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Exegesis

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Declaration of originality:

'I, Cameron John Chamberlain, hereby declare that the material presented here is the outcome of the Honours project I have undertaken during my candidacy, that I am the sole author unless otherwise indicated and that I have fully documented the source of ideas, quotations or paraphrases attributable to other authors.'

Signed, 31st October 2011

Instilling geometric primitives with emotion through character animation.

Abstract

Through a series of self portraits I am investigating how pictorially simplified characters may be used in 3D character animation to show emotion. Most 3D animation tends towards realism, which has been successfully used to create strong emotional reactions in an audience. Instead, I am using geometric primitives to explore motion separately from character models which are inherently emotive. I am bringing the techniques of character animation into a fine arts context to communicate emotively with the viewer.

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Introduction

I am researching the effectiveness of applying character animation techniques to geometric primitives to create emotive characters through self portraiture.

3D character animation is primarily focused on realism (Figure 1-2). When characters are abstracted it is iconically, retaining representational meaning (Figure 3). These character models are the clearest way to create emotive characters as some personality and life exists before the character even starts moving. Animating pictorially abstracted characters enables an exploration of character animation to discover how much emotion can be shown using animation alone. This series separates animation as much as possible from character design, modelling and texturing to explore animation by itself.

I am using 3D animation as it is currently the most widely used form of character animation. I am using the same toolsets that commercial projects would for realistic or iconically abstracted animation. To sincerely animate emotion the situation must be specific. My strategy to avoid cliche is to use moments from my own life when I felt strong emotions to create a series of self portraits using geometric primitives. Using these moments gives the work specificity of character and situation and helps me to create pieces that perform the emotions in a truthful way because I know how the situations felt.

The context of this project is 3D character animation, which is a field that stands on a foundation of 2D hand drawn character animation. Character animation creates an illusion of life through a sequence of images played at a constant speed.[1] [2] It is therefore concerned with character and emotion, not just movement. As an artistic medium it draws upon aspects of every other, from painting to film. This gives an artist great scope for self-expression.[3]

As geometric primitives are the simplest 3D shapes, they have minimal inherent emotion as character models. I am taking advantage of this to explore the emotional qualities of movement. Using character animation techniques on these shapes separates the movement from the usual character designs that have a head, face, limbs and hands that greatly help animators present emotion. I am further

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[1] Frank Thomas and Ollie Johnston, *The illusion of life : Disney animation*, 1st Hyperion ed. (New York: Hyperion, 1995), p15.

[2] For subsequent definitions see Glossary

[3] Thomas and Johnston, *The illusion of life : Disney animation*: p15.

exploring the limits of emotive self expression through 3D character animation, using these constraints to focus my research into movement over still imagery.

I am influenced by a wide range of animators from those working at large studios like Pixar Animation Studios, Walt Disney Animation Studios, DreamWorks Animation, and Warner Bros. Cartoons, to independent artists like David OReilly and Ryan Woodward. I am also influenced by artists in other fields, such as painter Johannes Itten's discussion of colour and Scott McCloud's writing about comic books. I have used these influences to strengthen my own work and as a foundation for some of the discussion that follows.

In this paper, I first discuss forms of abstraction and how they relate to animation. I then discuss my use of self portraiture in creating emotive works, which also brings up the relationship between viewer and artist. I then consider the control gained by using tools of animation such as colour, timing, lighting, camera and presentation. I subsequently analyse my progression through both the tests and final works, showing what I gained through various failures and successes. Finally, I suggest possible future paths for exploring pictorially abstracted character animation.

Figure 1. Andrew Adamson and Vicky Jenson, *Shrek*

Figure 2. Gore Verbinski, *Rango*

Figure 3. Pete Docter, *Up*

Self Portraiture

Emotive Self Portraiture

Before undertaking this project I tried to create objective work, but I realised that using my individuality could enable my works to be less formulaic and cliched. Animators and animation directors often talk about pouring their own experiences into their work. Chuck Jones, for example, mentions that he invests aspects of himself into each character he works on to make them more interesting and unique.[4] The artist is present in their art in all circumstances and this leads to part of the work's individuality. I have created a series of short, emotive self portraiture to record and express moments from my life in a way that presents both specificity and emotional universality.

Emotional Communication

I aim for the viewer to see the emotion that I am trying to communicate, and to develop empathy towards the geometric shape, seeing it as a character.

> *No other human being can ever know what it's like to be you from the inside. And no amount of reaching out to others can ever make them feel exactly what you feel. All media of communication are a by-product of our sad inability to communicate directly from mind to mind.*[5]

McCloud theorises that the goal of communication and therefore art is to share emotional thought. I aim to communicate emotionally to the viewer through my geometric characters.

Acting from Life Experience

The process of animating requires me to record myself acting as each character in the scene. To make the character appear genuine I am drawing from my emotional memory of the situation that I am depicting in each work. Caine notes that actors use their experiences and parts of their own personality to put themselves into the mindset of any role: "When you flesh out a character to make him real, your tools are the aspects of yourself that you apply and your role models."[6] By using my own

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[4] Hugh Kenner and Chuck Jones, *Chuck Jones : a flurry of drawings*, Portraits of American genius (Berkeley: University of California Press, 1994), p74.

[5] Scott McCloud, *Understanding comics* (Northampton, MA: Kitchen Sink Press, 1993), p67.

[6] Michael Caine, *Acting in film : an actor's take on movie making*, The Applause acting series (New York, NY: Applause Theatre Book Publishers, 1990), p96.

experience as the basis for scenarios I am both making a stronger link to help myself show each emotional state and putting more of myself into the work.

Performance

Since I am not using previously recorded video of each moment, I am recreating and performing each memory. When I started this project I was concerned that my performance may lead to creating works that were disingenuous. During research into self portraiture I discovered that all self portraiture is performed. As Bond writes, "Even when an artist's self-portrait seems to be the result of a genuine moment of self regard or self interrogation, it is invariably a kind of performance."[7] Here, Bond notes that the act of knowingly capturing something of yourself makes it a performance. For this series this is doubly true. Firstly, I am remembering each memory in a particular way, and then reenacting it in front of a video camera. Secondly, I am using this footage, along with my own knowledge of how each movement feels, to create an animated version of the memory that emphasises certain elements to convey the memory clearly and forcefully. Although these scenes are based on memories, I am influencing their appearance in the final works through multiple levels of performance. Instead of making the works insincere, this performance allows me to bring more of myself into the work.

Abstraction of Image and Motion

Caricature

Caricature is the simplification of a form, strengthening it by exaggerating the important details and de-emphasising the extraneous. Scott McCloud writes that caricature is "Amplification through Simplification."[8] In animation both image and motion define a style. In my work, the geometric characters are simplified away from representation, but keep recognisability through their caricatured posing and movement. This opposes the direction of contemporary animated television shows, where the character design is instantly recognisable but the motion is very limited (Figure 4).

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[7] Anthony Bond et al., *Self portrait : Renaissance to contemporary* (Sydney, London: Art Gallery of New South Wales, National Portrait Gallery, 2006), p17.

[8] McCloud, *Understanding comics*: p30.

