Tampere University of Applied Sciences

Colour Theory in Moving Picture Media

How colour theory and colour psychology is used in moving picture media

Katriina Ankkuri

BACHELOR'S THESIS
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Media And Art
Interactive Media

ABSTRACT

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The purpose of this thesis was to collect information on how the subconscious emotional connection to colour is used in moving picture media.

This was done by analysing past articles and research on colour theory and colour psychology. Major differences in colour psychology were examined by looking at cross-cultural colour associations and how they differ. To further examine how colour psychology and colour associations can be used to tell a story, three different genres of moving picture media were analysed for their usage of colour, and how they told a story with different methods of colour storytelling.

As a theory supporting project, a colour association survey was conducted. 37 participants were surveyed on their associations with given videos, and their answers were analysed within the common colour psychology understanding.

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storytelling colour theory colour psychology moving picture media

CONTENTS

1 INTRODUCTION

The thesis explores the usage of colour theory in moving visual media which is utilized to expand storytelling to a subconscious level.

The thesis first aims to explain the relevant basics of what colour is and how humans are able to observe it. Colour theory and its history are discussed in a way that the reader can grasp the needed information and use it throughout the thesis to understand the main topic. Colour theory and its history are discussed based on historical records and information provided by professionals who utilize colour theory in their profession. Alongside this, the study of colour psychology is explained in detail using studies, past examples, and opinions from colour professionals.

The history of colour in film is discussed in a relevant matter, and meaningful examples of past film industry inventions and films are explored. To further illustrate how colour psychology works and is used, three varying examples of visual media using colour psychology in storytelling purposes are discussed. Each of these examples use colour and their respective colour associations for different storytelling purposes and have gained recognition for it.

As a supporting project, the thesis includes results of an anonymous survey conducted by the writer. The survey explores the similarities and differences in respondents colour associations and analyses the answers within the colour psychology understanding.

2 COLOUR

2.1 What is colour

Colour consists of different wavelengths of light. The human eye is only able to see a small range of all the wavelengths, which is called visible light. Visible light waves are the only electromagnetic waves humans can see. Each colour has a different wavelength, and the colour a human sees depends on its wavelength. Red has the longest wavelength, and violet has the shortest wavelength. When all the waves are seen together, they make white light. (Science Learning Hub, Pokapū Akoranga Pūtaiao 2014.)
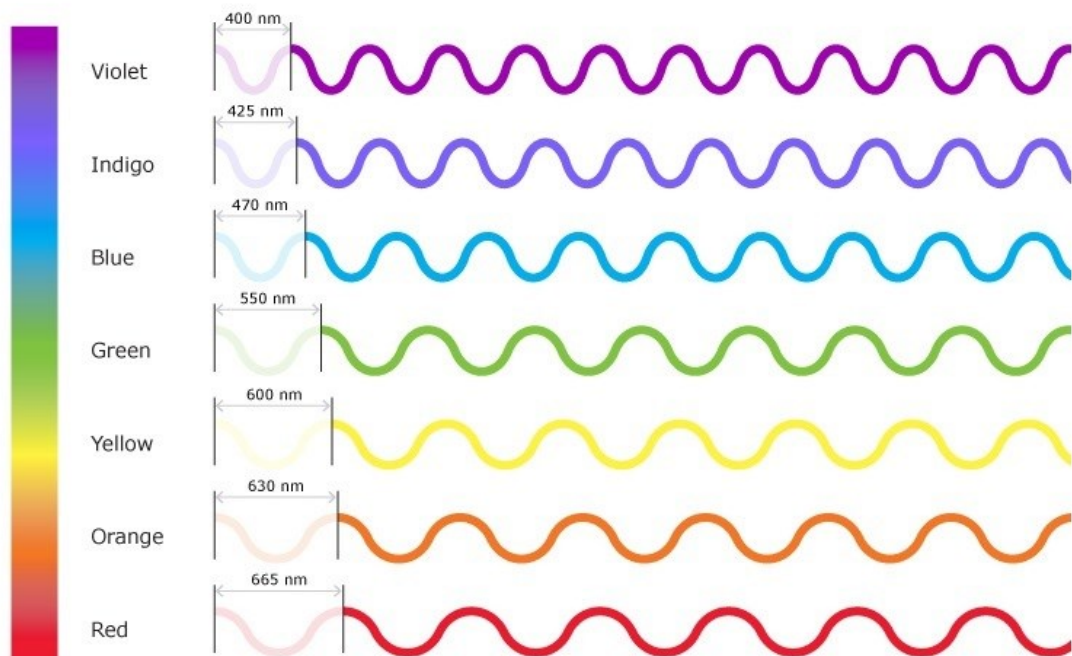
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PICTURE 1. The wavelengths of different colours (The University of Waikato 2012)

2.2 How we see colour

When an object is hit by light, the object absorbs some of that light and reflects the rest of it into an eye. Objects appear different colours because they absorb some of the wavelengths and reflects. White objects appear white because they

reflect all colours and black objects appear black because they reflect no light. The colours we see are the wavelengths that are reflected or transmitted. The reflected light enters the human eye first through the cornea. The cornea bends light toward the pupil and then through the lens. The lens then focuses the light on the retina, the layer of nerve cells in the back of the eye. The retina converts the light into electrical signals that are transmitted to the brain by the optic nerve. The optic nerve is able to interpret the signals as sight. (Science Learning Hub, Pokapū Akoranga Pūtaiao 2014).
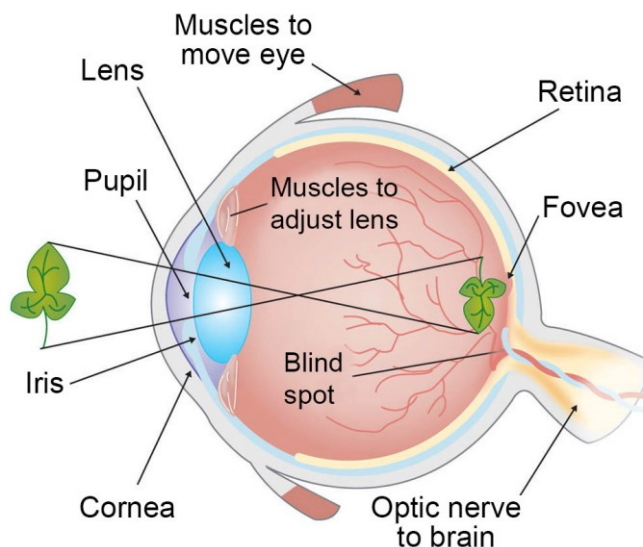
PICTURE 2. The anatomy of a human eye (Arizona State University 2010)

A Human eye can see colour because the retina has two different types of photoreceptors that detect and respond to light: cones and rods. (Mukamal, American Academy of Ophthalmology 2014). The cones detect colour and rods only allow to detect things in black, white, and grey. The cones only work in bright enough light, which is why things look grey and colourless in dim light or at night. (Science Learning Hub, Pokapū Akoranga Pūtaiao 2014.)

