



Color Hearing: Somewhere Over the Rainbow

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Contextual Review and Concept: Color Hearing: Somewhere Over the Rainbow, is a transformable garment that takes the wearer from the mundane to a technicolor dreamland with a simple spin, a true emulation of the Wizard of Oz character Dorothy leaving her life behind by being whisked away by a tornado to the magical dreamland of Oz. The design concept utilizes psychomimicry (Ridgway, 2017; Ridgway, 2018; Ridgway, 2021; Jonsson, 2014) to emulate synesthesia. Synesthesia is “a neurological condition in which stimulation of one sensory or cognitive pathway (for example, hearing) leads to automatic, involuntary experiences in a second sensory or cognitive pathway (such as vision)” (“Synesthesia”, 2019, p. 1). Chromesthesia is one of the most common types of synesthesia and is described as “the perception of colors when listening to music” or “hearing colors” (“Sound Synesthesia”, 2019, p. 1). Color Hearing: Somewhere Over the Rainbow, elaborates on past design work (Ridgway, 2017; Ridgway, 2018; Ridgway 2021), but focuses on a new design challenge of emulating synesthesia using a piece of music with multiple instruments (violin, piano, and cello). The **design challenge** was to take a complex, multiple-instrument song, and use design elements to emulate “color hearing” through the creation of a textile print(s). Additionally, the design team sought to create a garment that best represented the origin and popularization of the piece of music by capturing elements of the song’s history and visuals from the movie to which the song is best known. The incorporation of history builds upon past design scholarship, however, the incorporation of elements from the movie extends past design work in psychomimicry. The following **research questions** were explored: How will three different instruments be interpreted into a textile print that represents one piece of music? How can the inspiration of elements of weather, such as a tornado, influence design decisions? What design elements can be used to generate a visual connection between the viewer and the piece of music?

The design team used sociocultural capital as justification for the selection of the song “Somewhere Over the Rainbow”. This song was selected to pay tribute to the grandmother of one of the designers who passed away this past year. The song was written for the 1939 film, *The Wizard of Oz*, famously sung by Judy Garland and won the Academy Award for Best Original Song (Shapiro, 2017). Judy Garland sings the song in her role as Dorothy, a 12-year-old girl, in the opening black-and-white scenes of the movie. The song lyrics contain fantastical imagery of a whimsical land far away from Dorothy’s mundane life. It’s at the conclusion of the singing of the song, that a tornado comes and carries Dorothy away to the technicolor dreamland. Therefore, the designers created a girl’s size 10 dress, that transforms from a black and white plaid pinafore to a multi-colored gown with the wearer spinning in a circle to mimic the tornado. Furthermore, the costume designer for the movie *Wizard of Oz*, Adrian, used illustrations from the L. Frank Baum’s novel as well as “sketches from his own childhood” (Goodman,

2019). as inspiration for Dorothy’s costumes including the ruby red slippers and her blue and white pinafore which has been reported to actually have been blue and pink to provide better contrast on film (Goodman, 2019). With this in mind, the designers used sketched art from the great-grandchildren of the grandmother being honored through this dress, for the bodice front and back (fig 1). The children listened to the song “Somewhere Over the Rainbow” and drew what they heard. This took the concept of psychomimicry to the next level, by having the children emulate the experience of visually depicting what they were hearing. The designers used Illustrator to live trace the children’s drawings to be able to create a compilation of their artwork. The history and context of the song guided the designers’ design decisions.



Figure 1. Engineered Bodice Front and Back with Artwork

Process, Technique, and Execution:

To emulate synesthesia, the sheet music coded to create a textile print. Each of the three instruments were individually coded, but shared a color palette. The music was coded such that each note was allocated one color and the size of the stripe indicated the duration of the beat (see fig 1). Then the textile prints created from each instrument were digitally printed onto circles of silk organza. The repetition of circles in the design was purposeful to embody the tornado as catalyst for transition from black and white to color. Silk organza was selected so that as each of the instruments were layered on top of each other, the garment would depict the complete piece of music. Each instrument having their own part, but the audience (viewer) hearing (seeing) the instruments as one unified sound.

The pinafore garment is constructed out of a black and white plaid print. This print was created by taking the bars of music for the three instruments after coding for notes and beats and aligning them vertically. This created a square, which was then copy and pasted, rotated 90 degrees, and the transparency was dropped to create the plaid. A repeat print was then created. The plaid contains the entire song repeated multiple times and is meant to reflect the original plaid garment worn by Dorothy. Strategic design changes were made from the original Dorothy dress to better facilitate the transformation while still allowing the garment to be recognizable. These details include bias cut detailing, rick-rack trim, gathered neckline, puff sleeves, and decorative buttons. The garment closes together with Velcro along the side seams, shoulders, and underarm seams to enable the entire garment to be torn away when transforming.

The design of the rainbow under-dress went through several iterations making use of twisting panels and graduating circles to reflect the twisting nature of a tornado. The final version of the dress features an asymmetrical circle skirt covered in 7 layers of circular ruffles. The garment patterns were created using a combination of draping and flat patterning techniques, digitized using Gerber AccuMark, and imported into Adobe Illustrator for artwork placement. There is a total of 38 engineered printed circles (violin=9, cello=13, and piano = 16) making up the skirt of the dress. Each circle contained the complete song for the specific instrument twice such that when the circle was cut in half the entire song

was represented. The sleeves were created from half-circle patterns and were also engineered and digitally printed onto silk organza.

Design Contribution and Innovation: This transformational garment adds to three growing areas of design work, (1) design work that utilizes psychomimicry, (2) garments that transform through creative pattern-making and wearer action, and (3) designs inspired by weather elements. This work builds on past psychomimicry designs by exploring how three different instruments would be represented as one piece of music within the same garment. Past work has divided two distinct parts of music into two different garments (Ridgway, 2021). The current work utilized transparent fabric, organza, so that the three pieces of music visually interact to depict the full musical arrangement. Furthermore, this design incorporated children's artwork as the main point of connection for the viewer back to the song when in the past digitally printed sheet music and lyrics had been used (Ridgway, 2018; Ridgway, 2021). The children's artwork connects directly back to the type of inspiration that was used by the movie's costume designer. Another area of design to which this work contributes is transformational garments. This type of design is typically used for theater costumes and is an extremely challenging patternmaking puzzle to be solved. This work contributes to this area of design work by delineating the patternmaking process and construction techniques used so that future designers may build off of this work. Finally, garment designed influence by elements of weather is a relatively untapped area of design scholarship. We hope this work that incorporates the elements and features of a tornado will aid in future design work exploring the translation of weather into garments. Overall, design collaboration lends itself to the articulation of tacit knowledge and the designer's hope to collaborate more in the future to learn and understand different design processes and techniques. [This supplemental video depicts the design process and shows the real time transformation of the garment.](#) The designers' hope the inclusion of this video will help to explicate the design knowledge that went into the creation of this garment.

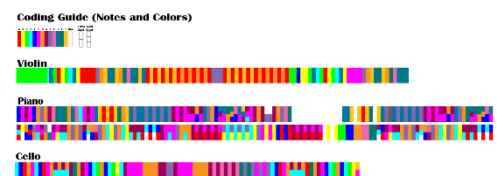


Figure 2, Music Coding, Each note is allocated one color and size of stripe indicates duration of beat

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