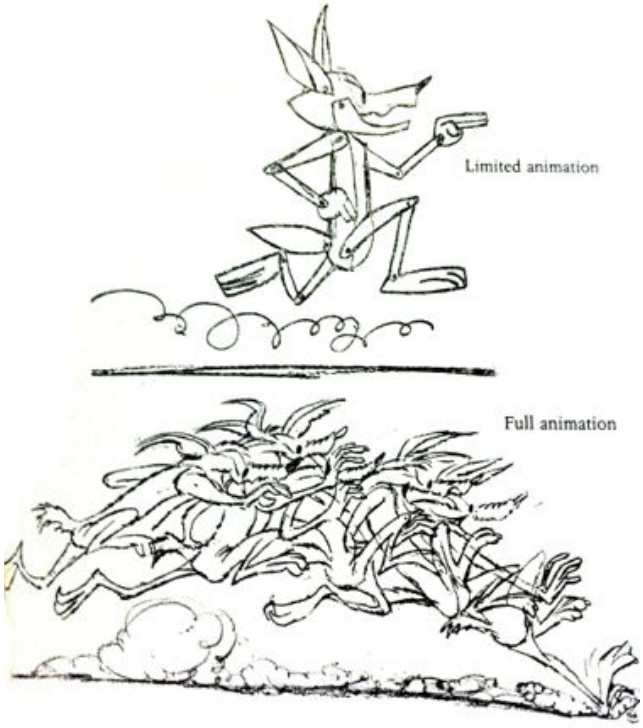

Figure 4. Chuck Jones, *untitled (showing the shortcomings of limited animation)*

Abstraction of Image

McCloud proposes two ways that an image may be abstracted: iconic abstraction and pure abstraction (Figure 5).[9] Iconic abstraction is where the meaning is retained but the extraneous details that are present in realism are removed. Pure abstraction is where the image is pictorially abstracted. The geometric forms I have been working with are primarily pure abstraction, where there are few recognisable elements. When moving the shapes are distorted to resemble an exaggerated form of the body that they represent. In this way my images are abstracted along both directions of "*The Big Triangle*" away from resemblance and realism. Abstracting an image in either direction makes the content more universal as the audience is invited to interpret the image not as a specific person but representative of everyone, including themselves (Figure 6).

[9] Ibid., p51.

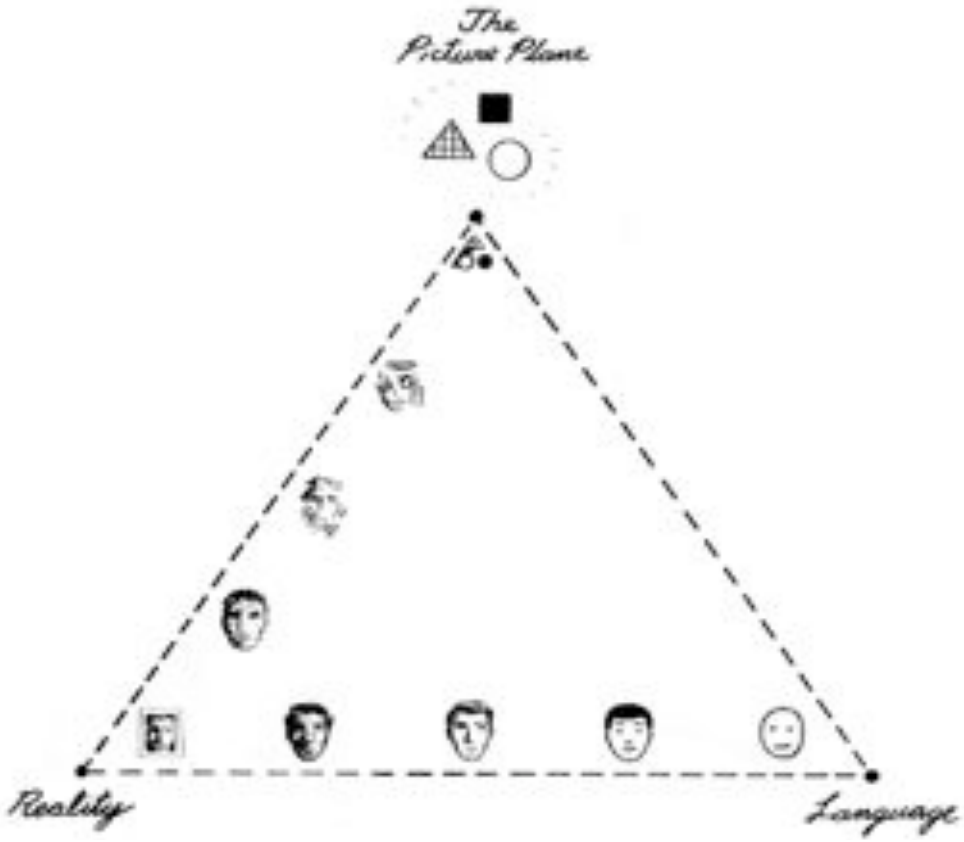

Figure 5. Scott McCloud, *The Big Triangle*
(Realism: left, Pure Abstraction: top, Iconic Abstraction: right)

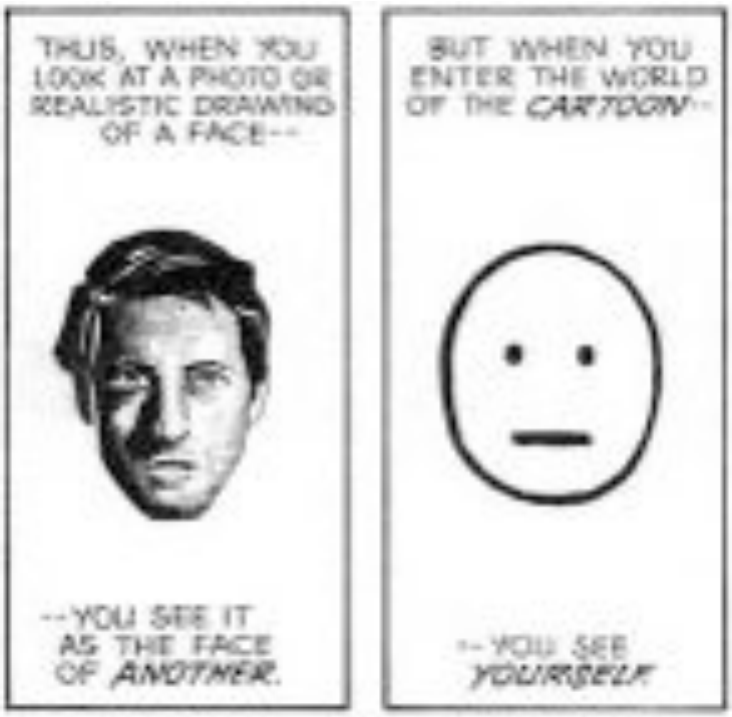

Figure 6. Scott McCloud, *Understanding Comics (detail)*

Abstraction of Motion

In animation, movement is at least as important as the still images that constitute it. Animated movement is usually somewhere between realism and iconic abstraction, because it is usually important to keep the meaning of an action. *Avatar*[10] is an example of realism, where the movement is as realistic as possible. *Presto*[11] uses stylised movement that retains meaning. The equivalent to pure abstraction of motion would be where the movements are stripped of representative meaning. However such an abstraction would be a move further away from character animation and into effects animation or motion design (Figure 7). I am interested in using characters, so the motion in my series is iconically abstracted, amplifying meaning.

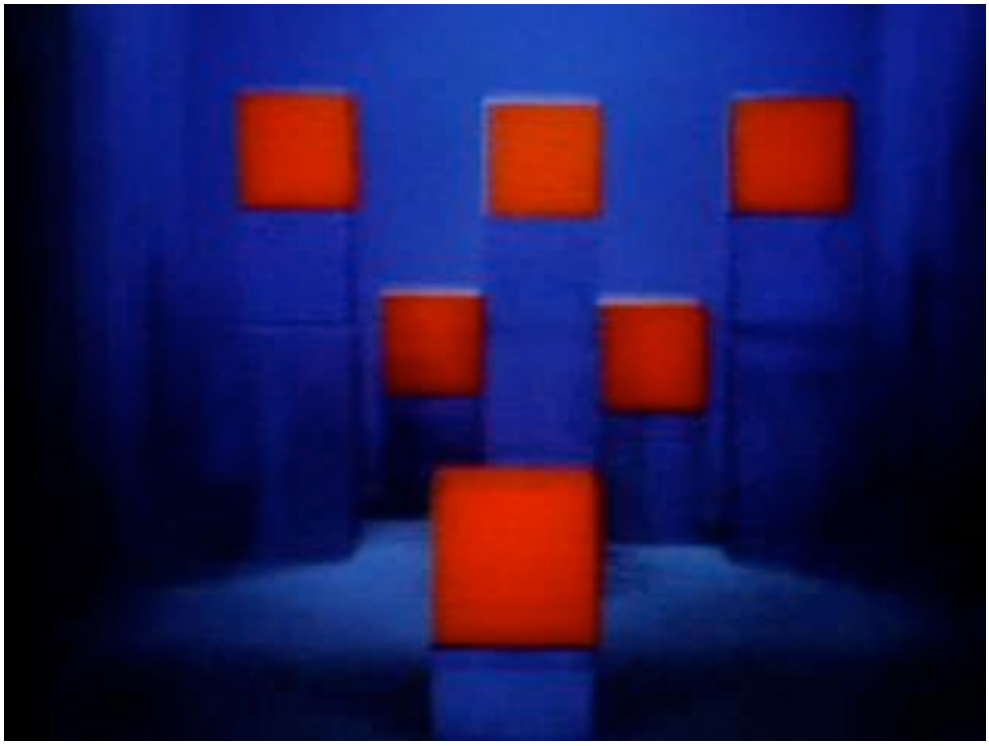

Figure 7. Oscar Fischinger, *Komposition in Blau*

[10] James Cameron, "Avatar," (USA: 20th Century Fox, 2009).