In some cases, a person may see colour, colour brightness, and shades of colour differently due to a form of colour blindness. There is many different colour blindness, and they can all affect a person's ability to view colour uniquely. Most of them make it difficult to detect differences between two colours, such as red-green colour blindness, but some forms of colour blindness can render a person unable to see any colour at all. (National Eye Institute, 2019)

3   COLOUR THEORY

3.1   The basics of colour theory

Colour theory consists of the multitude of guides, concepts, and definitions used in visual design to mix and combine colours. It creates a logical structure for colour organization that is used by design professionals and artists as a guide for creating eye-pleasing colour combinations. In traditional colour theory, there are three primary colours: red, blue, and yellow. Primary colours are the three colours that create rest of the colours by mixing them. (Picture 3) It is also impossible to create the tree primary colours by mixing rest of the colours. (Morton, Colour Matters, 2022.) It should be noted, that in painting many argue that instead of yellow, blue, and red, the primary colours are instead cyan, yellow, and magenta. (Edwards, Colour, 2004).

Secondary colours are the colours that are formed by mixing two of the primary colours together. These colours are green, purple, and orange. By mixing primary and secondary colours comes tertiary colours. These colours are Yellow-orange, red-orange, red-purple, blue-purple, blue-green & yellow-green. (Budrick, printmag.com, 2017.)

PICTURE 3. different colour wheels (Why Colour Matters 2022)

3.2   Colour wheel

Sir Isaac Newton first created his version of the colour wheel in 1672 when he observed light reflecting different hues of colour through a prism. This led him to

hypothesize that same as music, colours share a harmonious relationship between each other. Sir Isaac Newton's original colour wheel was in black and white and was made up of seven colours: red, orange, yellow, green, blue, indigo, and violet. The colours were laid down on a circular naturally progressing disk. (Budrick, printmag.com, 2017.) The advantage of this circular organization over a linear order was its ability to reveal the relationship between each colour. Observers were able to see the harmony between each colour, as well as their values, hues, and how colours of the highest contrast are located on the opposite of each other. (Edrwards, Colour, 2014.) This easily observable harmony is the main reason why the colour wheel is now used so commonly. (Budrick, printmag.com, 2017).
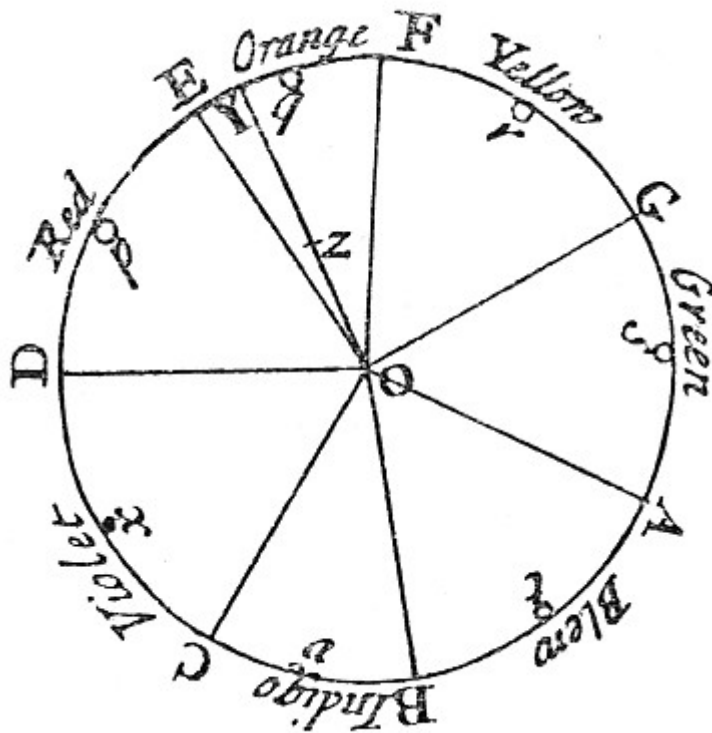
PICTURE 4. Sir Isaac Newton's original colour wheel based on musical intervals (Newton, Opticks, 2010)

Since its initial creation, the colour wheel has gone through several visual changes, all the while the basic theory behind it has stayed the same. A now common representation of the colour wheel includes 12 colours, but more detailed versions can also include different shades of colours.

4   COLOUR PSYCHOLOGY

4.1   Basic colour psychology

Colour psychology is the study of how colours affect people's emotions, actions, and thoughts (Cherry, Very Well Mind, 2022). Colour plays a vitally important role in the everyday life of people. Colour can affect people emotionally, psychologically, and physically, often on a subconscious level without the person becoming aware. (Studio Pinder, how to use colour in film, 2016.) In an early colour psychology study conducted by Keith W. Jacobs and James F. Suess on the effects of primary colours on anxiety, it was found that red or yellow increased anxiety levels in comparison with blue or green. (Jacobs & Suess, Effects of Four Psychological Primary Colours on Anxiety State 1975.)

While colour psychology has been studied for centuries, R.M. Osborne points out in their book Colour Design – Theories and Applications, that it is hard to say what influences colour preferences. Most past colour psychology studies have focused on determining which colour a person likes, rather than why. (Osborne, 2017) Because of cross-culturally and personally varying factors and lack of scientific evidence, there are no set rules for colour psychology and viewpoints.

4.2   Colour associations

From studies and research, it has been concluded that colours are generally associated with certain qualities which enables them to evoke specific feelings for people. (Roohi, Regarding colour psychology principles in adventure games to enhance the sense of immersion 2019). These associations can be created through multiple different personal factors, such as life experiences, cultural aspects, and religion. There are disagreements if factors such as gender can also affect colour association (Roohi 2019.) Colour associations can be highly personal and vary drastically, but it is still possible to observe an overall similarity with colour associations in some cases. An article in American Research Journal of Humanities and Social Sciences explains, that according to a 1999 study, it

was noted that in America and Canada the colour red was associated most with safety, adultery, rescue, excitement, spicy, and hot. In contrast, red was most associated with fertility and birth in India. (Colour Psychology, ARJHSS 1-6 2016.) This is simply one of the many major cultural differences observed during the study.

In a study "The colour of emotion: A metric for implicit colour associations", 194 participants of varying ages and genders were asked to connect emotions to squares of colour. The study observed that colours of similar valence resembled each other closely. Angry, tense, irritated, and anxious all shared an overall red colour scheme, as well as romantic and sensual had an overall theme of pink. (Golbert, Fridlund, Lucchina, The Colour of Emotion 2016.) However, amongst the overwhelmingly similar associations, individual differences could still be observed. (Appendix 1) The study concluded, that when given the option to select from an unrestricted array of colours on a computer screen, participants made deliberate colour matches to the given series of emotion terms. The results were qualitatively distinct and statistically different. (Golbert, 2016.)

Patti Bellantoni tells in her book "If It's Purple, Someone's Gonna Die: The Power of Colour in Visual Storytelling" about an experiment she conducted with voluntary students at the School of Visual Arts in New York, Film Institution in Los Angeles, and California State University in Los Angeles. Each student was ordered to select two emotions and paint strong memories associated with them. The students were given paints in the six major spectrum colours as well as black and white. Despite the students' differing cultural backgrounds, all the paintings by student who selected rage as their subject included red. (Appendix 2) None of the students knew the emotion each of them was painting. (Bellantoni 217-222, 2012)

4.3   Cultural differences

Cultural factors can be a major contributor to person's colour associations. There are dramatic differences in colours and their meaning cross-culturally. Even with

strong cultural factors, it cannot be stated for certain which factors affect a persons' association with colours. It can only be speculated and observed based on how cultures use colours.

