is generally accepted that there is no way to induce chromesthesia. There is also not much information available on the genetic prevalence of chromesthesia, except for the fact that it more common in humans with some form of autism (Baron-Cohen et. al). This research suggests that synesthesia and autism may share some
underlying neurological mechanisms. Though this study is current, further research is required in respect to a more valid testing method for synesthesia (Baron-Cohen et. al).

Since synesthesia is a neurological condition, the use of drugs encouraging synesthetic experiences does not count as induction. This is because the nature of the phenomenon is completely involuntary, and often uncontrollable, as made clear by Scriabin’s accounts (Galeyev et. al 360). This partially separates Scriabin, and other “legitimate” synesthetes, from people who may have at one time or another claimed to be synesthetes, or have had a synesthetic experience. Galeyev and Vanechkina however, remain skeptical, and seriously question the idea of “legitimate” synesthetes, claiming that without proper documentary evidence, one cannot be considered clinically synesthetic (360). The reason being, the vast majority of people could then be considered synesthetes. Again, this maintains the notion that synesthesia, and chromesthesia for that matter are involuntary and constant neurological conditions. The mere ability to think metaphorically about color and sound does not warrant the claim of possessing synesthesia.

Scriabin was regarded in his time as extremely eccentric as well as decadent. What his contemporaries as well as many people who observe his life and work fail to realize is that the manner in which his music was composed (e.g. the light organ) was completely necessary because of his synesthesia (Berman 17). What many musicians saw as “a stage trick to ginger up the dramatic intensity of the music” (16), was actually an integral and inseparable element for the artist. Scriabin was not able to have one without the other so to speak, when it came to incorporating color and sound.
Utilization

If one retains this knowledge of synesthesia and awareness of synesthetes like Scriabin when examining or critiquing audio-visual work, more meaning is extracted from the experience. Take for example, film. How much would the emotional value of film be reduced, if the element of sound (music, dialogue, noise, etc.) were removed? It would be quite significant. Even in the days of silent film, there was sound in terms of accompaniment (e.g. piano music). Likewise if the visuals were removed, and there was then only sound in complete darkness, the experience would not feel nearly as complete. To such a circumstance, the mind seeks to complete the sensory experience on its own. It is then fair to say that sound has the potential to enhance visual elements and vice versa.

Though audio-visual work is often seen in fine art, as well as design, it is more commonly a facet of live music performance (light shows, projections, lasers) and creative multimedia. These absolutely fall under the scope of design, however the audio-visual work is seen more as technological innovation, an exclamation of advancement. The idea of the work being a sensory stimulating device is an afterthought. Because technology has become such a fixture in culture, it is, to an extent, expected as a part of most every type of creative work, though not necessarily the main focus. This concept should be exploited; audio-visual work created by means of incorporating the exponentially increasing presence of technology has the power to be the new medium for creating powerful art and design. “Modern” art attempts to do this frequently, but somehow the potential still lies untapped. Those who choose to merge these two seemingly crucial elements know the importance of their placement and effect on meaning and emotion of the work. This is in congruence with research conducted on
synesthetes that determines that they generally possess more visual attention, as well as being able to perform better in conditions (identifying colored graphemes from distractors) where their synesthesia is enhanced (Asgerisson et. al 14-15).

With what is known about synesthesia and how it affects sensory perception, it makes sense that it is a common basis for the creation of audio-visual work. Technology plays an important part in the development of this work. Innovations that were originally only conceptual in nature (like the luce organ), can now be implemented using computers, MIDI (Musical Interface Digital Instruments), DAWs (digital audio workstations), etc.

As previously stated, the scientific consensus is that it is impossible to induce chromesthesia, as it is an involuntary neurological condition. A random synesthetic experience, whether induced physiologically or chemically, does not indicate clinical chromesthesia. That being said, the idea that a synesthetic experience can be simulated through the use of technology in the context of an audio-visual experience is fascinating.

**Implementation**

My plan is to expand upon the idea of Scriabin’s light organ, bringing it into the digital age, and incorporating a more audience interactive experience. This can be achieved in a number of ways.

A computer, running a DAW, such as Ableton Live, will be connected to an external sound system, as well as having its own dedicated MIDI controller. Several MIDI instruments will be programmed in the DAW, to produce specific note values when buttons are pressed. One instrument will produce notes in chromatic fashion, meaning all twelve semi-tones that exist in western music are accessible. The correlation to color for
this particular program would be the entire colored light spectrum (ranging from white to violet), which would in turn be programmed (also via MIDI in the DAW) to play on a peripheral monitor, tablet screen or projector. The program would span at least 3 octaves, where the middle octave is fully saturated tones, the lower octave plays shades, and the upper octave plays tints. The other MIDI programs would function similarly, one utilizing analogous color theory, and the other warm/cool complements.

Another idea will entail an interactive website, where users are what play along with pre-determined music or sounds, and produce the colors they choose. A reverse of this program would also be available; the users would play tones from the keyboard, along with a predetermined color sequence. A comment section would be provided for users to leave feedback about their various feelings and experiences.

Lastly, my intent is to continue composing music on the basis of color theory and interaction. These compositions will then be paired with corresponding video, and presented as a singular and inseparable work. They will be viewable through the website as well, with the interactive element then becoming the human response. The concept of an educational experience also allows for a profound amount of info-graphics, posters, and other traditional graphic-design work.

The bulk of these ideas add up to an extremely powerful and innovative user experience, such as a large-scale installation or a mobile app. The experience would be immensely educational in terms of illuminating color theory, as well as in a scientific respect (learning about synesthesia and the psychology behind it). Most importantly, it gives people a body of meaningful and emotional work they can examine and interpret, and that prods for a response, as good art should. That, coupled with the primal and
necessary desire to create things and to express oneself out of absolute necessity, is the reason for this work.

Synesthesia, and chromesthesia in particular has been an integral part of creative and design-based work since its earliest observation. It continues to be a relevant phenomenon that people can continually relate to, regardless of their respective synesthetic abilities. Synesthesia has the potential for influencing an infinite amount of significant audio-visual work.

Possessing synesthesia as the neurological condition it is not at all necessary in the understanding and presentation of the audio-visual work. An understanding of its nature, as well as being versed in its prevalence in artists throughout history, is necessary. Being able to put the work into context and explain it is important to its legitimacy and relevance. Otherwise, the work becomes a seemingly ordinary facet of technology, where meaning is often lost.

Interactive multimedia is now one the most profound ways of communicating emotionally through art. In short, it is the future of fine art as well as design. The audio-visual world, while well developed, lies largely untapped: an artistic revolution waiting impatiently on the horizon. This new noise provides for connection in humans, the way conventional work no longer can. Chromesthesia, is one phenomenon that has the potential to show the average, non-synesthetic person, a profound experience using interactive audio-visuals.
Bibliography