[11] Doug Sweetland, "Presto," (USA: Walt Disney Pictures, 2008).

Characterisation through Motion

In most animated films the character design gives the audience information about the character. A still image of Yogi Bear standing shows an instantly recognisable personality. John Kricfalusi notes of Ed Benedict's Yogi Bear design (Figure 8): "*You can tell from Ed's designs what the personality of the character is. … Yogi is confident looking. He's kind of a big oaf himself, but a loveable oaf and you can tell that he's mischievous.*"[12] This is because in limited animation a stationary character must convey its personality immediately. When using full animation, however, all aspects of the personality and emotion can be shown through acting –the way a specific character behaves in each specific situation. Jones notes,

> *… greatness, insofar as it's attachable to animation, undoubtably attaches to The Three Little Pigs, three characters who are characterized solely by the way they move, since they look exactly alike. … Unique selfness, inherent in a way of moving: that is the essence of the Character Animation.*[13]

Thus, characters can be given specific personality and emotion solely by their movement. Geometric primitives as character designs have no personality (Figure 9). In this series, characters are given personality and emotion through their movement instead of their appearance.

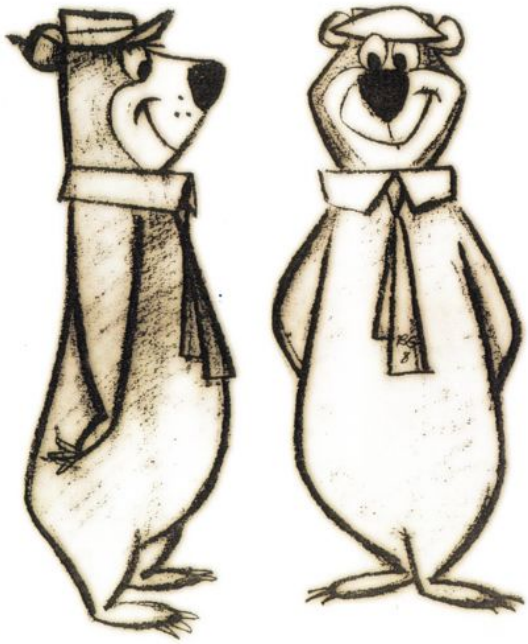

Figure 8. Ed Benedict, *Yogi Bear Character Model*

[12] Amid Amidi, *Cartoon modern : style and design in fifties animation* (San Francisco: Chronicle Books, 2006), p40.

[13] Kenner and Jones, *Chuck Jones : a flurry of drawings*: p10.

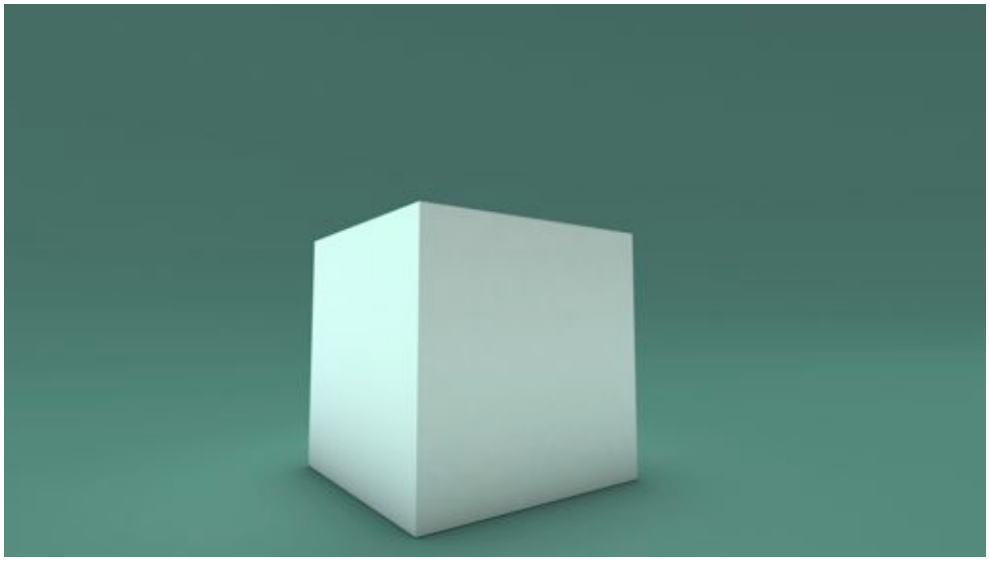

Figure 9. *Stationary Cube Model*

Thought of You

Ryan Woodward's *'Thought of You'*[14] is a hand-drawn animated short that uses dance to show the relationship between lovers. Woodward explores the potential of movement to convey emotion, showing restraint and simplification that inspires my work. Woodward's animation contains changing abstraction on the figures to enhance the movement, using both exaggeration and pictorial abstraction (Figure 10). *'Thought of You'* connects with me emotionally, so Woodward's simplification, exaggeration and emotion through movement influences my work.

Figure 10. Ryan Woodward, *Thought of You*

[14] Ryan Woodward, "Thought of You," (USA2010).

Geometric primitives

Despite the simplicity of geometric primitives they still imply meaning. For example, the cube implies a physicality, the sphere an idea, while the triangular pyramid seems aggressive.[15] Rounder shapes are softer and more spiritual or emotional, while hard edges are physical and sharp. I have primarily used cubes in my works because of this implied physicality. They are more defined than spheres but less aggressive than triangular forms. When deformed they become less harsh, but keep their physicality because of their defined edges. These quadrilateral prisms (after deformation they are no longer cubes) provide balances between physicality and spirituality and between softness and sharpness. The extra corners of a cube makes them easier to animate with clarity. I have kept the deformation of each edge to a simple curve, instead of posing the characters in 'S' curves or more complex shapes (Figure 11). This maintains the form's simplicity and forces me to simplify acting choices and pose the character with a clear line of action.

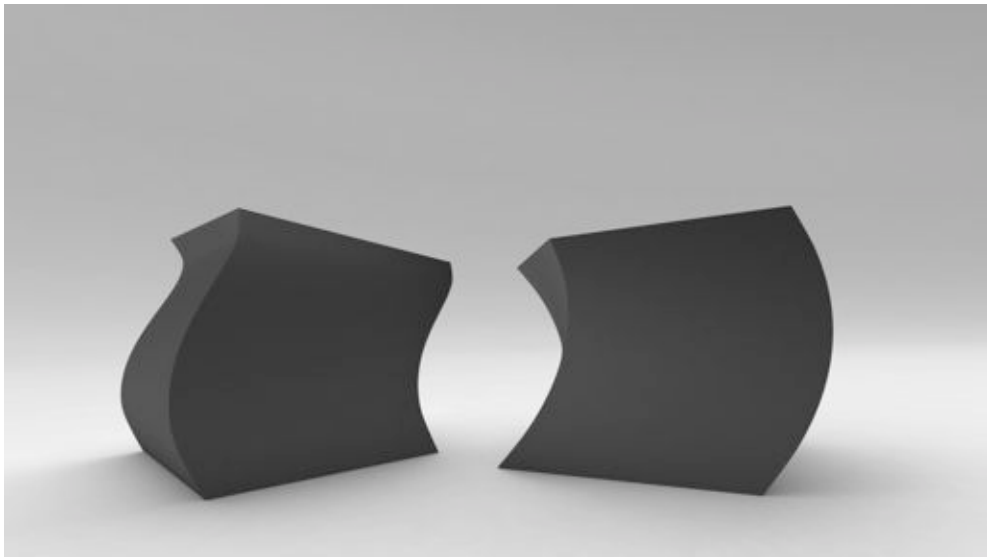

Figure 11. *Example of an 'S' curve and a simple curve*

[15] Johannes Itten, *The Art of Color: the subjective experience and objective rationale of color* (New York,: Reinhold Pub. Corp., 1961), p120-21.