In the Western World, red can be associated with love, lust, anger, and urgency. The strength of these associations varies depending on the country, but an overall common association can still be observed in practices such as Valentine's Day, which is heavily connected with red in the West (Eriksen Translations, 2020.) Angers' connection with red in Western countries is also common enough for it to appear in popular sayings describing a person feeling angry, such as "seeing red" (Olesen, Colour Meanings (173), 2013). In contrast, red is heavily associated with marriage customs and especially the bride in Hinduism beliefs in India. It is common for the bride to be wearing red and the wedding venue to be decorated in shades of red. (Smith, Sensational Colour)

PICTURE 5. An Indian groom and bride (Vogue Ballroom)

Black is a common colour of mourning in Europe and North America. This tradition is believed to have originated from the Roman Empire. In other cultures, purple is the colour of mourning. In Catholic cultures it is common to wear purple

during Easter to symbolize the suffering and death of Jesus Christ. In Brazil, purple and black are the main colours in Catholic funeral attire. (Craven Funeral Directors, 2019)


PICTURE 6. Tune funeral of Cardinal Arns in Sau Paulo (BBC news, 2016)

5   COLOUR IN MOVING PICTURE

5.1   History of colour in film

There are differing opinions about which was the first colour motion picture. Historically the first commercially produced coloured film was A Visit to the Seaside in 1908 by George Albert Smith. The film was made by using Smith's own invention called Kinemacolour, which was the first successful colour motion picture process. (McKernan, Victorian cinema.net)
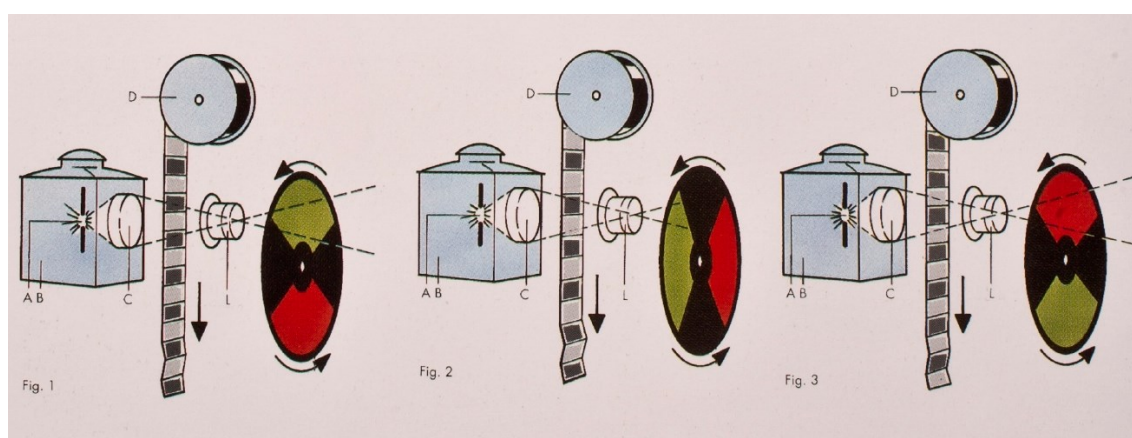

PICTURE 7. Kinemacolour projector (Flueckiger B. Timeline of Historical Film Colours, 2012)

Kinemacolour functions by alternating red and green filters in front of the camera and in front of the projector. This allowed for fringes of colour to become visible in the time parallax between the green and red filter. However, Kinemacolour did not allow for blue and violet hues to be visible. Kinemacolour works at 32 fps which is the double of the minimal frame rate of 16 fps. (Flueckiger B. Timeline of Historical Film Colours, 2012)

Some perceive the Warner Bros 1929 film The Wizard of Oz as the first important coloured motion picture because it popularized the usage of Technicolour. Technicolour was invented by Herbert Kalmus and Daniel Frost Comstock in 1916, and it was used in Hollywood motion picture industry until 1954. Technicolour three-strip camera captures colour records onto three separate strips of film. Light enters the camera through the lens which is then divided into two paths by a

beam-splitting prism. The path directly in front of the camera is exposed black and white negative film with a green filter in front of it. The second path has a red filter in front of it and is exposed to two strips of film sandwiched together. The film in front is sensitive to blue light, and the film behind it is sensitive to red light. (George Eastman Museum, 2022)
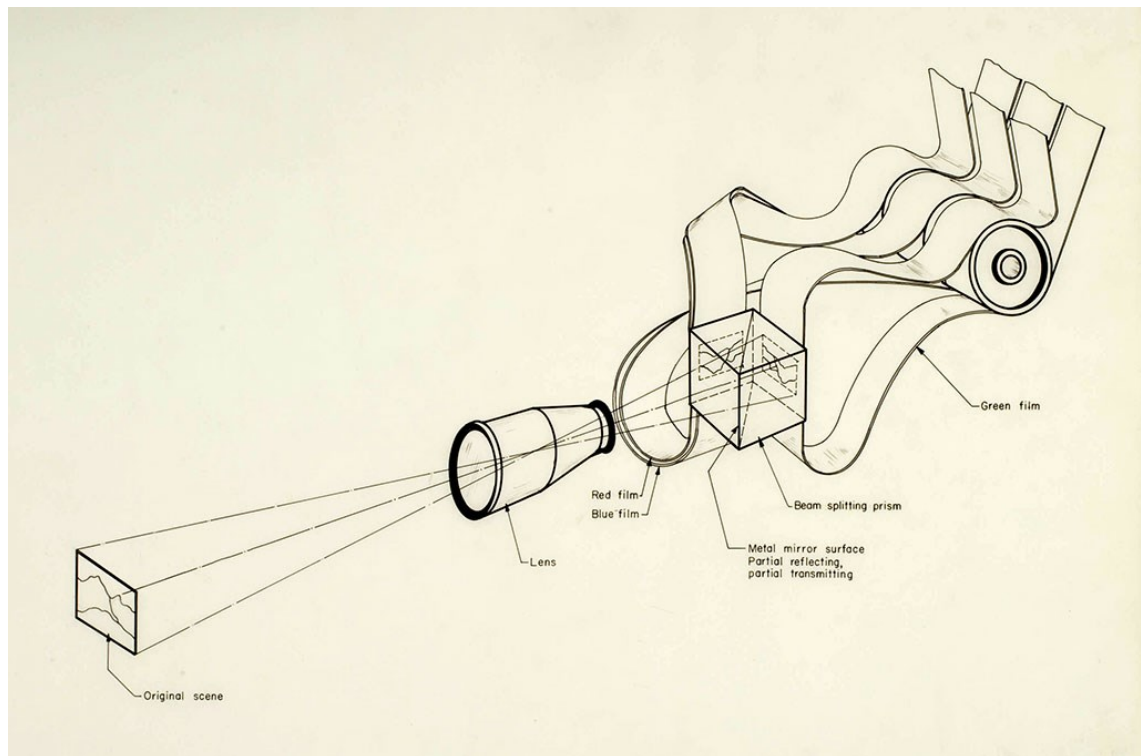
PICTURE 8. Three strip Technicolour camera (George Eastman Museum, 2022)

Initially, coloured film received a lot of critique. According to The Article, Critic Don Herold commented that the actors in the 1935 movie Becky Sharp looked like roast turkeys because of the overly saturated colours and juxtaposing hues. As filmmakers learned to use colour as inspiration and as a tool instead of limitation, coloured film was able to flourish. (REB, The Article, 2015)

5.2 Colour in storytelling

Colour is paramount in setting the mood, directing audiences' attention, foreshadowing events, and differentiating stories. A single colour can be broken into different saturations, hues, shades, and values, and be used to show a character's

progression, relationship between other characters, and their transformation throughout the story. All of this happens on the viewers' subconscious level, which makes colour a very powerful and an important tool to add depth and dimension to the story and characters. (Lee, Academy of Animated Art 2023).