Viewer

Unintended Narratives

Showing works near each other will cause the viewer to create unintended links between them. A narrative, constructed around these connections, is often constructed by the viewer. I do not see this as a negative effect on my work. Rather, the viewer's experience and interpretation is what enables deep communication between myself and the viewer. Unintended narratives are created when the viewer connects with and analyses the work. This is one way that the viewer can communicate with the artworks to draw out the emotional connections that I intend when creating the works, and so it does not negate the emotive goal of the piece.

Animation Principles

Early character animation was simplistic. Audiences were content to watch humorous characters move on screen, so there was no need to show any emotional depth through movement. Any emotions required were shown by image, not motion (Figure 12). In the 1930s animators at Walt Disney Productions, Ltd. experimented with animation to create more believable and interesting characters. Disney's lead animators, Frank Thomas, Ollie Johnston, Art Babbit, Vladimir Tytla, Milt Kahl and others, used this push for believability in animation to develop the twelve principles of animation by studying both observed and filmed movement and then testing how their observations work when animated.[16] These twelve principles (noted in the glossary) are tools that help artists express clear, convincing movement.

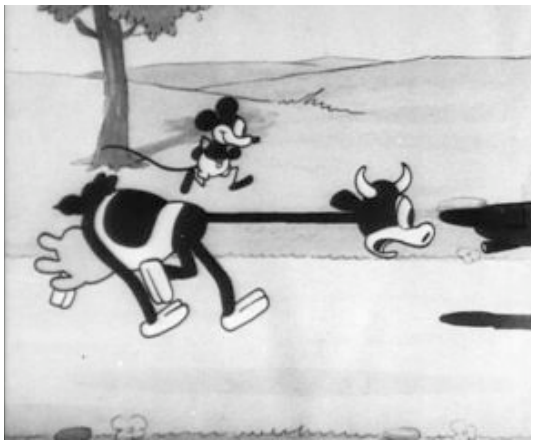

Figure 12. Ub Iwerks, Walt Disney, *Plane Crazy*

[16] Thomas and Johnston, *The illusion of life : Disney animation*: p47.

Visual Authenticity

David OReilly is a contemporary animator who uses simplified low polygon forms.[17] In '*The External World*' (Figure 13), he highlights the tools and medium used instead of trying to hide them. In my work I have similarly tried to use the aesthetic strengths of computer imagery instead of hiding the material or emulating another medium. Many other attempts to move away from realism in 3D animation have leaned towards a more painterly or cel animated aesthetic (Figure 14).[18] OReilly's work shows that 3D visuals do not have to appropriate authenticity from other media.

Figure 13. David OReilly, *The External World*

Figure 14. Emmanuel Gorinstein, *Skyland*

[17] David OReilly, "The External World," (Germany2010).

[18] Thomas Strothotte and Stefan Schlechtweg, *Non-photorealistic computer graphics : modeling, rendering, and animation* (San Francisco, CA: Morgan Kaufmann, 2002).

Timing

My previous works are united by an exploration of mood, which is created through timing. Timing is one of the most critical aspects to the mood and feeling of a moving image piece. For example, in my 2009 animation *Endurance* I timed everything too fast and it did not show the struggle of filming in the Antarctic, but once I slowed it down the tone of the piece improved. In both video art and cinema, artists often manipulate the timing of footage because it is such an effective way to manipulate the emotive qualities of a scene.[19] I use the timing of motion as a tool to help create an empathetic response.

Colour

Colour (the combination of luminosity, hue and saturation) strongly influences the viewer's emotional connection to a work. Even an attempt to remove colour, by using neutral greys, will still affect the mood of a scene. This is why I have explored colour in my works as a method to enhance the emotion without detracting from the character's movement.

Colour associations are subjective and difficult to predict. When I created a long, short shape and coloured it a particular red (Figure 15), some people associated the work with Uluru, which I think of as an orange. I thus changed it to a deep blue (Figure 16) to remove this unwanted relationship from the work. Colour is more culturally specific than most elements of animation. One person may associate deep red with passion, others with blood.[20]

As this series is self portraiture I have chosen colours that are emotionally resonant with me. These could be colours that remind me of the situation or person involved, or ones that make me feel like I remember feeling at the time. "The artist selects colors because they are the colors of the subject, because they appeal, in an ill-defined way, to subconscious memory, because they are reminiscent of past successes, or because he is frankly and randomly searching."[21] Here, Libby writes about the methods by which an artist can choose colours for a work. After initial attempts to decide on a rational way to select which colours to use, my work led me back to the methods noted above.

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[19] Catherine Elwes and University of the Arts London., *Video art : a guided tour* (London: I.B. Tauris, 2005), p20.

[20] Itten, *The Art of Color: the subjective experience and objective rationale of color*: p17.

[21] William Charles Libby, *Color and the structural sense* (Englewood Cliffs, N.J.,: Prentice-Hall, 1974), p90.

In this series the use of hue was limited to the characters, with backgrounds kept as a light grey (Figure 17). Doing this, however, isolated the characters from both the environment and the viewer. I then changed the backgrounds to a second colour, chosen by using the same methods as the first, while aiming to provide visual contrast. These backgrounds successfully incorporate the character into the environment, strengthening the viewers connection.

While colour is subjective, interpreted through an individual's experiences, it is also a powerful tool and difficult to negate. This is why I have used colour as a tool to enhance the mood and emotional connection between my works and the viewer.

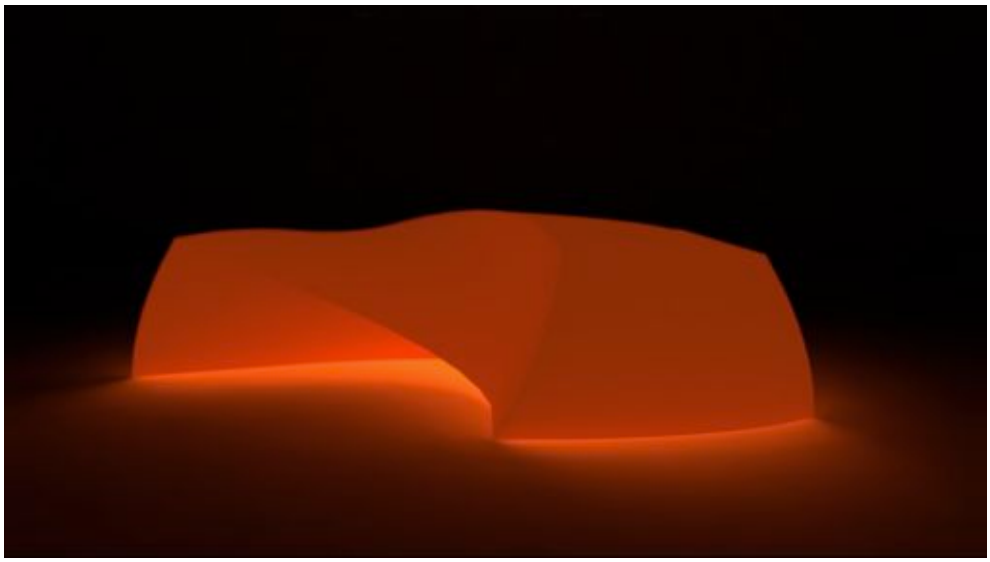

Figure 15. *Grief (red)*

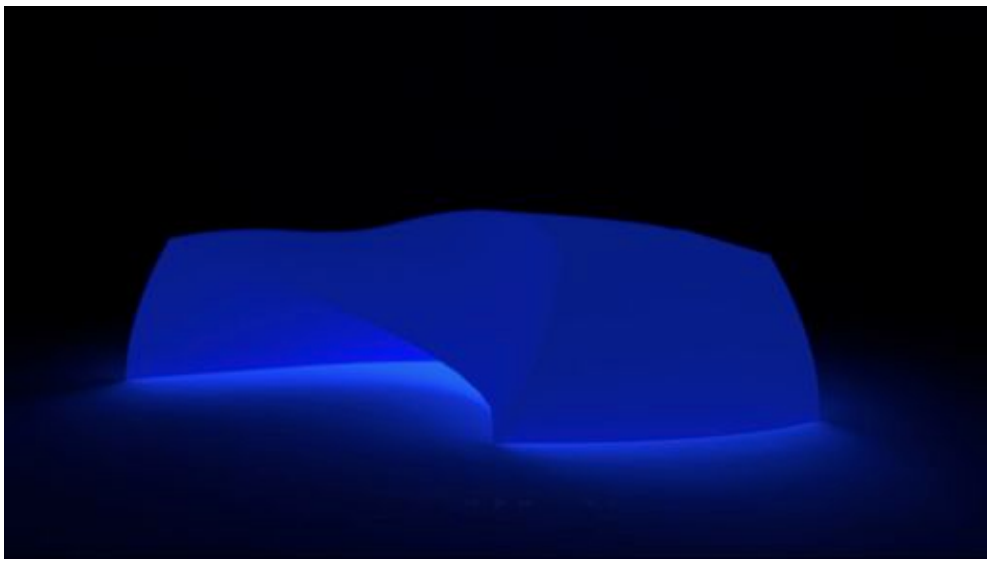

Figure 16. *Grief*

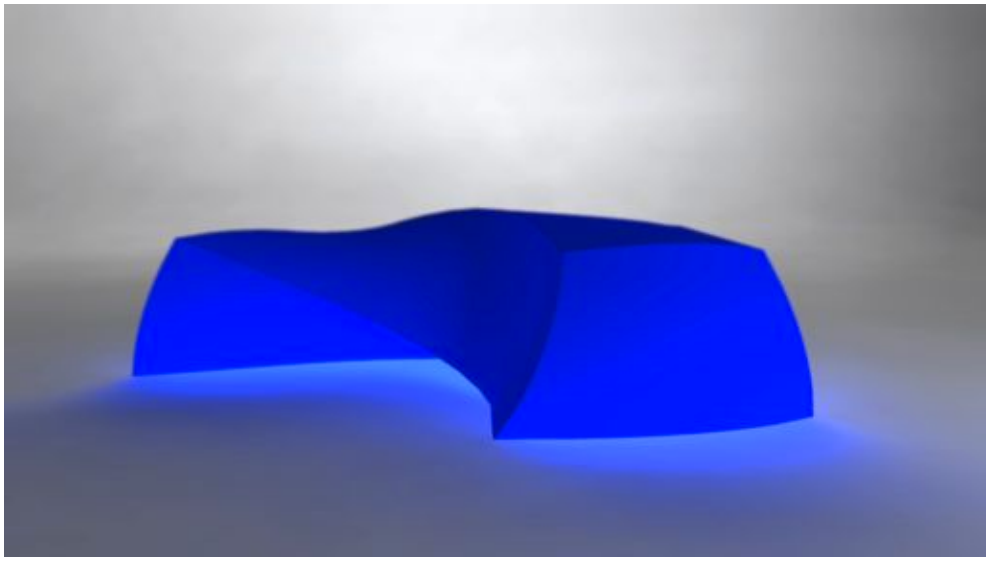

Figure 17. *Grief (white background)*

Camera

Camera placement and movement greatly affects the emotional impact of a scene, contrasting or complementing the character's emotion. A low camera shows the character as more powerful, while a high camera makes them seem insignificant.[22] The distance between the camera and the character correlates to the emotional distance the audience feels to the character. While creating works, I realised that objective camera angles impede the viewer's empathy (Figure 18). This caused me to move the camera closer to the characters (Figure 19) and to consider placement more thoughtfully before starting to animate.

[22] Joseph V. Mascelli, *The five C's of cinematography : motion picture filming techniques*, 1st Silman-James Press ed. (Los Angeles: Silman-James Press, 1998), p35-44.

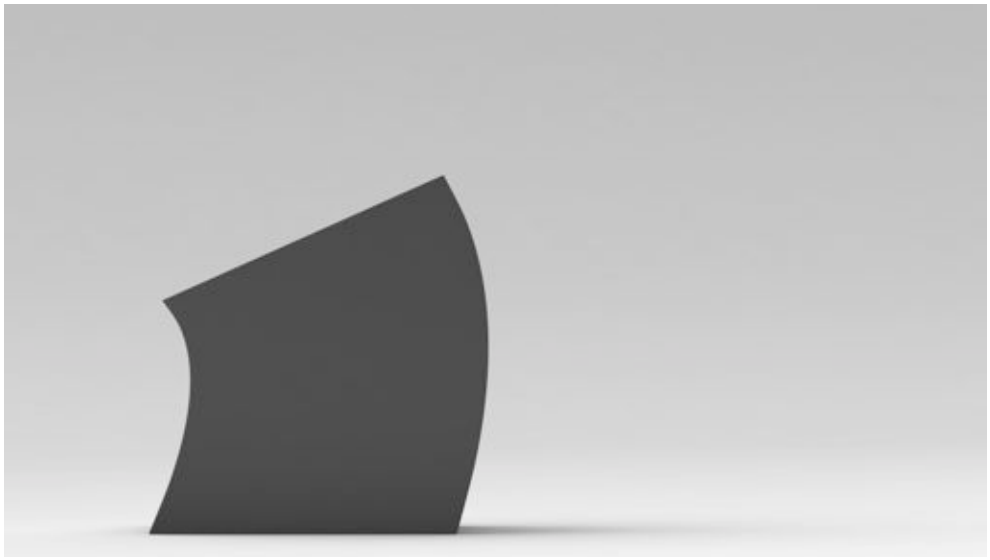

Figure 18. *Example of a flat, objective camera.*

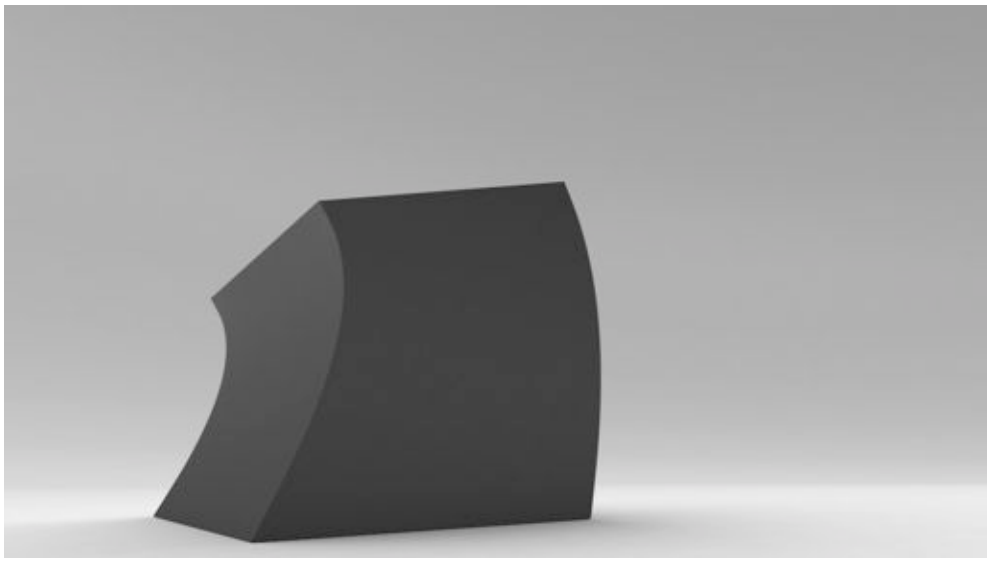

Figure 19. *Example of a more dynamic camera.*

Light

Lighting in 3D images is an approximation of how light works in the real world, but virtual light's behaviour can be adjusted to create unrealistic imagery. For example, indirect light is the light that reflects from one surface onto another. By increasing indirect light the colour of an object has more influence over the colours of surrounding surfaces than it would in the real world. I have used increased indirect light to represent the emotional states of the character affecting the character's surroundings as it radiates from within (Figure 16).