Before there was sound in films, filmmakers found ways to tell a story with colour. Because coloured film technology was still far away, filmmakers would go to painstaking lengths to add colour to their film. Silent film era filmmaker Erich von Stroheim spent almost a year colouring individual frames by hand for his 1924 film "Greed'" to convey a story of a couple who win the lottery and are slowly taken over by greed. (The Cinema Cartography, Colour in storytelling)

PICTURE 9. Examples of colour in Greed (Stroheim E. Greed, 1924)

Filmmakers also found a way to tell stories in black and white motion pictures. Shades of black and shades of white were used to differentiate the good characters from the bad. White colours were reserved for the good and black colours were for the evil characters. This simple split made it easy to direct the viewers emotions in a wanted way, and to tell a non-verbal story. (Lee, Academy of Animated Art 2023)

5.2.1 Expressing emotion

Because colours are heavily associated with emotions, conveying an emotion to a viewer is one of the common usages of colour in storytelling.

Gris is an indie game developed by Nomada studio and published by Devolver Digital. Nomada describes Gris as a game that tells the story of a young girl going through a painful experience in her life and trying to free herself from anger, frustration, or death. (Nomada.studio, 2018)

In an interview for Gamecreator, the game's director Adrián Cuevas explains that the colours were the most important aspect in the game. The team knew from the beginning that they wanted to use colours and their emotional connection to convey different feelings for the audience. (Cuevas for Gamecreator, 2018.) Because colour association is so unique for each person, it is common for film or games to create a set association viewers will have between a colour and a character. Cuevas says in the same interview: "The story is subtle, but we didn't want to explain it completely, because at the end of the day what we want you is to feel what Gris is feeling" (Cuevas for Gamecreator, 2018.)

According to Healthline.com, the five stages of grief are denial, anger, bargaining, depression, and acceptance (Lawrenz, Healthline 2022). While Gris does not explicitly name each different stage in the game and instead leaves the interpretation for the player, the game has ways to ensure that the player differentiates the stages and associates different emotions with each of them (Picture 5). Each level has unique architecture and unique mechanics that help with the associations.

PICTURE 10. The game levels of GRIS (GRIS 2018)

5.2.2 Character growth

Another common and effective usage of colour in storytelling is using colour to show how a character changes during a story. This can be done by having character's clothing colour change overtime or have the character's surrounding colours changing. (The Cinema Cartography, Colour in storytelling.)

A commonly brought up example of effective character development storytelling is the crime drama TV show Breaking Bad. The show was created by Vince Gilligan and aired originally between 2008 and 2013. The show's main character is Walter White a chemistry teacher diagnosed with terminal lung cancer. To combat the medical bills and hopefully save his family from financial ruin, he starts producing and selling methamphetamine with an old student of his, Jesse Pinkman. The story follows Walter White's spiral from a suburb chemistry teacher to a dangerous drug lord, taking his family and everyone he knows with him.

When creating the show, Vince Gilligan paid extreme attention to colours and their change. He explained in a QG Magazine interview in 2013, that he obsessed over such details. Gilligan would talk in detail with production designers and costumer designers how to specifically use colours in the series. To make sure each character's colour palette told a story, they would plan each character's colour palettes for a year in advance (Vince Gilligan to QZ 2013.)

During the show, Walter White goes through significant change as a character which is reflected in his clothing. When viewers are first introduced to Walter White, he is dressed in very plain brown colours. His colours are washed out and do not necessarily catch the viewer's eye. These colours were chosen on purpose to expresses to the viewers that Walter is unsatisfied with his life. Walter White's actor Bryan Cranston explained in a 2023 interview for GQ that the character started out as passive, submissive, and a pushover. Cranston said that he told the show's costume designer to choose clothing that would make the character disappear. The colours needed to represent that Walter White was a nobody, so the initial clothes were mostly off-white, beige, soft yellow, and pastels (Bryan Cranston to GQ, 2023.)
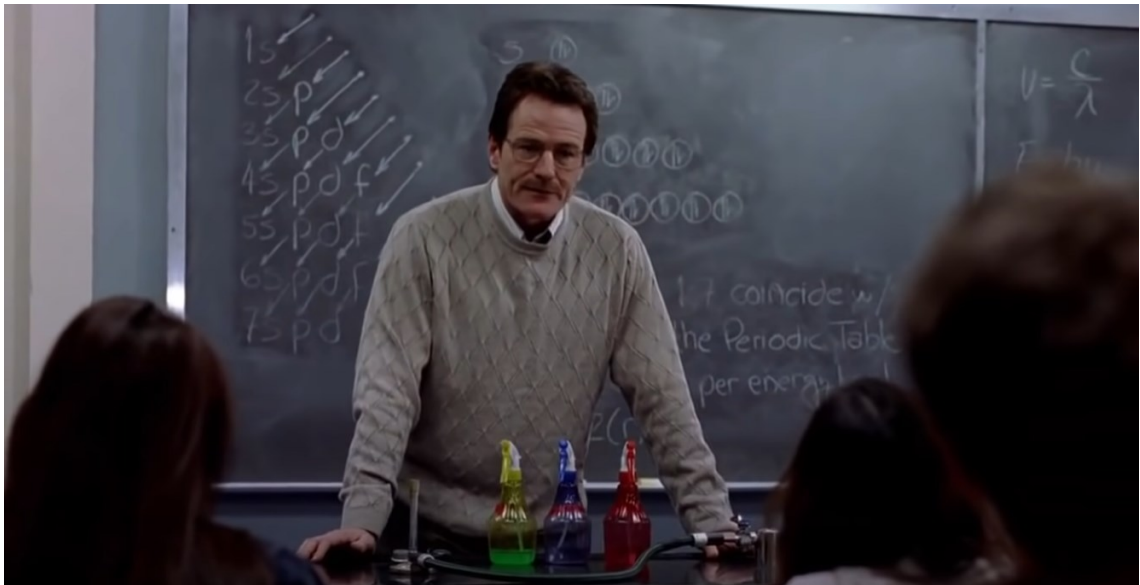
PICTURE 11. Breaking Bad Trailer (First Season) – Youtube

As Walter's moral judgement shifts and he falls deeper into the world of crime, stronger colours start appearing in his clothing, such as dark blue, dark brown, and red. While red can already be associated with things such as death, anger, crime, and blood by some, Breaking Bad purposefully creates situations where the association is born to all viewers. These scenes are often highly emotional and gruesome, which can help viewers associate red with not only death, but as well strong emotions and blood (Picture 7).