Lighting is critical for creating emotional engagement with any scene. and so in this series I have used lights sparingly to focus the viewer on the movement of the character.

Installation

The works in this series are moments instead of entire narrative arcs. This allows me to show only the specific moments that are necessary, expressing one emotional memory at a time without the need to tie them together. If not handled appropriately, this series could appear to be a series of technical tests rather than a body of artworks. Both the short length of each piece and the technical nature of the medium support this reading. I found that this interpretation is more likely when the pieces are played sequentially on one screen. When the pieces are separated by space as well as by time, they are instead seen as individual works. I am presenting my series over multiple projectors, each playing one at work at a time. I also use the spatial relationship between these projected images to convey a continuum between positive and negative emotions. I am using projectors so that I can show the characters at roughly life size, that is, a shape's height similar to the height of the viewer. This increases the empathetic connection between the viewer and the characters. My presentation of this series enhances the separation of each work to avoid interpretations of technical tests, while the scale and placement furthers the viewer-character connection. This installation brings my animation from a cinematic medium into a fine arts context.

Process

When I started this project I created template rigs for animating different primitives using lattice deformers. I also made a template scene with a general setup for the stage, lighting, camera and rendering. I modified these elements in each work to emphasise the emotion that scene is portraying.

For each piece I planned the smallest number of movements that would convey my intent. Utilising reference footage sourced online, I looked for motion that showed the emotional quality I was looking for. Then I placed the camera, relating the position and movement to the emotional intent. Looking through the camera, I placed lights to suit the emotion. I experimented with different colours for the character, as well as the lights and shadows.

I filmed myself acting out my chosen movements (Figure 20). I kept filming until the motion felt natural and genuine. Then I studied this footage and the online reference frame by frame to find strong poses and timing. I used this as the basis of my animation, exaggerating while sketching the key poses first in simplified human form, then as the geometry.

I began to pose the digital character, working on the keyframes, I then moved on to breakdowns. I started with stepped keys (no interpolation between poses) so I could see if I needed more breakdown poses to define the motion. I worked through all the keys of each control in turn, such as a corner or edge, refining its motion and exaggerating changes of shape. Finally I set the interpolation to splines (where the frames between keys are interpolated smoothly) and worked through again multiple times to control the inbetweens, creating the motion that I intended.

Figure 20. *Reference for Grief*

Analysis of Tests

I produced several tests to refine my animation technique and discover what I am able to show most strongly through animation of geometric primitives.

Chernabog

In this test, I was copying the silhouettes of Vladimir Tytla's[23] Chernabog (Figure 21) from *Fantasia*.[24] The forms of my test (Figure 22) seem mindless and uncontrolled compared to Tytla's. The issues with this test were that I did not put enough thought into simplifying the shapes, the placement of the camera, controlling the transitions between keyframes with breakdown positions, and maintaining a consistent volume. This test showed that I must focus on those areas to achieve a stronger result.

Figure 21. Vladimir Tytla, *Fantasia*

Figure 22. *Chernabog Test*

[23] John Culhane and Walt Disney Productions., *Walt Disney's Fantasia* (New York: H.N. Abrams, 1983), p188.

[24] Wilfred Jackson et al., "Fantasia," (United States: Walt Disney Productions, 1940).

Running Attitudes

These still poses are based on a drawing by Chuck Jones[25] of each of the Looney Tunes characters running. This was a test of whether I would need to add more points to have enough control over the shapes. As previously mentioned I found that an "S" curve reduced the shape's appeal. After this test I found that using a 3x3x3 lattice for controlling my characters was sufficient.

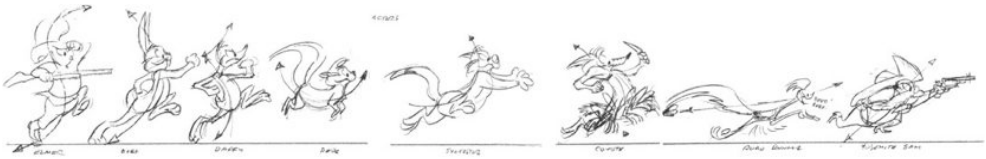

Figure 23. Chuck Jones, *Untitled (*Looney Tunes Running Attitudes)

Figure 24. *Running Attitudes Sketch*

Figure 25. *Running Attitudes Test*

Strut

Here I tested the effectiveness of using simplified shapes to express the same ideas as 2D animation. I used Eric Goldberg's drawings (Figure 26)[26] as a starting point, maintaining his exaggeration as much as possible. This test successfully showed that my character setup was able to convey similar general movement and emotion as a traditional hand drawn character.

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[25] Chuck Jones, *Chuck amuck : the life and times of an animated cartoonist*, 1st ed. (New York: Farrar Straus Giroux, 1989).

[26] Eric Goldberg, *Character animation crash course!* (Los Angeles: Silman-James Press, 2008).

Figure 26. Eric Goldberg, *Attitude Walk* (Keys, Passing Position, Breakdowns)

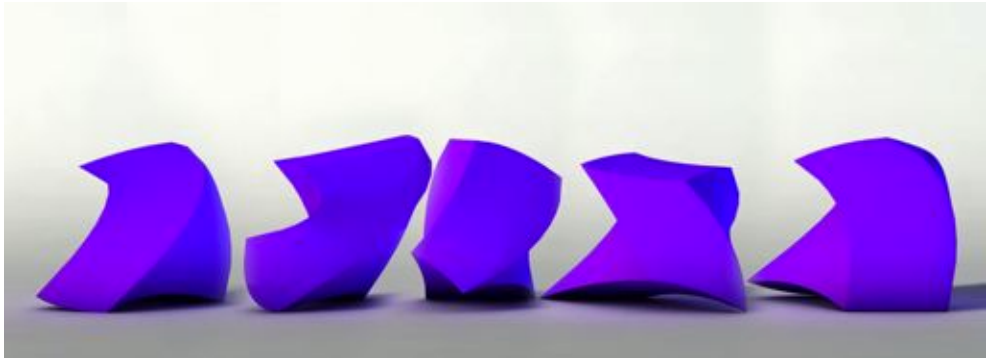
Figure 27. *Strut Test* (Keys, Passing Position, Breakdowns)

Dance

My interest in salsa dancing led me to animate a short dance with two characters to test more complex movements and the interaction between characters. This test revealed an issue with using deformers over conventional rigs, when rotating the cube in a spin. Since the position of each point is the only information stored, to make the form rotate 90 degrees or more I have to manually set all of the points' positions along the course of the rotation. With a skeleton rig the points move relative to each other in a parented relationship, so rotating the hips causes the whole body to rotate. Added controls could help, but would also add complexity to the rig as there would be more to set each time I move the character. I would not need to spin the character during other animations so I decided not to add extra controls.

Impatient Moonwalk

This test was intended to push the limits. An impatient moonwalk was the most difficult thing I could think of to show using my simplified character. While this test was moderately successful, it raised some interesting and unexpected issues. Since

the cube is symmetrical in both axes there is no obvious front of the character. This makes the audience assume that the direction of motion is the front. This is logical, but I did not anticipate it before animating a character moving backwards. When played to an audience it was often perceived as a strange forward walk instead of a moonwalk. In subsequent animation, when backward motion is required I first show the viewer where the front of the character is by moving them forwards first. The other issue raised by this test was the difficulty of showing mixed emotions on such a simple character. As these characters lack a face, I cannot use facial movement to show an inner emotion while the body movement is contradictory. This makes it difficult to have a character that is, for example, angry while skipping. All of the emotion must be shown using the movement of the entire shape. In the example of an angry skip, any skipping motion could be seen as happy, making it difficult to show anger at the same time with such a simple character. It is possible to show these contradictory emotion/action pairings to some degree but not with as much clarity as with normal character models.

Happy Jump

I used a sphere to test how my controls would translate to a different form, and how effectively a sphere would show the movement I needed. For this test, I tried to give physicality and weight to a sphere. I utilised the round form of the sphere by rolling it into view instead of walking. I exaggerated the anticipations and overlap to create a sense of weight.[27] This test was fairly successful but it was harder to show horizontal rotation or subtle movement without any edges.

Affectionate Giraffe

With this test I tried to evoke an empathetic response in the viewer as well as a feeling of contact between two characters. I was experimenting with using animal movement to represent human feelings, so the movement is based on giraffes rubbing their necks against each other affectionately. The start of this test is more successful than the end, where the characters change positions one character obscures the other, so it is harder for the viewer to see what they are doing. The silhouette of the characters must be readable for the audience to see the movement clearly, which I applied to my later work *"Love"*.

[27] See the glossary for definitions.

Analysis of Works

Affection

The first animation is based on a memory of my older brother. We went sailing on the lake with our dad and turned too quickly so the boat flipped. We were scared of going back onto the boat so when my brother decided he would walk back to the boat-ramp I gladly followed. It was a sunny day and we came to a long path along the lakeside made of concrete that burnt our feet. My brother had the great idea to run and then use our soaked life jackets to stand on and cool off. It worked fantastically so I felt affection toward him for helping me get across.

Since this animation has two characters I differentiated them by their running. I animated my brother's character with a more confident and longer stride because he is older and was more self assured. I show the relationship between the two by the interaction between them. This animation is successful at showing the relationship, but less successful then subsequent animations as the situation is so specific that there is less room for the viewer to interpret the story in their own way.

This was also the first time that I used a large camera movement. In this animation the camera motion works because it is so large that it is easily readable.

When I started animating this I created a background scene of the lake and boat, but I realised that the core of the story is the relationship not the setting so I pared it back to a plain background.

Grief

This animation shows me reacting to my first breakup as a teenager. I felt empty and broken as I collapsed to the floor alone in my house and cried.

I used the character as the light source in this animation to show the internal pulsing of this strong emotion.

As mentioned, the original red colour of the character created unwanted associations with Uluru, showing the difficulty of controlling the reading of an abstract work.

I needed to show the negative emotion by moving the character slowly, but this made the piece have a longer duration than others, requiring more time to animate. In future works I tried to cut down on the duration of the pieces while still showing slow movement, spending more time on each frame so I could strengthen each movement.

This piece showed that I could portray negative emotions at least as strongly as positive emotions using these characters and methods.

Pride

This piece shows the contrast between nervousness and then pride that I felt at my graduation ceremony. I focused on creating variation in timing to achieve this contrast, lingering on the preparation before the character steps out onto the stage.

The handshake was particularly difficult to show, as the cube has no hand to shake with. I used one edge of the cube as a forearm, extending it out and shaking it up and down, but since it is attached closer to the rest of the form than an forearm would be I could not make the silhouette as clear.

I wanted the camera to be quite close to the character in this scene but showing the character walking slowly while panning did not work because the background looks the same while it is moving as it does when stationary. I pulled the camera back and carefully adjusted the timing of the camera move so that it is clearer, but it is still harder to tell that the camera is also moving than it would be with a detailed background.

This piece successfully illustrates the feeling of a graduation, but feels too controlled, making it less interesting to watch than the spontaneity in other works.

Awe

In this piece I show the feeling of awe as I stepped out from a train station into the megacity of Tokyo for the first time.Camera movement is useful for showing a character's relationship to their environment. I needed to show the environment surrounding the character as he reacts to its size and majesty. To emphasise this I animated a large sweeping camera movement. When watching it with the finished character animation the camera movement distracted from the character's movement. I made the camera movement more restrained so that it gave a similar feeling but did not distract from the character.

This piece was the first time that I cropped part of the character out of the camera framing — in an effort to retain clarity I had previously shown the full form at all times in each piece. At the end of this piece the character's motion is mainly in the top section, so I wanted to get the viewer as close as possible so they could see slight changes in the form. The camera moves from an establishing shot into a closeup, bringing the audience into the character's thoughts and feelings as they are taking in the environment.

The cylinder has both the physicality of edges and the ethereal qualities of rounded shapes. I used it for this piece because in the situation I felt the size of the location as well as the thought of humanity's achievement. The cylinder also shows the character's relationship to the space, where the landscape surrounds, with the character wanting to look everywhere at once.

This piece showed me the difficulty of making a faceless character looking around interesting. Despite this, the piece conveys the feeling of awe felt in a massive landscape successfully.

Love

Love shows the connection I feel for my partner after we have been apart for weeks, when she walks in the door and I hold her close to me. Showing connection between characters in animation is difficult. There is no physicality so forms move through each other unimpeded like ghosts. Showing contact requires lining up the characters correctly so they look like they are pressing against each other (Figure 28). First I animated the character that would be pushing harder at a given moment, then moved the other to fit into that action.

It was tempting in this piece to use a more defined environment. The orange character originally opened a door and walked through. I realised the core of the scene was not the act of coming through a door, but the meeting of two lovers. I removed the background scene and used a sparse environment instead.

This piece can be read as aggressive because the first contact is fast. I will attempt to remove this possibility by fine tuning the first section of the animation, but there is an urgency that I want to keep so it will be a matter of balancing the two. Despite this issue the piece shows the contact between characters successfully.

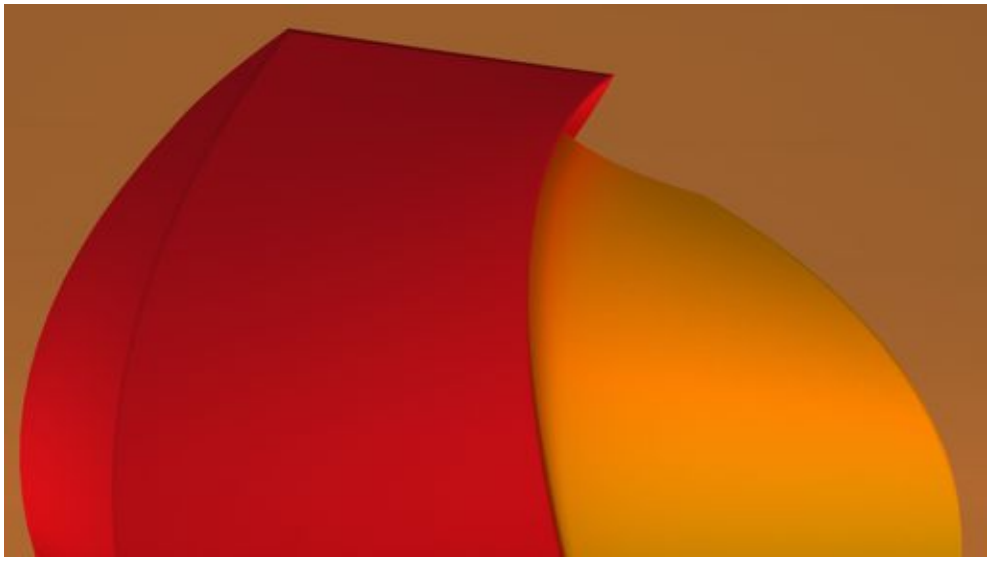

Figure 28. *Love*

Sadness

This piece shows a time when I accidentally angered and upset one of my best friends when we were talking over a chat program online. It made me sad and frustrated that I may have damaged our relationship, so this work shows my memory of being upset while trying to calm down and repair the damage.