PICTURE 12. Examples of red colour in extremely violent scenes (Breaking Bad)

Much like in the early days of cinema, black is used to separate the truly bad characters from the rest. Characters who have been part of the drug industry for a considerably long time are often wearing mostly black. Black starts appearing in Walter's clothing alongside actions which are completely self-serving and often involve unnecessary violent crime or taking a human life. In the same QZ interview, Vince Gilligan explained that Walter White's shift from red all the way to black was a carefully planned change (Vince Gilligan to QZ magazine 2013).

A notable theme throughout the series is Walter White's insisting that despite committing unforgivable acts of violence, his motives were always pure, and his actions were always done for his family's wellbeing in mind. In the final episode of the series, Walter White's character development comes to an end. He finally admits to his wife Skyler White, that deep down his actions were all done for his selfish enjoyment instead of helping his family. After this major final development step, Walter White dies wearing similar washed-out clothing he wore during the

first season before his character development journey began. While there is no conclusive answer as to what this means, it can be seen to symbolize that Walter White is still the same person as he was when his journey began.
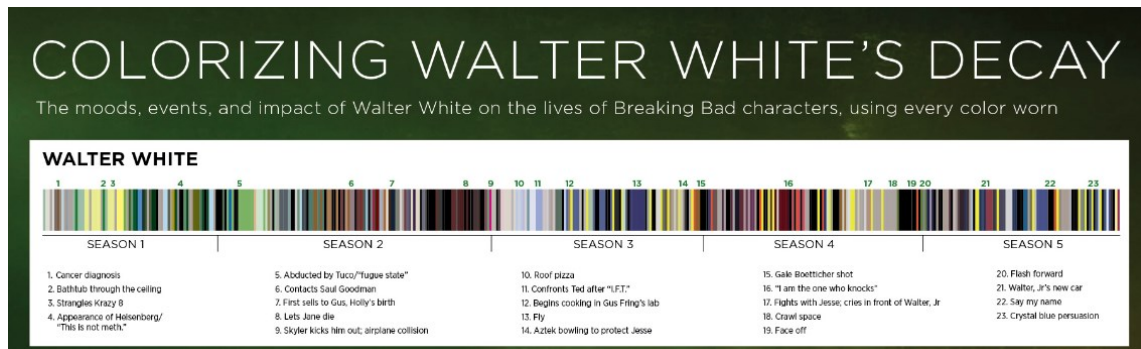
PICTURE 13. Walter White colour palette (LaRue J.)

5.2.3 Directing an eye

Colour can also be used to simply direct a person's eye. This is technique used in moving visual media to make a viewer focus on a specific point of great importance.

An example of this use of colour is the 1999 movie The Sixth Sense by M. Night Shyamalan. The movie tells the story of a child psychologist named Malcolm Crowe whose patient can see and communicate with the dead. In the end of the movie, it is revealed that the psychologist has been dead during the entire movie, and upon realizing this and accepting his own death, is able to move on.

Throughout the movie, red appears strongly in multiple scenes but only on very select elements. The colour is not used with an emotional association in mind. Instead, it is used to make a connection between important details that tell a non-verbal story. The colour connects scenes with death and ghosts, and even subconsciously reveals characters to be dead or killers even before the movie's plot does. No association between red and death is explicitly created on a conscious level, because the movie does not reveal the character being dead until the very end.

PICTURE 14. Anna Crowe's dress shades (Shyamalan M, The Sixth Sense, 1999)

Malcom Crowe's wife is only seen wearing red during the movie to indicate her connection with death. The shade of the clothing changes depending on her grief, but it always stays red. In scenes where she is seen giving a gift to a new boy-friend, her dress is muted red and nearly brown (picture 9.) This can be seen as her letting go of her grief and trying to move on. Contrasting to this is her bright red outfit on her and her late husband's anniversary. This is when her grief is the strongest and it is reflective in her outfit.

PICTURE 15. Red greeting cards and Mrs. Collins funeral attire (Shyamalan M, The Sixth Sense, 1999)

Another character associated with death, Mrs. Collins, is slowly poisoning her child which leads to the child's death. At the funeral, Mrs. Collins places bright red flowers on her child's coffin while wearing a red outfit and red lipstick (picture 10.) Her outfit stands out dramatically from everyone else dressed in traditional black. The shade of red is again indicating how strong the connection between death and the character is, as Mrs. Collins is directly responsible for her child's death.

6   Colour association survey

To explore the differences and similarities of colour association in moving visual media, a colour association survey was conducted. The purpose of this survey was to answer the following questions:

- Can a pattern of similar colour associations be observed?
- Can observable differences be noticed?

The survey was hosted using Google Forms and shared online in survey-related forums and websites. Each respondent was able to answer the survey remotely and anonymously.

6.1   The material

The material to be surveyed had to fit the criteria of moving visual media. Formats such as video (mp4, mov, avi), animation (2D, 3D), and an animated gif all fit the survey purpose and are within moving visual media. To ensure least technical difficulties during playing the material, mp4 video format was chosen.

The central focus of the videos was the colour, for this would be the part surveyed. The initial plan was to create four differently coloured short animations of a character performing a simple looping action such as walking or waving. However, having a humanoid character in a video created a possibility that the viewer subconsciously projects their associations of what or who that character reminds them of. For this reason, it was decided that no type of character would appear in the videos to reduce associations not related to colour. Instead, it was decided that each video would have an abstract animation of shapes,

To keep the survey size manageable, the colour variation for the videos was kept minimal. The colours chosen for the videos were red, blue, green, and black. The reason for these colours was their presence cross-culturally and their commonly differing associations.
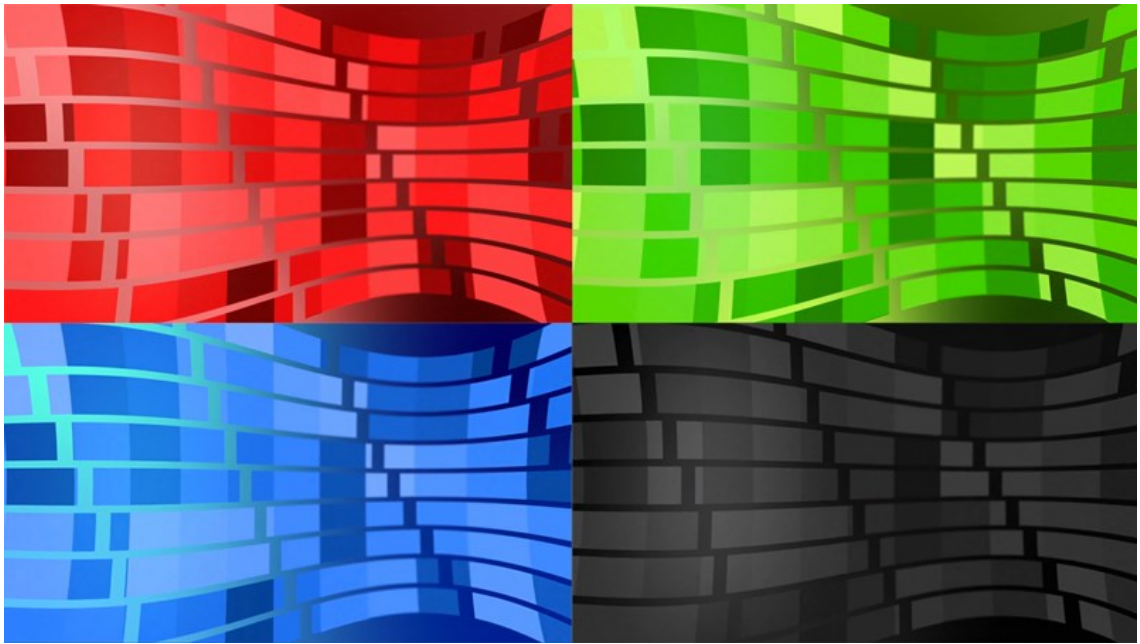
PICTURE 16. Screenshots of each video