For this piece I wanted to bring the audience into a close connection with the character and use more subtle movement to convey the character's emotion. This would normally require a closeup shot of the face. Geometric primitives have nothing resembling a face so this was problematic. I tried a spherical character initially because there was minimal physicality required in this scene: just thought and emotion, but a sphere is hard to read when you can only see the top third. The clearest way to show a pose or movement is through the silhouette. When the viewer can not see all of the form, the silhouette of a sphere has limited change, while a cube has both a more variable silhouette and edges within the silhouette that can show more subtle changes in form.

This moment was chosen both because it was a strong memory and because I do not move broadly in it. This allows me to experiment with more gestural, subtle movement instead of a common action like walking or jumping. On a simplified character model these changes are harder to show because there is no face or hands.

This piece is one of the most successful at both creating an empathetic response and showing how I felt at the time. The subtler animation and the universality of the scene contribute to this success.

Conclusion

This project begun as an exploration of character animation through stripping away as many elements as possible. The core of character animation is creating an illusion of life, emotive characters that can make a viewer empathetic. To achieve this I have created a series of self portraits using pictorially abstracted representation, animating with the principles of character animation.

I have created a series of works that show increasing understanding of character animation. Specifically I have shown how character animation may be applied to pictorially abstracted 3D forms as a tool for self expression.

I have learnt that geometric primitives do not prevent subtle movement and that it is possible to show emotion through a character subtlety by only using their overall form, not just be using facial expressions, limbs, or hand gestures. I have learnt that pictorially abstracted images leave more interpretation for the viewer, and that this can create strong empathy because the shape is seen not as someone else but as themselves. I have learnt the importance of character animation principles in all character animation, especially the creation of clarity and contrast through line of action, timing, exaggeration, silhouette and anticipation.

In the future, I will apply the knowledge and skills gained in this project to subsequent animation works. I am much more likely to use similarly abstracted forms in character animation now that I have learnt their versatility. I would like to explore different uses of these techniques, like creating longer, narrative driven pieces. I would like to investigate creating characters that speak using these same forms, using the body alone to convey speech. There are many further avenues for exploration from which I now have a strong platform to pursue.

Through creating these works I have used traditional animation techniques to explore the emotive capabilities of motion through pictorial abstraction. I have used this technical medium to create artworks that communicate emotively, uniquely deploying them in a gallery installation context that enables the viewer to see them as a series of artworks. I have shown that geometric primitives can be used effectively to create emotive self portraiture in the medium of character animation.

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Glossary

Anthropomorphism	Giving human characteristics to a non human form.
Breakdowns	Poses between keyframes that define the transition between them further.
Frame	An individual image that when played as part of the animation is shown for 1/24th of a second
Geometric Primitives	Basic geometric shapes such as spheres, cubes, toroids, cylinders, pyramids.
Inbetween	Images that form the transition between each keyframes or breakdown.
Interpolation	Constructing new data from surrounding points.
Keyframe	The most important frames, the images that are necessary to define movement
Lattice Deformer (FFD)	A method of controlling a 3D model using a set number of points to influence nearby vertices in the model.
Line of Action	A construction line that runs through the body. All parts of the form support this line to ensure a clear direction to the pose.
Modelling	Creating a three dimensional form using software tools.
Rigging	Adding controls to a 3D model so that it can be animated.
Silhouette	The outline of a form. If the pose is readable in silhouette then it have greater clarity.
Spacing	The movement between two frames.
Spline interpolation	One type of interpolation, using adjacent points to create smooth interpolation, as opposed to linear or stepped interpolation.

The 12 Principles[28]

1	Squash and Stretch	Compression and extension of a form to indicate its elasticity
2	Anticipation	The movement in preparation for another, larger motion. It also draws the viewer's attention.
3	Staging	Presenting an idea clearly. Leading the viewer's eye.
4	Straight Ahead and	A method of animation, creating each drawing sequentially in order. Creates less controlled movement.
	Pose to Pose	A method of animation, creating important poses as keyframes, then later filling in the frames between them.
5	Follow Through / Overlap	Parts of a form that keep moving after the core has stopped. (Hair, Clothing, Fat)
6	Ease in / Ease out Slow in / Slow out	Decelerating into or out of a key pose.
7	Arcs	A curve made by plotting points of motion over time. Found in almost all movements.
8	Secondary Action	Motion of a part of a character that is driven by and is in support of the primary motion.
9	Timing	The speed of a movement.
10	Exaggeration	Highlighting by enlarging one detail over another.
11	Solid Drawing	Constructing images with clear form, weight, dimensionality.
12	Appeal	Pleasing qualities of motion or image that maintain the viewers attention.

[28] Thomas and Johnston, *The illusion of life : Disney animation*: p47-69.

Appendix: Scripts Written to Animate Lattices

Creating a Locator for each point in Lattice

```
import maya.cmds as cmds    # Bring the Maya commands into this script
pointNum = 0        # Declare the variable for which point in the lattice we are looking at currently. Look at point 0 first
n = cmds.ls(type='transform', selection=True )      # Check what is selected and save it as n
print n[0]# Write out the name of what is selected
for i in xrange(0,26):              # Do the following 27 times
            cmds.spaceLocator( p=(cmds.pointPosition( str(n[0]) + '.pt[' + str(pointNum) + ']' ) ) )      # Make a Locator on the selected point
            pointNum = pointNum + 1    # Add to the current point number so that we are looking at the new correct point
```

Swapping locations of lattice points along X axis of cube

```
import maya.cmds as cmds    # Bring the Maya commands into this script

n = cmds.ls(type='transform', selection=True        # Check what is selected and save it as n
print n[0]# Write out the name of what is selected

pointNum = 0        # Declare the variable for which point in the lattice we are looking at currently. Look at point 0 first
for i in xrange(0,9): # Do the following 10 times
            a = cmds.pointPosition( str(n[0]) + '.pt[' + str(pointNum) + ']' )          # First point
            b = cmds.pointPosition( str(n[0]) + '.pt[' + str(pointNum + 2) + ']' )   # Opposite point along X axis
            a, b = b, a # Swap the two variables
            cmds.move( a[0],a[1],a[2], str(n[0]) + '.pt[' + str(pointNum) + ']',
absolute=True )      # Set the first point to its new position
            cmds.move( b[0],b[1],b[2], str(n[0]) + '.pt[' + str(pointNum + 2) + ']',
absolute=True )      # Set the second point to its new position
            pointNum = pointNum + 3    # Add to the current point number so that we are looking at the new correct point
cmds.scale( -1, 1, 1, str(n[0]) + '.pt[0:2][0:2][0:2]' , centerPivot=1)      # Scale -1 along X so that everything is in the right spot
```

Swapping locations of lattice points along local Z axis of cube

```
import maya.cmds as cmds    # Declare the variable for which point in the lattice we are looking at currently. Look at point 0 first

n = cmds.ls(type='transform', selection=True )      # Check what is selected and save it as n
print n[0]# Write out the name of what is selected

pointNum = 0        # Declare the variable for which point in the lattice we are looking at currently. Look at point 0 first
for i in xrange(0,9): # Do the following 10 times
            a = cmds.pointPosition( str(n[0]) + '.pt[' + str(pointNum) + ']' )          # First point
            b = cmds.pointPosition( str(n[0]) + '.pt[' + str(pointNum + 18) + ']' ) # Opposite point along Z axis
            a, b = b, a# Swap the two variables
            cmds.move( a[0],a[1],a[2], str(n[0]) + '.pt[' + str(pointNum) + ']',
absolute=True )      # Set the first point to its new position
            cmds.move( b[0],b[1],b[2], str(n[0]) + '.pt[' + str(pointNum + 18) + ']',
absolute=True )      # Set the second point to its new position
            pointNum = pointNum + 1    # Add to the current point number so that we are looking at the new correct point
cmds.scale( 1, 1, -1, str(n[0]) + '.pt[0:2][0:2][0:2]' , centerPivot=1)      # Scale -1 along X so that everything is in the right spot
```