The background of the animation was a gradient within the given colour shade range instead of a solid colour background. The shades ranged from very dark to very light. The animation consisted of simple gently moving wave of square shapes on top of the gradient background. These squares also had the same shade range as the background. The animation also included the changing shade of the squares, which alternated in a random pattern.

To ensure technical similarity between the colours, the saturation, contrast, and colour shades were kept the same. This was done by layering a black-and-white adjustment layer on top of the animations. Black was given more contrast to keep the overall colour from tinting too grey.
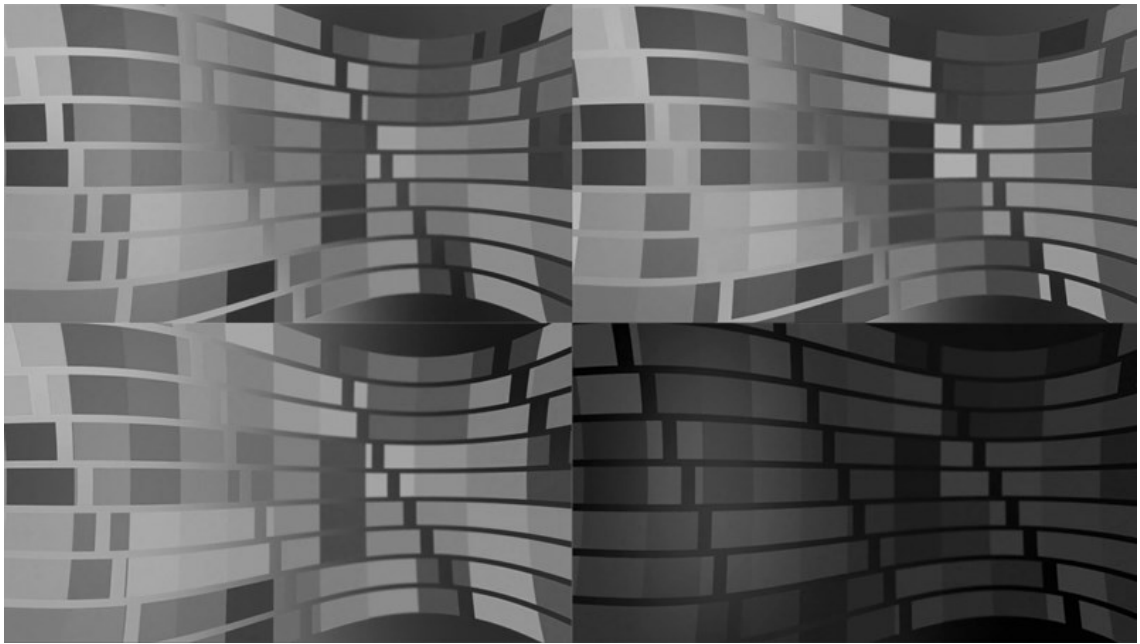
PICTURE 17. Video contrast differences

6.2 The survey

The survey included only two questions about personal information: the respondents' gender and country. Because colour associations can vary so drastically, the answer options were selected beforehand. Each colour was given four common associations that were found to have major differences cross-culturally.

Blue	sadness	freedom	trust	loyalty
Red	luck	fertility	love	violence
Green	wealth	nature	health	youth
Black	mourning	authority	elegancy	evil

TABLE 1. Colours and their assigned colour associations

The selected words were mixed into a random order and the order was put into a multiple answer selection format. The random order of the answers was same after each video to avoid affecting the answer results. The respondents were also given an opportunity to give a freeform answer after the given answer options.

6.3 General questions

Overall, 37 answers were given from which one answer had to be discarded. The age of the respondents ranged from 15 to 51. The most common age of the respondents was 23.

From the respondents, 64,9% identified as male and 18,9% identified as female. One person preferred not to answer the question, while rest of the answers fell under the LGBTQ+ umbrella.

Most of the respondents were from the United States (27.03%). The second largest respondent group was from the Nordic countries. (16.22%). The answers were analysed under the assumption that they were given correctly, as well as that the respondent has lived most of their life in their given country. This was done due to verifying either of this information was not possible remotely. These factors have been taken to account when analysing the answers.

6.4 Colour answers

Respondents associated the pre-selected in a variety of differing ways. Each colour had a different word that was selected significantly more than the rest. Each colour also had words that were not selected once, and these selections also had great variety between the colours.
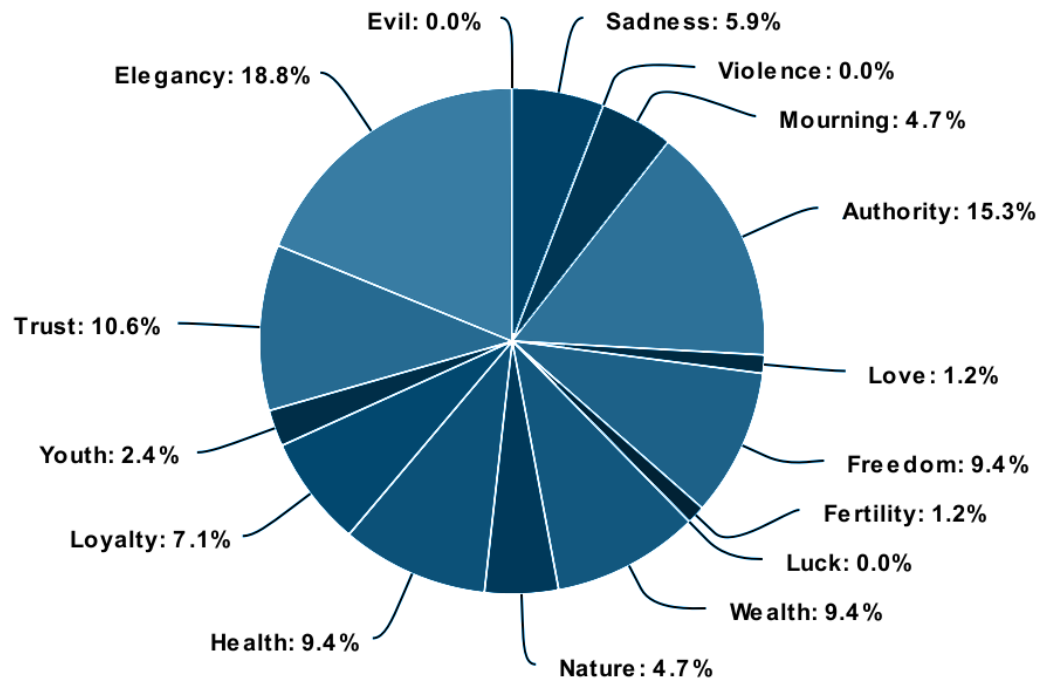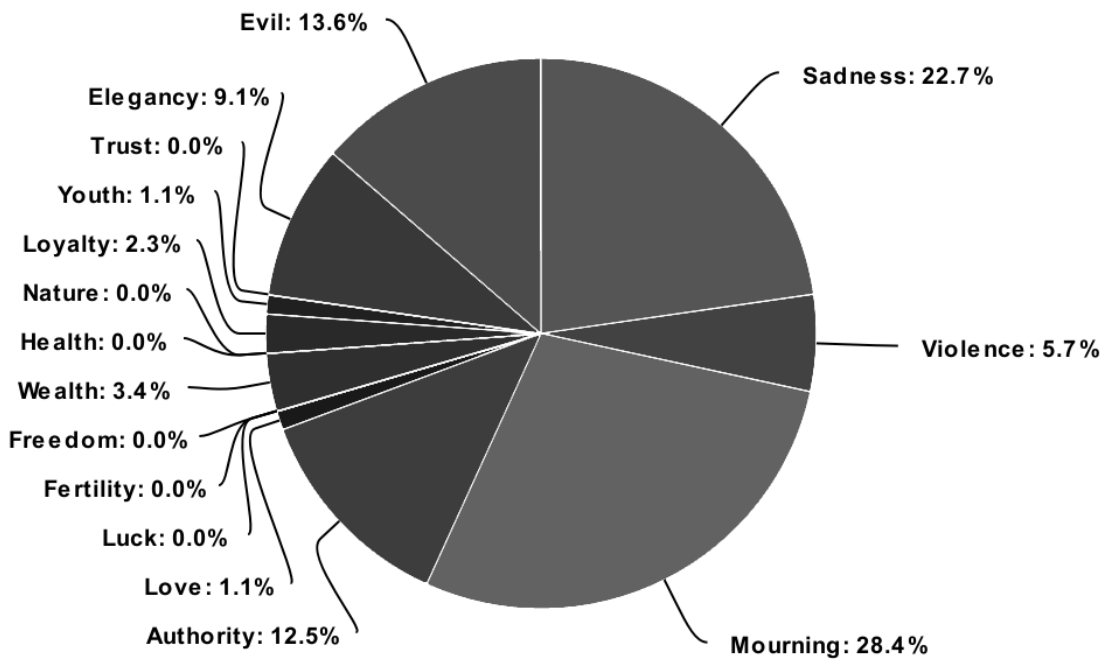
PICTURE 18. Associations with the blue video
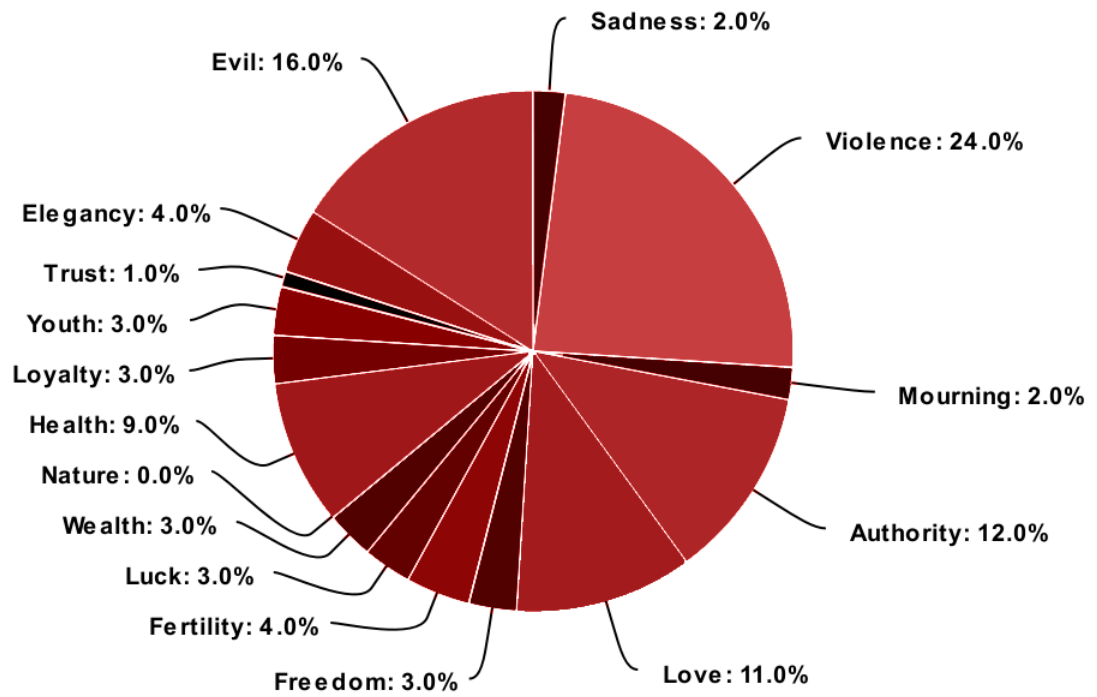
PICTURE 19. Associations with the red video
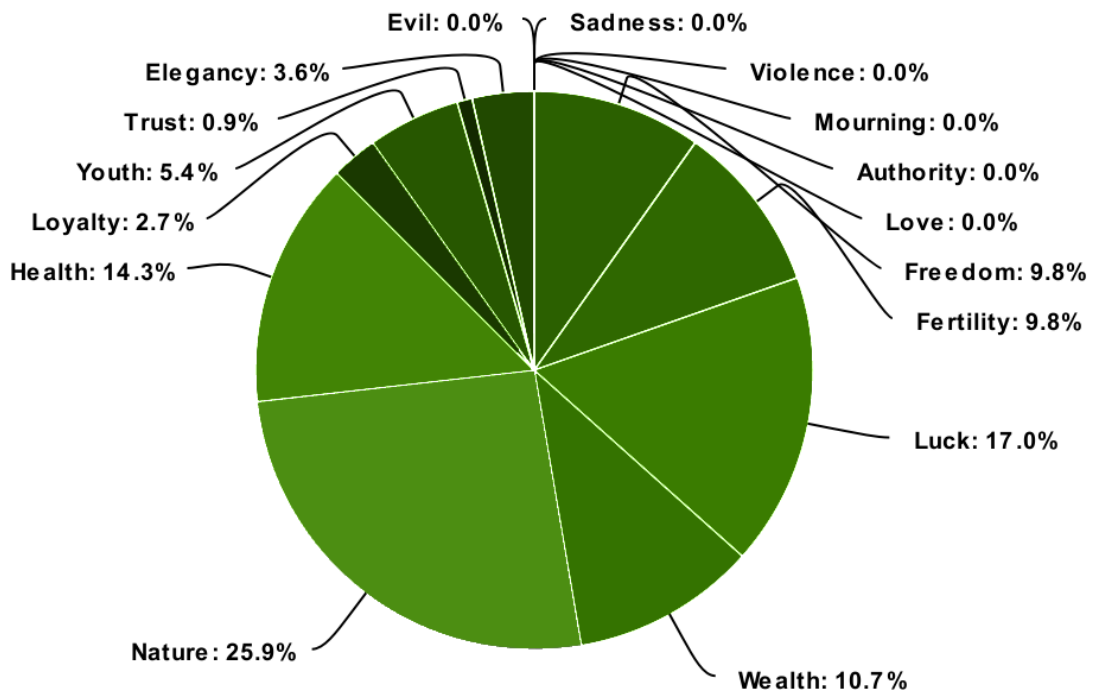
PICTURE 20. Associations with the green video

PICTURE 21. Associations with the black video

The freeform answers were found to have at least some commonality. Despite not knowing each other's answers, respondents often gave answers that were either identical or fell under the same theme.

- Blue: Unsure, pondering, synthetic, technology, calm, formal, intelligent, system, neutral, nostalgic, corporation, cold, bank, peace, glass, wave

- Red: Aggressive, anxiety, fear, danger, passion, virility, night, lockdown, urgency, sterile, warning

- Green: Calm, digital, happy, positivity, peaceful, energetic, fresh

- Black: Dusty, neutral, anticipation, ennui, morbid, death, fatality, enclosed, calmness, void, empty/emptiness

6.5   Survey conclusion

Because the survey was conducted remotely, each participant answered the questions on their own device. Because of the possible drastic colour differences between device screens and users' personal device settings, the answers could have had differences if the survey was conducted in a controlled environment. It was also impossible to determine if the respondent was truthfully from the country they answered to be from and if they had lived there long enough for cultural associations to be born.

Acknowledging the small survey size and possible interfering factors, it was still possible to observe similarity in answers between respondents. Each colour had a single majority association chosen the most, which was mostly shared between respondents from the same country or a similar cultural background. It was also possible to observe associations which differed greatly from the majority. The answers collaborated our current understanding of colour psychology and colour associations, although it cannot be ignored that it is possible that multiple factors such as the respondents' own device screen settings, the respondents' surroundings during answering, and possible associations created by the animation, could have affected the answers. All these factors should be considered. Many of these factors could be eliminated by creating a neutral environment with a single device that each participant uses, and by making the animation even more abstract or eliminating it completely.

In conclusion, despite the circumstances, it was possible to observe some common colour associations between the respondents, as well as singular exceptions, both which are common in colour psychology testing.

7 DISCUSSION

Colours are an extremely powerful tool that humans have used in moving picture media long before sound technology. It was utilized in storytelling before the understanding of colour psychology was even born. In modern times people have had the ability to study colour psychology and its effects, which has given filmmakers the chance to use colours in multiple different storytelling ways.

While colour psychology can have drastic differences cross-culturally and individually, the basics of it can still be used. Colour psychology still leaves room for much creative freedom because a filmmaker can create brand new colour associations for a viewer in their game, film, or series.

Despite being a non-verbal subconscious way to tell a story, colour has been proven time after time to be one of the most effective ways for storytelling. Strong colour associations allow filmmakers to utilize colour to set the correct mood and ensure the viewer feels the wanted emotions. Assigned character colours are essential in developing a character and showing the viewer how the character has changed. Highlighting an important aspect from a film with a set colour does not only direct the viewer's eye but can be used to subconsciously reveal information.

Despite its loose rules and endless variables, colour psychology and colour associations are a strong tool for storytelling that allows for visual subconscious storytelling in a unique deep level. For this reason, it is a vital part of storytelling and should be taken in account for any piece of moving visual media.

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APPENDICES

Appendix 1. The Colour of Emotion results

Avery N. Gilbert, Alan J. Fridlund, Laurie A. Lucchina. 2016. The colour of emotion: A metric for implicit colour associations. Food Quality and Preference.
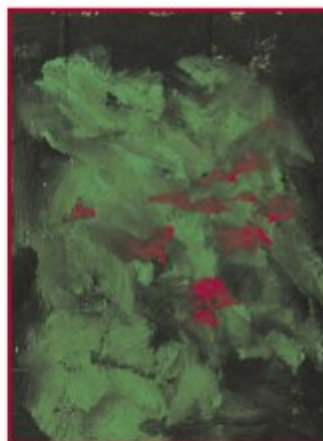
Appendix 2. Rage inspired paintings

RAGE

Samuel
Bogata, Colombia

Rage is an explosion coming from black. I was actually astonished that as I evolved this emotion, I saw a lot of green in it. Green mixed with black and on top, the furious red.

Kaido
Tokyo Japan

Again, I have no reasons why I picked black, red, and yellow. I painted spontaneously with no vertical or horizontal lines. I put some pattern in based on my feelings.

Ilya
Mexico City, Mexico

The painting was done standing up and in 4 minutes at the most. A spatula, a pair of scissors, and a utility blade were the tools I chose to extend my body. My strokes were forceful sharp and spastic. I scraped and injured the paper with blacks and different shades of reds. My heartbeat sped up and my breathing became agitated.
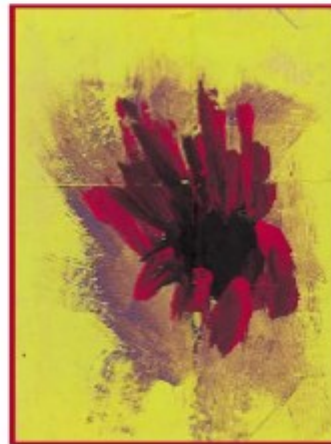
Anna
Berlin, Germany

It is almost like an explosion for me coming from the lower parts of my body, moving up. Red came up immediately to me, but also black and yellow.

Christiane
Albertville, France

On a sunny day (which is why I use the yellow), something explodes in my heart for a moment. I bleed (red). I hurt deeply (black).

Juey
Singapore

There was a time in my life when I had a hot temper. I remembered the times when I felt so angry that I lost control and became more physical than I should. At those moments, I just blew up. It felt irrational, out of control, explosive. The end result wasn't pretty. Today, I painted an ugly red and repeatedly pounded my fist dipped in black at the paper.

My seven-year-old noticed "Rage" when I was packing the paintings to bring to the FedEx office. In two seconds, she stunned me by saying, "That looks like mad." I hadn't told her what I was painting. She just knew.

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Bellantoni P. If It's Purple, Someone's Gonna Die: The Power of Colour in Visual Storytelling. Published by Taylor and Francis in 2012.

Appendix 3. Project material

Project videos:

https://youtu.be/6WTGTwQR-wA

https://youtu.be/2upQVnzai0U

https://youtu.be/VbIrxDV9_tk

https://youtu.be/NLV8DAsE38c

Survey results: https://docs.google.com/spreadsheets/d/1KG8J1odH4UUt-mjK34tANUyRxvWbfEHb8nuQ1EM03LUc/edit?usp=sharing